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Corporate Governance and Sustainability: The role of the board of directors

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To my dearest people,

who inspired, mentored, and supported me during this journey:

Lorenzo

My parents

My sisters

My friends of Percorsi Assisi

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Abstract (English)

The contemporary socio-economic context, marked by conflicts, climate change, inequalities, etc., underscores the importance of environmental and social issues more than ever. In response to these challenges, companies are urged to adopt a sustainability-focused approach that pairs the objective of profit maximization with societal value creation. Over the past decades, academic interest in corporate sustainability has grown exponentially, and a large strand of management literature has focused on the analysis of drivers pushing companies towards more sustainable practices and increased sustainability performance. Among these factors, the board of directors (BoD) plays a prominent role. Indeed, given its threefold function of strategic planning, control, and networking, the BoD contributes to, and is responsible for, corporate performance. While many studies have analyzed the relationship between the BoD and corporate sustainability, the results have been inconclusive, leaving room for further investigation.

This thesis, consisting of three articles, contributes to this ongoing discussion by examining the relationship between the BoD and sustainability from various perspectives. First, aligning with the emerging literature on corporate purpose, the thesis emphasizes the need for a purpose that extends beyond mere profit maximization to guide the company towards a sustainable transition, highlighting the critical role of the BoD in this regard. Accordingly, the first article delves into the relationship between the BoD characteristics and the adoption of a social purpose.

Second, the thesis aims to contribute to the debate on the association between BoD and sustainability performance. Specifically, the second article investigates an under-explored BoD characteristic, namely the board sustainability-related experience, and examines the boundary

conditions that permit it to drive enhanced sustainability performance, highlighting the contingency effect of the BoD age.

Finally, the thesis explores corporate sustainability as a mechanism that can explain the link between board characteristics and financial performance. In this context, the third article examines interlocking directorates as networking sources for the focal firm and analyzes their impact on corporate financial performance, showing that corporate sustainability mediates this relationship.

Abstract (Italian)

Il contesto economico-sociale contemporaneo, caratterizzato da conflitti, cambiamento climatico, disuguaglianze, ecc., pone più che mai l'accento sull'importanza delle tematiche ambientali e sociali. Le aziende sono chiamate a rispondere a tali sfide, operando in un'ottica sostenibile che affianchi all'obiettivo di massimizzazione del profitto quello di creazione di valore per la società. Negli ultimi decenni l'attenzione accademica sul tema della sostenibilità aziendale è cresciuta esponenzialmente e un ampio filone della letteratura manageriale si è concentrato sull'analisi dei drivers che spingono le aziende ad essere più sostenibili. Tra questi, il consiglio di amministrazione (CdA) riveste un ruolo di prim'ordine. Infatti, data la sua triplice funzione, strategica, di controllo e di networking, il CdA contribuisce (ai) ed è responsabile dei risultati aziendale. Sebbene molti studi abbiano analizzato la relazione tra CdA e performance aziendali, focalizzandosi in particolare sulle caratteristiche del consiglio in termini di composizione e struttura, i risultati sono inconcludenti e lasciano il dibattito aperto.

Questa tesi, costituita da tre articoli, contribuisce a tale dibattito analizzando la relazione tra CdA e sostenibilità da varie prospettive. In primo luogo, in linea con la letteratura emergente sullo corporate purpose, la tesi si focalizza sull'importanza di definire uno scopo che vada al di là della sola massimizzazione del profitto per guidare l'azienda verso una reale transizione sostenibile, evidenziando il ruolo chiave del CdA in tal senso. Pertanto, nel primo articolo si analizza la relazione tra le caratteristiche del CdA e l'adozione di uno scopo sociale.

In secondo luogo, la tesi intende contribuire al dibattito accademico sulla relazione tra CdA e performance di sostenibilità. In particolare, nel secondo articolo si esplora una caratteristica del CdA poco esaminata in letteratura, ossia l'esperienza in materia di sostenibilità degli

amministratori, e si esaminano le condizioni affinché tale esperienza conduca ad una migliore performance di sostenibilità, evidenziando l'effetto moderatore dell'età del CdA.

Infine, la tesi esplora la sostenibilità aziendale come meccanismo in grado di spiegare la relazione tra le caratteristiche del CdA e la performance finanziaria. A tal fine, il terzo articolo esamina gli interlocking directorates quali fonti di networking per l'azienda e analizza il loro impatto sulla performance finanziaria, mostrando che la sostenibilità aziendale svolga un ruolo di mediatore in tale relazione.

Introduction

Social and environmental issues are currently a top and unquestionable priority in all fields, as stressed by numerous documents, including the United Nations 2030 Framework for Sustainable Development, Pope Francis' encyclical *Laudato Si'*, the Paris Agreement on Climate Change, and the Addis Ababa Action Agenda of the Third International Conference on Finance for Development. Given their substantial role in the social contexts in which they operate, companies must take the lead in supporting practices with considerably positive social and environmental consequences (Franco, 2021; Harrison et al., 2010; Mio et al., 2020). To accomplish this aim, companies must operate with an ethos that goes beyond the pursuit of profit, incorporating a pro-social corporate purpose (Henderson, 2021; Mayer, 2021; Morrison & Mota, 2023).

A pivotal moment in this paradigm shift occurred with Larry Fink's renowned 2018 Letter to CEOs (Larry Fink, Letter to CEOs 2018), highlighting that the most significant global capital sources increasingly prioritize social purpose. Thus, this shift towards a pro-social commitment of companies is no longer solely the concern of international organizations, third-sector members, or environmental activists. In his open letter, Fink underscored the centrality of corporate purpose, stating:

> "[Purpose] is a company's fundamental reason for being – what it does every day to create value for its stakeholders. Purpose is not the sole pursuit of profits but the animating force for achieving them.
>
> Profits are in no way inconsistent with purpose – in fact, profits and purpose are inextricably linked. Profits are essential if a company is to effectively serve all of its

> stakeholders over time – not only shareholders, but also employees, customers, and communities." (Larry Fink, Letter to CEOs 2019)

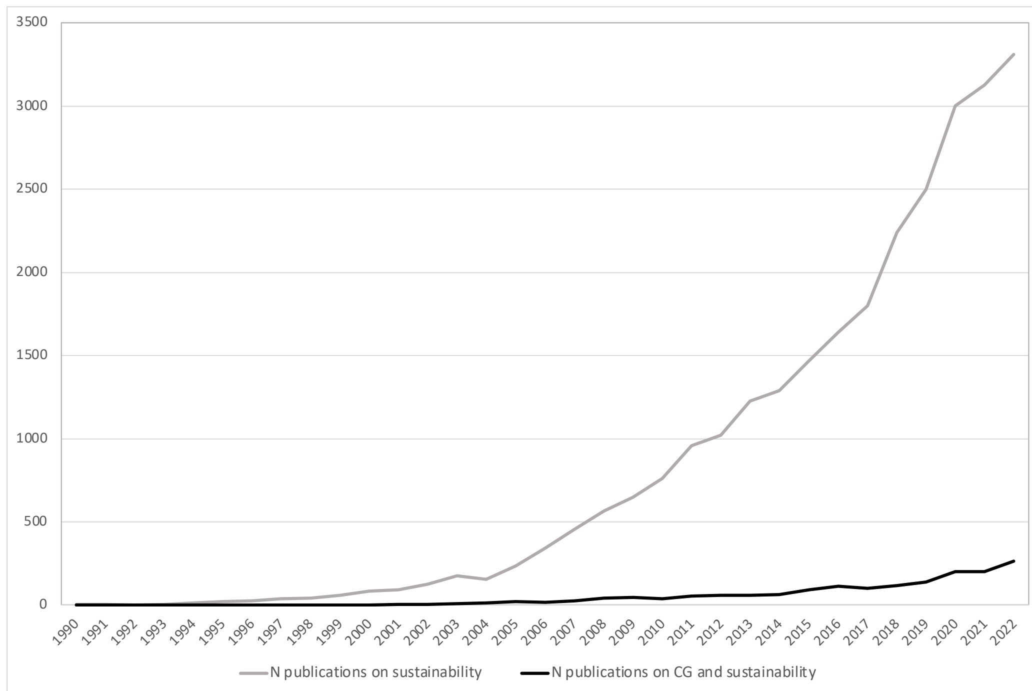
According to Fink, pursuing a social purpose is not inconsistent with generating profits, as sustainability is a cornerstone for maintaining market competitiveness. Indeed, as shown by the World Economic Forum's Davos Agenda 2021, all major economic actors express a strong commitment to sustainability. In response to this shift in focus, companies have begun to display increased transparency, with sustainability reports growing increasingly popular. A cursory look at company websites suggests that every company appears deeply concerned about the environment, its employees, and social issues. However, this strategy might only be symbolic (Nadeem, 2021), lacking a genuine commitment to contribute positively to society.

Many companies engage in greenwashing, prioritizing highly visible corporate social responsibility (CSR) initiatives and symbolic communication over intangible yet significant actions (Walker & Wan, 2012; Wu et al., 2020). To effectively address the sustainability challenge, a strategy that transcends merely symbolic greenwashing tactics and upholds social and environmental impact through substantial sustainable engagement is required. In order for sustainability to be more than just a marketing strategy, it needs to be deeply integrated into the company's purpose and embedded within its business models and corporate plans (Battilana et al., 2022). In other words, being really sustainable requires that sustainability should not be a standalone objective separate from profit but rather a consistent operational principle guiding the company towards improved sustainability performance.

Corporate sustainability has become a focal point in academic managerial debates since the 1990s and is now recognized as one of the most pressing issues in contemporary research. The following graph illustrates the dramatic increase in emphasis on corporate sustainability, showing

that this emphasis has notably surged following the 2008 financial crisis and associated scandals revealing unethical corporate governance practices, with the Lehman Brothers case being a prominent example (Zattoni, 2020). As a result, there has been heightened concern about corporate governance structures and their potential influence on company behavior (Ben-Amar et al., 2017; Walls et al., 2012).

N. of papers published per year on the topic of corporate sustainability



Source: Author's elaboration from Scopus data[1]

Over the last decades, the relationship between corporate governance (CG) and sustainability has emerged as a critical topic in academic debates (Agovino et al., 2021; Aguilera et al., 2021; De Masi et al., 2021; Karpoff, 2021; Konadu et al., 2021; Liao et al., 2021; Naciti et al., 2022), and the number of management publications examining the CG-sustainability relationship has more

[1] Data are collected from Scopus as of 25th January 2023.

than quadrupled, rising from 40 in 2008 to 262 in 2022, as illustrated by the black line in the graph above.

According to Elkington, "corporate governance is fundamentally about such questions as what business is for—and in whose interests companies should be run, and how" (2006, p. 522). In line with this definition, CG is crucial for defining corporate purpose and steering it towards a sustainable transition. This involves balancing profit maximization with the creation of environmental and social value.

Among CG mechanisms, the board of directors (hereafter board) can be considered the "prince" as it holds decision-making power, defines the purpose of the company, and is responsible for its actions. Due to the board's importance, its role has been widely studied by previous literature, which highlighted three primary duties of the board (Hillman & Dalziel, 2003; Huse, 2005; Johnson et al., 1996; Minichilli et al., 2009): (1) strategic or service role, which refers to the board's involvement in strategy by actively contributing to the decision-making process; (2) control or monitoring role, related to the safeguarding of shareholder and stakeholder interests by supervising management actions; (3) resource dependency or networking role, which refers to the directors' ability to establish and maintain relationships with the external environment, thereby providing critical resources to the company in terms of relational and social capital.

Given the threefold role assigned to the board of directors, it should both contribute to and be held accountable for corporate outcomes (Nicholson & Kiel, 2007). Extensive literature has investigated the board's influence on corporate performance, with a growing emphasis on sustainability performance (Naciti et al., 2022). In particular, given the difficulty of directly observing the inner workings of the board, the so-called black box, research has primarily explored

the board’s impact on corporate outcomes by examining board composition and structure using input-output models (Daily et al., 2003; Dalton et al., 1998; Pugliese et al., 2009). Board composition mainly concerns three aspects: (i) board size, that is, the number of directors on the board; (ii) the type of directors, whether they are executive, non-executive, independent; and (iii) board diversity, including the demographic (e.g. age, gender, nationality) and cognitive characteristics (e.g. education, professional and non-professional experience) of directors. Board structure, instead, pertains to the roles and influential power of directors, encompassing factors like Chairman-CEO duality, board tenure, and the presence of board committees.

Numerous scholars have studied board characteristics, in terms of both composition and structure, that influence corporate sustainability, mainly focusing on aspects such as gender diversity (Ben-Amar et al., 2017; Cosma et al., 2021; De Masi et al., 2021; Glass et al., 2016; Post et al., 2011), board size (Naciti, 2019), board independence (de Villiers et al., 2011; Hussain et al., 2018; Jizi, 2017; Walls et al., 2012), CEO duality (Arena et al., 2015; Mallin et al., 2013; Naciti, 2019), board interlocks (Harjoto & Wang, 2020; Homroy & Slechten, 2019; Ortiz-de-Mandojana & Aragon-Correa, 2015), experience and competences (Homroy & Slechten, 2019; Ngu & Amran, 2019), age (Chams & García-Blandón, 2019; Cosma et al., 2021), and education (Chang et al., 2017; de Villiers et al., 2011).

Despite the growing body of research, a consensus has not been reached regarding which board characteristics contribute to improved performance, as findings have been inconclusive (Endrikat et al., 2021). On the one hand, this discrepancy may be attributed to unexplored relevant characteristics of the board. On the other hand, it may suggest that the effect of board characteristics

on firm performance is contingent on other variables. Therefore, the debate surrounding boards and sustainability is far from over.

This thesis, developed in the form of a collection of three research papers[2], engages with the ongoing debate by examining the relationship between board characteristics and corporate sustainability from various perspectives.

First, the thesis aligns with the burgeoning literature on corporate purpose, asserting that a genuine commitment towards corporate sustainability requires embracing a social purpose beyond profit maximization. The first paper delves into this concept, examining the role of the board in adopting such a social purpose.

Second, the thesis aims to contribute to the debate on the relationship between the board of directors and corporate performance (Paper 2 and Paper 3). Specifically, the second paper investigates a characteristic of the board that could encourage companies to commit more strongly to sustainability, which has received limited attention in existing literature, namely the sustainability-related experience of the board. In doing so, the second paper explores for the first time the interplay between the sustainability experience and the age of the board to assess the effect on firm sustainability performance, thus contributing to the understating of boundary conditions of sustainable boards in leading corporate sustainability.

The third paper attempts to study the board-performance relationship from a more comprehensive standpoint, encompassing both sustainability and financial performance in its analysis. In so doing, it focuses on an additional board characteristic, namely interlocking directorates.

[2] All three papers are currently submitted to the Journal.

More in detail, the thesis has pinpointed three distinct research gaps that are addressed individually in the three papers.

Paper 1 – Board of Directors and the Adoption of a Social Purpose in For-profit Firms

As has been highlighted, there is an escalating demand for businesses to operate according to a corporate purpose that combines profit maximization with creating environmental and social value, i.e., a social purpose (Henderson, 2021; Hollensbe et al., 2014; Mayer, 2021). The definition and integration of a social purpose into the corporate strategy are crucial to ensuring that the firm's sustainability efforts are more than just symbolic gestures (Battilana et al., 2022; George et al., 2021; Rey & Bastons, 2018). To this end, the board of directors plays a pivotal role due to its strategic function, as it is responsible for defining the corporate purpose and objectives (Eccles et al., 2014; Henderson, 2021; Hillman & Dalziel, 2003).

As already argued, while a vast stream of research has focused on the association between the board of directors and sustainability (or corporate social responsibility, CSR) performance, it is important to note that CSR performance does not always signify a genuine commitment to a social purpose. Instead, it could merely be a manifestation of greenwashing strategies. Despite the consensus among recent research emphasizing the importance of a social purpose as a primary catalyst for a genuine sustainable corporate transition and the significant role of corporate governance in this aspect (Battilana et al., 2022), there is a dearth of empirical studies examining the specific board characteristics that encourage a company to adopt a social purpose. The first paper of the thesis attempts to fill this gap by investigating whether the strategic adoption of a social purpose is positively associated with specific board characteristics. To this end, relying on

prior literature, we test the effect of various board composition and structure characteristics on the likelihood of adopting a social purpose in European for-profit companies.

Paper 2 – Sustainable Governance: Board Sustainability Experience and the Interplay with Board Age for Firm Sustainability

According to previous research, directors' background is critical in leading corporate sustainability performance (Hambrick, 2007; Hambrick & Mason, 1984; Hillman et al., 2000). However, while board demographic characteristics often attract substantial attention due to their observable nature, cognitive characteristics, which could be particularly crucial for sustainability, tend to be overlooked. In particular, experience plays a pivotal role as a cognitive filter for processing and understanding information (Hambrick, 2007; Starbuck & Milliken, 1988), which in turn influences decision-making. Since a company's solid commitment to sustainability necessitates awareness of sustainability issues, practices, and goals, as well as the knowledge to pursue them (Amui et al., 2017), previous board sustainability-related experience could be a key factor in driving sustainability performance.

Yet, only a few studies have analyzed the relationship between the sustainability-related experience of board members and sustainability outputs, showing heterogeneous results (Velte, 2023). This divergence in findings underscores the need to investigate the contingency conditions that influence this relationship. Accordingly, we introduce the moderating effect of board age into the analysis, arguing that it reflects the awareness and sensitivity of directors towards sustainability. Indeed, we contend that the presence of sustainability experience alone is insufficient to boost firm sustainability if the board's inherent motivation does not endorse it.

In light of the above, the second paper investigates whether board sustainability experience influences corporate sustainability performance and whether this relationship depends upon board age.

Paper 3 – Unpacking the Link between Firm Network and Financial Performance: The Mediating Role of Corporate Sustainability

Corporate governance literature attributed a strategic role to the board of directors in opening corporate boundaries and facilitating networking (Carpenter & Westphal, 2001; Hillman et al., 2000). Previous studies suggest that, by concurrently serving on multiple corporate boards, directors can establish an external network that enables cross-fertilization among firms. This is achieved through the exchange of information and resources, which in turn influences firm performance (Hauser, 2018; Larcker et al., 2013; Zhao, 2021). Research on board interlocks has grown significantly in recent years, showing that they have a positive impact on corporate performance (Hauser, 2018; Kim, 2005; Larcker et al., 2013; Martin et al., 2015; Smith & Sarabi, 2021; Zaheer et al., 2010; Zhao, 2021; Zona et al., 2018). However, little is known about the underlying mechanisms that drive this positive association, and no empirical studies have yet attempted to empirically test how firm networks boost financial performance (Smith & Sarabi, 2021).

The third paper of this thesis aims to fill this gap and broaden the literature regarding the relationship between company network, as measured through board interlocks, and firm performance by exploring one possible mechanism that explains it, i.e., corporate sustainability. Scholars have recognized corporate sustainability as a crucial source of competitive advantage (Bhuiyan et al., 2023; Walsh & Dodds, 2017) and have proposed alternative views on how it may

contribute to superior business performances (Amui et al., 2017; Juo & Wang, 2022), highlighting the relevance of various inter-organizational factors. Among them, particular emphasis has been placed on relational resources and network factors provided by the board of directors as drivers of corporate sustainability performance (Gölgeci et al., 2019; Harjoto & Wang, 2020).

The three papers in this thesis applied different quantitative methodologies, including propensity score matching techniques, logistic regressions, panel data methods, social network analysis, and structural equation models. Originating from a common universe, i.e. all European companies included in the BoardEx database, distinct samples were created following a purposive sampling approach to conduct the analyses. Information on board composition, retrieved from BoardEx, was integrated with data from the Refinitiv Eikon database to gather information on corporate sustainability, measured through the ESG scores, and firm-specific factors.

Overall, this thesis offers several noteworthy contributions to the understanding of the relationship between the board of directors and sustainability, which are briefly summarized below.

First, it provides first empirical evidence on the association between board of directors and the likelihood of adopting a social purpose, showing that specific characteristics in terms of board composition and structure are positively related to the adoption of a social purpose in European for-profit firms. These results suggest that the board of directors plays a key role in driving a real sustainable transition of companies by clearly defining a corporate purpose beyond profit maximization. In this way, the research deepens our understanding of the board's role in sustainability, bridging the literature on corporate governance with that on corporate purpose.

Second, this thesis enhances the body of knowledge on the relationship between board composition and corporate sustainability by showing that the prior sustainability experience of the board positively affects firm sustainability performance and that such an effect is contingent on board age. In doing so, we provide evidence supporting the arguments that if an intrinsic motivation of the board towards sustainability does not support its sustainability experience, the latter may not translate into positive sustainability outcomes.

Lastly, the thesis highlights that corporate sustainability intervenes in the relationship between the company network generated by board interlocks and financial performance. In so doing, we introduce a new mediator in the relationship between board interlocks and financial performance, thus expanding existing literature that has traditionally focused solely on the direct relationships between board interlocks and corporate sustainability and between board interlocks and financial performance.

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1.

Board of Directors and the Adoption of a Social Purpose in For-Profit Firms

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ABSTRACT

The debate on corporate purpose has gained momentum over the last decade, prompting businesses to rethink their role in society. To effectively integrate sustainability in corporate strategies, for-profit firms are increasingly called to adopt a social purpose (SP), jointly pursuing financial and social objectives. However, adopting a SP is a significant change that requires an internal push from corporate actors. In particular, due to its function of strategic decision-making, the board of directors (BOD) represents a key agent in leading to the adoption of a SP.

This study explores the impact of BOD characteristics on the likelihood of adopting a SP in for-profit firms. To this end, 580 European firms were examined using propensity score matching and logistic regression techniques. Our results provide preliminary insights that the board composition impacts the adoption of a social purpose.

