How eco-design policies adoption is influenced by the board composition

Abstract

Family firms are the most common form of business in the world. Given their nature and increasing number, it is of utmost important to understand their role in the continuous attempts of companies to minimize the environmental threats produced by global warming. Although family firms comprise the larger number of registered firms, the large ones are the ones capable of allocating more resources to generate better eco-friendly results. However, decisions at the top level are not solely made by the family owner but rather by the discussion and agreement of the members of the board of directors. Based on the SEW framework and the upper echelons theory, which explains the decision making behaviour of family firms and the executives tendency towards specific strategies respectively , we try to fill a gap in the literature by providing evidence on how these decisions are made based on the family presence and gender diversity found in the board of directors. To perform this analysis, we observe the likelihood of large US companies to engage in eco-design products policies based on the percentage of women in the board and their association, or lack of, with the founding family. The results show that within these large firms, engagement in eco-design policies are influence by the diversity present in the board; what's more, female directors belonging to the family have a slightly greater effect on these decisions over those that don't belong to the family. This study contributes to the existing literature by shedding light on the effect of board composition in family firms on the dynamics of eco-innovative policies development.

Keywords: Family firms, eco-innovation policies, board of directors, female directors

1. Introduction

Family firms are the most common form of business in the world (Casillas et al., 2007; Parada et al., 2016) and while the decision of the family revolves around keeping a tight and relatively small group, roughly 25% of the top 1000 firms in the US are family owned (Fortune Media IP Limited, 2024). Their survivability and long-term success can be attributed to their levels of innovation (Karmmerlander et al., 2015) and their unique structure which ties closely to their innovation levels compared to non-family enterprises (Berrone et al., 2012). This level discrepancy is explained through the socio-emotional wealth framework.

Nowadays, the global threat of climate change grows at an alarming rate and environmental innovation shows up as an alternative to mitigate its effects (Farza et al., 2022). Studies in the area have expressed the need to focus on environmental innovation studies to face the current crisis (Dangelico and Pujari, 2010; Lin et al., 2014; Peng and Liu, 2016); moreover, the increased attention towards environmental innovation is crucial for the implementation of environmental sustainability (Cancino et al., 2018; Keshminder and del Rio, 2019).

However, who is in charge to shift the direction of innovativeness of a firm to a greener approach? While the owners of such firms establish the path to follow, the board of directors can play a pivotal role in communicating and expressing the needs of better eco-friendly strategies. Several studies have highlighted that corporate board structure influences company growth and sustainable development programs (Farza et al., 2022). Particularly, board independence which allows to stabilize corporate network by reinforcing trust which are valuable intangible assets that have a positive effect on innovation; empirical evidence of such relationship was provided by Lu and Wang (2018).

Not only is board independence a factor that determines its weight on eco-innovation decisions, board composition takes part on it as well; more noticeably, the board's gender diversity. Gender accounts for differences in interpersonal behaviour, in particular, women are associated with behaviours such as compassion, empathy and concern for others as well as their interest in implementing values and ethics in relationships of great importance for the community (Boulouta, 2013). Therefore, it is expected that board gender diversity will have a greater influence in environmental innovation decisions.

Our work attempts to evaluate the implications of board gender diversity in family settings. That is, by evaluating family firms' decisions through the analysis of board composition, we expect to understand the level of influence of the board in the adoption of eco-innovation practices. The results show that, within family firms, the female presence in the board of directors is positive and significantly correlated with the adoption of eco-design policies. What's more, when we evaluate the belonging to the family of these female directors, we observe that while both are positive correlated, the female directors that are part of the family have a stronger influence regarding the adoption of eco-design practices compare to the female independent directors. Finally, we observe an inverted U-shape behaviour regarding the presence of independent female directors while this pattern is not observed when analysing the female directors that are part of the family.

The evidence found in this work contributes to the family firm literature by exploring corporate governance variable that affect decisions that are explained through the lenses of the socio-emotional wealth theory by providing deeper understanding on how the board composition takes part in the decision-making process.

