# THE EFFECTS OF CEO DUALITY, BOARD SIZE, AND INFORMAL SOCIAL NETWORKS ON SUSTAINABLE INNOVATION AND FIRM PERFORMANCE

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## Abstract

Corporate governance affects the ownership and control of a firm. Conflicts between agents, managers and shareholders caused the crises of WorldCom, Enron, Tyco and Lehman Brothers. Therefore, the impact of chief executive officer (CEO) duality or board size on sustainable innovation and performance of small and medium-sized enterprises (SMEs) is relevant for research and evaluation. This may reflect the CEO style that supports long-term business growth with limited resources to enhance accountability, fast decision-making, and minimise hindrances to governance, particularly in emerging markets like India. The finding will help SMEs in maintaining their long-term viability. The current study examines the impact of CEO duality, board size, and informal social networks on sustainable innovation, governance, and performance of Indian SMEs to enable management to assess the significance of factors that contribute to firms' sustainable performance.

**Keywords:** Informal Social Network, CEO Duality, Board Size, Sustainable Innovation Capabilities, Sustainable Firm Performance, SMEs

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## 1. INTRODUCTION

A critical component of corporate governance is the relationship between ownership and control separation, which affects the firm's performance (Berle & Means, 1932). The agency theory of Jensen and Mackling (1976) explains this association that when ownership and control are separated, corporate managers prioritize their interests, resulting in the suboptimal maximization of shareholders' value (Fama & Jensen, 1983; Baliga et al., 1996; Abbas et al., 2023). In their study on corporate control mechanisms, Walsh and Seward (1990) argued that the sub-optimization of shareholders' value occurs because the board of directors, who represent shareholders, need more interest in effectively fulfilling their governance role. The conflict of interest between the agent (manager) and the firm's owner (shareholder) results in corporate scandals like WorldCom, Enron, Tyco, and Lehman Brothers (Kalsie & Shrivastav, 2016). As a result, certain scandals in the early 2000s caused significant companies to go bankrupt. During this time, the idea of chief executive officer (CEO) duality, where one person holds both the positions of CEO and chairperson, became a topic of significant interest.

CEO duality may have benefits for more effective communication and more simplified decision-making (Dwivedi & Jain, 2005; Xu, 2023). For Indian small and medium-sized enterprises (SMEs), it is imperative to comprehend the effects of CEO duality since it can provide light on whether or not this type of leadership structure supports long-term firm success in the face of resource limitations. However, this can raise problems due to potential conflicts of interest and a need for more organizational supervision. Thus, the question becomes relevant:

*RQ: Does this centralized power structure promote sustainable corporate performance or hinder effective governance?*

The size of the board of directors is crucial in controlling owning ship indulgence. The board size denotes the numerical count of members comprising a firm's board of directors at this location. Whether a large board facilitates better scrutiny and decision-making or impedes efficient governance is still up for dispute. The argument put out by critics is that larger boards may result in inefficiencies because they may take longer to establish an agreement, have slower decision-making processes, and need help reaching a consensus. Examining board size is crucial for Indian SMEs as it can provide insights into the most effective composition for governance. Within the context of SMEs, where limited resources are available to the board, it is crucial to comprehend the influence of board size on the firm's long-term success. Studies in this field can guide SMEs in finding the optimal equilibrium between maintaining a board with adequate diversity and preventing inefficiencies that may result from a vast board (Goel & Sharma, 2020). The CEO duality can be mitigated through the constitution of the board of directors and their informal social networking with owners, shareholders, and employees. This practice substantially influences both positive and negative outcomes regarding sustainable firm performance. They can facilitate informal contact, cooperation, a positive organizational culture, the promotion of innovation, knowledge exchange, and the flow of information. The influence of informal social networking on the long-term success of Indian SMEs is especially relevant, as personal contacts and connections can substantially impact commercial interactions. Understanding the functioning of informal networks within SMEs can offer valuable insights into how these networks contribute to cooperation, creativity, and the organization's general performance. Network exchange involves the essential components of acquiring social resources and the outcomes of resource movement within a social network (Strobl et al., 2014).

To adapt governance and management practices to the particular traits and difficulties experienced by SMEs in the Indian business landscape, it is imperative that CEO duality, board size, and informal social networking be studied in the context of Indian SMEs. Hence, it is imperative to critically analyse the correlation between CEO duality, board size, informal networking, and their influence on sustainable firm performance and creativity. Empirical research is necessary to fully comprehend the influence of these aspects on a corporation's sustainable success. It is critical to carefully evaluate their impact on key performance indicators (financial performance, sustainability, and productivity).