Our study represents the first attempt to quantitatively examine the relationship between BOD and SP. By doing so, we contribute to the theoretical advancement of the complementarity of corporate governance and corporate purpose. Moreover, we encourage practitioners to accrue awareness of the BOD characteristics that promote the adoption of a SP within the firm.

KEYWORDS:

Social Purpose; Board of Directors; Sustainability; Change Agents

1. INTRODUCTION

The debate around corporate purpose in the modern economic system has gained considerable momentum over the last decade (Battilana et al., 2022; Birkinshaw et al., 2014; George et al., 2021; Henderson, 2021b; Henderson & Van Den Steen, 2015; Hollensbe et al., 2014; Mayer, 2021; Morrison & Mota, 2023; Rey et al., 2019). Increasingly, for-profit firms are called to revise their traditional profit-maximization objective and adopt a social purpose (SP), i.e., goals aimed at creating value by contributing to the welfare of society and the planet (Brosch, 2023). According to prior literature, despite the financial/social trade-offs that can arise in dual-purpose companies (Battilana et al., 2022), adopting a SP is not conflictual with generating profits (Brosch, 2023). It provides several benefits to companies that can translate to good financial and sustainability outcomes. More specifically, the adoption of a SP may lead to more outstanding corporate stewardship towards people, values, and natural resources (Hollensbe et al., 2014), to greater creation of societal value thanks to a multiple stakeholders orientation (Harrison et al., 2020), or to more effective implementation of systemic innovations aimed at tackling sustainability challenges, such as climate change or social inequalities (Henderson, 2021b).

However, adopting a SP is not a straightforward process (Quinn & Thakor, 2018; Rey et al., 2019). It requires individual efforts to embed a SP in firms' decision-making processes (Morrison & Mota, 2023) and business models (Schaltegger et al., 2016). Thus, the people who make key decisions in the firm play a critical role (Battilana et al., 2019, 2022).

In for-profit firms, members of the board of directors (BOD) are one of the most critical agents for the adoption of a SP, given their "generative role that involves interpreting and reinterpreting the mission in light of current trends and changing circumstances" (Ebrahim et al., 2014, p. 85). The BOD provides and allocates resources to achieve firm objectives (Hillman &

Dalziel, 2003), establishes crucial value commitments (Forbes & Milliken, 1999), and mitigates trade-offs between divergent institutional logics, such as social and financial ones, that may occur from the adoption of a SP (Battilana et al., 2022). Thus, investigating the role of the BOD in adopting a corporate SP is fundamental to better understanding how for-profit firms may drive the change to respond to the call of paying closer attention to their impact on communities and the environment (Battilana et al., 2019).

Each board differs in terms of the composition and characteristics of directors, which impact BOD dynamics and effectiveness, thereby influencing firm decision-making, strategies, and outcomes. For this reason, the study of BOD characteristics has become a topic of extreme interest in the management literature (Chams & García-Blandón, 2019; Chang et al., 2017; García Martín & Herrero, 2020; Kagzi & Guha, 2018; Kang et al., 2007; Naciti et al., 2022; Zattoni et al., 2022). Given the growing pressure on sustainability issues, many scholars have analyzed the impact of board characteristics on CSR performance in recent years, highlighting mixed results (Endrikat et al., 2021). However, despite the strict relatedness between corporate purpose and CSR (Brosch, 2023), CSR performance is not always indicative of a real commitment to pursuing a SP but could result from greenwashing strategies. Therefore, specific analyses are needed to understand the association between BOD characteristics and the adoption of a SP.

However, to the best of our knowledge, no study has yet attempted to empirically examine the relationship between the board of directors and corporate social purpose. In our study, we attempt to fill this gap by addressing the following research question:

RQ: How do board characteristics affect the probability of adopting a social purpose in for-profit firms?

Building on the mainstream BOD and corporate purpose theories, we evaluate whether the strategic adoption of a SP in the setting of for-profit firms is positively associated with specific BOD characteristics.

We conducted a quantitative cross-sectional empirical study on a sample of 580 European for-profit firms. We collected data from the Refinitiv Eikon and BoardEx databases as of December 2020 and triangulated information from firms' reports and websites. The analysis consists of two phases. First, we used a propensity score matching (PSM) approach to determine which BOD characteristics are important in influencing the adoption of a SP while controlling for self-selection biases. Second, we perform a logistic regression analysis to estimate the impact of BOD characteristics on the probability of adopting a SP.

Overall, our results provide preliminary evidence about the impact of board composition on adopting a social purpose. More specifically, we found significant differences between the BODs of firms with a SP and those without a SP, and, as showed by the logistic regression analysis, specific BOD characteristics affect the probability of adopting a SP. More in detail, we found a positive and significant impact of gender diversity, internal network size, and directors' educational background on the adoption of SP. In contrast, we found that the age and tenure of the BOD negatively impact the adoption of SP.

Our study makes several theoretical contributions. First, we contribute to the intersection of corporate governance and corporate purpose theories by highlighting that the BOD is a key driver for moving toward a SP. Second, by doing so, we provide evidence supporting the BOD strategic role that goes beyond the mere approval of strategic management decisions. Third, according to the upper-echelons theory, we pointed out that not only structural and demographic characteristics of the BOD are important, but directors' personal qualities are especially relevant for adopting a

SP. Finally, we encourage corporate practice to acknowledge corporate governance and social purpose as intertwined issues and to become aware of the board's personal and structural features that promote the integration of a social purpose into the organization.

The remainder of the paper is organized as follows. The following paragraph briefly reviews the existing literature on social purpose in for-profit firms, boards of directors, and the intersection between the two streams of literature. Then, we present methods and data for the quantitative analysis. Next, we illustrate and comment our results, which are discussed in the subsequent paragraph, where we highlight theoretical contributions and practical implications. Finally, we conclude by detailing limitations and avenues for future research.

2. THEORETICAL BACKGROUND

Today, business ethics play a central role in our globalized and interconnected world, increasingly assuming a political dimension (Lynn, 2021). Firms are increasingly pressured to pay more attention to their impact on the society in which they operate, moving beyond their single-minded pursuit of financial gains (Battilana et al., 2019). Firms strive to proactively contribute to sustainable development by undertaking transformative processes (M. P. Johnson & Schaltegger, 2020) that go beyond mere legal compliance (Harjoto & Jo, 2015), symbolic adoption of CSR practices (Graafland & Smid, 2019) or corporate greenwashing (Laufer, 2003). By engaging in public discourses with nonmarket actors, they try to manage and gain legitimacy regarding the fairness of their actions that bring environmental (Battilana & Casciaro, 2012) or social change (Girschik, 2020).

CSR disclosure is one of the most institutionalized corporate approaches to seeking legitimacy (Archel et al., 2009). Social and sustainability reports have become mainstream documents, and, looking at firms' websites, several firms declare to be concerned about the

environment, employees and critical social issues (Jose & Lee, 2007). However, this approach can be merely symbolic (Nadeem, 2021) and not reflective of a genuine desire to positively impact society. Many firms engage in greenwashing strategies, disclosing just salient and immediately observable CSR initiatives or engaging in symbolic communication that ignores substantial but unobservable sustainable actions (Walker & Wan, 2012; Wu et al., 2020).

Such decoupling behaviors of firms are related to the conception of a business's role and purpose in society. For about half a century, maximizing shareholder value has been the dominant corporate purpose for firms (Friedman, 1970). Consequently, any alternative objective was regarded as a planet orbiting the sun of profit maximization. As a result, CSR approaches have been generally considered a corollary to pursuing the firm's competitiveness (Porter & Kramer, 2006, 2011). However, with the worsening of environmental crisis and social inequalities, Friedman's dictate has been strongly contested. Various scholars claim that shareholder primacy is an ontological impediment to the pursuit of effective CSR (Campbell, 2007; Phillips et al., 2003; Smith & Rönnegard, 2016).

The adoption of a SP – referred to as "the concrete goal or objective for the firm that reaches beyond profit maximization" (Henderson & Van Den Steen, 2015, p. 105) – is increasingly understood as the essential condition for firms to implement substantial CSR programs that contribute to a better society (Henderson, 2021b; Hollensbe et al., 2014). This is because for-profit firms with a SP aim to solve societal needs that deliver value for people and the planet (Mayer, 2021) without renouncing to generate profits (Birkinshaw et al., 2014; Brosch, 2023; Mazzucato, 2018).

The call to adopt a SP in the context of for-profit firms no longer comes exclusively from nonmarket actors but also from the major financial institutions. For instance, in his 2018 letter to

CEOs, Larry Fink wrote that "purpose is not a mere tagline or marketing campaign; it is a firm's fundamental reason for being – what it does every day to create value for its stakeholders. Purpose is not the sole pursuit of profits but the animating force for achieving them" (Fink, 2018). Soon after, in August 2019, 181 for-profit firms belonging to the American Business Roundtable signed the new statement on the purpose of a corporation, which caused clamor for the declared commitment towards all the corporate stakeholders, including community, environment and employees (Harrison et al., 2020).

2.1. Social Purpose and Corporate Social Responsibility

Extant literature has explored the relationship between the adoption of a SP and CSR using different investigation lenses. A first research avenue focuses on the impact of SP on CSR performance. Hollensbe et al. (2014) suggest that stewardship in service to SP can drive firms' commitment towards CSR issues, thanks to a greater acceptance of corporate responsibilities towards future generations and natural resources. Henderson and Serafeim (2020, p. 178) claim that "actively encouraging firms to embrace an authentic social purpose might significantly accelerate the process of decarbonization and have a very significant effect on the problem of climate change." More specifically, the authors believe that purpose-driven firms are more likely to embrace innovation and take the necessary risks to invest in a carbon-neutral economy, thus outperforming their counterparts in sustainability outcomes. Along the same line, Schaltegger et al. (2019) discussed the potential business case for sustainability from a stakeholder theory perspective. Firms can effectively achieve higher CSR performance by going beyond profit maximization and embracing a SP that creates manifold benefits to multiple stakeholders.

The second perspective of investigation concerns the dynamics through which purpose facilitates CSR actions and practices. In extreme events, such as natural disasters or global

pandemics, firms may leverage SP to intervene with CSR actions. In particular, Forcadell and Aracil (2021) empirically found that SP facilitates effective and efficient post-shock CSR responses – and also time response – through specific sustainable dynamics capabilities. To rapidly fight against the Covid-19 pandemic and support the sustainability of local communities, firms may also combine R&D management strategies with the implementation of SP actions (Ferrigno & Cucino, 2021), thus exploiting purpose-driven innovation to deliver social benefits.

Henderson (2021b) pointed out how purpose-driven firms can actually reshape our capitalistic system thanks to their ability to catalyze systemic change and seize opportunities for sustainable growth. More specifically, she believes that SP may drive (1) higher vision and strategic alignment, (2) higher employee engagement, effort and creativity, (3) and a higher level of trust across the firm. These dynamics, in turn, make it easier to implement architectural innovation, which "will undoubtedly be important in solving many of the social and environmental challenges we now face" (Henderson, 2021a, p. 5479).

2.2. BOD as a key change agent for SP adoption

A meaningful sustainable transition requires for-profit firms to integrate a SP into business models and corporate strategies (Morrison & Mota, 2023). By doing so, they can ensure that a pro-social commitment becomes more than a marketing strategy but rather a firm's behavioral model. However, adopting a SP requires a significant shift in the firm's values, beliefs, and behaviors (Quinn & Thakor, 2018; Rey et al., 2019). Such a revolution is challenging due to the difficulty of taken-for-granted norms (Greenwood & Hinings, 1996), and it does not occur by itself (Schaltegger et al., 2016). It necessitates the internal push of individuals belonging to the firm.

Among these, the BOD plays a vital role in leading strategic change (Golden & Zajac, 2001) as it contributes to strategic decision-making by both monitoring and advising management

(Hillman & Dalziel, 2003). As the firm's governing body, it is responsible for defining corporate purpose (Mayer, 2021; Tuggle et al., 2010) and ensuring that it is effectively integrated into business plans and corporate strategies (Battilana et al., 2022; Ebrahim et al., 2014). Therefore, the BOD can play a transformative role in the strategic adoption of a SP that directly affects the sustainable transition of firms.

For instance, empirical evidence from a sample of 180 firms shows that highly sustainable firms have BODs that are more accountable towards CSR issues than less sustainable firms, thanks to their ability to direct governance mechanisms towards the fulfilment of a SP (Eccles et al., 2014). Battilana et al. (2022) theorized that BODs can lower the intensity of trade-offs between financial and social objectives in firms adopting a SP since they focus corporate attention on selected dimensions of organizational performance, such as CSR performance. They also claim that "as the guardians of organizational purpose, board members help the firm maintain these [value] commitments through their role in the allocation of the requisite attention to a limited number of critical organizational issues" (Battilana et al., 2022, p. 247).

Yet, different managerial theories give alternative, but not mutually exclusive, interpretations of the BOD role in corporate governance, specifically in governing CSR. For decades, the primary reference theory to study the governance role of BODs has been the agency theory, which argues that BODs had the main function of monitoring managers in order to avoid that opportunistic behavior erodes shareholder values (Fama & Jensen, 1983). With the burgeoning of the stakeholder theory, agency theory has been broadened to encompass the larger perspective of stakeholders as agents (Hill & Jones, 1992). In this scenario, the agency problem concerns the misalignment of management's interests with the interests of all firm stakeholders. Drawing on this theory, several scholars contended that managers might be reluctant to pursue CSR actions since they entail

significant investment that may only materialize in the long term, undermining the short-term wealth of managers (Aguilera et al., 2021; de Villiers et al., 2011). Therefore, the monitoring role of the BOD – enhanced by higher CEO duality and independence – is critical to reaching CSR outcomes (de Villiers et al., 2011; Naciti, 2019; Post et al., 2011). In the case of agency theory, BODs are guarantors of shareholders' long-term interests, and CSR actions are no more than instrumental to achieving financial goals.

Other scholars analyzed the relationship between BOD and CSR by using the resource dependence theory (C. Mallin et al., 2013; C. A. Mallin & Michelon, 2011). According to it, the BOD plays the crucial role of acquiring and allocating strategic resources. Indeed, BODs represent a good source of knowledge, skills, experience, and network (Hillman et al., 2000; Hillman & Dalziel, 2003). With proper skills and competences, BODs can foster CSR implementation within the firm, helping managers to adopt pro-social behaviors and boosting the sustainable value created by the firm (Berrone & Gomez-Mejia, 2009; Chams & García-Blandón, 2019). Under this theoretical perspective, characteristics such as experience and internal network size of BOD are crucial for a conscious and effective allocation of resources.

A third theoretical perspective on the governance role of the BOD builds on the upper-echelons theory (Hambrick & Mason, 1984), which argues that executive teams act on the basis of their personal cognitive perception. Therefore, individual characteristics, values and background of the BOD may directly influence the adoption and implementation of CSR strategies. Accordingly, several scholars analyzed the impact of personal BOD characteristics on CSR outcomes, focusing mainly on gender, education, and professional experience (Cosma et al., 2021; De Masi et al., 2021; Glass et al., 2016; Naciti et al., 2022). Drawing on this theory, the adoption of sustainable strategies and specific CSR initiatives in for-profit firms appear to be significantly

related to individual characteristics of BODs, given the influence of personal values and beliefs on the propensity to commit to solving social and environmental problems.

2.3. Impact of BOD characteristics on the adoption of SP

Although the relationship between BOD characteristics and CSR has been widely explored (Aguilera et al., 2021; Chams & García-Blandón, 2019), management literature has overlooked the potential relationship between BODs and the adoption of a SP. As was previously noted, it necessitates special attention since, despite their close connection, CSR and SP are distinct concepts. While an organization's corporate purpose establishes the fundamental rationale for its existence, CSR has a more functional focus and can be considered as one vehicle for implementing corporate purpose (Brosch, 2023).

Corporate governance, for which the BOD is primarily accountable, "is fundamentally about such questions as what business is for—and in whose interests firms should be run, and how" (Elkington, 2006, p. 522). This definition immediately sheds light on the potential interconnections between BODs and the adoption of a SP. As argued above, the BOD engagement is key for a real enforcement of SP that is far from simple compliance, advertising, or a merely symbolic approach. Indeed, "by articulating *for what* a company is accountable as well as *to whom* it is primarily accountable, the board helps the company set some of its fundamental value commitments" (Battilana et al., 2022, p. 247).

According to the upper-echelons theory (Hambrick, 2007; Hambrick & Mason, 1984), strategic decisions and outcomes reflect the leadership's values, personality, and background. A board of directors is a team of people with different backgrounds that define together the goals of the firm. Therefore, the composition of the BOD is critical in driving decision-making, and we contend that BOD characteristics may affect the adoption of a SP in for-profit firms. However, to

the best of our knowledge, no study has yet attempted to empirically determine whether BOD characteristics affect the adoption of a SP.

We focused on the following BOD characteristics that are the most used according to the mainstream theories of the BOD.

1.1.1 Board size

Previous research has shown that board size is closely related to board effectiveness and its involvement in strategic decision-making (Cornforth, 2001; Eisenberg et al., 1998; Golden & Zajac, 2001; Jensen, 1993). Moreover, several studies highlighted that board size influences sustainability strategies (Aguilera et al., 2021; Chams & García-Blandón, 2019), and such a relationship might result from SP adoption. Therefore, we speculate that BOD size may affect the adoption of a SP.

1.1.2 Independence

Previous literature examined the impact of BOD independence on firm outcomes, revealing that it is crucial for conducting an effective monitoring and accountability mechanism (Hillman & Dalziel, 2003) as the duty of independent directors is to ensure that firms are long-term sustainable. Although independent directors, as outsiders, are less involved in strategic decision-making (Ruigrok et al., 2006), their presence affects the quality of non-financial disclosure and CSR performance (Aguilera et al., 2021). Prior research suggests that having a higher percentage of independent directors increases the attention on social and environmental issues, following the interests of both shareholders and other stakeholders (García-Sánchez & Martínez-Ferrero, 2018; Walls et al., 2012). Thus, we accounted for BOD independence in our study.

1.1.3 Age

According to Kang, Cheng, and Gray (Kang et al., 2007), "age remains one of the most important observable background diversity issues for the BOD." As directors' age influences their experience and social background, age diversity ensures a greater heterogeneity in visions and perspectives within the board, fostering constructive debate and, eventually, strategic change. Indeed, several studies show that directors' age is positively related to strategic change, arguing that young directors are more likely to initiate changes than older directors (S. G. Johnson et al., 2013). Prior research showed that directors' age positively affects social performance (Hafsi & Turgut, 2013). Indeed, age is closely related to personal moral judgment (Post et al., 2011), which may reflect in personal sensitivity to the social impact of firms and, therefore, to the adoption of SPs.

1.1.4 Gender diversity

Gender diversity is another critical variable for board diversity, which scholars have increasingly analyzed (Cabrera-Fernández et al., 2016; De Masi et al., 2021; Khatib et al., 2020). According to recent research, gender diversity impacts beyond readily observable data, providing valuable information that is unobservable, such as knowledge, skills, values, attitudes, and behavioral styles that may differ between men and women (Kirsch, 2018). Such personal characteristics are reflected in social sensitivity (Amorelli & García-Sánchez, 2020; Boulouta, 2013), which may influence the probability of adopting a SP.

1.1.5 Nationality diversity

Directors' nationality is another dimension of diversity becoming increasingly analyzed in the board diversity literature (Adams et al., 2015; Jo et al., 2016; Kagzi & Guha, 2018; Kent Baker et al., 2020; Naciti et al., 2022). In particular, it appears to be relevant in the European context

(Ruigrok et al., 2007). Different nationalities bring cultural diversity within the board, which also concerns the perspective on the role of firms in society. Thus, board nationality diversity may impact the adoption of SPs.

1.1.6 Tenure

The longer directors have been operating in a firm, the more thoroughly they will know and identify themselves with it. Indeed, previous literature has shown that tenure is closely linked to directors' identification with the firm, which in turn influences BOD cooperation, behaviour and motivation in carrying out its functions (Hillman et al., 2008). We argue that identifying with the firm is crucial to defining corporate purpose and pursuing SP. Indeed, identification leads individuals to mirror their own achievements, values and goals with those of the firm (Ashforth et al., 2008). Organizational studies underlined the deep connection between personal purpose and corporate purpose (Quinn & Thakor, 2018), highlighting how the internalization of corporate values can facilitate the commitment towards a shared strategy (Hillman et al., 2008). Therefore, the greater the identification, the greater the leadership commitment to SP is expected to be (Rey et al., 2019). However, on the other hand, as the time spent within the firm increases, directors would adapt to existing routines and organizational culture, thus being reluctant to introduce radical change.

1.1.7 Internal network size

According to Gartenberg et al. (2019, p. 4), corporate purpose is "enacted via the set of beliefs held by employees." Therefore, the relationship between the BOD and employees is relevant to fully integrating of corporate purpose into the firm's business model, which can lead to the adoption of SP. We accounted for the possibility of sharing and connecting between the board and employees by measuring the size of the board network within the firm, i.e., the average number of individuals

with whom administrators overlap while employed in other activities or education roles in the same firm.

1.1.8 Education

Previous studies argued that directors with advanced educational backgrounds tend to have broader societal concerns, resulting in more accountability to CSR (Chams & García-Blandón, 2019; Post et al., 2011). Therefore, the educational background of BOD members may also influence SP adoption.

3. METHODS AND DATA

3.1. Research Design

Our analysis aims to explore whether and which board characteristics may influence the adoption of SP. Because the adoption is non-random but self-selected, we need to account for self-selection bias using non-experimental methods. Therefore, we carried out a propensity score matching (PSM) analysis to understand the relevant variables that impact the adoption of SP, controlling for self-selection biases. After the PSM analysis, we conducted a logistic regression analysis to empirically evaluate how each board characteristic impacts the adoption of SP, both in the extent and statistical significance.