The following sections are divided in the theoretical framework and hypothesis development of this work, the methodology used for the analysis, and the obtained results. Later we discuss the

results and present a conclusion of our work while also providing potential limitations that prevent the generalizing of the findings.

2. Theoretical Framework and Hypothesis Development

Female directors and Eco-innovation pursuit

Eco-innovation, also called green innovation, is a technical improvement or administrative practices for improving environmental performance and competitive advantage of an organization (Huang et al., 2009). Eco-innovation can originate from the power that stakeholders, such as the government (regulatory stakeholders), clients and collaboration partners (market stakeholders) have over the firm. Stakeholders have the ability to improve or damper a firm's performance and reputation if it does not abide by the stakeholders demands of more eco-friendly activities as it has been the trend during recent years.

To this end, the board of directors plays a key role in defining strategies that abide by the stakeholders demands while at the same time improve the firm's performance or entrepreneurial actions and this effect has been greater as years pass (Neely et al., 2020; Bauweraerts et al., 2020). Upper echelons theory explains that, based on their experiences, personalities and values, directors will shift towards strategic decisions that reflect their idiosyncrasies (Hambrick & Mason, 1984). Therefore, understanding the board of directors reasoning, shaped by its composition, will allow us to understand the steps behind adopting strategies favourable for the improved performance of the firm (Zahra et al., 1999) which is achieve through innovation of products and processes (Covin & Slevin, 1991).

Literature suggests that managers lean towards certain strategic decisions based on different characteristics such as specialization, tenure, age and gender; which in turn impact the

organizational outcome (Nielsen, 2010). Authors have also evaluated and found positive relationships between the presence of female executives and different organizational outcomes such as financial leverage, financial performance, corporate cash holdings and innovation performance (KiongTing et al., 2015; Dezsö & Ross, 2012; Doan & Ishkandar-datta, 2019; Chen et al., 2018).

What is more, empirical research has provided evidence regarding a beneficial degree on corporate social responsibility (CSR) when comparing female executives against their male colleagues (Lu et al, 2020). Due to their more salient characteristics such as helpfulness, kindness, thoughtfulness and community-oriented approaches, female executives are more inclined supporting and implementing CSR techniques (Ibrahim & Hanefah, 2016). Not only are their intrinsic characteristics but also societal norms that require them to be affable and kind, for example, while avoiding confrontational behaviour such as harshness and aggression (Cook & Glass, 2018).

These characteristics found in female executives lead to an extensive study which determined that there is a favourable correlation between CSR performance and female CEOs (Hyun et al., 2022; Velte, 2016). Female executives, thanks to their emotional and altruistic behaviour, focus more of their decision making with a stakeholder-oriented approach (Sun et al., 2021) which leads them to address environmental requests and decrease environmental damage (Liao et al., 2018). This stakeholder-oriented approach allows the firm to enhance its public image and social relationships by adopting more social than performance-oriented strategies which, as previously studied, provides an understanding on the positive relationship between female presence on the board of director and proactive environmental strategies such as eco-design policies or reduction of greenhouse gas emissions (Fritz and Knippenberg, 2017; Konadu et al., 2022).

The evidence in the literature has established a strong positive relationship between female executives and adoption of eco-innovation strategies. We aim to prove that the same relationship is present within our data, and to that end we elaborate the following hypothesis:

Hypothesis 1: Female board directors influence positively the likelihood of adoption eco-design policies.

Family Firms idiosyncrasies

Firm's reputation is a core element that family firms both try to improve and protect based on the understanding of these firms through the Socioemotional wealth (SEW) framework. As family members' identity is inextricably tied to the organization (Sharma and Sharma, 2011; Brigham et al., 2014; Berrone et al., 2012), it is expected that engagement in eco-innovation becomes a major focus for these types of firms.