The remainder of this paper is structured as follows. Section 2 provides a comprehensive literature review of relevant studies to provide further understanding of the problem and presents a conceptual framework with associated hypotheses. Section 3 explains the methodology for data collection and analysis. Section 4 presents the results obtained from the panel data analysis. Section 5 presents a discussion of the study results. Finally, Section 6 concludes the paper by considering its limitations and charting directions for future research.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 2.1. Theoretical background

#### 2.1.1. Arguments supporting the impact of CEO duality, board size, and informal social networks on firm sustainability performance

The upper echelons theory, articulated by Hambrick and Mason (1984), is an approach that provides evidence for CEO duality. According to this idea, the experiences, values, and cognitive frameworks of senior executives have a substantial impact on strategic decisions and the overall performance of an organization (Hambrick & Mason, 1984). CEO duality, in which the CEO concurrently holds the position of board chair, can strengthen leadership unity and improve decision-making efficiency (Abels & Martelli, 2013). CEO duality facilitates the development of a cohesive strategic vision, ensuring that the cognitive frameworks of top executives are incorporated into both operational and governance aspects, potentially enhancing the firm's long-term success (Al Daoud et al., 2018; Boshnak et al., 2023). Support for this claim comes from a 7-year longitudinal study on Indian firms, which consistently shows that CEO duality impacts the disclosure score of sustainable firm performance (Bhatia & Marwaha, 2022). In addition, proponents of CEO duality contend that the absence of CEO duality leads to tension between the CEO and the chairman, confusion because there are two public spokespersons, and, ultimately, a reduction in intrapreneurship and creativity and compromise the independence of their board of directors (Dodds et al., 2011).

On the other hand, agency theory provides a theoretical framework for comprehending the connection between a board's size and a firm's long-term performance. As per this view, the board functions as a representative of shareholders and must oversee and synchronize managerial decisions with the interests of shareholders (Jensen & Meckling, 1976). Selecting the optimal board size is essential for balancing effective monitoring and organization efficiencies in decision-making. Increasing the board size can lead to a broader range of viewpoints, improving the board's effectiveness in overseeing operations. Conversely, a smaller board can promote faster and more streamlined decision-making (Le et al., 2023). Social capital theory (SCT) offers a theoretical basis for comprehending the influence of informal social networking on a firm's long-term success. Per this view, the connections and networks inside an organization are considered significant social capital that may be organised for mutual advantage (Nahapiet & Ghoshal, 1998).

Within certain bounds, firms have an advantage over markets in creating and sharing intellectual capital because of their denser informal social capital. It also helps to create innovative intellectual capital. Consequently, informal social networks can facilitate the establishment of trust, shared norms, and collaborative endeavours, promoting a favourable organizational culture that ultimately improves a firm's long-term success (Putnam, 1993; Nahapiet & Ghoshal, 1998).

While other research employs CEO duality and board size as control or moderating variables, most studies show a favourable relationship with business success.

### 2.1.2. Arguments against the positive effects of CEO duality, board size, and informal social networks on firm sustainability performance

One theoretical perspective is that agency theory casts doubt on CEO duality. According to Jensen and Meckling (1976), separating the CEO's and board chair's duties is essential to preserve internal checks and balances. The agency theory suggests that CEO duality enhances insider control and may impact the firm performance. In his study, Jensen (1993) accurately asserted that CEO non-duality improves firm performance by facilitating efficient monitoring and oversight. The combination of the CEO and chairperson roles can consolidate power, which may decrease supervision and responsibility. The consolidation of power may be outside the shareholders' interests and could harm the firm's long-term success (Carty & Weiss, 2012). Another study by Sehrawat et al. (2020) examined 2,552 Indian non-financial enterprises to understand the link between firm performance and corporate governance measured by board size, executive shareholding, audit committee independence, and CEO duality. A panel analysis of the performance of 15,671 companies from 2010 to 2019 found that management ownership improves firm performance (return on assets — ROA). In contrast, audit committee independence, board size, and CEO duality did not enhance corporate performance (Sehrawat et al., 2020). Carcello et al. (2002) found that independent boards do audits with more excellent quality and effort; these findings are only possible in companies without CEO duality.

Nevertheless, the board chairman is also crucial in enhancing the efficiency of the individual directors and the board. The chairman also oversees and assesses the overall managerial performance, including evaluating the CEO's performance. Therefore, the board chairman should be someone other than the CEO who will assess the CEO's performance. Otherwise, the CEO will be reviewing themselves (Jensen, 1993). Consequently, a firm must have distinct positions for the CEO and chairman.

Resource dependency theory (RDT) challenges the idea of optimal board size. According to this hypothesis, larger boards may lead to conflicts of interest, unequal access to information, and difficulties in making decisions because of the various interests represented (Pfeffer & Salancik, 1978). According to RDT, a smaller and more cohesive board may have an advantage in making decisions effectively, lowering the potential risks of disputes and information asymmetry (Ben-David et al., 2017; Pfeffer & Salancik, 1978).