3.2. Sample Selection

Our starting sample originated from the 5357 European firms included in the BoardEx database, for which we have information on board composition and directors' characteristics as of December 31, 2020. We used cross-sectional data because it was not possible to retrieve longitudinal data on a firm's adoption of SP. However, as previous research on BOD has shown

(e.g. Ben-Amar & Zeghal, 2011; Hu & Loh, 2018), while not capturing temporal effects, cross-sectional analyses can provide important insights, especially in exploratory research settings.

We then gathered the CSR data provided by Refinitiv Eikon, available for 1799 firms. Because the amount of data collected did not allow us to singularly investigate firm's website and documents, the analysis is based on a smaller final sample. More specifically, to develop the dependent variable "SP adoption", we singularly investigated firms' websites and such hand data collection for the entire population would have been excessively time-consuming. Therefore, we opted for a simple random sampling technique, which ensured that every firm had an equal chance of being selected (Kgoroeadira et al., 2019). We randomly selected one-third of the firms from the entire population, resulting in 600 firms. Twenty were then dropped due to missing values, obtaining the final sample of 580 observations. Such a sample size has sufficient statistical power for the analysis, as it is aligns with the minimum sample size required by Yamane's formula (Yamane, 1967)[3]. Moreover, it meets the requirement of ten observations per variable (Austin & Steyerberg, 2015; Cappa et al., 2021), given that we processed one independent and seven control variables in each model.

3.3. Propensity Score Matching Analysis

The PSM method allows to reduce selection bias and construct a plausible counterfactual based on observed characteristics (Dehejia & Wahba, 2002). PSM combines all covariate information into an estimate of the probability of being treated, i.e., propensity scores. As the

[3] Yamane's formula:

$$n = \frac{N}{1 + Ne^2}$$

Where, n = unknown sample size
N = Population size (1799)
e = Margin of error (0.05, 95% confidence interval)
So, we get n = 327.

treatment effect is a dummy, propensity scores can be estimated using a probit or logit model (Rosenbaum & Rubin, 1983). In this paper, we measure propensity scores using logit regression:

$$p(X) \equiv logit(D = 1|X) = E(D|X)$$

where D={0,1} is the treatment, i.e., the adoption of a SP, and X is a vector of observed characteristics unaffected by the treatment, i.e., the matching variables.

Once obtained propensity scores, we measured the effect of the treatment on the observed outcomes, i.e., BOD characteristics, by estimating the average treatment effect on the treated (ATT). It is the difference in outcomes between the treated and control groups appropriately matched by the propensity score.

To check for the robustness of PSM results, we performed the analysis using different matching techniques: (1) Kernel, (2) Nearest-Neighbor (NN), and (3) Radius. Kernel matches the outcome of a treated individual with the outcomes of all untreated ones with similar propensity scores, which are weighted proportionally to the proximity of the propensity scores of treated and untreated individuals (Heckman et al., 1998). The NN technique matches a treated firm with the untreated one with the closest propensity score. The risk of this method is to obtain inadequate matching if the nearest neighbor is too far away (Caliendo & Kopeinig, 2008). This limitation can be overcome by imposing a maximum propensity score distance, referred to as radius or caliper. In radius matching, each adopter is matched with firms in the control group with the closest propensity score within a predetermined region. Following the recommendation by Austin (2011), we set the caliper to 0.02, which is 0.2 multiplied by the standard deviation of the logit estimation of the propensity score. We use matching without replacement, which improves the accuracy of the estimates (Dehejia & Wahba, 2002).

3.4. Variables Measurement

1.1.9 Treatment variable

As anticipated, our study analyzes SP firms versus non-SP firms. Thus, the treatment variable is the adoption of a SP by analyzed firms. Because of its inherent intangibility, measuring the adoption of SP is extremely complex. In fact, only a few studies have pursued to deal with corporate purpose measurement, adopting qualitative methods of data collection such as interviews and questionnaires (Bhattacharya et al., 2023; Gartenberg et al., 2019; Lashitew et al., 2023). However, these methods are subject to respondents' subjectivity, as well as researchers' discretion. Therefore, we measured the adoption of SP from secondary data.

We argue that publicly declaring to adopt a social purpose is firstly essential as it represents a public commitment of the company towards the external society (Battilana et al., 2022; George et al., 2021; Rey & Bastons, 2018). Therefore, we first verified that the firms in the sample had specifically and explicitly set social goals while communicating their corporate purpose. We manually analyzed each firm's website and public corporate documents to identify companies with a clear social purpose. However, despite being representative of the firm consciousness of its social role, publicly declaring to pursue a social purpose is not sufficient, as it can be merely symbolic. For a company to be purpose-driven, it must concretize its commitment towards society (Battilana et al., 2022; George et al., 2021). Thus, corporate purpose should be reflected in the realized social outcomes. To gauge the firms' efforts in materializing SP, we relied on information provided by Refinitiv Eikon to check whether the firm published an extra-financial statement that communicates its commitment to sustainable development by reporting on the social impact of at least 50% of the global firm activities. In fact, as companies simultaneously implement actions of different ethical levels on different planes (Lynn, 2021), we believe that placing the focus on the

social impact of more than half of the firm's activities is indicative of a real commitment to actualize its purpose.

Based on the above, we identified SP firms following three criteria, which must be jointly met: 1) the firm explicitly discloses the adoption of a specific corporate purpose; 2) the firm published an extra-financial report, such as a CSR/H&S/Sustainability report, in recent years, i.e., in 2019 or 2020, to explain how its activities fit the social purpose; 3) the firm's extra-financial report covers at least 50% of the firm's global activities.

1.1.10 Matching variables used for propensity scores construction

Researchers indicated some requirements to guide the choice of matching variables to be incorporated into the propensity score model (Caliendo & Kopeinig, 2008). First, these variables should be the determinants of both treatment and outcome variables. Thus, in our research, only variables that simultaneously influence the adoption of SP and BOD characteristics should be included in the model. In addition, endogeneity due to reverse causality must not occur, i.e., matching variables must not be affected by the treatment. In order to satisfy these conditions, the variable selection was based on the existing theories of corporate purpose (Birkinshaw et al., 2014; Hollensbe et al., 2014; Morrison & Mota, 2023) and previous empirical findings (Caliendo & Kopeinig, 2008).

We selected the following matching variables for SP and non-SP firms: revenues, assets, equity, debt, and employees. Financial variables have been used to exclude the potential bias of firms adopting SP after profit maximization, which is contrary to the definition of SP. This allowed us to analyze SP and non-SP firms for similar level of revenues, assets, equity, and debt. Moreover, we took into account heterogeneity in employee size, which may impact SP adoption (Gartenberg, C., Prat, A., & Serafeim, G., 2019; Rey, Bastons & Sotok, 2019).

Financial and employee data were retrieved through the Refinitiv Eikon software. All of these variables are winsorized at 0.01 level to exclude outsider values. Moreover, we used the logarithmic transformation for the matching variables in order to obtain directly interpretable coefficients.

1.1.11 Outcome variables

In order to explore potential differences in the BODs of SP firms relative to non-SP ones, our outcome variables relate to BOD characteristics. In particular, based on previous corporate governance literature, we focus on the following BOD characteristics:

- *Board size.* The size is measured by the number of directors who sit on the board.
- *Independence.* We accounted for BOD independence with two measures: the percentage of independent directors sitting on the board (NED) and CEO duality, i.e., the overlapping role of the chairman and the CEO.
- *Age*. We analyzed the effect of age on SP by measuring both the BOD average age of directors (*Age*) and the percentage of directors *Under35*, *Under40* and *Under45*.
- *Gender diversity.* Following previous studies, we measured gender diversity as the percentage of women sitting on the board (*Female*).
- *Nationality diversity*. We accounted for nationality diversity by measuring the percentage of different nationalities represented on the board (*Diff Nationality*).
- *Tenure.* We evaluated tenure both by measuring how long, on average, directors have sat on the board (*Time on board*) and how long directors have been involved with the firm (*Time in firm*).
- *Internal network size.* We accounted for the possibility of sharing and connecting between the board and employees by measuring the size of the BOD network within the firm

(*internal network size*), i.e., the average number of individuals with whom the board members overlap while employed in other activities or education roles in the same firm.

- *Education*. We measured education by accounting for the number of qualifications held, on average, by BOD members (*N. Qualifications*). In addition, we also measured the level of education with ordinal values, equal to 1 if the director has a diploma, to 2 if he or she has a bachelor's degree, to 3 indicates a master's degree, to 4 for postgraduate education titles, i.e., MBA, executive master, etc., and to 5 if the director holds a PhD. We then measured the *Qualification level* of the board, that is the average level of qualifications held by BOD members.

All the measures for the outcome variables were directly gathered or elaborated using data from the BoardEx database. Table 1 shows the list of all variables used in our analysis with their description.

Table 1 - Variables definition

Variables	**Definition**
SP	Dummy variable which takes value 1 if the for-profit firm adopted a social purpose, 0 otherwise
Board size	Number of directors sitting on the board (source: BoardEx)
NED	Percentage of non-executive independent directors (source: BoardEx)
CEO duality	Dummy variable which takes value 1 if the chairman is also the CEO of the firm, 0 otherwise (source: BoardEx)
Age	Average age of directors (source: BoardEx)
Under35	Percentage of directors under 35 (source: elaborated by BoardEx data)
Under45	Percentage of directors under 45 (source: elaborated by BoardEx data)
Under50	Percentage of directors under 50 (source: elaborated by BoardEx data)
Female	Percentage of female directors (source: BoardEx)
Diff Nationality	Percentage of different nationalities represented on the board (source: elaborated by BoardEx data)
Time on board	Average time since directors have sat on the board, measured in years (source: BoardEx)
Time in firm	Average time since directors have been employed by the firm, measured in years (source: BoardEx)

Internal network size	Average number of individuals with whom the board members overlap while in employment, other activities, or education roles at the same firm (source: BoardEx)
N. Qualifications	Average number of qualifications hold by directors (source: BoardEx)
Qualification level	Average level of qualifications held by directors. The qualification level It is an ordinal variable that takes a value from 1 to 5 depending on the level of education achieved: 1=diploma, 5=PhD (source: elaborated by BoardEx data)
Revenues	Natural logarithm of total revenues (source: Refinitiv Eikon)
Asset	Natural logarithm of total asset (source: Refinitiv Eikon)
Debt	Natural logarithm of total debt outstanding (source: Refinitiv Eikon)
Equity	Natural logarithm of total equity (source: Refinitiv Eikon)
Employees	Natural logarithm of the number of employees (source: Refinitiv Eikon)

3.5. Logistic Regression Analysis

Following Gomes (2019), we also performed logistic regressions to quantitatively evaluate the impact of board characteristics on SP. In particular, we used SP as the dependent variable, BOD characteristics as independent variables – examined one at a time in separate models – and financial measures as control variables. We also controlled for sectors and countries. Logistic analyses were carried out by applying the following model:

$$logit(PDS = 1|BOD\ characteristic) = \frac{1}{1 + e^{z}}$$

with $z = \beta_0 + \beta_1 xBOD\ Characteristic + \beta_2 xRevenues + \beta_3 xAsset + \beta_4 xDebt + \beta_5 xEquity + \beta_6 xEmployees + \beta_7 xSector + \beta_8 xCountry.$

4. RESULTS

Descriptive statistics of the variables included in the analysis are reported in Table 2. As shown, 26% of the firms exhibit a SP.

Table 2 - Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
SP	0.26	0.44	0	1
Board size	10.44	4.54	3	29
NED	0.51	0.27	0	1
CEO duality	0.21	0.41	0	1
Age	57.79	4.26	43.10	74.58
Under35	0.01	0.03	0	0.21
Under40	0.03	0.07	0	0.50
Under45	0.08	0.11	0	0.71
Female	0.28	0.15	0	0.80
Diff Nationality	0.22	0.25	0	1
Time on board	6.11	3.26	0.59	32.52
Time in firm	7.42	4.10	0.59	37.62
Internal network size	862.39	754.40	17	5155.79
N. Qualifications	19.41	10.22	1	66
Qualification level	2.87	0.41	1	4.11
Revenues	21.19	1.82	17.11	25.37
Asset	22.03	2.02	18.09	27.38
Debt	20.44	2.25	14.56	25.69
Equity	20.85	1.85	13.48	24.90
Employees	8.47	1.99	2.83	12.59

Table 3 - Correlation matrix

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) SP	1																			
(2) Board size	0.12	1																		
(3) NED	0.18	-0.13	1																	
(4) CEO duality	-0.02	0.25	-0.14	1																
(5) Age	0.01	0.01	0.19	0.02	1															
(6) Under35	-0.07	-0.04	-0.08	-0.04	-0.28	1														
(7) Under40	-0.06	-0.07	-0.07	-0.06	-0.45	0.51	1													
(8) Under45	-0.10	-0.05	-0.14	0.02	-0.63	0.33	0.65	1												
(9) Female	0.18	0.07	0.28	-0.05	-0.06	0.00	0.05	0.02	1											
(10) Diff Nation.	0.13	0.00	0.23	-0.06	0.20	-0.14	-0.08	-0.09	-0.07	1										
(11) Time on board	-0.14	0.02	-0.19	0.16	0.35	0.03	-0.05	-0.14	-0.04	-0.14	1									
(12) Time in firm	-0.07	0.21	-0.24	0.16	0.26	0.00	-0.05	-0.12	-0.02	-0.17	0.88	1								
(13) Int. Net. Size	0.21	0.07	0.29	-0.02	0.21	-0.13	-0.16	-0.14	0.03	0.59	-0.11	-0.12	1							
(14) N. Qual.	0.18	0.81	0.01	0.15	0.06	-0.08	-0.10	-0.11	0.04	0.20	-0.06	0.09	0.30	1						
(15) Qual. Level	0.08	-0.03	0.08	-0.09	0.02	-0.01	-0.02	-0.01	0.01	0.08	-0.07	-0.05	0.11	0.10	1					
(16) Revenues	0.22	0.61	0.02	0.17	0.14	-0.05	-0.11	-0.10	0.10	0.21	0.05	0.18	0.27	0.57	0.01	1				
(17) Asset	0.22	0.60	0.10	0.12	0.15	-0.07	-0.11	-0.11	0.18	0.21	-0.02	0.11	0.36	0.63	0.04	0.86	1			
(18) Debt	0.18	0.50	0.15	0.12	0.12	-0.05	-0.06	-0.08	0.18	0.21	-0.07	0.04	0.33	0.54	0.02	0.73	0.89	1		
(19) Equity	0.21	0.58	0.09	0.12	0.15	-0.06	-0.09	-0.09	0.16	0.25	0.03	0.15	0.35	0.61	0.06	0.80	0.94	0.80	1	
(20) Emp.	0.18	0.53	-0.03	0.17	0.15	-0.04	-0.11	-0.12	0.00	0.20	0.10	0.23	0.26	0.49	0.03	0.88	0.62	0.55	0.60	1

The correlation matrix (see Table 3) shows correlation coefficients below 0.9 for all the variables, which, according to Hair, Black, Babin, Anderson, & Tatham (Hair et al., 2006), may not cause serious multicollinearity problems. However, other scholars argued that multicollinearity problems might arise with correlation coefficients greater than 0.7 (Mela & Kopalle, 2002). Therefore, we also performed the variance inflation factor (VIF) test to check for multicollinearity (see Table 4), which is confirmed to be absent since all the values are less than 10 (Gujarati & Porter, 2009), with an average value of 2.92.

Table 4 - VIF test

VARIABLES	VIF	1/VIF
Time on board	6.60	0.15
Time in firm	6.41	0.16
Revenues	5.79	0.17
Equity	5.54	0.18
BOD size	4.17	0.24
N. Qualifications	3.84	0.26
Debt	2.56	0.39
Under45	2.43	0.41
Age	2.22	0.45
Asset	2.19	0.46
Under40	2.16	0.46
Internal network size	1.97	0.51
Diff Nationality	1.73	0.58
Employees	1.7	0.59
Under35	1.40	0.72
NED	1.40	0.72
Female	1.21	0.86
CEO duality	1.16	0.87
Qualification Level	1.08	0.92
Mean VIF	**2.92**	

4.1. Propensity Score Matching Results

A requirement to use PSM is that observations with the most similar propensity score must have the same distribution of observable attributes, i.e., matching variables, regardless of treatment. In other words, the balancing property test must be satisfied (Dehejia & Wahba, 2002). There is no strict rule about the level of acceptable imbalance in a propensity score. However, some researchers indicated the maximum tolerable level for the standardized difference in specific covariates ranges, ranging from 10% to 25% (Austin, 2009; Duong & Thanh, 2019; Garrido et al., 2014). Results of the balancing test of unmatched and matched samples are reported in Table 5. Before matching, many covariates show standardized differences greater than 25%. After matching, all covariates show standardized differences below 25%, and most of them below 10%. Therefore, the balancing property is satisfied.

The results of PSM are reported in Table 6, which shows the difference in BOD characteristics between SP firms and non-SP firms, matched according to the closest probability to be treated. We observe significant differences between SP and non-SP firms for several board characteristics. In particular, SP firms have more independent directors than non-SP counterparts. Indeed, the percentage of NED is, on average, from 0.09 to 0.11 higher at a significant level of 1%, regardless of the applied matching method. On the contrary, the differences in BOD size and CEO duality are not statistically significant. Although the average age of directors is not statistically significant, there is a significant difference in the percentage of directors under 45 who are less represented on corporate boards of SP firms. While this difference is slight in coefficients, around 0.02 points lower in SP firms than in non-SP firms, it shows statistically significant 5% and 10% levels with Kernel and Radius methods, respectively. While not holding with the NN method, this result is valid, given the higher accuracy of Radius matching. On the contrary, women are more

present in BODs of SP firms, as highlighted by the 5% increase in gender diversity in SP firms. This result holds whatever the model used at a significant level of 1%. In addition, the BODs of SP firms exhibit around 5% greater nationality diversity at a significance level of 10% regardless of the applied method.

Board tenure empirically plays a relevant role in the adoption of SP. In fact, time on board and time in the firm significantly differ between SP and non-SP firms. In the latter, directors have, on average, at least one year less board experience, and this difference is significant at 1%. Time in firm is also significant, resulting in an average of 0.94 to 1.13 years shorter in SP firms (at a significance level of 5% in Kernel and Radius methods and 1% in the NN method). There is also a positive and strongly significant difference in the internal network size of SP firms compared to non-SP firms. On average, BODs of SP firms have 206 to 252 more overlaps with other firm colleagues than similar non-SP firms.

Finally, concerning educational diversity, while the results of the number of qualifications are not significant, there is a significant difference in the average level of qualifications. More specifically, the average level of qualifications is 0.07 points higher in the BODs of SP firms, and this result holds with both Kernel and Radius models at a 10% significance level. Although not confirmed by all three matching models, taken together, these results suggest that directors' education is a relevant discriminator between SP and non-SP firms.

Table 5 - Balancing test of unmatched and matched samples

	Unmatched			Kernel			NN			Radius		
Variable	Treated	Control	Stand. Diff.	Treated	Control	Stand. Diff.	Treated	Control	Stand. Diff.	Treated	Control	Stand. Diff.
	Mean	Mean	In %	Mean	Mean	In %	Mean	Mean	In %	Mean	Mean	In %
Revenues	21.88	20.92	54%*	21.65	21.64	0.47%	21.55	21.45	5.33%	21.84	21.90	-3.39%
Asset	22.55	21.53	55%*	22.26	22.26	-0.27%	22.11	22.05	3.00%	22.49	22.50	-0.96%
Debt	20.89	19.97	45%*	20.67	20.67	0.04%	20.51	20.45	3.25%	20.85	20.98	-6.38%
Equity	21.39	20.47	52%*	21.17	21.14	1.85%	21.02	20.94	4.23%	21.36	21.29	3.51%
Employees	9.01	8.22	40%*	8.84	8.83	0.63%	8.76	8.71	2.67%	8.99	9.12	-6.61%
Obs (on-support)	580			563			298			572		
Obs (off-support)				17			282			8		

** Absolute value of mean standardized difference above 25%.*

Table 6 - Board composition difference between SP firms and non-SP firms

	(1) Kernel	(2) NN	(3) Radius
Board size	0.059	-0.126	-0.214
	(0.12)	(-0.24)	(-0.43)
NED	0.114***	0.097***	0.096***
	(4.27)	(3.46)	(3.56)
CEO duality	-0.029	-0.066	-0.062
	(-0.68)	(-1.61)	(-1.47)
Age	-0.27	-0.462	-0.309
	(-0.61)	(-1.06)	(-0.78)
Under35	-0.003	-0.003	-0.003
	(-1.13)	(-1.39)	(-1.35)
Under40	-0.005	-0.003	-0.004
	(-0.82)	(-0.43)	(-0.66)
Under45	-0.021**	-0.013	-0.019*
	(-2.10)	(-1.30)	(-1.93)
Female	0.052***	0.046***	0.049***
	(3.7)	(3.24)	(3.63)
Diff Nationality	0.045*	0.049*	0.052*
	(1.66)	(1.72)	(1.96)
Time on board	-1.166***	-1.062***	-1.215***
	(-4.00)	(-3.71)	(-4.31)
Time in firm	-1.071***	-0.936**	-1.13***
	(-2.76)	(-2.36)	(-2.99)
Internal network size	230.1***	206.9**	252.7***
	(3.06)	(2.31)	(3.23)
N qualifications	1.735	1.406	1.243
	(1.64)	(1.29)	(1.18)
Qualification Level	0.065*	0.045	0.068*
	(1.68)	(1.14)	(1.69)

*This table reports the results of pair-matched analysis for BOD characteristic. Matching is done using different PSM methods: (1) Kernel (Epanechnikov kernel), (2) Nearest-Neighbor (with n=1), and (3) Radius (with caliper=0.02). t statistics in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

4.2. Logistic Regression results

Logistic regression results are shown in Table 7. Our analyses reveal that specific BOD characteristics have significant effects on the adoption of a SP. In particular, results highlight a positive and statistically significant effect of gender diversity (1% significance level), internal network size (5% significance level), and the average number of qualifications held (1% significance level).