The Socioemotional wealth framework suggests that a family firm's main objective is the pursue of affective needs' satisfaction, such as identity, the ability to exercise family influence, the perpetuation of family dynasty, and family's control exerted on them through the owners of the firm (Miller and Le Breton-Miller, 2014; Gómez-Mejía et al., 2007; Debicki et al, 2017). In pursuing these affective needs, family control and influence allow those in leadership positions to shift the strategic direction to achieve the family goals while showing commitment to their executive responsibilities and loyalty to the family (Debicki et al., 2017). Their formal capacity to exercise control and interest in monitoring that emanates from their controlling ownership shares puts family firms in positions where they focus their strategies into abiding by the stakeholders demands (Gedailovic et al., 2004). The socio-emotional endowments generated from the long relationship between family and the firm (Berrone et al., 2010; Gomez-Mejia et al., 2007) allows

for the coexistence of both financial goals with non-financial goals, particularly the preservation of the family influence and the long-established ties with both internal and external stakeholders (Cruz et al., 2010; Zellweger et al., 2012); this facilitates the transition and adoption of family firms into more eco-innovative policies and strategies.

Adding both lines of thoughts regarding family ownership, through the socioemotional wealth framework, and female executive presence, through upper echelons theory, we can address an overlooked gap in the literature. Different authors provide evidence of the positive relationship of these two aspects with eco-innovation performance; however, this work contributes to the past literature by analysing the difference in contribution that a female executive will provide to the adoption of eco-innovation strategies by analysing separately those that belong to the family and those that are independent directors. Therefore, we establish the following hypothesis:

Hypothesis 2: Female board directors that belong to the family have a greater influence in the likelihood of a firm adopting eco-design policies than independent female directors.

Additionally, literature has provided evidence that female executive needs to have a large enough representation on boards to be effective in developing green initiatives (García-Meca, 2022). Therefore, one could assume that a better female representation in the board will lead to a greater likelihood of proposing adoption of eco-innovative strategies and policies. This work, however, will test whether this effectiveness of developing green initiative will suffer when we differentiate between family-belonging female directors and independent female directors, believing that in a setting where there are more independent female directors the likelihood of proposing and implementing eco-innovative strategies will diminish. Therefore, we establish the following hypothesis:

Hypothesis 3: There's an inverted U-shaped relationship regarding female presence in the board and eco-design policies adoption

3. Methodology

Sample and Data Collection

The information for our empirical study comes from the fillings provided by the firms to the U.S. Securities and Exchange Commission. This entity requires publicly trading firms to fill forms detailing relevant information for the interested parties. For the purpose of this study we gathered corporate governance variables obtained from the definitive proxy statements submitted to the online platform.

The aim of this study is to analyse how board composition in family firms influence the adoption of eco-design policies on American companies that belong to the annual list of the Fortune 1000 (FT1000). We used data comprising the period 2018 – 2022 and extracted the information regarding the shares that are owned by members of the founder's family and non-family members. This analysis provided us with the information to state that out of the 1000 firms on the list, 246 are categorized as family firms as the number of shares are owned by members of the family. Additionally, the analysis has been performed yearly so that a family firm could become a non-family firm, and vice versa, to which each year has a different amount of family firms to be analysed.

Following the differentiation of firm ownership, we also extracted information pertaining to the board, such as number of board members, independent board members, average board tenure, number of female members, with the latter being differentiated in female directors that belong to the family and those that are independent directors. Finally, we complemented this information

with that obtained from the database Refinitiv Eikon, to acquire information regarding eco-innovation strategies and decisions per each of these firms.

Dependent Variable

Eco-design policy. This variable, obtained from Refinitiv Eikon, allows us to verify whether a firm has incorporated an eco-design policy for the products generated by the firm. As such, this variable is a binary variable that takes the value of one (1) if the firm has an eco-design policy and (0) otherwise.

Independent Variables

Female Directors. This variable contains the number of women that are part of the board of directors. To better observe the effect that they have as board members, we used the relative term. That is, the percentage of women that are present in the board.

Family Female Directors. This variable is a more detailed view of the female directors in the board. Information regarding relationships between board members is publicly displayed in the proxy statements which allowed us to define which female directors are part of the family. Similar to the previous variable, the relative term is used.