Transaction cost economics offers a theoretical basis for caution in informal social networks. As per this idea, it is necessary to organise the expenses related to organisational transactions, such as opportunism and information asymmetry (Williamson, 1985). Thus, informal social networks can be categorised as a subset of informal collaboration. Gulati et al. (2012) perceive networking and collaboration as overarching concepts encompassing coordination and cooperation. However, they contend that collaboration explicitly denotes the lack of free riding, which pertains to pursuing individual objectives to the detriment of collective goals. While informal social networks might enhance collaboration, there is a risk of forming exclusive cliques that may increase transaction costs and hinder a firm's long-term success (Williamson, 1985).

## 2.2. Hypotheses development

The formulation of the hypotheses will establish a framework for empirical research on the correlation between CEO duality, board size, informal social network, sustainable firm performance, and innovation. The first hypothesis is formulated as follows:

*H1: There is a negative impact of CEO duality on sustainable firm performance.*

The study proposes that the negative influence of CEO duality on sustainable firm performance is mediated by its impact on sustainable innovation. As CEO duality makes it harder to have a strategic vision and lead with authority, it will likely hurt sustainable practices and innovation. Le et al. (2023) examine the link between CEO duality, board size, and firm performance of the top 200 Vietnam Stock Exchange (VSE) companies from 2014 to 2015. The result indicates that CEO duality makes monitoring things difficult for the board. Conversely, many executive directors in the top management positively influence firm performance. Onyina and Gyanor's (2019) study of Ghana uses CEO duality, board size, and independence as explanatory factors to examine how they affect a firm's performance. The boundaries of corporate governance do not affect how well a firm does, but having CEO duality has an adverse effect on how well a firm does (ROA). Wijethilake and Ekanayake (2020) study of 212 publicly traded companies in Sri Lanka shows that when the CEO has additional informal power, it has a negative effect on firm performance. On the other hand, when boards are involved, having two CEOs positively impacts the firm's performance. The evidence suggests that having a sufficiently large board can mitigate CEO duality. The second hypothesis is formulated as follows:

*H2: Board size has a significant impact on sustainable firm performance.*

The corporate governance research study predominantly discusses the board of directors, including its makeup, ability to make decisions, autonomy, and creation of policies. The board is an essential part of running a business; board actions need to be clear and focused on getting things done. The board's responsibility is to monitor management and ensure that their actions align with what is best for shareholders, so the correct board number makes for good governance. A balanced board size should make monitoring and making decisions more accessible, which will improve the long-term success of the firm. Alqatan et al.

(2019) looked at UK FTSE 100 non-financial businesses using data from 2012 to 2015 to see how board size, independence, and pay affect firm performance. The research also found a positive link between board size and ROA. On the other hand, there was a strong negative relationship between firm size and industry and financial performance.

The influence of board composition on various factors, including social dynamics, is frequently investigated in corporate governance and organisational behaviour research. Adherent corporate governance best practices indicate that, although board size is essential, fostering an atmosphere favourable to casual social networking should take precedence. The correlation between the size of the board and the extent of informal social networking within a firm is intricate and subject to variation depending on multiple factors. Although a sufficient board size can offer a wide range of viewpoints and talents, promoting collaboration and communication, the relationship between board size and informal social networking is not necessarily direct. The third hypothesis and its sub-hypotheses are formulated as follows:

*H3: Informal social networks have a positive effect on sustainable firm performance.*

*H3a: Sustainable innovation capabilities positively mediate the relationship between informal social networks and sustainable firm performance.*

*H3b: Firm size and gender diversity significantly moderate the relationship between informal social networks and sustainable firm performance.*

Informal social networks facilitate the accumulation of social capital within the firm. The presence of social capital, demonstrated by robust interpersonal connections, trust, and common standards, is anticipated to improve cooperation, employee involvement, and overall firm efficiency. As a result, it will have a favourable impact on the firm's sustainable performance. Their influence on innovation facilitates them. Informal social networks have a direct effect on firm effectiveness and also promote a culture that stimulates creativity. Their favourable impact on overall performance is created in two ways. Also, the firm size of a corporation is a crucial component in driving innovation. It is widely considered that larger firms have access to more resources, which they can utilise to enhance innovation and improve firm performance (Damanpour, 1992; Ferraris et al., 2019). Refer to Figure 1 below for corporate ownership and control conceptual framework.