On the contrary, we found a negative and statistically significant impact on the adoption of a SP for the following board characteristics: average percentage of directors younger than 35, time on board and time in firm (at a significance level of 5%, 1% and 1% respectively). We repeated these regressions using probit models to check for robustness, and the results hold (see Table 8).

Table 7 - Board characteristics and the probability of adopting a SP

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(13)	(14)	(8)	(9)	(10)	(11)	(12)
VARIABLES	**Board size**	**NED**	**CEO duality**	**Age**	**Under 35**	**Under 40**	**Under 45**	**Female**	**Diff Nation.**	**Time on Board**	**Time in Firm**	**Internal network Size**	**N. Qual.**	**Qual. Level**
Indep var	0.045	0.82	0.04	-0.04	-10.42**	-2.14	-1.34	3.13***	0.18	-0.16***	-0.10***	0.0004**	0.05***	0.38
	(0.04)	(0.56)	(0.36)	(0.03)	(4.98)	(1.94)	(1.21)	(1.09)	(0.64)	(0.05)	(0.03)	(0.00)	(0.02)	(0.28)
Revenues	0.04	0.09	0.07	0.07	0.02	0.05	0.06	0.11	0.08	0.06	0.09	0.11	0.08	0.09
	(0.27)	(0.26)	(0.26)	(0.27)	(0.26)	(0.26)	(0.26)	(0.26)	(0.26)	(0.27)	(0.27)	(0.26)	(0.28)	(0.26)
Asset	0.72**	0.66*	0.72**	0.74**	0.82**	0.74**	0.73**	0.55	0.72**	0.63*	0.66*	0.61*	0.67*	0.71**
	(0.36)	(0.36)	(0.35)	(0.36)	(0.35)	(0.35)	(0.35)	(0.36)	(0.35)	(0.35)	(0.35)	(0.37)	(0.36)	(0.36)
Debt	-0.07	-0.07	-0.07	-0.06	-0.09	-0.07	-0.07	-0.02	-0.07	-0.07	-0.08	-0.08	-0.09	-0.07
	(0.13)	(0.13)	(0.13)	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.13)
Equity	-0.22	-0.17	-0.19	-0.21	-0.21	-0.18	-0.18	-0.16	-0.19	-0.10	-0.11	-0.16	-0.25	-0.20
	(0.22)	(0.23)	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)	(0.21)	(0.22)	(0.23)	(0.22)	(0.22)
Employees	-0.11	-0.10	-0.11	-0.09	-0.11	-0.11	-0.12	-0.09	-0.11	-0.05	-0.07	-0.13	-0.13	-0.11
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.15)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
Constant	-11.60***	-12.68***	-12.34***	-10.08***	-12.37***	-12.11***	-12.11***	-11.97***	-12.32***	-11.65***	-12.71***	-11.88***	-10.96***	-13.19***
	(3.11)	(3.00)	(3.01)	(3.43)	(2.99)	(3.01)	(3.03)	(2.997)	(2.996)	(3.054)	(3.058)	(3.019)	(3.258)	(3.091)
Obs	528	523	528	527	528	528	528	528	528	528	528	528	528	528
Sector	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
LR Chi2	86.20	85.04	80.33	79.22	81.32	82.20	83.96	87.91	80.22	84.19	86.40	80.22	90.75	82.95
Prob>chi2	0.01	0.01	0.03	0.03	0.02	0.02	0.01	0.01	0.03	0.01	0.01	0.03	0.00	0.01
Pseudo R2	0.18	0.18	0.18	0.18	0.19	0.18	0.18	0.19	0.18	0.20	0.19	0.19	0.19	0.18

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

Table 8 - Robustness check: Probit regression

VARIABLES	(1) Board size	(2) NED	(3) CEO duality	(4) Age	(5) Under 35	(6) Under 40	(7) Under 45	(13) Female	(14) Diff Nation.	(8) Time on Board	(9) Time in Firm	(10) Internal network Size	(11) N. Qual.	(12) Qual. Level
Indep. Var.	0.05	0.82	0.04	-0.04	-10.42**	-2.14	-1.34	3.13***	0.18	-0.16***	-0.10***	0.0004**	0.05***	0.38
	(0.04)	(0.55)	(0.35)	(0.03)	(5.20)	(1.95)	(1.23)	(1.15)	(0.68)	(0.05)	(0.04)	(0.00)	(0.02)	(0.32)
Revenues	0.02	0.06	0.04	0.04	0.02	0.03	0.04	0.08	0.06	0.09	0.11	0.08	0.09	0.08
	(0.15)	(0.15)	(0.15)	(0.15)	(0.14)	(0.15)	(0.15)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Asset	0.41**	0.39*	0.41**	0.42**	0.47**	0.42**	0.42**	0.72*	0.63*	0.66*	0.611	0.67*	0.71*	0.72*
	(0.21)	(0.21)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.37)	(0.38)	(0.38)	(0.37)	(0.37)	(0.37)	(0.37)
Debt	-0.03	-0.04	-0.03	-0.03	-0.05	-0.03	-0.03	-0.07	-0.07	-0.08	-0.08	-0.09	-0.07	-0.07
	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)	(0.14)	(0.15)	(0.14)	(0.14)	(0.1)	(0.14)	(0.14)
Equity	-0.13	-0.11	-0.12	-0.12	-0.13	-0.11	-0.11	-0.19	-0.10	-0.11	-0.16	-0.25	-0.20	-0.19
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.21)	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)	(0.21)
Employees	-0.06	-0.06	-0.06	-0.05	-0.07	-0.07	-0.07	-0.11	-0.05	-0.07	-0.13	-0.13	-0.11	-0.11
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
Constant	-11.60***	-12.68***	-12.34***	-10.08***	-12.37***	-12.11***	-12.11***	-11.97***	-12.32***	-11.65***	-12.71***	-11.88***	-10.96***	-13.19***
	(3.15)	(3.11)	(3.08)	(3.58)	(3.09)	(3.08)	(3.08)	(3.10)	(3.07)	(3.10)	(3.10)	(3.09)	(3.15)	(3.18)
Observations	528	523	528	527	528	528	528	528	528	528	528	528	528	528
Sector	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
LR Chi2	112.1	112.8	110.9	111.8	115.8	112.2	112.2	118.5	111	122.6	119.2	115.2	118.9	112.3
Prob > chi2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R2	0.18	0.18	0.18	0.18	0.19	0.18	0.18	0.19	0.18	0.20	0.19	0.19	0.19	0.18

*Robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01*

5. DISCUSSION

Overall, our results highlight that specific BOD characteristics affect the probability of adopting a SP in for-profit firms (see Table 9), while others have no effect, as discussed below.

Our findings confirm the inconclusive results highlighted by previous research on the influence of board size on strategic decision-making (Cornforth, 2001; Golden & Zajac, 2001; Goodstein et al., 1994). Indeed, both PSM and regression analyses show non-significant coefficients.

Regarding board independence, while CEO duality is not significant in both PSM and regression analyses, the PSM analysis showed highly significant differences in the percentage of independent directors between treated and untreated companies, suggesting that it could be a possible driver of adopting a SP. However, the regression analyses revealed that it does not directly affect the probability of adopting a SP. Therefore, we cannot conclude that the independency of the board directly affects the adoption of a SP in European for-profit firms.

Counterintuitively to the extant literature, our findings indicate a negative effect of young directors on adopting a SP. Perera, Auger & Klein (2018) argued that younger generations exhibit greater sensitivity to environmental and social issues, thus being flexible to drive structural change for societal good within organizations. However, younger directors may also be hindered from implementing changes within the corporate board by older directors who are accustomed to "it's always been done this way" practices. Moreover, compensation incentives to maintain the status quo and career growth opportunities may also greatly paralyze younger directors to adopt SP, representing a radical change in the firm's strategic structure (Henderson, 2021a; Izzo & Vanderwielen, 2018).

Concerning gender diversity, our findings show that as the number of females on boards increases, the likelihood of adopting a SP increases too. This confirms recent studies on gender

diversity that stressed women's capacity to shift the corporate governance focus from a shareholder to a multi-stakeholder perspective (De Masi et al., 2021). In particular, the adoption of a SP requires going beyond profit maximization to look at the needs of people and the environment (Mayer, 2021), and gender diversity positively impacts such corporate capacity as women are more sensitive to sustainability initiatives than men (Amorelli & García-Sánchez, 2020; Boulouta, 2013).

Moreover, our findings demonstrate that board tenure, measured in terms of how long the directors are employed in the firm and on the board, is negatively and significantly associated with the probability of adopting a SP. Such a result suggests that the longer directors have sat on the board or worked for the firm, the less they will be motivated to introduce changes by adopting a SP.

The positive effect of directors' educational background on adopting a SP is consistent with previous corporate governance studies that showed it positively affects sustainability performance (Chams & García-Blandón, 2019; Post et al., 2011). Indeed, such a positive effect highlighted by previous research could result from consciously adopting a purpose beyond profit maximization. A further explanation besides the greater environmental awareness and social concern of people driven by higher levels of education may also be the higher pro-social orientation of the education system. Therefore, people with a higher education level can be more aware of social and environmental issues, and this, in turn, positevly impacts the willingness to adopt SP.

Finally, BOD internal network size positively affects the likelihood of adopting a SP. Indeed, tight connections of BOD members with firm employees facilitate the implementation of SP, which in turn, is demonstrated to drive employees' engagement, creativity and effort (Henderson, 2021a). Within this auto-reinforcing circle, the preliminary condition is that BOD members connect as much as possible with employees, as empirically verified by our analysis.

The higher the connections between the board and employees, the higher the likelihood of adopting a SP. Moreover, sharing activities and roles between individuals is the basis for building organizational unity, which is necessary to realize the change, as in the case of adopting a SP.

Overall, our findings provide evidence that the BOD can be a key agent for SP adoption as both structural characteristics of the BOD (BOD size, independence, internal network size, and tenure) and directors' personal characteristics (education, gender diversity, and age) affect the likelihood to adopt a SP.

Table 9 - Comparison between PSM and regression analysis

	PSM analysis	Regression analysis	Total
Board size	None	None	None
Independence	+	None	None
Age	-	-	-
Gender diversity	+	+	+
Diff Nationality	None	None	None
Tenure	-	-	-
Internal network size	+	+	+
Education	+	+	+

(+) Positive and significant effect, (-) Negative and significant effect, (None) Not significant effect

5.1. Theoretical contributions

Our study contributes to the academic literature in several ways. First, our research contributes to the intersection of corporate governance and corporate purpose literature streams. By empirically testing the relationship between the BOD and the adoption of a social purpose in for-profit firms, we highlighted that the BOD is a key agent for moving toward a SP. In particular, we showed that specific BOD characteristics play a key role in leading the firm to adopt a SP. In so doing, we provide first empirical evidence supporting the importance of internal corporate governance mechanisms for integrating the corporate purpose within the firm (Battilana et al., 2022).

Second, while prior research has adopted qualitative methods of data collection to measure corporate purpose, such as interviews and questionnaires (Bhattacharya et al., 2023; Gartenberg et al., 2019; Lashitew et al., 2023), that are affected by respondents' subjectivity as well as researchers' discretion, we developed a measure to identify firms with social purpose based on secondary data, thus contributing to the call for developing objective metrics to empirically test corporate purpose conceptualizations (Battilana et al., 2022; Brosch, 2023; Lashitew et al., 2023). More specifically, based on prior literature, we identified three criteria that must be jointly met: 1) the firm explicitly discloses the adoption of a specific corporate purpose; 2) the firm publishes an extra financial report to explain how its activities fit the social purpose by communicating its commitment to sustainable development; 3) this supplementary report discloses the social impact of at least 50 percent of the firm's overall activities.

Third, by highlighting which BOD characteristics influence the adoption of a SP, we pointed out that not only structural and demographic characteristics of the BOD are important, but directors' personal qualities are especially relevant for adopting a SP. In particular, according to the upper-echelons theory, we showed that BOD human capital is crucial to giving ontological meaning to organizations' strategic management. Indeed, personal characteristics are non-negligible elements when pursuing pro-social goals, especially in for-profit business contexts (Battilana et al., 2019, 2022; Goranova & Ryan, 2022). In so doing, we contribute to expanding knowledge on the strategic role of the BOD, providing empirical evidence that it goes beyond the mere approval of strategic management decisions. Indeed, we found that specific BOD characteristics significantly affect the probability of adopting a SP, and such a result suggests that BOD play a vital role in setting strategies.

5.2. Managerial implications

Our research also contributes to managerial practice by providing useful indications to practitioners and policymakers. First, our findings show that firms can move toward a social purpose by leveraging specific BOD characteristics. Indeed, we showed that specific board characteristics are positively correlated with the likelihood of adopting a social purpose, while others have no or negative effect. This result points to the relevance of directors' qualities in building a sense of purpose that can lead the firm to pay more attention to its impact on society. In particular, cultivating the network with employees, welcoming independent members into the board and fostering gender diversity are key factors in facilitating strategic change aimed at solving the grand challenges of our times.

In addition, we provide useful guidance to investors by highlighting which board characteristics are drivers of SP adoption. Investors are increasingly concerned about the social impact of the firms they invest in and demand that they integrate efforts in sustainability into strategy and operations (Block et al., 2021). The board plays a key role in this regard. Thus, by providing initial insights into the BOD characteristics that favor the adoption of a social purpose, our study offers guidance to investors when selecting directors.

6. CONCLUSIONS

In this explorative study, we empirically analyzed the relationship between the characteristics of the board of directors and the adoption of a social purpose in for-profit firms. We collected data from a sample of 580 European firms, using BoardEx and Refinitiv Eikon databases to measure the variables of interest. In particular, we explored the impact of the following board characteristics on adopting a SP: board size, independence, tenure, age, education, gender diversity, nationality diversity and internal network size. First, we applied Kernel, NN and Radius propensity score matching techniques to explore which BOD

characteristics differ between SP and non-SP firms. We matched firms based on similar financials and employees to control for self-selection bias. Second, we applied logistic regression analyses in our sample of 580 European firms to assess how the abovementioned characteristics affect the adoption of SP.

Our empirical findings provide first evidence that specific BOD characteristics may affect a firm's probability of adopting a SP, thus suggesting that BOD composition is crucial for leading firms toward goals beyond profit maximization.

6.1. Limitations and future research

Our study is not exempt from limitations that could be addressed by future research. First, we performed a cross-sectional analysis that may hinder the generalizability of our results. While BoardEx and Refinitiv Eikon databases provide longitudinal BOD and financial data, we did not find a valid longitudinal measure for the adoption of social purpose. Future researchers may overcome this limitation by observing our dependent variable over time.

Second, we examined the impact of board characteristics on the adoption of social purpose, not on its implementation. Understanding how SP can be successfully implemented in for-profit firms and what are the most affected functions within the organization would be extremely interesting to advance knowledge on corporate purpose. Qualitative methods, such as multiple case studies, can adequately evaluate the actual implementation of social purpose. Therefore, mixed methodologies could be used to properly assess the effects of BOD characteristics on the actual implementation of SP.

Third, while we perform an explorative analysis through simple models to investigate which BOD characteristics may drive the adoption of a SP, further research may advance knowledge on the BOD-SP relationship by focusing on contingency factors.

Fourth, we did not consider corporate performance. In particular, the commitment to solve a societal need other than profit maximization should also increase corporate sustainable performance. Researchers are invited to investigate how different BOD characteristics affect sustainability performance by differentiating for the adoption of a social purpose.

In addition, because we use secondary data, we were limited to analyzing observable board characteristics and could not examine the internal dynamics of BOD that foster the adoption of a social purpose. For example, using qualitative methods would be fascinating to understand how and how much the board discusses corporate purpose.

Furthermore, it would be interesting to analyze the reverse relationship, i.e., whether adopting a SP affects the composition of BODs by favoring specific characteristics of directors.

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2.

Sustainable Governance: Board Sustainability Experience and the Interplay with Board Age for Firm Sustainability

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ABSTRACT

The growing emphasis on sustainability in the business landscape has prompted scholars and industry practitioners to explore the role of corporate governance, especially the board of directors, in promoting firm sustainability. While previous research has primarily focused on observable board characteristics, this study delves into a less visible aspect of sustainable boards, i.e. sustainability experience. Drawing on upper echelons and resource dependency theories, we explore the impact of board sustainability experience on firm sustainability performance, with a particular focus on the potential moderating effect of board age. By employing propensity score matching and panel regression analyses on a sample of 510 European listed companies from 2014 to 2020, our results show that the effect of board sustainability experience on firm sustainability performance is contingent upon board age. Specifically, sustainability experience leads to high sustainability performance when the board is younger, while it becomes negative when the board is older. It is the first study to examine the joint impacts of board sustainability experience and board age, thus providing valuable contributions to theory and insights for firms in director recruitment and offering recommendations for regulatory practices.

KEYWORDS

Board of Directors, Sustainability Experience, Board Age, Sustainability Performance; ESG.

1. INTRODUCTION

The contemporary business landscape is experiencing a significant shift towards sustainable practices as organizations face mounting pressure to become more environmentally and socially responsible, catering to the diverse needs and expectations of various stakeholders, including investors, employees, customers, and regulators (Broman & Robèrt, 2017; Centobelli et al., 2020; Porter & Kramer, 2011; Stål et al., 2023). The heightened emphasis on sustainability has sparked a growing interest among scholars, policymakers, and industry practitioners in exploring ways to promote sustainability within companies (Arena et al., 2015; García Martín & Herrero, 2020). This, in turn, has increased concerns about how companies are governed and what governance mechanisms can effectively influence corporate behavior towards sustainable practices (Ben-Amar et al., 2017; Walls et al., 2012). Literature on corporate governance and sustainability has grown substantially, and special emphasis has been placed on the role of the board of directors in steering organizations towards a sustainable transition in recent years (Aguilera et al., 2021; De Masi et al., 2021; Karpoff, 2021; Konadu et al., 2021; Liao et al., 2021; Naciti et al., 2022). Indeed, as boards wield considerable influence on strategic decision-making and organizational outcomes, understanding the factors that shape their orientation towards sustainability is crucial in driving the firm's sustainable transition.

While previous research has predominantly focused on easily observable board characteristics, such as board size, chairman-CEO duality, directors' independence, and gender diversity (Chams & García-Blandón, 2019; Cosma et al., 2021; De Masi et al., 2021; de Villiers et al., 2011; Naciti, 2019), this study aims to contribute to this burgeoning field of research by delving deeper into less visible aspects of sustainable boards. In particular, we examine the impact of board members' sustainability experience on firm sustainability performance, as well as the potential moderating effect of board age.

Building on the upper echelons theory (Hambrick, 2007; Hambrick & Mason, 1984) and resource dependency theory (Hillman et al., 2000; Pfeffer & Salancik, 1979), we posit that the sustainability expertise of board members plays a key role in guiding a firm's sustainable orientation, which can ultimately result in higher sustainability performance. Specific expertise is essential for sustainability, as it enables individuals to grasp the complexities of sustainability (Amui et al., 2017). Indeed, when equipped with the necessary skills and competencies, directors play a vital role in initiating sustainability implementation (Chams & García-Blandón, 2019).

Few studies have analyzed the relationship between the sustainability-related expertise of board members and sustainability outputs, showing heterogeneous results (Velte, 2023b). Such conflicting results suggest that sustainable boards can serve as mere symbolic gestures for firms, raising greenwashing concerns, or can genuinely support firms' sustainability efforts, reflecting intrinsic motivation from decision-making (Velte, 2023a). In line with this, we posit that holding sustainability expertise is not sufficient to leverage firm sustainability if the intrinsic motivation of the board does not support it.

Existent research has primarily focused on institutionalized forms of integrating sustainability expertise within the board of directors, such as the presence of CSR committees (Fuente et al., 2017; Javeed et al., 2022; Velte & Stawinoga, 2020) or a chief sustainability officer (CSO) (Kanashiro & Rivera, 2019; Peters & Romi, 2015; Velte, 2023b; Velte & Stawinoga, 2020). However, individual board members' characteristics may also be relevant for sustainable boards. As a genuine commitment to sustainability entails its full integration as a core aspect of corporate strategy rather than a subsidiary activity (Galpin & Whittington, 2012; Lynn, 2021; Siltaloppi et al., 2021), sustainability issues should be discussed within the board alongside corporate strategies, rather than being solely confined to specific roles or committees. In this regard, we emphasize the significance of the individual characteristics of

all board members, as they contribute to the overall sustainability expertise of the board and can drive the firm's sustainability efforts to greater success.

In particular, we argue that the prior sustainability experience of the board is instrumental in shaping a firm's approach to sustainable development. Indeed, directors with sustainability experience have a greater understanding and appreciation of sustainability issues, leading to an increase in sustainability disclosure (Alodat et al., 2023).

Only a few studies have focused explicitly on the sustainability experience of the board, providing evidence that it positively affects sustainability outcomes. Homroy and Slechten (2019) conducted a study utilizing data from FTSE 350 firms over the period 2006-2014, with a specific focus on environmental performance. Their findings revealed that companies with directors with solid networks and specific environmental expertise exhibit lower greenhouse gas emissions. Jamil et al. (2021) analyzed sustainability reporting quality in Malaysian firms from 2010 to 2014, showing that it is positively affected by the percentage of directors with sustainability-related experience. Similarly, the recent research conducted by Subramaniam et al. (2023) , examining the top-150 Australian companies, found that the presence of board members with sustainability experience positively impacts the quality of reporting related to Sustainable Development Goals.

However, despite these initial findings, there is limited knowledge about the impact of board sustainability experience on firm sustainability performance in the European capital market (Velte, 2023a). To the best of our knowledge, the only study exploring this relationship in the EU context is currently by Velte (2023b), which examines the sustainability experience of Chief Sustainability Officers (CSOs) and its effect on biodiversity disclosure, founding a positive association. Thus, further exploration is needed to understand the broader effect of overall board sustainability experience on firm sustainability performance in the European context.