Independent Female Directors. Similarly, the proxy statements state the independence of each of the members of the board. This allows us to identify which female directors are independent as per the NSYE or NASDAQ regulations. The relative term is used.

Control Variables

We control for both firm characteristics and general corporate governance variables. In this regard, we consider the following variables as control variables in the relationship between female directors and eco-design policy engagement:

Firm Age. Represents the age of the firm from the date of establishment of the firm up to year range of the analysis.

Firm Size. This variable captures the number of employees present in the firm. To normalize this value, despite all firms being large American firms (more than 250 employees), we used the logarithm of the total number of staff.

Environmental Score. This variable captures in a scale from 0 – 100 the environmental score that has been attributed to the firm based on eco-innovative friendliness in products and processes.

Average Board Tenure. Variable that captures the average number of years that the directors have been part of the board.

Non-executive Board Members and *Independent Board Members.* These variables capture the percentage of board members that are non-executive and board members that are independent.

In addition, we also considered variables such as the presence of CEO duality, percentage of independent board members, percentage of non-executive board members, average age of female board members and average years of service as female director.

Estimation Methods

The nature of the dependent variable estimates the odds of implementing an eco-design policy, in addition to following a cumulative normal distribution, leads to the use of a probit model in our

panel data analysis. We start by first analysing the main effect of the presence of female directors in the board and how it affects the likelihood of implementing eco-design policies. Later we dive deeper into the characteristics of these female directors and differentiate them between family and independent directors to observe their effect on the policy implementation. Finally, we also test for the presence of a U-shape or inverted U-shape tendency both in general and per each group of female directors.

4. Results

The descriptive statistics and correlation for the variables used in this work are reported in Table 1. Results show that there are not high correlations between the variables used in this model, with correlations ranging from 0.03 to 0.5 in both the positive and negative spectrum. There are positive correlations between percentage of independent board members and percentage of women in the board of directors. That is, as the literature suggests, board independency and gender diversity are positively correlated with eco-innovation policies promotion. So far, data in this study's sample reflects the findings present in the literature.

--- Insert Table 1 around here ---

An initial glance to the correlation of the variables seems to indicate that gender diversity and board independency is positively correlated with eco-innovation policies promotion in firms belonging to the Fortune 1000 ranking. However, for more robust results and to properly evaluate the effect of members belonging to the family and those that are independent we proceed to test a logit model. Model 1 evaluates the main effect of board independency and gender diversity in the promotion of eco-innovative policies. Model 2 evaluates the individual effect of female directors that belong to the family and female directors that are independent. Finally, Model 3 evaluates

whether a larger representation of both female directors is beneficial or detrimental to eco-innovation policies promotion. Table 2 summarizes the results of these three models.

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The results from the regression models provide enough evidence to support Hypothesis 1 as there is a positive and significant relationship between female directors and eco-innovation policies promotion. That is, the larger the female representation on the board, the higher the likelihood that a large family firm will adopt eco-innovative policies in addition to their pursuit for socioemotional needs satisfaction. The results of this model go in line with those obtained by Lestari & Soewarno (2024), Javed et al. (2023) and Bauweraerts et al. (2020) as we also find a positive relationship between female representation and eco-innovation promotion. On the other hand, we observe that while the coefficient related to board independence is positively correlated, it is not significant thus stating that board independence in family firms does not have a significant influence compared to board gender diversity.

Hypothesis 2 evaluates the relationship between female directors and eco-innovation promotion while evaluating their ties to the founding family. Results show that both independent female directors and female directors that belong to the family have a positive relationship with eco-innovation promotion; however, we observe a greater effect from female directors that belong to the family, therefore fully supporting our second hypothesis. These results go in line with those of Tran & Nguyen (2022) as we observe a positive effect from female presence in the board. An important observation from this second model is the positive and significant effect of independent female directors. While the first model failed to provide evidence for significant effect of board independence, on the second model we see these results reflected on the presence of female independent director. This seemingly contradictory finding could be due to the percentage of

female representation on the board and to this end, Figure 1 provides evidence of the average percentage of female representation on the board throughout the evaluated years. We observe that from 2018 to 2022 female representation was 15%, 18%, 20%, 23% and 25% respectively, which could help explain the discrepancies of the main effect of board independence and the effect of female independent directors.