**Figure 1.** Conceptual framework of corporate ownership and control
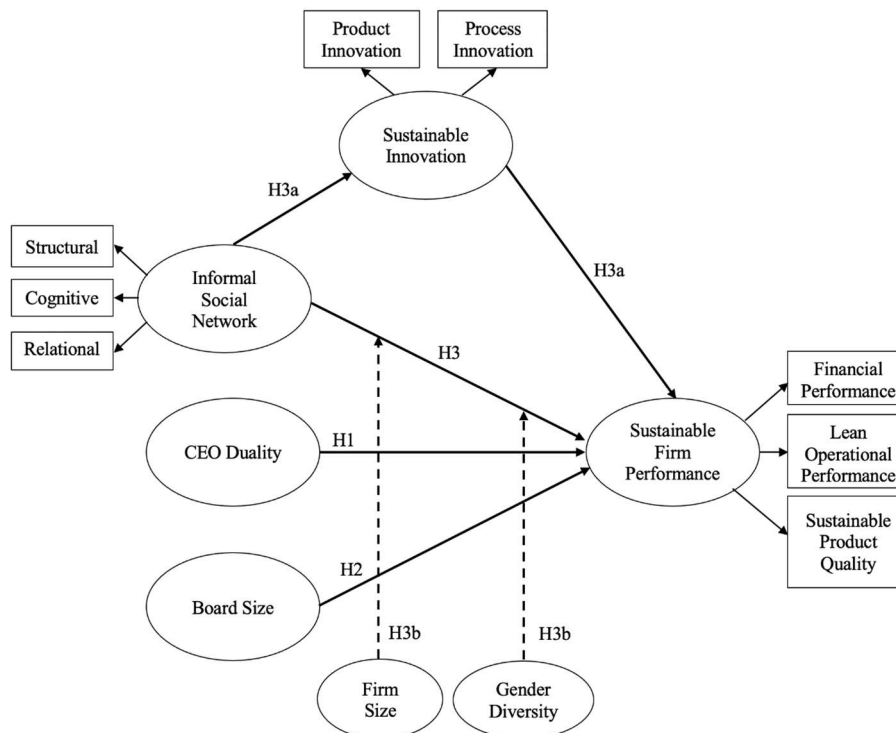


*Source: Authors' elaboration.*

## 3. RESEARCH METHODOLOGY

The research employs a cross-sectional exploratory study design. This approach allows for time-frame-specific variables revealing current SMEs' status. Empirical data was collected from Indian SMEs using a structured questionnaire. The questionnaire was developed by researchers in collaboration with academics and industry experts through brainstorming sessions to incorporate important aspects of informal social networking, sustainable innovation,

and firm performance. The research follows ethical guidelines for confidentiality, voluntary involvement, and informed consent. All data is protected and utilised for research.

### 3.1. Sample

The research centres on Indian SMEs enrolled with Udyam (an online system for registering micro, small and medium-sized enterprises (MSMEs) established by India's Ministry of MSMEs on July 1, 2020).

It operates on self-declaration and allows entrepreneurs to get a free unique identity number referred to as the Udyam Adhaar number, which helps them receive various advantages from the Indian government, such as easy access to loans without collateral and subsidies and incentives. This registration also enables them to categorise entities based on two specific factors: 1) investment in tangible fixed assets (such as plant and machinery/ equipment), and 2) turnover in the manufacturing and service sectors, as presented in Table 1 below.

**Table 1.** Classification of MSME

| Classification | Micro | Small | Medium |
|---|---|---|---|
| Manufacturing enterprises and enterprises rendering services | *Investment in plant and machinery/equipment:* Not more than INR1 crore. *Annual turnover:* Not more than INR5 crores. | *Investment in plant and machinery/equipment:* Not more than INR10 crore. *Annual turnover:* Not more than INR50 crore. | *Investment in plant and machinery/equipment:* Not more than INR50 crore. *Annual turnover:* Not more than INR250 crore. |

*Note: INR — Indian rupees.*
*Source: Ministry of Micro, Small and Medium Enterprises of India (2020).*

The study determines the appropriate sample frame and data collection methods based on the Revised MSME Classification applicable from July 1, 2020 (https://msme.gov.in/know-about-msme). The selected samples (SME respondents) were SMEs with between 10 and 250 employees, meeting the requirements of the European Commission's (EC & Directorate-General Enterprise and Industry [DG-ENTR], 2005) definition of SMEs for wider coverage worldwide. The selected SMEs in the manufacturing and service industries were asked to respond to the questionnaire with comments regarding the survey content, such as language, readability, comprehensiveness, and relevance related to measuring the research constructs. The filtering protocol, which consisted of two criteria, was promptly applied during the pilot survey. The first criterion required the number of employees of the firm to be between 10 and 250, and the second criterion required an investment of more than INR1 crore and a turnover of more than INR5 crores in services and manufacturing. Given the prevalence of SMEs in various sectors, the study committee, experts, industry associations, and some entrepreneurs have also advocated for filtration to obtain more refined and informed responses.