In addition, while the sustainability experience of board members will increase sustainability performance, boundary conditions may influence this relationship. As argued above, board sustainability expertise may not be sufficient to leverage firm sustainability if not supported by board members' intrinsic motivation towards social and environmental responsibility. Thus, other board characteristics may intervene in the relationship between board sustainability experience and firm sustainability performance.

In particular, we posit that the age of board members can influence the association between board sustainability experience and firm performance, as younger and older directors may have different levels of attention, awareness, and sensitivity towards sustainability issues (Cosma et al., 2021; Gardiner, 2022; He et al., 2023). This difference translates into distinct intrinsic motivations to leverage sustainability experience in promoting a sustainable transition. Thus, we speculate that board age may influence the effect that the board sustainability experience has on firm sustainability performance.

In light of the above, the objective of this study is to investigate whether board sustainability experience influences firm sustainability performance and whether this relationship depends upon board age. Thus, we pose the following research questions:

RQ1: Does board sustainability experience affect firm sustainability performance?

RQ2: Does the relation between board sustainability experience and firm sustainability performance depend on board age?

To address these questions, we carried out propensity score matching and panel regression analyses on a sample of European listed companies from 2014 to 2020. Results confirm our arguments by showing that the effect of board sustainability experience on firm sustainability performance depends on board age.

This research makes several theoretical and practical contributions. It is the first study to investigate the impacts of board sustainability experience and board age together, revealing that board age moderates the effect of board sustainability experience on sustainability performance. By focusing on a tiny explored board characteristic, i.e. sustainability experience, we advance the literature on the relationship between board composition and corporate sustainability. In addition, we provide useful recommendations to firms in recruiting directors and offer interesting insights for regulation.

The remainder of the paper is structured as follows. In the next section, the theoretical framework and the hypotheses are described. The third section presents the method, data, and variables. The fourth section presents the results. Finally, in the fifth section, we discuss the results, highlight our theoretical and practical contributions, and draw limitations and future research.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

According to Elkington's definition, corporate governance (CG) "is fundamentally about such questions as what business is for—and in whose interests companies should be run, and how" (Elkington, 2006, p. 522); therefore, sustainability decisions are dictated by CG arrangements. Among the CG mechanisms, the board of directors is the most important as it plays a vital role in integrating sustainability into corporate governance (Ludwig & Sassen, 2022). The board defines the corporate purpose, sets priorities, and directs and monitors business strategies (Battilana et al., 2022; Castellanos & George, 2020; Kim et al., 2009). In so doing, it shapes a firm's sustainable orientation, playing a pivotal role in driving sustainability strategies and affecting its sustainability performance (Naciti, 2019).

The relationship between the board of directors and firm sustainability is explained by several theories, including stakeholder theory, agency theory, upper echelons theory, resource

dependency theory, and legitimacy theory (for a review see, for instance, Madhani, 2017). In line with prior research (e.g. Cosma et al., 2021; Velte, 2023b), we focus on the upper echelons theory and resource dependency theory to investigate the relationship between board sustainability experience, board age and firm sustainability performance.

The upper echelons theory (Hambrick, 2007; Hambrick & Mason, 1984) posits that an organization's strategic choices, behaviors, and outcomes are significantly influenced by the individual characteristics of its leadership, namely the top management team and the board of directors. According to this theory, individual differences in background, experiences, values, and cognitive styles among upper echelons contribute to how they approach and make decisions, influencing strategic choices and corporate performance (Carpenter et al., 2004). Based on this theory, upper echelons' characteristics serve as drivers for strategic choices concerning corporate sustainability, impacting the sustainability performance of the companies in which they operate (Velte, 2023b).

The resource dependency theory (Hillman et al., 2000; Pfeffer & Salancik, 1979) posits that the board of directors serves as a resource provider for a company, offering a wealth of skills, qualities, and human capital. Based on the premise that the external environment contains limited resources that are crucial for business survival, this theory emphasizes the critical role of the board in providing resources for the organization and minimizing its dependence on external resources (Arioglu, 2021; Jamil et al., 2021). Board members offer valuable resources to the firm not only through their networks but also through their professional and personal competencies (Huse, 2005). According to Hillman and Dalziel (Hillman & Dalziel, 2003), the experience and expertise of the board are the primary factors leading to better resource provision for the company.

As previous research has shown, implementing and integrating sustainable strategies involve challenges and complexities that must be effectively managed, requiring specific

resources and competencies not always available within companies. (Amui et al., 2017). With adequate expertise, board members can thus promote the implementation of sustainability within the firm, helping managers adopt pro-social behaviors and enhance the sustainable value created by the company (Berrone & Gomez-Mejia, 2009; Chams & García-Blandón, 2019).

Combining these two theoretical lenses, it emerges that the board's composition influences decision-making, thus affecting corporate performance, as members with different characteristics have different views and perceptions of issues, particularly regarding sustainability, and bring different resources and capital to the company. Consequently, examining board characteristics has emerged as a topic of considerable interest in management literature concerning sustainability (Disli et al., 2022; Endrikat et al., 2021; García Martín & Herrero, 2020; Ludwig & Sassen, 2022; Ortiz-de-Mandojana & Aragon-Correa, 2015).

In particular, the prior sustainability-related experience of board members represents a factor of particular interest, as the directors' background influences their sensitivity, awareness, and preparedness on sustainable issues, thus impacting the board's sustainable orientation (Subramaniam et al., 2023; Velte, 2023a). Thus, the board's ability to provide strategic direction responsive to society and the environment's needs depends on its experience and expertise, based on which it interprets and recognizes institutional pressures (Hillman & Dalziel, 2003; Walls & Hoffman, 2013), such as sustainable development. Therefore, we contend that previous experience of the board in sustainability-related roles can be even more crucial in affecting corporate sustainability performance.

2.1. Board sustainability experience and firm sustainability performance

Experience represents a crucial cognitive filter for processing and comprehending information, shaping the way reality is interpreted (Hambrick, 2007; Starbuck & Milliken, 1988). In line with the upper echelons theory, board members will determine strategic priorities

and crucial issues to bring to the board's attention based on their experience (Tuggle et al., 2010). Moreover, according to resource dependency theory, experience is a fundamental asset of the human capital provided by the board of directors (Walls & Hoffman, 2013).

Gaining experience in specific roles allows people to develop specialized and innovative skills and knowledge, allowing organizations to break away from established norms (Battilana, 2006; Sewell, 1992). The sustainable transition represents a challenge requiring companies to innovate their business models and move beyond established norms, developing novel solutions with positive societal and environmental impacts (Delmas et al., 2019; Schaltegger et al., 2016). Thus, the board's specific sustainability-related experience can facilitate the implementation of sustainable strategies leading to high sustainability performance (Homroy & Slechten, 2019; Subramaniam et al., 2023).

Sustainability experience allows for in-depth knowledge of sustainability-related issues (Jamil et al., 2021). This knowledge can help board members to better identify and understand opportunities and challenges arising from managing sustainability. Therefore, a deep understanding of sustainability issues is a fundamental prerequisite for initiating sustainability implementation by adopting sustainable strategies and practices that can drive sustainability performance (Chams & García-Blandón, 2019).

Furthermore, board members with sustainability experience will be more skilled in integrating sustainability dimensions into corporate decision-making processes, preventing it from becoming a merely symbolic, ancillary activity of the leading business strategy. Indeed, prior research argued that sustainability experience should reduce the risk of greenwashing (Fu et al., 2020) and lead to more balanced and sustainable decisions, considering the interests of various stakeholders (Velte, 2023b), resulting in high sustainability performance.

Additionally, integrating sustainability into corporate strategy involves trade-offs between economic, social, and environmental objectives (Battilana et al., 2022). Board

members with sustainability experience are already familiar with these trade-offs and can better manage them, thus achieving improved sustainability performance.

Therefore, in line with emerging research on the topic (Jamil et al., 2021; Peters & Romi, 2014; Subramaniam et al., 2023; Velte, 2023b), we hypothesize the following:

Hypothesis 1 - Previous sustainability experience of the board of directors has a positive effect on firm sustainability performance.

2.2. The moderating effect of board age

Among board characteristics, age is an important attribute that deserves specific attention, given the current trend toward actively promoting younger directors entering the boardroom (Gardiner, 2022). As reported by the PWC's Census of Directors 50 and Under (PWC, 2018), despite being still underrepresented on corporate boards, the presence of young directors has been increasing in the last few years. However, board age has not gotten as much attention in the literature as other board characteristics, and previous research has produced conflicting results about its effect on firm outcomes, pointing to the contingent impact of board age (Gardiner, 2022; Kagzi & Guha, 2018).

Age is an important demographic characteristic of the board, as it reflects the attitudes, opinions, and values of its members (Gardiner, 2022; Talavera et al., 2018; Y. Xu et al., 2018). Notably, older and younger individuals have considerable differences in interests, experiences, technology usage, social network affiliations, and focus on sustainability issues (He et al., 2023; Janahi et al., 2022). Following the upper echelons and resource dependency theories, board members of varying ages bring a range of resources and perspectives to the table (Harrison & Klein, 2007; Hillman et al., 2000), ultimately shaping the decision-making process and influencing organizational outcomes.

Although implementing sustainability within a company requires specific knowledge and skills, which can stem from board sustainability experience, if an intrinsic motivation towards sustainability does not support these, they may not translate into positive sustainability outcomes (Velte, 2023a).

Sustainability is not only an essential requirement for remaining competitive in the market, given the growing attention from stakeholders, but it also concerns the social role of companies (Morrison & Mota, 2023). Since integrating sustainability involves managing a trade-off between financial and socio-environmental objectives (Battilana et al., 2022), if sustainability efforts are driven mainly by economic goals, they will remain secondary and difficult to genuinely incorporate into the organization to achieve good sustainability outcomes. For a thorough and genuine integration of sustainability, a firm must recognize its responsibility towards society and strive to leave a lasting impact for a better world (Battilana et al., 2019; Brosch, 2023; Henderson, 2021). In this regard, the values and motivation of people guiding the firm's decisions are fundamental.

Values are particularly significant drivers of human action, which are substantially reflected in directors' economic decisions (Adams et al., 2011), and recent research has highlighted a strong connection between age and values (Arioglu, 2021; Talavera et al., 2018). Individuals' worldviews and value foundations develop based on diverse experiences, social, political, and economic environments, and events (Katmon et al., 2019). Consequently, the coexistence of different generations within the board implies the presence of varying cultural norms and mindsets that influence the decision-making approach of the directors (Talavera et al., 2018).

Considering that the average age of the European boards is around 56 years (Heidrick & Struggles, 2021), the younger directors have grown up in a period when social expectations for corporate behavior have changed, and the concept of corporate social responsibility has become

increasingly important for investors and business leaders. They have formed their personalities in a context where sustainability has become a mainstream corporate activity and a familiar term (He et al., 2023). Therefore, younger directors are more familiar with sustainability issues and have developed greater awareness and sensitivity towards the social and environmental impact of corporate activities (Gardiner, 2022). Based on these arguments, we assume that younger boards will be more motivated to integrate sustainability within the company. Therefore, they will be more inclined to leverage and value the expertise of directors with sustainability experience on the board to promote sustainability, leading to better sustainability performance.

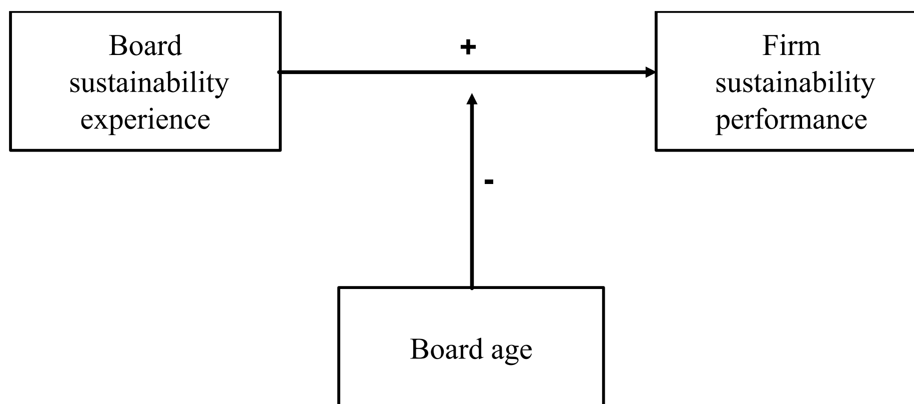
On the contrary, older directors may be less motivated to promote sustainable change within the company. This is not only because they have not fully experienced the times of CSR transformation and may be less aware and sensitive about environmental and social issues (He et al., 2023) but also because they tend to be more risk-averse and conservative (Bertrand & Schoar, 2003; Chindasombatcharoen et al., 2023; Kagzi & Guha, 2018; Wiersema & Bantel, 1992). As mentioned, implementing sustainability within a company requires significant innovation and organizational changes. Consequently, older directors might hinder the movement towards sustainability, stifling the sustainability experience present on the board. Thus, in older boards, directors are less motivated to exploit their sustainability-related experience to drive firm sustainability, weakening the effect of board sustainability experience on sustainability performance.

From the above, we expect that boards of directors with a higher average age neglect the potential of the board sustainability experience to improve firm sustainability performance, thus weakening the relationship, while younger boards enhance the effect of sustainability experience on firm sustainability performance. Based on this, we introduce our second hypothesis:

Hypothesis 2 - Board age negatively moderates the effect of board sustainability experience on firm sustainability performance.

The theoretical framework tested in the study is represented in Figure 1.

Figure 1 – Theoretical model



3. METHODS

3.1. Sample

To test our hypotheses, we perform multivariate analyses on a sample of European listed companies analyzed from 2014 to 2020.

The choice of the European capital context is based on two main factors. First, European Union places significant emphasis on corporate governance mechanisms that can guide companies toward sustainable transitions, recognizing the board's role in sustainability matters, as highlighted by Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022. Nevertheless, over the last few years, the heightened academic focus on gender diversity (Ben-Amar et al., 2017; Cordeiro et al., 2020; Liu, 2018) has overshadowed the importance of other board characteristics, such as sustainability expertise and age (Gardiner, 2022; Zattoni et al., 2022). As a result, investigating the effects of these characteristics on the sustainability of European companies could offer valuable insights for policymakers and

regulators. Second, emerging studies concerning the sustainability-related experience of the board have predominantly focused on individual countries (Homroy & Slechten, 2019; Janahi et al., 2022; Subramaniam et al., 2023) or the US context (Peters & Romi, 2014), leaving the European setting largely unexplored.

Following a purposive sample selection process, we first considered all the European companies included in the BoardEx database, which allows to collect data on directors' characteristics. BoardEx provides data for 4842 European companies, and we focused only on companies with available board information for the period of interest. We then merged information with the Refinitiv Eikon database, from which we retrieved firms' financial and sustainability data. After dropping cases with all missing data, our final sample consists of 510 unique European listed companies included in both BoardEx and Refinitiv Eikon databases, over six years, for a total of 1587 observations.

3.2. Variables

3.2.1. Dependent variable – Corporate sustainability performance

In line with previous research (Disli et al., 2022; Drempetic et al., 2020; Rajesh, 2020; Shaukat et al., 2016), we measured firm sustainability performance through the ESG scores provided by Refinitiv Eikon. ESG score is an environmental, social and governance aggregate rating representing a good proxy for firm sustainability performance. Indeed, ESG scores serve as crucial indicators of a firm's non-financial performance, focusing on assessing its sustainable and ethical practices (Boerner, 2007). Thus, by incorporating ESG scores, stakeholders can gain insights into the organization's commitment to sustainability and responsible practices.

ESG scores assigned by Refinitiv Eikon go from 0 to 100 and are built on 186 metrics grouped into the environmental, social and governance dimensions that cover issues related to

ten main themes: resource use, emissions, innovation, workforce, human rights, community, product responsibility, management, shareholders, and corporate social responsibility strategy.

3.2.2. Independent variable

Information about directors' professional experience was drawn from the BoardEx database, which provides information about directors' employment history related to board and non-board roles. To assess board sustainability experience, we considered all sustainability-related roles that each director held before the year of interest (t). To this end, we conducted a content analysis of the role's description provided by BoardEx. Following Fu et al. (Fu et al., 2020), we used the following keywords to conduct an initial screening of sustainability-related roles: sustainability/sustainable, ethic/s, responsibility, environment/environmental, ESG, and CSR. We then read the full descriptions of the resulting roles to confirm their relevance to sustainability, ultimately identifying the roles that were indeed related to sustainability. Once these roles were identified, board sustainability experience (Sust Exp) was measured as the sum of the years of experience in sustainability-related roles accumulated by all board members before the year t.

3.2.3. Moderator variable

We included the moderator variable Board age in the analysis to test our second hypothesis. In line with prior research, we measured board age by the average age (in years) of board members (Y. Xu et al., 2018; Zhong et al., 2022).

While the growing emphasis on board diversity encourages research to concentrate on board age diversity (Gardiner, 2022), which refers to the variation in ages of board members within a given board (age spread), our interest lies in understanding how younger or older boards influence the relationship between sustainability experience and sustainability performance. In this context, the average age of the board serves as a more appropriate measure

than age diversity since these two concepts are separate from one another (Prior Jonson et al., 2020).

3.2.4. Control variables

In order to control the effects of alternative explanatory factors and avoid biased results, we include several control variables in our analysis concerning board- and firm- aspects, in line with prior research. We included *Board size*, measured as the natural logarithm of the total number of directors on the board, as previous studies showed that the size of the board could affect sustainability performance. We also controlled for the board's independence by including the percentage of non-executive directors (*NED*) and *CEO duality*, a dummy variable gauging the value of 1 if the Chairman is also the CEO of the company and 0 otherwise. Board tenure (*Tenure*) is measured as the average number of years the directors have been on the board of the firm, on average. Moreover, as prior research highlighted that board diversity might affect sustainability performance (Naciti, 2019), we control for gender diversity and nationality diversity. *Females* is the percentage of female directors on the board. *Nationalities* is the percentage of different nationalities within the board.

The firm-level control variables include *Firm size*, the natural logarithm of the firm's total assets; *Debt*, the natural logarithm of the firm's total long-term debt; and *Firm age*, the number of years since the incorporation date. We also included year dummies and industry fixed effects.

3.3. Endogeneity

Corporate governance mechanisms are self-defined by the companies, and firms' characteristics thus determine the composition of the board. Accordingly, previous research showed that firms hire directors based on their previous experience (Harford & Schonlau, 2013). Therefore, sustainability-experienced boards are not randomly selected. To address this endogeneity concern, we applied propensity score matching (PSM) (Rosenbaum & Rubin,

1983) to ensure that firms are similar on all variables except the dependent (*ESG*) and the independent variables of most interest, i.e. sustainability experience (*Sust Exp*) and *Board age*. In this way, PSM allows for neutralizing the effect of other variables and helps to provide evidence that board sustainability experience is associated with sustainability performance (Lu & Herremans, 2019).

First, we estimated the propensity scores, i.e. the probability of a company to be treated, given a vector of covariates X_i (Rosenbaum & Rubin, 1983), through the following logistic regression:

$$treat_{i,t} = \beta_0 + \beta X_i + \varepsilon_{i,t}$$

where for firm i and year t, treat is a dummy that gauges value 1 if there is at least one director with past sustainability experience and 0 otherwise, and Xi represents the matching variables. In line with prior research, we adopted the one-by-one nearest neighbor matching without replacement with a caliper of 0.01 (Oyotode-Adebile & Raja, 2019).

We execute the balance diagnostic test to verify that our matching is appropriate. The results shown in Table 1 confirm the goodness of the matching, resulting in comparable treated and non-treated samples after matching. Indeed, after the matching, there are no significant differences in means (p>0.1), and the %bias is lower than 5% for any of the covariates. Moreover, the reduction in bias was at least 90% for almost all covariates except for CEO duality, Board tenure, and Firm age.

In addition, all independent, moderator and control variables are lagged one year (t-1) to reduce the possibility of the results being driven by reverse causality (Joecks et al., 2013; Liu, 2018; D. Xu et al., 2019; Zhong et al., 2022).

Table 1 – PSM balance diagnostic test

Variable	Unmatched/ Matched	Mean Treated	Control	%bias	%reduct |bias|	t-test t	p>|t|
Board size	U	0.11	-0.05	47.80		15.06	0.00
	M	0.05	0.05	0.60	98.80	0.13	0.89
NED	U	0.05	-0.02	27.40		8.65	0.00
	M	0.03	0.02	1.30	95.40	0.29	0.77
CEO duality	U	0.37	0.26	22.80		7.34	0.00
	M	0.31	0.29	4.40	80.70	1.01	0.31
Females	U	0.05	0.00	34.10		10.84	0.00
	M	0.03	0.02	2.40	92.90	0.56	0.57
Nationalities	U	0.05	-0.02	37.50		12.02	0.00
	M	0.02	0.03	-0.90	97.70	-0.20	0.85
Tenure	U	-0.19	-0.02	-5.60		-1.76	0.08
	M	-0.18	-0.24	1.90	65.60	0.45	0.65
Firm size	U	0.52	-0.22	45.50		14.32	0.00
	M	0.21	0.21	-0.40	99.10	-0.09	0.93
Debt	U	0.62	-0.31	37.60		11.83	0.00
	M	0.25	0.23	0.70	98.30	0.15	0.88
Firm age	U	0.89	-0.26	3.60		1.14	0.26
	M	-0.76	-0.34	-1.30	63.10	-0.29	0.77

3.4. Regression models

To test our hypotheses, we carried out panel regression analysis on the matched sample resulting from the PSM analysis. Since there may be unobserved heterogeneity in a pooled OLS model for panel data, regardless of how many firm-specific features we add, which results in biased and inconsistent OLS estimators (Wooldridge, 2010), we tested the model using the fixed effects model. We used a Hausman test to confirm the choice of fixed effects over random effects.