--- Insert Figure 1 around here ---

Finally, Model 3 evaluates the effect of larger female representation. The results of this model indicate that there is an increasing effect of female directors that belong to the family but a negative effect of female independent directors. That is, while authors have pointed out that larger female representation helps a better promotion of eco-innovative policies (García-Meca et al., 2023) the results of the third model indicates that this is true to an extent for female independent directors. The reason why we believe that the inverted U-shape is present in the female independent directors and not in the female directors that belong to the family is because of the Socioemotional wealth framework. While larger independent representation is correlated to better firm eco-innovative performance, at some point female independent directors will shift their interest away from these policies. This could be explained through agency theory and socioemotional wealth, while the family tries to preserve their reputation and relationship with the majority of stakeholders, the board of directors could pursue their own interests thus causing the discrepancy at a higher number of female representations in the independent director side. On the other hand, this inverted U-shape is not present within female directors that belong to the family, and this phenomenon could be explained as belonging to the family, they will align their interests with the controlling family and therefore, push for eco-innovative policies promotion to increase the socioemotional wealth of the firm.

Lastly, to test for multicollinearity, we obtain the VIF statistics of the model. The Variance Inflation Factors take a value lower than ten. These values reassure the fact that there are not multicollinearity issues among the variables used in the model since authors emphasize a rule of thumb for a VIF value higher than 10 as evidence of severe multicollinearity (Shieh, 2010; Lieberman et al., 2014).

5. Conclusion and Discussion

Board composition is one of the many determinants to understand how firms adopt strategies based on the goals they pursue, and it is for this reason that it is a hot topic in the current literature. In this paper we have tried to deepen our understanding about the composition itself and how it reflects in the strategic choices that family firms make to improve their overall performance while maintaining, or also increasing, their socioemotional wealth. We have shown that, in general, female presence in the board correlates positively with the promotion of eco-design policies as the findings present in the literature imply (Lestari & Soewarno, 2024; Javed et al., 2023 and Bauweraerts et al., 2020). What's more, we analyse the differences between female directors that are members the board of directors of the family firms that are, at the time of writing this article, in the Fortune 1000 ranking; stating the difference between independent female directors and female directors that belong to the founding family. It is through this analysis that the results provide us with evidence to state that female directors that belong to the founding family on average have a greater effect when it comes to eco-design policies promotions than the independent female directors.

Additionally, following the literature regarding a critical mass required of gender diversity in the board of directors to make a significant difference in the shifting of strategies adopted (García-Meca et al., 2023), we found that a larger number of female directors that belong to the founding

family keeps the positive effect of the first batch of results; however, a larger number of independent female directors seem to cause a conflict between the firm's goals and the director's goals as it presents an inverted U-shape pattern; that is, as the number of independent female directors increase, the likelihood of promotion eco-design policies diminishes.

Therefore, the findings of this work suggest that the presence of female directors in the board makes a significant impact on eco-design policies promotion and it lines up with findings in the upper echelon theory literature (Lestari & Soewarno, 2024). First, we found that board gender diversity has a positive effect on eco-design policies promotion, fully supporting hypothesis 1. The interpretation of this can be found in the upper echelon theory literature where it explains that the tendency of directors supporting certain strategies is based on their individual characteristics, being gender one of them (Hambrick & Mason, 1984). Specifically, given their kinder nature, female directors are more likely to pursue and promote strategies that will have beneficial effect on stakeholders with greater needs, policies that support an improvement of wellbeing for both the society as a whole or a certain group of individuals; we see this variation on female director representation in the board of directors in Figure 1 which helps explain why the proposed model supports our first hypothesis. The results of this work contribute to the upper echelon theory literature.