Given the vast quantity of MSMEs in India, it is impractical to encompass them all; however, the study includes an exhausting number of SMEs operating in the economy's formal and informal sectors. Complete inclusions are difficult as millions of formal and informal SMEs make it impossible for national-level surveys to capture the picture entirely. Creating an approved MSME database is still a long-term goal for India. Hence, partial least squares structural equation modelling (PLS-SEM) is used to minimise the issue of large data sets, which is extremely difficult, in case of SMEs, as they are highly unorganized and scattered in the remote locations of the country. Consequently, PLS-SEM, which operates on minuscule sample sizes, was used in the current studies analysis. Several scholars advocate for the applicability of PLS-SEM in both small-sample-size research (such as business-to-business research) and significant sample-size research (Sarstedt et al., 2016). The sample selection criteria have been finalised based on this premise.

The general guideline for assessing the sufficiency of data for applying PLS-SEM is to have a dataset that is at least ten times larger than the number of formative indicators used to test a single construct (Hair et al., 2014). It is indicated that the minimum sample size should be tenfold the highest number of arrows directed towards the latent variable in any part of the model. However, the study employed power analysis instead of the 10 Times Rule for improved accuracy. Power analysis was utilised to determine the most complex regression in the structural and measurement model, which served as the reference point. Power analysis assists in determining the minimum sample size necessary for an experiment based on the specified significance level, statistical power, and effect size.

*Effect size* provides information about the magnitude of one construct's impact on another. If the values are less than 0.05, they indicate a mild effect. If the values are between 0.15 and 0.35, they are regarded to have a moderate impact. Values larger than 0.35 are considered to have a substantial effect (Sullivan & Feinn, 2012). The effect magnitude is determined by the contribution of $R^2$ and the number of independent variables. Previous research indicates that the $R^2$ value for this study is 0.25 (Migdadi, 2022), but as the study is focused on SMEs, a modest influence has been assumed for safety reasons. Therefore, 0.11 has a significance level of 0.05 and a maximum of 11 arrows pointing toward a single construct. The findings indicate that our desired sample size is 134 (Schmiemann, 2008). Nevertheless, to minimise the inaccuracy in our model, we have collected 259 samples for this investigation.

Regarding the *sample size* and *the sector*s studied, we note that among the 259 SMEs, 183 SMEs (70.65% of the sample) are classified as small businesses, and 76 SMEs (29.34%) are classified as medium-sized businesses. The manufacturing sector includes the following industries: pharmaceuticals, office and computer equipment, scientific instruments, food processing items, electrical components, die and chemicals, textile and apparel, biofertilisers, and wood processing. At the same time, the service sector encompasses real estate, retail and wholesale commerce, interior design, consulting, information technology (IT) related services, motor vehicle sales, maintenance, repair, and transportation-related operations.

Regarding the *educational qualification*, we note that the research data was obtained from high-level executives such as CEOs, owners, partners, and managing directors of SMEs to reduce response bias. SME owners were invited to participate in the study throughout the data-gathering phase. This approach is because owners or CEOs are the primary decision-makers responsible for formulating the firm's long-term strategy. At the same time, low- and middle-level employees are primarily involved in the implementation of the existing plan.

## 3.2. Model measurement

### 3.2.1. Sustainable firm performance

Sustainable firm performance (*SFP*) is a multi-dimensional construct that may be assessed using both hard and soft indicators, according to research by Kafetzopoulos and Psomas (2015). Conventional financial metrics must be improved to achieve a competitive advantage in the modern business landscape. Therefore, this study encompasses the three categories of performance indicators: 1) contribution of financial performance towards sustainability, 2) lean operational performance, and 3) sustainable product quality.

The research measures sustainable financial performance using profitability, economic outcomes, net profit margin, sales growth, and overall performance leading to sustainable results. These indicators are crucial for accomplishing financial and market share targets. Every item is assessed using a 5-point Likert scale. Lean operational performance provides insights into the firm's internal operations based on reduction (minimisation of waste). In the context of SMEs, this study employs enterprise productivity, efficiency, enterprise cost of supplies, production and sale, and process effectiveness as the component of operational performance which is a second sub-construct of sustainable firm performance variables. The third sub-construct evaluates the product or service attribute of reusing and recycling. The dimension concepts are similar to Kafetzopoulos and Psomas (2015). However, the questionnaires are designed to incorporate sustainability measures using a 5-point Likert scale.