The full econometric model for estimation is specified in the following equation:

$$\begin{aligned} ESG_t = {} & \beta_0 + \beta_1 Sust\ Exp_{i,t-1} + \beta_2 Board\ age_{i,t-1} + \beta_3 Sust\ Exp_{i,t-1} * Board\ age_{i,t-1} \\ & + \beta_4 Board\ size_{i,t-1} + \beta_5 NED_{i,t-1} + \beta_6 CEO\ duality_{i,t-1} + \beta_7 Females_{i,t-1} \\ & + \beta_8 Nationalities_{i,t-1} + \beta_9 Tenure_{i,t-1} + \beta_{10} Firm\ size_{i,t-1} + \beta_{11} Debt_{i,t-1} \\ & + \beta_{12} Firm\ age_{i,t-1} + year\ fixed\ effect_{i,t} + industry\ fixed\ effect_{i,t} \\ & + \varepsilon_{i,t} \end{aligned}$$

4. RESULTS

Summary statistics of the variables included in the analysis are reported in Table 2. The mean ESG score is about 60, with a standard deviation of 18.37. Thus, on average, the companies in our sample have relatively good ESG performance. The average sustainability experience of the boards of directors in our sample is 4.56 years, ranging from 0 (no sustainability experience) to 40.61. The board age is, on average, 58, with a minimum value of 41 and a maximum value of 70.

Autocorrelation is not an issue in our sample, as shown by the coefficients in the correlation matrix (Table 3), which are all lower than the threshold of 0.7 (Mela & Kopalle, 2002). The VIF test, reported in Table 4, shows all values lower than 5, confirming that autocorrelation between variables is not a problem.

Table 2 – Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ESG	1587	60.04	18.37	0.43	94.93
Sust Exp	1587	4.56	6.62	0.00	40.61
Board age	1587	57.69	4.11	41.33	70.31
Board size	1587	2.53	0.34	1.61	3.43
NED	1587	0.53	0.26	0.00	1.00
CEO duality	1587	0.31	0.46	0.00	1.00
Tenure	1587	0.23	0.13	0.00	0.64
Females	1587	0.28	0.17	0.00	1.00
Nationalities	1587	5.94	2.88	0.04	19.83
Firm size	1587	23.06	1.52	19.31	27.04
Debt	1587	21.11	2.31	12.28	25.84
Firm age	1587	33.99	33.52	0.00	183.00
2014	1587	0.11	0.32	0.00	1.00
2015	1587	0.13	0.33	0.00	1.00
2016	1587	0.15	0.35	0.00	1.00
2017	1587	0.15	0.35	0.00	1.00
2018	1587	0.16	0.36	0.00	1.00
2019	1587	0.20	0.40	0.00	1.00
2020	1587	0.11	0.31	0.00	1.00

Table 3 – Correlation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) ESG	1																			
(2) Sust Exp	0.25	1																		
(3) Board age	0.18	0.17	1																	
(4) Board size	0.35	0.20	-0.05	1																
(5) NEDpct	0.25	0.10	0.22	-0.22	1															
(6) CEOduality	0.11	0.03	0.04	0.33	-0.10	1														
(7) Tenure	0.30	0.09	-0.02	0.04	0.23	0.06	1													
(8) Females	0.15	0.17	0.23	-0.35	0.33	-0.18	0.00	1												
(9) Nationalities	-0.04	0.03	0.38	0.02	-0.13	0.11	-0.02	-0.07	1											
(10) Firm size	0.38	0.22	-0.02	0.40	0.03	0.02	0.07	-0.06	-0.08	1										
(11) Debt	0.32	0.16	-0.02	0.30	0.07	0.01	0.09	-0.04	-0.13	0.76	1									
(12) Firm age	0.18	0.10	0.12	0.07	-0.04	0.02	0.08	0.01	0.21	0.08	0.04	1								
(13) 2013	-0.03	0.02	-0.02	0.05	-0.03	0.02	-0.14	0.00	0.01	0.04	0.02	0.01	1							
(14) 2014	-0.03	0.04	-0.01	0.06	-0.01	0.02	-0.11	0.00	0.03	0.05	0.02	0.02	-0.11	1						
(15) 2015	-0.01	0.03	-0.02	0.05	0.00	0.02	-0.07	0.01	0.02	0.06	0.04	0.01	-0.11	-0.12	1					
(16) 2016	0.01	0.04	-0.01	0.06	0.02	0.01	-0.01	0.02	0.00	0.06	0.03	0.01	-0.11	-0.12	-0.12	1				
(17) 2017	0.02	0.04	0.01	0.05	0.02	0.02	0.02	0.01	0.01	0.05	0.01	0.00	-0.12	-0.12	-0.13	-0.13	1			
(18) 2018	-0.01	-0.02	-0.02	-0.05	0.02	-0.02	0.07	0.00	-0.03	-0.04	-0.03	-0.03	-0.14	-0.15	-0.15	-0.16	-0.17	1		
(19) 2019	-0.04	-0.08	0.02	-0.11	-0.03	-0.03	0.11	-0.04	-0.01	-0.12	-0.05	-0.04	-0.16	-0.17	-0.18	-0.18	-0.19	-0.23	1	
(20) 2020	0.11	-0.04	0.05	-0.06	0.04	-0.02	0.07	0.02	-0.02	-0.06	-0.01	0.02	-0.10	-0.11	-0.11	-0.11	-0.12	-0.14	-0.16	1

Table 4 – VIF test

Variable	VIF	1/VIF
Firm size	2.64	0.38
Debt	2.43	0.41
Board size	1.62	0.62
Board age	1.37	0.73
Nationalities	1.36	0.73
Tenure	1.32	0.76
NED	1.32	0.76
Sust Exp	1.18	0.85
CEO duality	1.16	0.86
Females	1.1	0.91
Firm age	1.07	0.93
Mean VIF	1.51	

Results from the regression models are shown in Table 5. Model 1 includes control variables only, Models 2 and 3 include the independent variable (*Sust Exp*) and the moderator variable (*Board age*), respectively, while Model 4 also includes the interaction term between the independent and the moderator variables.

Table 5 – Regression models

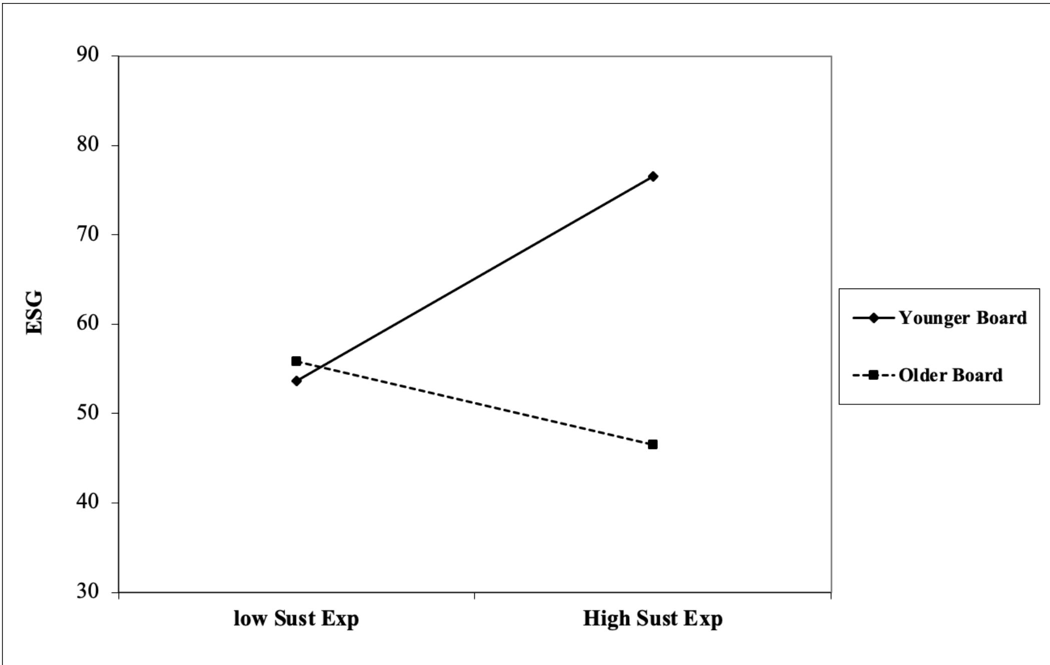
VARIABLES	Model 1	Model 2	Model 3	Model 4
Sust Exp		0.108*	0.110*	0.123**
Board age			-0.055	-0.029
Sust Exp * Board age				-0.027**
Board size	2.636	1.843	1.909	1.394
NED	2.320	2.290	2.485	2.549
CEO duality	-0.884	-0.938	-0.975	-1.017
Females	11.322***	11.923***	11.698***	11.479***
Nationalities	-1.219	-2.063	-2.033	-1.851
Tenure	0.563***	0.533***	0.573***	0.585***
Firm size	2.794***	2.713***	2.745***	2.809***
Debt	0.034	0.025	0.024	-0.007
Firm age	3.184***	3.188***	3.184***	3.210***
Year dummies	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Constant	2.364	2.465	2.516	2.490
Observations	1,587	1,587	1,587	1,587
R-squared	0.383	0.385	0.385	0.388
Number of firms	510	510	510	510

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Hypothesis 1 predicted that board sustainability experience has a positive effect on firm sustainability performance. Models 2, 3 and 4 show that the coefficients of *Sust Exp* are positive and statistically significant at conventional levels. In particular, firms with highly experienced boards in sustainability have, on average, 11% higher ESG compared to firms with less experienced sustainability boards. This result provides support for our first hypothesis.

Hypothesis 2 predicted a negative moderation effect of board age. The results reported in Model 4 show that the coefficient of the interaction term *Sust Exp * Board age* is significantly negative and significant (beta=-0.027, p<0.05). This result shows that the average age of the board is a significant moderator of the relationship between sustainability experience and sustainability performance. Indeed, the older the board, the weaken the positive effect of *Sust Exp* on *ESG*. Therefore, hypothesis 2 is supported. The moderating effect of *Board age* on the relationship between *Sust Exp* and *ESG* is shown in Figure 2.

Figure 2 – Moderation effect of board age on the relationship between Sustainability experience and ESG



The solid line represents the effect of board sustainability experience on sustainability performance (ESG) when the board of directors is relatively younger. Conversely, the dotted line illustrates the effect of board sustainability experience on sustainability performance in the context of an older board of directors.

The graph illustrates that at low levels of sustainability experience, both firms with young and old boards have average ESG levels (between 50 and 60). As sustainability experience increases, its impact on ESG becomes significantly positive for young boards. In contrast, for older boards, a high level of sustainability experience leads to a reduction in ESG results, reversing the relationship.

In addition, results show that having a higher proportion of women on the board leads to higher ESG, as the coefficient of *Females* is significantly positive (beta=11, $p<0.01$ in all models). *Tenure* is also a significant variable explaining ESG. Indeed, more tenured boards reach about 0.6 higher sustainability performance. *Assets* and *Firm age* also have a positive and significant effect on ESG scores ($p<0.01$), while other control variables do not significantly impact sustainability performance.

5. DISCUSSION AND CONCLUSIONS

In this study, we examined the relationship between board sustainability experience and firm sustainability performance. Drawing from the upper echelons and resource dependency theories, we contended that sustainability-related experience provides directors with the necessary expertise to more effectively manage and incorporate sustainability into business decisions, ultimately resulting in improved sustainability performance. By analyzing European listed companies over the period 2014-2020, we found evidence that the sustainability experience of the board of directors has a positive impact on firm sustainability performance, thus supporting our view.

However, previous literature has highlighted that having sustainable boards, i.e., with specific expertise in sustainability, may merely serve a symbolic purpose in gaining legitimacy (Velte, 2023a, 2023b). Consequently, we contended that while sustainability-related expertise is essential, it alone is insufficient for effectively integrating sustainability within a company

and achieving good sustainability performance, unless it is accompanied by a board's intrinsic motivation towards embracing sustainable practices.

Our findings provide support for this thesis by showing that the effect of board sustainability experience on firm sustainability performance depends on board age, which reflects values and sustainability sensitivity and awareness of directors (Arioglu, 2021; Chindasombatcharoen et al., 2023; Gardiner, 2022; Kagzi & Guha, 2018; Talavera et al., 2018; Y. Xu et al., 2018). Specifically, we provide evidence that a younger board with high sustainability-related experience leads the firms towards high sustainability performance. Nevertheless, when an older board holds high sustainability-related experience, it leads to lower sustainability performance. The reason may be that board age reflects the intrinsic motivation of the board members to promote corporate sustainability in order to improve the social and environmental impact of the firm.

Knowing that the average age of the boards in the analyzed firms is 57 years, it can be inferred that, in younger boards, directors have grown up in a time when sustainability has become a major concern and a mainstream business activity (He et al., 2023). As a result, they possess a deeper understanding of sustainability issues and increased awareness of the social and environmental impacts of corporate actions (Gardiner, 2022). This, in turn, fuels a strong desire to make a difference and contribute to a better world. Driven by their intrinsic motivation, these directors may harness the expertise stemming from sustainability experience within the board in order to effectively address sustainability challenges. Therefore, in younger boards, the motivation to put into practice the knowledge acquired from sustainability experience leads to improved sustainability performance.

On the contrary, in older boards, directors tend to be, on average, less aware and sensitive to social issues compared to their younger counterparts. Additionally, since older directors are more conservative and less inclined to take risks and embrace change (Ararat et al., 2015;

Arioglu, 2021; Chen & Hao, 2022), they may be reluctant to promote sustainable transitions, which entail complex challenges to be managed and yield long-term effects that they may not personally benefit from. The overall lack of motivation among older boards to integrate sustainability into corporate strategies can stifle the potential advantages stemming from sustainability experience, leading to suboptimal sustainability performance.

Therefore, in line with our view, our findings suggest that specific sustainability expertise is crucial to allow the board to lead firm sustainability. However, it should be accompanied by an intrinsic motivation of the board members to integrate sustainability in decision-making in order to achieve higher sustainability performance.

Regarding control variables, although the PSM analysis enabled us to isolate the effects of the variables of interest, namely sustainability experience and board age, the results indicate that the percentage of women on the board, board tenure, and firm size and age significantly influence sustainability performance. Since the PSM tests demonstrated that treated and untreated firms are comparable in terms of control variables, these findings imply that even slight differences in these factors can impact sustainability performance, suggesting that they may warrant special consideration. These results corroborate the crucial role of gender diversity in driving corporate sustainability, as extensively highlighted in the literature (Ben-Amar et al., 2017; Glass et al., 2016; Lu & Herremans, 2019; Wu et al., 2022).

5.1. Theoretical Implications

This study makes several theoretical contributions. First, we add to the corporate governance literature by exploring a very little-explored characteristic of the board of directors, i.e. board sustainability experience, showing that it plays a key role as a driver of firm sustainability performance. While recent research has started to examine institutionalized forms of integration of sustainability expertise within the board, such as the presence of CSR

committees or a chief sustainability officer (Fu et al., 2020; Fuente et al., 2017; Javeed et al., 2022; Peters et al., 2019; Velte, 2023b; Velte & Stawinoga, 2020), little attention has been paid to board expertise derived from non-institutionalized roles. Thus, by focusing on specific sustainability-related experience held by directors, this study contributes to advancing knowledge in this field.

Second, while other studies have measured sustainability expertise by analyzing corporate disclosure documents (Jamil et al., 2021; Subramaniam et al., 2023), we have focused on experience derived from previously holding sustainability-related roles. To this end, we employed secondary data provided by BoardEx, which, besides being more objective, allowed us to obtain data for an extended period and conduct a longitudinal analysis. This approach is particularly suitable for understanding the effect of board characteristics, as board decisions may take years to influence corporate performance (Gardiner, 2022).

Third, to the best of our knowledge, this is the first study that brought the impacts of board sustainability experience and board age on sustainability performance together by examining the moderating effect of board age on the relationship between board sustainability experience and firm sustainability performance. In particular, we highlighted that while board age does not primarily affect sustainability performance, it significantly moderates the effect of board sustainability experience. More specifically, we argued that age is reflective of the intrinsic motivation of the board towards sustainability, which can translate sustainability experience in positive sustainability performance. In this way, we also respond to the call to explore the cognitive attributes of the board (Kent Baker et al., 2020; Zattoni et al., 2022), which are little explored in the literature as they are more difficult to be observed. In addition, by showing that the impact of board sustainability experience is contingent on the age of the board, we contribute to shedding light on the inconclusive findings related to the effect of board age (Gardiner, 2022; Kagzi & Guha, 2018).

Fourth, this study helps broaden our understanding of sustainable boards in the European context, an area previously underexplored in research (Velte, 2023a, 2023b). In doing so, we move beyond the single-country focus of prior studies (Homroy & Slechten, 2019; Janahi et al., 2022; Subramaniam et al., 2023) and conduct a multi-country analysis, enabling us to offer more generalizable findings.

Fifth, by performing the propensity score matching analysis, we adopted a more rigorous methodology to address the endogeneity, which is an under-considered issue in previous studies (Zattoni et al., 2022).

5.2. Practical Implications

This research also offers implications of practical value. First, our findings emphasize the value of directors' specialized experience in sustainability. Specifically, we demonstrate that boards with substantial cumulative sustainability-related experience deliver higher firm sustainability performance. Therefore, companies aiming to improve their sustainability performance and create a positive social and environmental impact should consider sustainability expertise when selecting board members.

However, such expertise derived from prior sustainability experience may not be sufficient to promote a thorough integration of sustainability within the company that can drive high sustainability performance. Indeed, our results suggest that if the board's sustainability experience is not supported by its intrinsic motivation toward such issues, the effect on sustainability performance may be detrimental. Consequently, firms should pay attention not only to specific sustainability-related expertise but also to the values and characteristics of board members.

In this regard, the age of board members represents an important characteristic, as it generally reflects the values, priorities, and mindsets of different generations. Companies

should thus encourage the inclusion of younger directors on their boards to foster an organizational culture oriented toward sustainability.

This research also provides relevant implications for regulators, urging them to consider such board characteristics in regulations related to board composition. While the EU context encourages companies to consider board diversification and communicate the adopted policies in this regard (see, for instance, Directive EU 2022/2464 of the European Parliament and of the Council of 14 December 2022), explicit measures have so far only been taken concerning gender diversity (Directive EU 2022/2381 of the European Parliament and of the Council of 23 November 2022 on improving the gender balance among directors of listed companies). To facilitate firms' sustainable transition, regulators should consider introducing explicit and mandatory sustainability expertise requirements for boards. Moreover, the results of this study encourage lawmakers to include generational diversity as a key component in good corporate governance codes. Although we believe setting quotas for young members (similar to gender quotas) may be counterproductive, regulators could address, for instance, this issue through appropriate retirement policies.

5.3. Limitations and future research

This study is not exempt from limitations that pave the way for future developments. When measuring sustainability experience, we considered the total years of experience in board and non-board sustainability-related roles previously held by directors. However, experience in sustainability can also derive from studies undertaken or from personal experience, volunteer work, etc. Therefore, future studies may consider these additional aspects. Furthermore, while we have used the information from the BoardEx database, future research may supplement this data with alternative sources.

In addition, we focused on the board's age, which, as a reflection of the directors' values and worldview, serves as a proxy for the board's intrinsic motivation toward sustainability. We acknowledge, however, that this motivation could also arise from other individual characteristics that are not easily observable. Future research could attempt to gather primary data using alternative methods, such as surveys and interviews, to gain insights into board members' values, awareness, and sensitivity regarding sustainability issues. Nevertheless, conducting such research could be challenging, as directors may hesitate to provide truthful answers due to the sensitivity of the topic, and the collected information could be biased.

We used ESG scores provided by the Refinitiv Eikon database to assess firm sustainability performance. Although it is an authoritative and widely used source in the literature, future research could explore other sources of ESG scores, such as Bloomberg, Sustainalytics or MSCI, to validate the results. Furthermore, ESG scores are one possible measure of sustainability, and future studies could use alternative measures to gauge sustainability performance.

Furthermore, while we considered listed companies, which may have different human capital because they are subject to particular standards in terms of corporate governance, scholars could also assess the impact of the sustainability experience in unlisted companies.

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3.

Unpacking the Link between Firm Network and Financial Performance: The Mediating Role of Corporate Sustainability

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ABSTRACT

In a fast-paced and interconnected global environment, firm networks emerge as pivotal relational assets to build a competitive advantage. Previous research has shown that the board of directors plays a key role in generating network through board interlocks, thereby providing external resources that can foster firm financial performance. Although several studies provide evidence to support this, what underlying mechanisms explain the relationship between firm network and financial performance is still unclear. In this study, we introduce a factor intervening in this relationship, namely corporate sustainability, by empirically testing its mediating effect on a sample of 958 European public firms. First, we perform a social network analysis of board interlocks to obtain four network centrality measures. Second, we applied a structural equation model to test the mediation analysis. Our results show that corporate sustainability partially explains the relationship between firm network and financial performance.

KEYWORDS

Firm network; Board interlocks; Sustainability; ESG; Competitive advantage; Social network analysis.

1. INTRODUCTION

The current extremely dynamic, interconnected and fast-paced global environment challenges firms to continuously identify new opportunities to develop and sustain their competitive advantage. In this scenario, firms cannot function in isolation, and relational assets and inter-firms' networks emerge as crucial for generating competitive advantage (Majchrzak et al., 2015; Melander, 2017). Firms nowadays are increasingly embedded in a network of relationships where business success, competitive advantage, and value creation dynamics are determined by a firm's network position and connections (Zaheer & Bell, 2005).

According to relational view (Dyer & Singh, 1998), relations established by a firm with the external environment are key enablers of resources and trust that enable the firm to outperform competition (Zaheer et al., 2010). In line with this view, the firm network is an extremely important relational asset for firms, that must increasingly rely on external resources (Bischoff & Buchwald, 2018; Liu, 2020; Wang et al., 2019). Indeed, networks provide resources, information and knowledge from outside the organization (Zaheer & Bell, 2005).