Second, we prove that there is a difference between independent female directors and female directors that belong to the family. The results of the model show that while both of them have positive correlations with eco-design policies promotion, the female directors that belong to the founding family have a slightly larger effect than the independent female directors. This difference can be explained through the socioemotional wealth theory which states that members of the family will make their strategic decisions such that their socioemotional wealth increases or, in the

worst-case scenario, remains the same even if it contradicts financial performance. As the subject of study is the promotion of eco-design policies, it is important to note that the implementation of such strategies will improve firm's reputation and strengthen already established bonds with both external and internal stakeholders. Therefore, it is expected that family members will support these strategies as it will maximize their socioemotional wealth. These results fully support our second hypothesis which evaluates a difference between independent female directors and those that belong to the family. What's more, we contribute to the family firm literature not only providing further evidence of a positive correlation between family firms and eco-innovation strategies but also findings that evaluate the relationship between board composition and family ties with eco-design policies promotion.

Third, literature suggests that for gender diversity in the board of directors to have a significant effect, relevant presence is necessary (García-Meca et al., 2023). We test this by analysing the quadratic increment of female directors in the board while maintaining the difference between those that are independent and those that are not. The results of this study partially support hypothesis 3 as only the female directors that belong to the family retain their positive correlation with the promotion of eco-design policies, while the independent female directors shifted their tendency thus creating an inverted U-shape relationship. Our findings partially contradict those of García-Meca et al. (2023) as we partially fail to provide evidence that a larger presence will retain its significant effect; this effect is only observed in one of the two subsamples that we evaluated. While a larger female presence in the board will significantly impact the promotion of eco-design policies, this effect is only observable in the sub sample of female directors that are part of the founding family.

Finally, the results of this study provide important practical contributions. First, the effect of gender diversity will promote the adoption of more eco-innovative practices, especially if this presence is part of the founding family. While there is a small difference between independent directors and family members, we can't rule them out as their presence provides a positive influence. This is especially important for investment as the decision of funding a firm that is more likely to pursue eco-innovative goals is easier to make based on the composition and election of members of the board. However, one should be careful on the degree of diversity present on the board on the independent director group as goals might start misaligning when a certain threshold is met. Second, as per the socioemotional wealth theory, presence of the family in the board of directors will shift the decision making towards the one that maximizes the attainability of social needs that the family has; just as the previous case, investors can decide to support firms that tries to balance maximization stakeholder satisfaction and financial goals or purely focus on firm performance; based on the regulations that will be enforced in the future due to the increasing importance of environmental protection, external stakeholders can make a more informed decision.

6. Limitations

This study is however not without limitations. The data used is primarily focused on larger firms that belong to the Fortune 1000 ranking. And while they have a larger impact when deciding to adopt eco-innovation practices and are the larger focus of different studies, we can't control for cultural differences. To generalize the findings a larger-scale analysis is needed to account for these cultural differences, investment settings and factors that can affect decision making within the board of directors. Additionally, to build a more sophisticated model, authors could take into account the number of shares that either belong to the family or analyse individual possession of shares, this is not only an indicator of the power that a board member has but also can explain through upper echelon theory how and why are they supporting specific decisions that shift the direction of the firm.

Another important limitation of our study is that we cannot directly consider the complete the background of the involved directors. What we do is to show that gender diversity and family belonging influences the promotion of eco-design policies. The inclusion of measure such as years of experience in certain type of industries can also interact with the superficial variables that we account for. As different sectors have a different number of stakeholders that act as regulators, also the degree of which they make stricter demands, we open the door for future research in which it would be very interesting to see the effect of the different background variables that could be considered based on the resume of female directors, (stronger ties with the family firm, stronger inclination to work towards societies) which includes the different sectors where they worked throughout their respective careers.

The objective of this paper was to find out how differences in gender and independence affect the likelihood of green policies promotion, focusing on female directors. A future line of research

could delve into this relationship by differentiating by industries and the effect that regulators stakeholders have regarding the adoption and promotion of eco-innovative strategies. This information would not only be useful to find out which companies adhere more to the change that society demands regarding environment protection, but it could allow a more detailed analysis of the effect of board composition on the adoption of such strategies.