### 3.2.2. Informal social network

Informal social networks (*ISN*) aid in the building of social capital inside the firm. Socialisation is the act of individuals sharing and combining unspoken knowledge, which is later expressed and ultimately adds to the collective memory of the group. According to Adler and Kwon (2002), social capital refers to the arrangement and substance of connections among individuals within a given system. Nahapiet and Ghoshal (1998) delineate three distinct dimensions of social capital: structural, cognitive, and relational. The structural dimension pertains to the relationships between actors, namely the individuals or entities with whom they interact and how frequently they exchange information. Individuals get an understanding of the disparity between practical knowledge and formal written procedures through the means of storytelling, introspective conversations, and cooperative talks. This type of learning, which takes place in a specific context, might improve performance, especially in firms that rely heavily on expertise.

The second dimension of relational social capital refers to the nature of personal ties that individuals have formed over time through encounters (Nahapiet & Ghoshal, 1998). One of its notable characteristics is the degree of trust among the individuals involved (Leana & Pil, 2006; Nahapiet & Ghoshal, 1998; Claridge, 2018). Trust-based relationships promote cooperative and collective action when no explicit procedures encourage formal and informal behaviours. Establishing trust-based informal relationships enables the exchange of a more significant amount of information and information that is more comprehensive and potentially more valuable. Mutual trust among members increases the likelihood of sharing confidential information inaccessible to anyone outside the trusted group. This study integrates both components, which contribute to the development of informal social networks, drawing from the research of Leana and Pil (2006), Nahapiet and Ghoshal (1998), and Claridge (2018). The study utilised the dimensions and questionnaire items from Nahapiet and Ghoshal's (1998) study, assessed using a 5-point Likert scale.

### 3.2.3. CEO duality & Board size

The study utilises CEO duality (*DUAL*) and board size (*BSIZE*) as the independent variables. The variable *DUAL* is a binary indicator that equals one if the CEO or general manager holds the additional chairperson of the board (CEO duality); otherwise, the value is 0. In sampling analysis, 38% of the enterprises showed evidence of dualism. *BSIZE* is the natural logarithm of the number of directors at the board level. The data has been encoded as a value of 0 indicates the absence of a board of directors, a value of 1 indicates a range of 2 to 5 board members, and a value of 2 indicates the board of directors is in the range of 6–9. If the range falls inside 10–13, it is coded 3. If the number of board members exceeds 13, it is recorded as 4.

### 3.2.4. Mediator

The importance of sustainable innovation as a mediator between the informal social network and sustainable firm performance is considered in this study. The direct relationship between product innovation and firm performance is supported by several current studies (Bhaskaran, 2006). Product innovation entails either providing new products that reflect a novel combination of features and their preferences or modifying existing product features to boost the willingness of potential customers to pay (Gunday et al., 2011; Tavassoli & Karlsson, 2016). Market share can be captured by businesses that can consistently launch innovative, more effective, and customer-focused products (Jajja et al., 2014). Introducing new items can boost sales due to their superior performance and enhanced features compared to the market's current offerings (Xin et al., 2010).

Sustainable innovation capabilities (*SIC*) encompass implementing novel production techniques, which may involve adopting alternative approaches for managing commodities or services in a business setting, leading to environment-friendly production. It decreases production costs by optimising input utilisation and enabling greater production capacity. As a result, there is an enhancement in the quality and timely delivery of products, a more dominant position in the market, increased competitive advantages (Gunday et al., 2011; Tavassoli & Karlsson, 2016), and a higher level of firm performance.

*3.2.5. Control variables*

The study includes gender diversity (*GD*) and firm size (*FSIZE*) as control variables. The size of a corporation is a crucial component in driving innovation. It is widely considered that larger firms have access to more resources, which they can utilise to enhance innovation and improve firm performance (Damanpour, 1992; Ferraris et al., 2019). Therefore, this study includes gender diversity and firm size as factors influencing innovation and the success of SMEs (Sarstedt et al., 2011; Bhatia & Marwaha, 2022). It will help thoroughly understand the statistical significance of discrepancies between group estimates. Thus, our data was divided into two groups according to the firm's size as a categorical variable. There were $n = 183$ small firms and $n = 89$ medium firms, and board size (*BSIZE* zero, $n = 41$; *BSIZE* 2–5, $n = 75$; *BSIZE* 6–9, $n = 96$; *BSIZE* above 13, $n = 47$).