The board of directors is an important corporate governance mechanism that influences decision-making (Pugliese et al., 2009; Yar Hamidi & Machold, 2020), and prior literature attributed the board of directors a key strategic role in opening corporate boundaries and networking (Carpenter & Westphal, 2001; Hillman et al., 2000). Indeed, through director interlocks, the board establishes strong inter-firm relational ties. By sitting simultaneously in the boardroom of different firms, directors create an external network that can foster cross-fertilization between firms through the exchange of information and resources. Thus, the board of directors can improve the firm network through their own relationships, as shown by previous research (Rossi et al., 2018). Indeed, if the same director works for both firms A and B at the same time, he/she could informally transfer information between these firms, thus

creating a direct linkage. Accordingly, in this study we refer to firm network as the network generated by board interlocks.

Research on board interlocks has grown significantly in recent years, focusing particularly on the effects they have on firm performance. This has been supported by the rise of new and reliable data sources, which have facilitated more robust and accurate analysis (Garcia-Bernardo & Takes, 2018). Prior literature has highlighted a positive relationship between board interlocks and financial performance, suggesting that firms with extensive networks tend to perform better financially (Hauser, 2018; Y. Kim, 2005; Larcker et al., 2013; Martin et al., 2015; Smith & Sarabi, 2021; Zaheer et al., 2010; T. Zhao, 2021; Zona et al., 2018).

However, despite this growing body of literature, little is known about the underlying factors influencing the relationship between board interlocks and financial performance (Smith & Sarabi, 2021). While some research has attempted to theoretically identify the mechanisms that explain how network resources contribute to firm performance (Gulati et al., 2011), most of the existing research has focused on the outcomes of this relationship and no empirical studies have yet tested how the firm network boosts financial performance (Smith & Sarabi, 2021). Therefore, empirical studies that go beyond conceptualizing frameworks or testing the direct relationship between board interlocks and financial performance are needed to better understand how the firm network can create competitive advantage.

In this study, we attempt to fill this gap and expand the literature on the association between firm network and firm performance by including the testing of a possible mechanism that explains it, i.e., corporate sustainability.

The sustainable transition is one of the main challenges firms face nowadays (Broman & Robèrt, 2017; Centobelli et al., 2020), representing not only a moral obligation towards society but also a strategic choice for firms to thrive in today's rapidly changing business landscape (Franco, 2021; Harrison et al., 2010; Mio et al., 2020). In this framework, corporate

sustainability took the seat in the current managerial debate (Amui et al., 2017; Delmas et al., 2019), and it is increasingly being investigated from a business strategy perspective (Lloret, 2016; Vishwanathan et al., 2020). Scholars acknowledged corporate sustainability as an important source of competitive advantage (Bhuiyan et al., 2023; Walsh & Dodds, 2017) and proposed alternative views on how corporate sustainability contributes to superior business performances (Amui et al., 2017; Juo & Wang, 2022), highlighting the relevance of various inter-organizational factors. Among them, particular attention has been devoted to the relational resources and network factors as drivers of corporate sustainability performance (Gölgeci et al., 2019; Harjoto & Wang, 2020).

Our research aims to analyze the mediation effect of corporate sustainability in the relationship between firm network and firm performance, addressing the question: *Does corporate sustainability intervene in the relation between firm network centrality and firm financial performance?*

Building on the relational view theory (Dyer & Singh, 1998), we posit that firm network has a positive effect on financial performance and that such an effect is mediated by corporate sustainability. We perform a mediation analysis applying a structural equation model on a sample of 958 European firms. Consistent with our arguments, we found that corporate sustainability, measured through ESG scores, positively mediates the effect of firm network on financial performance.

The rest of the paper is structured as follows. The second paragraph provides a brief review of the literature on firm network, corporate sustainability and financial performance that led to the hypothesis development. The third paragraph describes the methodology used to test the hypotheses. The fourth section presents the results of descriptive and mediation analyses. In the fifth section, the results are discussed by highlighting the theoretical and managerial implications of the study, and limitations and future research directions are presented.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

According to the relational view theory (Dyer & Singh, 1998), firm's critical resources can extend beyond firm boundaries and be part of inter-organizational resources and routines. Thus, idiosyncratic inter-firm relations become an important source of competitive advantage, resulting from the generation and appropriation of the so-called relational rents. More specifically, Dyer and Singh (1998) identified four categories of relational rents: (1) relation-specific assets, (2) knowledge-sharing routines, (3) complementary resources and capabilities, and (4) effective governance.

Under the lens of the relational view, relations among firms within a network can lead to competitive advantage by increasing the firm's social and relational capital, which facilitates external knowledge acquisition (Zaheer et al., 2010). Social capital is defined as the relational resources that individuals can obtain through their social connections and relationships with other individuals (Adler & Kwon, 2002; Gölgeci et al., 2019; Tsai, 2000). Therefore, it is closely related to the ability of actors to take advantage of their positions in a network.

The corporate governance literature has emphasized the strategic role of the board of directors in opening corporate boundaries and networking (Carpenter & Westphal, 2001; Hillman et al., 2000). According to earlier studies, directors sitting simultaneously in different firms' boardrooms create linkages that can stimulate the exchange of information, knowledge, and resources (Hauser, 2018; Larcker et al., 2013; T. Zhao, 2021). Through board interlocks, directors can generate relevant social capital and compensate for the need for external resources, thus supporting a firm's sustainable development (Hillman et al., 2000; Hillman & Dalziel, 2003; Horton et al., 2012). Under this perspective, the firm network can be understood as the relational resources shared among networked firms through individuals that sit on multiple boards of directors, i.e., board interlocks.

2.1. Firm network and financial performance

Numerous studies have examined the relationship between the firm network and its financial performance, showing a positive association (Hauser, 2018; Y. Kim, 2005; Larcker et al., 2013; Martin et al., 2015; Smith & Sarabi, 2021; Zaheer et al., 2010; T. Zhao, 2021; Zona et al., 2018). In particular, firm networks provide economic advantages by facilitating the exchange of information and resources through board interlocks, as noted by Smith & Sarabi (2021). By providing broader and more complete information, board interlocks also allow firms to manage and reduce environmental uncertainty, resulting in a positive impact on firm performance (Martin et al., 2015; Zona et al., 2018). In addition, the increased availability of resources enables the firm to timely respond to investment opportunities (Larcker et al., 2013). Accordingly, recent research has shown that board networks increase investment efficiency (T. Zhao, 2021), which can lead to higher firm performance.

The benefits derived from the network will be all the more remarkable the more the firm holds a central position within the network (Larcker et al., 2013). Indeed, a central firm holds more (or better) connections with other firms, thus being able to benefit from relational ties to a greater extent compared to firms that occupy more marginal positions in a network. The concept of good interconnection is multidimensional, and social network theory has developed several connotations of centrality, pinpointing four main centrality measures: degree centrality, closeness centrality, eigenvector centrality, and betweenness centrality (Jackson, 2010; Larcker et al., 2013). First, the goodness of the connection may depend on the number of direct ties (i.e. degree), as a large number of relationships with different firms allows for a greater exchange of resources and access to different perspectives. Second, a firm is well-connected if it has quick and direct access to network information and resources without going through intermediaries (i.e. closeness). Third, a firm is well-connected when its direct contacts are also well-connected

(i.e. eigenvector). Fourth, a firm covers a central position if it is a key intermediary for exchanging information and resources between other firms (i.e. betweenness).

Based on the above, we hypothesize that firm network centrality has a positive effect on firm financial performance, as follows:

Hypothesis 1 – Firm network centrality has a positive effect on firm financial performance.

2.2. Firm network and corporate sustainability

Zhao (2021) argued that holding a prominent position in the network will encourage firms to take the initiative to actively or passively engage in corporate social responsibility, still resulting in higher corporate sustainability. Well-connected firms can access and facilitate dissemination of more valuable information about sustainability practices (Homroy & Slechten, 2019). Through their relational linkages, firms can access external resources and information to overcome the lack of the specific resources and expertise needed to enable firms' sustainable commitment to be more than merely symbolic and translated into effective sustainable practices and actions (Amui et al., 2017). Moreover, well-connected firms can acquire knowledge on sustainable best practices, thus fostering the firm's sustainable development (Homroy & Slechten, 2019). Indeed, the network plays an essential role as an enabler of cognitive multiplication in sharing best practices (Corazza et al., 2022). Central firms in the network also enjoy greater reputation and trust. Therefore, they will be proactive in engaging in sustainability in order to maintain their status quo and increase the benefits from their central position in the network (Chahine et al., 2019). In addition, firms with more extensive networks may have a greater understanding of the needs of a wider variety of stakeholders and may respond promptly to them, thus achieving higher sustainable performance (Harjoto & Wang, 2020).

In line with these arguments, recent research provided empirical evidence of a positive relationship between corporate networking and corporate sustainability. Ding et al. (2022), analyzing Chinese listed firms from 2008 to 2015, found that board interlock leads to a higher likelihood of CSR adoption. This finding is consistent with the cross-sectional study conducted by Nandy et al. (2020), who analyzed listed firms operating in 17 countries showing that firm network positively influences CSR decisions. Moreover, focusing on environmental performance and using data from FTSE 350 firms, Homroy and Slechten (2019) showed that firms with better-networked directors holding specific environmental experience have lower greenhouse gas emissions. In addition, expanding the analysis to environmental, social, and governance (ESG) performance, Harjoto and Wang (2020) showed that board network centrality positively affects ESG performance in FTSE-350 non-financial listed firms.

In line with prior research, we hypothesize the following:

Hypothesis 2 – Firm network centrality has a positive effect on corporate sustainability.

2.3. Corporate sustainability and financial performance

Since the turn of the century, increasing attention on sustainability issues has led academic research to focus on the benefits it can bring to the firm, leading to the claim "it pays to be green" for firms (Russo & Fouts, 1997). Since then, a huge stream of research has focused on the relationship between corporate sustainability and performance, and although some studies have shown that sustainability can hamper financial performance, the vast majority of the literature agrees on the benefits it brings to firms, which are reflected in increased performance (Atz et al., 2023; W. Lu et al., 2014; Miroshnychenko et al., 2017; Van Beurden & Gössling, 2008).

Engaging in sustainability allows focusing on a wide variety of stakeholders, which play a vital role in the success, survival, and growth of a firm (Freeman, 1984; Porter & Kramer,

2011). Therefore, by focusing on stakeholders, a firm can improve its market and competitive performance (Barnett & Salomon, 2012; Harrison et al., 2010). Moreover, prior research has shown that by prioritizing sustainability, firms can improve their reputation and brand image (Vishwanathan et al., 2020; W.Y. Wong et al., 2014), create new business opportunities and ventures (Amankwah-Amoah et al., 2019; Keskin et al., 2013), reduce costs and risks (Hockerts, 2015; Walsh & Dodds, 2017), and increase efficiency (Caiado et al., 2017). In addition, as consumers are increasingly environmentally and socially conscious, they are likely to favor firms that demonstrate a strong commitment to sustainability (Testa et al., 2021). Consequently, sustainable firms have greater potential to attract new customers (Walsh & Dodds, 2017).

Therefore, we propose the third hypothesis as follows:

Hypothesis 3 – Corporate sustainability has a positive effect on firm financial performance.

2.4. The mediating role of corporate sustainability

Collectively, prior research revealed that occupying central positions in the network will increase corporate sustainability, and corporate sustainability in turn increases firm performance, suggesting that corporate sustainability may constitute a mechanism through which the firm network can lead to higher financial performance. In fact, as evidenced by recent studies, a firm's commitment to sustainability provides a suitable context for examining the relationship between the firm network and firm value (Chahine et al., 2019; T. Zhao, 2021).

Holding a central position in the network represents a source of power for the firm (Ibarra, 1993), enabling it to better leverage its relational and social capital. However, in order for this position of power to translate into a competitive advantage, the firm must obtain legitimacy. Indeed, scholars of institutionalism argued that a firm's success and longevity over time are

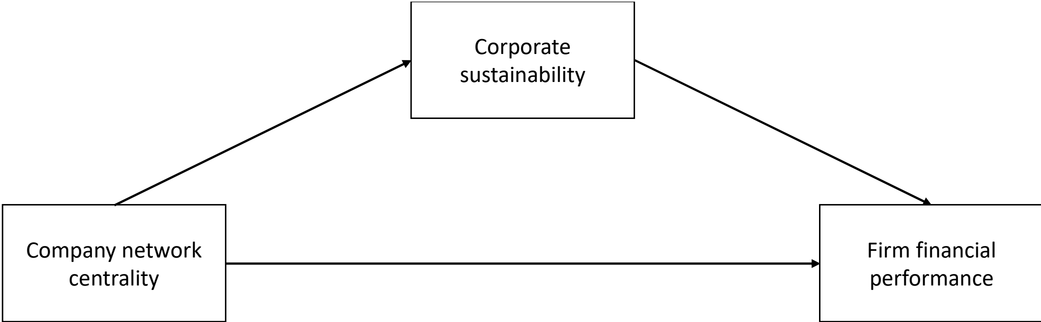
related not only to internal business practices but also to the firm's efforts to gain legitimacy in its institutional environment (Di Maggio & Powell, 1983). Legitimacy measures the degree to which the community accepts and supports an organization (Suchman, 1995). In the current scenario, firms are called to realize the public interests of society and not just the maximization of profit. Therefore, to acquire public recognition, firms need to be able to create environmental and social value, achieving high sustainability performance (Ahn & Park, 2018).

Based on these arguments, we posit that when relational capital translates into high corporate sustainability, it helps establish the legitimacy required to achieve higher financial performance. This leads us to hypothesize that corporate sustainability mediates the effect of firm network centrality on financial performance. Therefore, we propose the fourth hypothesis as follows:

Hypothesis 4 – Corporate sustainability mediates the effect of firm network degree on financial performance.

Figure 1 shows the theoretical research model.

Figure 1 – Theoretical model



3. RESEARCH METHODS

3.1. Sample and data

The study's hypotheses were tested on a sample of 958 European public firms. The research is based on a purposive sampling approach, where population members are selected when their characteristics match the purpose of the research, i.e., assessing the impact of network centrality on financial performance and whether such an effect is mediated by corporate sustainability. Accordingly, the study focuses on all European firms whose directors simultaneously served multiple positions in diverse firms' boards, and for which financial performance (measured through Tobin's Q) and corporate sustainability (measured through ESG scores) data are available. To this aim, the sample was created by intersecting firms in two distinct databases, namely BoardEx and Refinitiv Eikon, with reference to the period 2015-2020.

Data about director interlocks were gathered from the BoardEx database, which provides data about directors and executives of European firms. Data about firms' financial performance and ESG scores were gathered from the Refinitiv Eikon database, which provides scores, metrics and analytics covering over 80% of global market cap. Other firm-level information used as controls in the analysis were also retrieved from both Boardx and Refinitiv Eikon databases.

BoardEx data about firm networks, in terms of interlocking directorships, was utilized to map directors that simultaneously served positions in diverse firms' boards. This data was used to construct a network of firms that have shared at least one director in the period 2015–2020. European firms constituted the nodes of the network; thus, firms were included in the network when they shared at least one board member with another firm in the reference period. Directors serving positions in multiple boards constituted the edges of the network: accordingly, an edge

between two nodes indicated that the two firms shared at least one board member in the reference period. Isolated nodes – i.e., firms with zero interlocking directors or executives with other firms – were excluded from the network.

Employing UCINET software for social network analysis (SNA), network data were arranged in edgelist format in order to compute four centrality measures – namely degree centrality, eigenvector centrality, closeness centrality, and betweenness centrality – as detailed in the following paragraph.

3.2. Measures

3.2.1. Dependent variables

According to prior research, we measured firm's financial performance using Tobin's Q, that is one of the most used and complete financial indicators to describe the firm's performance (Awaysheh et al., 2020; S. Kim et al., 2021; Minutolo et al., 2019). It is measured through the following formula (Awaysheh et al., 2020):

$$Tobin's\ Q = \frac{Total\ Assets - \ Book\ Value\ of\ Common\ Equity\ +\ Market\ Capitalization}{Total\ Assets}$$

Data to measure Tobin's Q were retrieved from Refinitiv Eikon as of 31 December 2020.

3.2.2. Independent variables

Firm network centrality measures are the independent variables in the study. The firm network was constructed by considering each firm as a node in the network and by connecting two firms, *i* and *j*, with an edge when at least one director sat on the board of both firms at the same time over the analyzed period 2015-2020.

Based on this network data retrieved by BoardEx, we focused on the four most commonly used centrality measures (Jackson, 2010; Larcker et al., 2013): (i) degree centrality (*DEGR*);

(ii) closeness centrality (*CLOSE*); (iii) eigenvector centrality (*EIGEN*); (iv) betweenness centrality (*BETW*).

Degree centrality measures the total number of unique direct connections (or edges) that each node holds with the other nodes in the network through interlocking directors. It indicates the number of available information channels. Degree centrality is measured as:

$$DEGR_i = \sum_{j \neq i} d_{i,j}$$

where $d_{i,j}$ is equal to 1 if firms i and j shared at least one director over the analyzed period, 0 otherwise.

Closeness centrality measures the distance of a node from all other nodes in the network by summing the length of the shortest paths between the node and the other nodes. This measure tells us how easily a firm can reach all the other firms in the network. High closeness indicates more effective contacts between firms without going through many intermediaries (Homroy & Slechten, 2019). Closeness centrality is measured as:

$$CLOSE_i = \frac{n-1}{\sum_{j \neq i} l_{i,j}}$$

where $l_{i,j}$ is the distance between firm i and j.

Eigenvector centrality is a proxy of the quality of connections of a firm in the network, as it measures a node's centrality as a function of the centralities of the nodes it is connected to. It indicates the influence of the firm in the network, as it considers the network of the related firms. Eigenvector centrality is measured as:

$$EIGEN_i = \lambda^{-1} \sum_{j \neq i} d_{i,j} e_j$$

where λ is the eigenvalue, $d_{i,j}$ is a dummy that gauges value 1 if firms i and j shared at least one director over the analyzed period, 0 otherwise, and e_i is the eigenvector of firm j. Thus, the eigenvector weights connections with other firms according to their eigenvector values.

Betweenness centrality is a proxy of a firm's control over information flows in the network or its potential to act as a "gatekeeper" through its network. In other words, it gives us the intermediatory role of a firm. It measures the number of times a node sits on the shortest paths (i.e. geodesic distance) between two other nodes. Betweenness centrality is measured as:

$$BETW_i = \frac{P_i(j,k)/P(j,k)}{(n-1)(n-2)/2}$$

where $P(j,k)$ is the number of the shortest paths between firms j and k, and $P_i(j,k)$ is the number of the shortest paths between firms j and k that goes through i.

3.2.3. Mediator variable

In line with prior research, we measured corporate sustainability using the environmental, social and governance performance (ESG) scores provided by Refinitiv Eikon (Bruna et al., 2022; Drempetic et al., 2020; Gebhardt et al., 2022; Haque & Ntim, 2022). ESG performance allows considering the multidimensionality of sustainability issues, including various dimensions: "E" refers to issues like resource use, emission, pollution, eco-innovation, and climate change; "S" refers to aspects such as workforce, human rights, and product responsibility; "G" refers to aspects such as management structure, shareholders management and transparency. By taking into account a variety of aspects of firms' ESG performances, Refinitiv Eikon generates the overall ESG performance and provides quantifications of ESG ratings that are impartial and comparable (W. M. Lu et al., 2022).

Specifically, Refinitiv Eikon's E, S and G scores are based on more than 630 quantitative and qualitative metrics, which are compiled and updated annually by Refinitiv's analysts (Refinitiv, 2022). Each score ranges from 0 to 100, depending on firms' performance on environmental, social, and governance aspects. For the sake of the present study, firms' scores were retrieved with reference to the year 2020 in order to examine the impact of board network

measures computed across a six years period (i.e. 2015 – 2020) on the most recent ESG performance data available.

3.2.4. Control variables

We considered several control variables while examining the relations between network centrality, ESG, and financial performance: (i) *firm size*, measured through the natural logarithm of total assets, a continuous variable indicating the value of firms' total assets in US dollars; (ii) *BOD size*, i.e. the number of directors sitting on the board; (iii) the number of non-executive independent directors (*NEDs*); (iv) the number of female directors on the board (*Females*); (v) the average age of the board of directors (*BOD age*); (vi) *firm age*, a continuous variable indicating the number of years from firm's foundation. In addition, we included country and sector dummy variables that capture unmeasured differences by country and sector (Kennedy, 2003). Board-level variables as well as sector and country were retrieved from BoardEx, while firm size and age were from Refinitiv Eikon.

4. DATA ANALYSIS

4.1. Descriptive analysis

Table 1 reports the descriptive statistics results, while Table 2 and Table 3 provide the breakdown of the sample in terms of country and sector, respectively. The mean value of Tobin's Q is 1.64 and the standard deviation is 1.36. This indicates that the overall financial performance of these European listed firms is not high and the distribution is relatively concentrated. The mean ESG score is 61.63, with a standard deviation of 18.06. The minimum value is 0.43 and the maximum value is 95.08. This shows that firms significantly differ in terms of sustainability performance. Regarding the firm network, the centrality measures are quite different for each firm, showing high standard deviations. The degree shows a mean value

of 6, revealing that, on average, firms have 6 connections. According to our purposive sampling approach, all firms in the sample present at least one connection, with a maximum level of 43. Closeness ranges from 1 to 373.58 and presents a mean value of 243.95 and a standard deviation of 64.48. This means that, on average, firms can reach quite easily all other firms in the network, but such effectiveness of contacts varies a lot from each other. Finally, betweenness shows a minimum value of 0 (the firm does not play an intermediatory role) and a maximum level of 46193. Moreover, it shows an extremely high standard deviation (more than 1.5 times the mean).