Finally, our study is limited by the use of a dichotomous variable which captures whether the company promotes eco-design policies. As we have already pointed out, having these policies promoted helped us understand the outcome of the board's decision regarding the eco-performance of the firm. In addition, we could extend the same analysis to different variables that capture eco-innovation such as their performance or the planned and executed eco-innovative projects, which could also provide interesting findings.

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Table 1. Correlation Table and Descriptive Variables

Number of Observations: 721

	Mean	SD	1	2	3	4	5	6
1. Eco-design products Policy	0.132	0.339	1.000					
2. Environmental Management Team	0.511	0.499	0.207***	1.000				
3. Environmental Score	29.891	32.168	0.333***	0.346***	1.000			
4. Firm Age	66.549	47.975	0.055***	0.154***	0.196***	1.000		
5. Log Number of Employees	9.512	1.362	0.136***	0.242***	0.233***	0.186***	1.000	
6. Average Board Tenure	8.645	3.792	0.015	-0.063***	0.014	0.053***	-0.007	1.000
7. Non-Executive Board Members	84.679	8.403	0.049***	0.214***	0.133***	0.201***	0.174***	-0.175***
8. Independent Board Members	81.614	12.359	0.062***	0.241***	0.144***	0.154***	0.151***	-0.115***
9. CEO-Chair Duality	0.597	0.491	0.034**	0.023	0.060***	0.091***	0.111***	0.296***
10. CSR Committee	0.604	0.489	0.166***	0.504***	0.323***	0.148***	0.219***	-0.095***
11. Percentage of Women in the Board	20.591	12.562	0.141***	0.168***	0.200***	0.075**	0.265***	0.002

Table 1. Correlation Table and Descriptive Variables (contd.)

	6	7	8	9	10	11
6. Average Board Tenure	1.000					
7. Non-Executive Board Members	-0.175***	1.000				
8. Independent Board Members	-0.115***	0.594***	1.000			
9. CEO-Chair Duality	0.296***	-0.006	-0.032**	1.000		
10. CSR Committee	-0.095***	0.244***	0.254***	-0.037**	1.000	
11. Percentage of Women in the Board	0.002	0.284***	0.248***	0.022	0.222***	1.000

Table 2. Regression Results

Variable	Model 1	Model 2	Model 3
Environmental Management Team	2.462* (1.275)	1.667 (1.447)	2.691** (1.329)
Environmental Score	0.133*** (0.026)	0.135*** (0.026)	0.146*** (0.022)
Firm Age	-0.046*** (0.016)	-0.037** (0.017)	-0.041*** (0.016)
Log Number of Employees	-1.197*** (0.457)	-0.902 (0.647)	-0.887** (0.361)
Average Board Tenure	0.753*** (0.189)	0.569*** (0.178)	0.553*** (0.119)
Non-Executive Board Members	-0.009 (0.063)	-0.019 (0.072)	-0.029 (0.071)
Independent Board Members	0.024 (0.043)	-0.003 (0.068)	0.039 (0.045)
CEO-Chair Duality	-0.811 (1.046)	0.869 (1.596)	2.409* (1.290)
CSR Committee	2.116* (1.244)	1.841* (1.069)	2.449** (1.070)
Percentage of Women in the Board	0.105*** (0.038)		
Percentage of Women in the Board (Family Member)		0.256** (0.130)	0.371*** (0.090)
Percentage of Women in the Board (Independent Director)		0.149** (0.058)	0.437** (0.188)
Squared Percentage of Women in the Board (Independent Director)			-0.006* (0.004)
Squared Percentage of Women in the Board (Family Member)			0.138* (0.022)
Average Female Director's Age		-0.011 (0.123)	-0.043 (0.091)
Average Female Director's Appointed Years		0.159 (0.113)	0.288** (0.114)
Constant	-14.444*** (5.039)	-14.464 (9.542)	-20.683*** (7.343)
Wald Chi 2	49.78	41.77	124.66
Prob > Chi 2	0.000	0.000	0.000
Number of Observations	721	649	649
Number of Groups	165	161	161

Figure 1. Female presence in the board 2018-2022