## 4. RESULTS

The research construct indicators were obtained by thoroughly examining the literature and expert input from industry and the academy. The indicators will assess the sustainable firm performance and innovation of Indian SMEs. The data analysis was conducted using SmartPLS 4 with PLS-SEM application to conceptualise the framework of sustainable firm performance's composite variables were evaluated using three distinct latent variables (financial performance, lean operational firm performance, and environment-friendly product quality). The PLS-SEM examination consists of two stages: 1) constructing a measurement model and 2) structural model. The measurement model examines each indicator's precision and consistency, verifying each construct's validity and reliability. The measuring model must adhere to the specification guidelines established by Hair et al. (2014) to be authorised for utilisation in the study construct. The model validation procedure has four independent stages: 1) measuring the reliability of indicators, 2) evaluating internal consistency reliability (InterCon), 3) checking convergent validity (CV), and 4) analysing discriminant validity (DV). Cronbach's alpha is used to assess InterCon, which measures the extent to which all items or indicators are related to a construct. Indicator dependability is determined by outer loading, which demonstrates the relationship between each item and the construct. CV, as determined by the average variance extracted (AVE) measures, suggests that the construct explains more than 50% of the variation in its indicators on average. The Fornell-Larcker criterion and heterotrait-monotrait ratio (HTMT) criterion are utilised to quantify DV, which exists at the construct-to-construct level and signifies that each construct is separate and distinguishable from the others (Henseler et al., 2015). As recommended by previous research, the consistent PLS-SEM (PLSc-SEM) algorithm is employed in all of these studies. The PLS research construct aims to identify the optimal multidimensional axis in the latent variables (*ISNX1*, *DUALX2* and *BSIZEX3*) space that accounts for the most amount of variance in the dependent variable (*SFPY1*) space.

## 4.1. Measurement model evaluation

The study adheres to the methodology outlined by Hair et al. (2021) to assess the measurement model. Table 2 displays the statistical indicators of the measuring model. The survey items exhibit outer loadings that surpass the standard threshold of 0.70, thereby confirming the satisfactory variation accounted for the variable of a specific factor. Researchers have employed Cronbach's alpha and AVE to measure internal consistency, and all of the scores listed in Table 2 are significantly higher than the cut-off point of 0.70. Similarly, studies have employed the HTMT ratio for DV, and each construct's values are less than one. Doing this can allow one to proceed to the next phase, the structural model evaluation. The scale developed for measuring sustainable firm performance and sustainable innovation may be further utilised for analysis and research model fitting.

**Table 2.** Measurement model evaluation

| Construct | Item | Loading | AVE | CR | CA |
|---|---|---|---|---|---|
| Sustainable firm performance (*SFP*) | FP1 | 0.71 | 0.511 | 0.924 | 0.92 |
| | FP2 | 0.723 | | | |
| | FP3 | 0.747 | | | |
| | FP4 | 0.683 | | | |
| | FP5 | 0.751 | | | |
| | OP1 | 0.796 | | | |
| | OP2 | 0.768 | | | |
| | OP3 | 0.741 | | | |
| | OP4 | 0.783 | | | |
| | PQ1 | 0.665 | | | |
| | PQ2 | 0.659 | | | |
| | PQ3 | 0.652 | | | |
| | PQ4 | 0.583 | | | |
| Informal social network (*ISN*) | RSC1 | 0.786 | 0.511 | 0.918 | 0.903 |
| | RSC2 | 0.865 | | | |
| | RSC3 | 0.797 | | | |
| | RSC4 | 0.792 | | | |
| | SSC1 | 0.815 | | | |
| | SSC2 | 0.717 | | | |
| | SSC3 | 0.713 | | | |
| Sustainable innovation capability (*SIC*) | PRDT1 | 0.724 | 0.479 | 0.863 | 0.813 |
| | PRDT2 | 0.803 | | | |
| | PRDT3 | 0.759 | | | |
| | PRDT4 | 0.756 | | | |
| | PRS1 | 0.576 | | | |
| | PRS2 | 0.623 | | | |
| | PRS3 | 0.559 | | | |

*Note: FP — Financial performance, OP — Lean operational performance, PQ — Environment-friendly product quality, RSC — Relational social capital, SSC — Structural social capital, PRDT — Sustainable product innovation, PRS — Sustainable process innovation, CR – Composite reliability, AVE – Average variance extracted, CA – Cronbach's alpha.*
*Source: Authors' elaboration.*

## 4.2. Structural model evaluation

The structural model and hypothesis testing were evaluated using the methodology outlined by Hair et al. (2016). The results of the test statistics are presented in Table 3. At the initial phase, the inner variance inflation factor (VIF) values were assessed for collinearity (*ISN* VIF = 1.105 and *SIC* VIF = 1.105), and the scores for each variable were found to be less than five (Neter et al., 1985). There is no autocorrelation among the residuals of the research model (Durbin-Watson statistic = 1.83). Path coefficients, which evaluate the significance of the link, are estimated in the second phase. For formula notation, refer to Appendix.