Table 1 – Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Tobin's Q	1.64	1.36	-0.22	14.53
ESG	61.63	18.06	0.43	95.08
DEGR	5.55	5.11	1	43
CLOS	243.95	64.48	1	373.58
EIGEN	0.03	0.11	-0.66	1
BETW	1847.63	3142.74	0	46193
Firm size	23.16	2.14	16.65	31.22
BOD size	11.31	4.40	4	30
NEDs	5.58	3.11	0	20
Females	3.32	1.95	0	11
BOD age	58.09	4.25	41.75	82
Firm age	23.83	31.13	0	175

Table 2 - Sample breakdown: Country

Country	%	Country	%	Country	%
Germany	12.6%	Republic Of Ireland	3.8%	Portugal	1.3%
France	11.2%	United Kingdom	3.8%	Liechtenstein	1.0%
Switzerland	10.3%	Belgium	3.5%	Cyprus	0.5%
Sweden	10.1%	Denmark	3.3%	Czech Republic	0.4%
Italy	8.2%	Russian Federation	3.3%	Malta	0.4%
Spain	6.1%	Poland	2.6%	Hungary	0.2%
Netherlands	4.7%	Austria	2.1%	Monaco	0.1%
Finland	3.8%	Luxembourg	1.7%		
Norway	3.8%	Greece	1.3%		

Table 3 - Sample breakdown: Sector

Sector	%	Sector	%
Banks	8.5%	Clothing & Personal Products	2.2%
Pharmaceuticals and Biotechnology	5.4%	Insurance	2.2%
Construction & Building Materials	5.0%	General Retailers	2.1%
Real Estate	5.0%	Steel & Other Metals	2.0%
Engineering & Machinery	4.9%	Food & Drug Retailers	1.7%
Oil & Gas	4.3%	Beverages	1.4%
Speciality & Other Finance	4.0%	Renewable Energy	1.3%
Diversified Industrials	3.5%	Household Products	1.1%
Electronic & Electrical Equipment	3.4%	Mining	1.1%
Telecommunication Services	3.4%	Investment Companies	1.0%
Media & Entertainment	3.3%	Forestry & Paper	0.8%
Software & Computer Services	3.3%	Private Equity	0.7%
Chemicals	3.2%	Aerospace & Defence	0.5%
Health	3.2%	Life Assurance	0.5%
Transport	3.2%	Containers & Packaging	0.4%
Automobiles & Parts	3.1%	Consumer Services	0.3%
Business Services	3.0%	Publishing	0.3%
Food Producers & Processors	2.7%	Leisure Goods	0.2%
Leisure & Hotels	2.7%	Education	0.1%
Electricity	2.5%	Tobacco	0.1%
Information Technology Hardware	2.3%	Wholesale Trade	0.1%

The reliability of the analytical findings of the mediation analysis can be impacted by strong multicollinearity among independent variables in the model. To test for this issue, in line with prior research, we perform the Pearson correlation test and the variance inflation coefficient (VIF) (Gujarati & Porter, 2009). Results are reported in Table 4 and Table 5, respectively. As shown in Table 4, all correlation coefficients are below 0.5, that is the accepted threshold for multicollinearity problems (Wooldridge, 2010), except for the network centrality measures that present coefficients very close to or higher than such a threshold. The results from the VIF test also show high values, higher than 5 (Neter et al., 1985), for degree and betweenness. Therefore, to avoid multicollinearity issues, we decided to apply distinct models, one for each independent variable.

Table 4 - Pearson correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Tobin's Q	1											
(2) ESG	-0.096***	1										
(3) DEGR	-0.026	0.465***	1									
(4) CLOSE	0.009	0.421***	0.655***	1								
(5) EIGEN	0.038	0.092***	0.184***	0.162***	1							
(6) BETW	0.032	0.342***	0.846***	0.482***	0.348***	1						
(7) Firm size	-0.298***	0.367***	0.345***	0.265***	0.081**	0.277***	1					
(8) BOD size	-0.075**	0.323***	0.332***	0.277***	0.032	0.261***	0.398***	1				
(9) NEDs	-0.081**	0.404***	0.372***	0.313***	0.078**	0.287***	0.277***	0.429***	1			
(10) Females	-0.111***	0.408***	0.412***	0.329***	-0.047	0.300***	0.245***	0.641***	0.432***	1		
(11) BOD age	-0.01	0.110***	0.069**	0.082***	-0.052*	0.035	0	-0.067**	0.137***	-0.038	1	
(12) Firm age	0.008	0.119***	0.097***	0.105***	0.042	0.044	0.076**	0.087***	-0.017	0.075**	0.080**	1

**** p<0.01, ** p<0.05, * p<0.1*

Table 5 - VIF test

Variable	VIF	1/VIF
DEGR	6.17	0.16
BETW	4.58	0.22
Females	2.25	0.45
BOD size	2.17	0.46
CLOSE	2.01	0.50
ESG	1.54	0.65
NEDs	1.47	0.68
Firm size	1.36	0.73
EIGEN	1.28	0.78
BOD age	1.07	0.94
Firm age	1.05	0.95
Mean VIF	2.27	

4.2. Mediation analysis

To test our hypotheses, we performed a cross-sectional analysis using a structural equation model (SEM), according to prior research (Ali et al., 2020). Indeed, in mediation analysis, SEM is better than regression techniques as it allows for testing simultaneous path models and offers a reasonable way to control measurement error (Iacobucci et al., 2007; X. Zhao et al., 2010). Four distinct models were structured in order to examine the impact of each network centrality measure (i.e. DEGR, CLOSE, EIGEN, and BETW) separately. To enhance the interpretability of the coefficients, we used all standardized variables in the models. The results of the SEM models are reported in Table 6, showing the direct effects of independent variables on Tobin's Q and ESG. A significant direct effect is a conditio sine qua non for testing a mediation effect (Rucker et al., 2011). In particular, both the direct effects of the independent variable on the mediator and on the dependent variables must be significant. Despite being necessary, such a condition is not sufficient to determine a mediation effect, and the indirect effect must also be significant (Rucker et al., 2011). Table 7 shows the decomposition of the total effect of independent variables on financial performance as mediated by ESG, thus highlighting the indirect effects of network centrality measures on Tobin's Q. The statistics

show that the indirect effect of all network centrality measures on Tobin's Q is significant in the presence of ESG, despite being smaller than the respective direct effects. Thus, ESG partially mediates the association between firm network centrality and financial performance. More in detail, 13% of the total effect of DEGR on Tobin's Q is mediated by ESG. Moreover, ESG mediates almost 17% of the total CLOS-Tobin's Q effect. Finally, the proportion of total effect mediated by ESG is relatively smaller in the case of EIGEN and BETW (about 7%). Thus, all our hypotheses are confirmed.

Table 6 – SEM results

	Model 1	**Model 2**	**Model 3**	**Model 4**
	DEGR	***CLOSE***	***EIGEN***	***BETW***
Tobin's Q				
DEGR	0.0772^{***}			
CLOSE		0.0578^{*}		
EIGEN			0.0831^{***}	
BETW				0.107^{***}
ESG	0.0645^{**}	0.0708^{**}	0.0722^{**}	0.0606^{**}
Firm size	-0.286^{***}	-0.274^{***}	-0.269^{***}	-0.287^{***}
BOD size	-0.0166	-0.0154	-0.0130	-0.0158
NEDs	-0.0276	-0.0229	-0.0246	-0.0287
Females	-0.0125	-0.00547	-0.00482	-0.0169
BOD age	-0.0127	-0.0136	-0.0121	-0.0129
Firm age	0.00184	0.00134	0.00138	0.00426
_cons	0.0330	0.0207	0.0730	-0.0272
ESG				
DEGR	0.180^{***}			
CLOSE		0.176^{***}		
EIGEN			0.0893^{***}	
BETW				0.124^{***}
Firm size	0.424^{***}	0.443^{***}	0.491^{***}	0.462^{***}
BOD size	-0.0689	-0.0679	-0.0622	-0.0647
NEDs	0.156^{***}	0.165^{***}	0.178^{***}	0.170^{***}
Females	0.146^{***}	0.163^{***}	0.168^{***}	0.152^{***}
BOD age	0.00734	0.00533	0.00661	0.00596
Firm age	0.00548	0.00490	0.00552	0.00871
_cons	-0.247	-0.291	-0.209	-0.318
var(Tobin's Q)_cons	0.434^{***}	0.435^{***}	0.433^{***}	0.428^{***}
var(ESG)_cons	0.494^{***}	0.498^{***}	0.509^{***}	0.502^{***}
Dummy Country	YES	YES	YES	YES
Dummy Sector	YES	YES	YES	YES
N	958	958	958	958

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 – Mediation analysis: Effect's decomposition

Hypothesis	Direct effect	Indirect effect	Total effect	Mediation type observed
DEGREE-ESG-Tobin's Q	0.077***	0.012**	0.089***	partial mediation
CLOSE-ESG-Tobin's Q	0.058*	0.012**	0.070**	partial mediation
EIGEN-ESG-Tobin's Q	0.083***	0.006**	0.090***	partial mediation
BETW-ESG-Tobin's Q	0.11***	0.008*	0.115***	partial mediation

5. DISCUSSION AND CONCLUSIONS

Our research analyzed corporate sustainability as a mechanism intervening in the relationship between the firm network, established through board interlocks, and firm financial performance. Relying on the relational view theory, we argued that firms could access external resources and knowledge necessary for creating competitive advantage by utilizing relational capital from the firm network (Dyer & Singh, 1998; Zaheer et al., 2010; Zaheer & Bell, 2005). Furthermore, we attempted to explain the mechanism that underlies this association by showing that corporate sustainability acts as a mediator.

Our findings support that both sustainability and financial performance can be improved through a higher firm network centrality, and that sustainability performance can further leverage financial performance. More specifically, results show that the number of linkages (degree), the quality of connections (eigenvector) and the position in the network, i.e., acting as an intermediator (betweenness) and being able to reach other actors without intermediation (closeness), positively affect firm financial performance. Higher network centrality measures are also positive for sustainability performance, leading to higher ESG scores. Indeed, holding a central position within the network allows firms to better exploit their relational capital, having access to more relevant resources and information that can lead to competitive advantage (Adler & Kwon, 2002; Gölgeci et al., 2019; Homroy & Slechten, 2019; Larcker et al., 2013; Tsai, 2000).

Regarding control variables, results show that while firm size positively affects both sustainability and financial performance, the number of non-executive independent directors and female directors only impacts sustainability performance—more specifically, the more independent and female directors in the boardroom, the higher ESG scores.

Our results are consistent among the different centrality measures, revealing that several aspects of network centrality need to be considered, i.e., the quantity (degree) and the quality (eigenvector) of relations as well as the specific position in the network (closeness and betweenness).

5.1. Contribution to the literature

Our research contributes to the academic literature in several ways. First, our research contributes to expand knowledge on the association between firm network (or board interlocks) and firm performance by analyzing one of the possible mechanisms that explain how the firm network impacts financial performance. More in detail, we showed that corporate sustainability intervenes in the relationship between firm network and financial performance. In so doing, we introduced a new mediator in this relationship, thus expanding previous research that has focused on the direct relationship. Results from the mediation analysis indeed revealed that ESG explains the relationship between network centrality measures and financial performance. In particular, when relational capital results in high corporate sustainability, it enables higher financial performance. In fact, high performance in sustainability ultimately gives the firm the legitimacy it needs to grow over time since it demonstrates its commitment to society and the environment in which it operates (Ahn & Park, 2018; Suchman, 1995).

Second, by addressing different measures of centrality (i.e. degree centrality, closeness centrality, eigenvector centrality and betweenness centrality), the study demonstrates that several aspects of network centrality are relevant in leading the competitive advantage. In so

doing, we also provide evidence of the mediation effect of corporate sustainability on the relationship between the different centrality measures and financial performance.

Third, by focusing on the mediating effect of corporate sustainability, we also contribute to the literature on the association between sustainability and financial performance, suggesting that firms that engage in sustainability have higher market value (Miroshnychenko et al., 2017). In this view, the study's results endorse the "business case" of sustainability (Dyllick & Hockerts, 2002), highlighting sustainability performance not only as a direct antecedent of financial performance, but also as a crucial mechanism in converting relational rents into economic returns.

Fourth, while the most prominent theories addressed to examine the effect of board interlocks on firm performance were agency theory and resource dependence theory (Zona et al., 2018), we leverage on relational view theory, which represents a useful theoretical lens for explaining firms' competitive advantage (Juo & Wang, 2022). In so doing, we contribute to expanding knowledge on the effect of firm networks on competitive advantage by showing that it drives both sustainability and financial performance.

5.2. Managerial implications

The study also provides implications for managerial practice. In the first place, the findings point at the benefits of opening organizational boundaries for firms' financial and sustainability performance. The results of the study remind managers that corporate sustainability doesn't happen in isolation, but it rather requires firms to participate in collaborative efforts, to establish partnerships and engage with diverse stakeholders. In this view, the study suggests that board interlocks constitute a valuable pathway to foster collaborative efforts for greater sustainability performance. In light of the relational view theory (Dyer & Singh, 1998), board interlocks may constitute sources of valuable relational rents and

social capital for corporate sustainability: by participating in other firms' boards, and by taking part in multi-sectorial relational networks, directors may indeed access and develop complementary, external resources and capabilities, as well as knowledge and information. Board of directors may leverage relational rents to support their firms' sustainability efforts and performance: knowledge and information accessed through boards interlocks may help firms in interpreting future scenarios associated with sustainability challenges, reducing uncertainty with regard to sustainability-related investments, and thus facilitate decision-making and strategic planning processes; similarly, boards interlocks may enhance sharing of *"best practices"* among firms and across industrial sectors, as well as facilitating access to novel technologies and technology providers, thus stimulating innovation; being a source of relational benefits, boards interlocks may facilitate firms in accessing sectorial sustainability networks or international sustainability partnerships (e.g. UN Global Compact), which may entail direct reputational benefits and institutional support; boards interlocks may facilitate firms in sensing, interpreting and monitoring changes of regulatory environments, thus reducing exposure to regulatory uncertainty and enhancing responsiveness to the increasingly rapid evolutions of sustainability regulations; lastly, boards interlocks may secure institutional support, by facilitating firms in lobbying public institutions at national and international levels.

By examining the effects of diverse network centrality measures on financial and sustainability performance, the study suggests that benefits of boards interlocks do not only stem from the quantity of interlocks (i.e. degree centrality): quality of boards interlocks and network position also play a role. The results for eigenvector centrality indeed advise firms to secure boards interlocks with firms that are characterized by an already solid network of relations, and thus favor firms with a high number of boards interlocks over more isolated or marginalized organizations. Such "high quality" relationships allow firms to gain access to larger networks and thus accrue greater relational rents, thanks to a larger – and possibly more

diverse – consortium of valuable resources, capabilities, and relations. Accordingly, firms should strategically target those firms that are already embedded in large systems of inter-organizational relationships.

In this same vein, the results for closeness and betweenness centrality highlight network position as a strategic leverage of financial and sustainability performance. Managerial implications point to the need of monitoring firms' positioning within networks of boards interlocks in order to assess the strategic implications of diverse configurations of inter-organizational relationships. On the one hand, the results for closeness centrality emphasize the importance of nurturing direct connections with firms in inter-organizational networks, thus reducing "mediated" relations, in order to secure greater relational rents. Contrary to "mediated" relations, direct relations - in the form of board interlocks – allow a firm to benefit from relational rents (e.g. complementary resources, knowledge or information) without having to depend on intercession of other organizations. On the other hand, the results for betweenness centrality highlight the benefits of playing the "mediator" role for both sustainability and financial performance. By mediating the relation between two or more firms, firms may be able to exert a greater influence over their network: this position may allow firms to better control and monitor information flows within the network, and thus accrue relational rents. Thus, we advise firms to consider not only their ability to form relationships through board interlocks, but also assess and monitor their position in the network.

Our results are also of interest for investors who appoint directors in firms' boards. Indeed, we show that directors sitting in several boardrooms provide a valuable source of relational capital that can help the firm to engage in sustainability in outperform.

Most importantly, the study's results highlight corporate sustainability as a relevant mechanism in translating the relational rents accruing from boards interlocks in better financial performance. In this view, good sustainability performance emerges as an increasingly

necessary legitimacy factor, which can facilitate firms to benefit from their networks of inter-organizational relationships. Thus, managerial implications suggest leveraging corporate sustainability in the development of board interlocks and other inter-organizational relationships in order to secure economical returns. For instance, in developing boards interlocks, firms may promote joint sustainability initiatives with the threefold objective of improving sustainability performance, strengthening network relationships, and enhancing valuable relational rents.

5.3. Limitations and further research

By showing that corporate sustainability partially mediates the effect of the firm network on financial performance we contribute to deepening knowledge of the mechanisms that explain the value-creation potential of the firm network. However, being able to claim only partial mediation means the job still needs to be finished, and other mechanisms might be relevant (Hayes, 2018). Thus, further research might explore other different mechanisms that can explain the firm network-financial performance link.

Furthermore, we addressed an ego-level analysis, focusing on the effect of network centrality position for each firm within the network. Other studies can adopt a whole network perspective. In addition, while we performed a cross-sectional analysis, further research might apply different methodologies to take into account the time effect. For instance, by spanning the period of investigation and using a dynamic social network analysis, future studies can analyze whether and how the evolution of the firm networks modifies our results.

In addition, we have used Refinitiv Eikon's ESG scores for corporate sustainability. Despite being a reliable source, future research may examine additional sources of ESG scores, such as Sustainalytics and MSCI.

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Conclusions

This thesis, composed of three articles, builds on the ongoing discussion surrounding the role of the board of directors in driving corporate sustainability by addressing various perspectives. Firstly, the thesis examines the connection between the board and corporate purpose, with the latter being essential for the company to effectively convert its commitment to sustainability into tangible and positive social impact (Paper 1). Secondly, the thesis delves into the concept of sustainable boards, i.e. boards capable of guiding the company toward favorable sustainability outcomes, and focuses on a characteristic of such boards that has been little explored in existing literature, namely sustainability experience (Paper 2). Lastly, the thesis broadens the scope of the analysis of board-driven corporate performance by investigating corporate sustainability as a mechanism that clarifies the relationship between the corporate network, originated by the interlocking directorates, and financial performance (Paper 3).

These perspectives are separately addressed and investigated in the three papers.

Most notably, the first paper investigated the relationship between the board of directors' characteristics and the adoption of a social purpose in for-profit firms, aimed at answering the following question: "How do board characteristics affect the probability of adopting a social purpose in for-profit firms?". By applying propensity score matching and logistic regression analyses to perform a cross-sectional analysis on a sample of 580 European companies, the study found that specific board characteristics significantly influenced a firm's likelihood of adopting a social purpose, suggesting that the composition of the board of directors is critical for guiding for-profit firms towards goals beyond profit maximization. Results showed a positive and significant impact of gender diversity, internal network size, and directors'

educational backgrounds on the adoption of a social purpose. In contrast, age and tenure of the board have a negative impact. To the best of the authors' knowledge, it is the first research that quantitatively investigates the relationship between the board of directors and social purpose. In so doing, we proposed a measure to quantitatively assess the adoption of a social purpose, thereby contributing to the call for developing objective metrics to empirically test corporate purpose conceptualizations.

The second paper analyzed the relationship between board sustainability experience and firm sustainability performance, addressing two research questions: "Does board sustainability experience affect firm sustainability performance"; "Does the relation between board sustainability experience and firm sustainability performance depend on board age?". We applied propensity score matching and panel regression analyses on a sample of 510 European listed firms from 2014 to 2020, for a total 1587 firm-year observations. Findings provided support for the significant role played by the sustainability-related experience of the board in driving sustainability performance, highlighting that such an effect depends on board age. More specifically, results show that sustainability experience leads to high sustainability performance when the board is "younger", while it becomes negative when the board is "older". These findings suggest that sustainability experience should be accompanied by an intrinsic motivation of the board members, that can be reflected by board age, to integrate sustainability in decision-making in order to achieve higher sustainability performance. The main contribution of this research is that it for the first time investigates the interplay between the sustainability experience and age of the board of directors to assess the effect on firm sustainability performance. In so doing, the article provides evidence of the boundary conditions of sustainable boards in leading corporate sustainability.

The third paper analyzed the influence of interlocking directorates on both financial and sustainability performance, addressing the question: "Does corporate sustainability intervene in

the relation between firm network centrality and firm financial performance?". We conducted a cross-sectional analysis on a sample of 958 European listed firms by applying a social network analysis and a structural equation model. Results provided evidence that both firm sustainability and financial performance can be improved through a higher firm network centrality, measured through board interlocks, and that sustainability can further leverage financial performance. These findings suggest that interlocking directorates may constitute sources of valuable relational rents and social capital for corporate sustainability. Indeed, by participating in other firms' boards and taking part in multi-sectorial relational networks, directors may access and develop complementary, external resources and capabilities, as well as knowledge and information.

In conclusion, this thesis aimed at deepening the understanding of the role of the board of directors in corporate sustainability. First, by advocating the leading role of the board in adopting a clear social purpose beyond economic goals, that is needed to set the sustainable orientation of the company. Second, by offering insight into characteristics of the board for sustainable governance that are still little examined in the literature.

More specifically, this thesis underscores the critical role of the board of directors in driving sustainable transitions and emphasizes the importance of considering a range of board characteristics in order to better understand the relationship between the board and corporate sustainability. In particular, the sustainability experience and age of the board members, as well as interlocking directorates, are critical characteristics for developing sustainable boards.

The findings of this thesis have important implications for both theory and practice that are detailed in the three papers. Indeed, by emphasizing some critical characteristics of the board that should be taken into account to encourage sustainability integration within companies, these findings not only enhance the theoretical understanding of the subject but also

offer valuable insights for both companies selecting directors and policymakers regulating board composition.