**Table 3.** Structural model evaluation

| Hypothesis | Sample mean (M) | Standard deviation (STDEV) | T-statistics (\|O/STDEV\|) | p-values | Decision (Y/N) |
|---|---|---|---|---|---|
| H1: DUAL → SFP | 0.115 | 0.042 | 3.069 | 0.029 | Y (Plausible) |
| H2: BSIZE → SFP | 0.123 | 0.057 | 2.069 | 0.039 | Y (Plausible) |
| H3: ISN → SFP | 0.483 | 0.06 | 7.992 | 0 | Y (Plausible) |
| H3a: ISN → SIC | 0.323 | 0.06 | 5.195 | 0 | Y (Plausible) |
| H3a: SIC → SFP | 0.279 | 0.071 | 3.932 | 0 | Y (Plausible) |
| H3a: ISN → SIC → SFP | 0.09 | 0.029 | 2.989 | 0.003 | Y (Plausible) |
| H3b: FSIZE * ISN → SFP | 0.052 | 0.056 | 0.986 | 0.324 | N (Rejected) |
| H3b: GD → SFP | -0.032 | 0.063 | 0.5 | 0.617 | N (Rejected) |
| H3b: GD * ISN → SFP | -0.066 | 0.065 | 1.122 | 0.262 | N (Rejected) |

*Note: Y = Yes influencing, N = Not influencing.*
*Source: Authors' elaboration.*

The study revealed that three factors, namely board size (p-value = 0.039), CEO duality (p-value = 0.029), and informal social networks (p-value = 0.00), have a statistically significant and beneficial influence on sustainable firm performance. Accordingly, each dimension's function has a noteworthy and advantageous impact on the firm's long-term success. The study revealed that the informal social network (p-value = 0.00) clearly and substantially influences sustainable innovation capability and significantly impacts sustainable firm performance. In addition, the findings indicate that neither gender diversity nor the firm size (medium vs. small) has a statistically significant effect on the association between the success of the firm and its informal social network.

Evaluation of hypotheses and exploratory analysis were aided using PLS-SEM. However, examining the validation and strength of the connections established in the PLS-SEM is relevant. Thus, in the second phase, the general linear model (GLM) was applied to directly analyse the associations between observable variables, validating the structural framework and evaluating the normality of residuals. It also checks whether the assumptions underpinning the linear model are satisfied.

The GLM multivariate test statistics reveal a significant relationship and 42% of the variability observed between the informal social network (F-statistic = 2.32, p-value = 0.002; when Pillai's trace: F-statistic = 3.56, p-value = 0.000, and Wilks' lambda: F-statistic = 3.78, p-value = 0.000; $R^2 = 0.419$) and the combination of dependent variables sustainable firm performance and mediator sustainable innovation capabilities. The interaction effect between informal social network, CEO duality and board size with a combination of dependent and moderating variables was run to determine if the impact of one independent variable on the dependent variables (as a whole) is influenced by the value of the other independent variable. The outcome signifies informal social network in combination with CEO duality (*ISN * DUAL* => F-statistic = 2.061, p-value = 0.008; when Pillai's trace: F-statistic = 2.026 p-value = 0.001, and Wilks' lambda: F-statistic = 2.114, p-value = 0.000; $R^2 = 0.49$) explains a significant relationship and variance of 49% between the dependent variables (*SFP*) and the mediator — sustainable innovation capabilities (*SIC*). The interaction effect between different independent variables and control variables is proved to have insignificant relation and effect on dependent and mediating variables except for *ISN * DUAL * FSIZE* on *SFP* (F-statistic = 2.073, p-value = 0.04) and *ISN * FSIZE * BSIZE* on *SFP* (F-statistic = 2.178, p-value = 0.04), indicating that

CEO duality and board of directors have similar relation and effect on sustainable innovation capability and sustainable firm performance.

## 5. DISCUSSION

The power dynamics of corporate ownership and control, which affect decision-making procedures and firm performance, are significantly shaped either by CEO duality or board size (Yermack, 1996; Hermalin & Weisbach, 2003; Dalton et al., 2007; Cabral & Sasidharan, 2021; Boshnak et al., 2023). Understanding the interplay between CEO duality and board size as part of firm ownership and control requires a nuanced analysis that considers the specific context of Indian SMEs. The dynamics are not universal, and the relationship can vary across different firms and sectors.

A manipulation check is an essential procedure in research to verify that the intended manipulation has successfully influenced the independent variable. Given the analysis of interaction effects, including a manipulation check in the context of both CEO duality and CEO non-duality (the firm has independent directors) is essential. One way to do this is to find the average difference between groups that experienced CEO duality and those that did not. Indicating that Indian SMEs' sustainable firm performance and innovation function, both in the presence and absence of CEO duality (*n* = 53), the mean difference between CEO duality and CEO non-duality for informal social networks (t = 0.110, p-value = 0.913), sustainable innovation capability (t = 1.175, p-value = 0.243), and sustainable firm performance (t = 0.830, p-value = 0.409) does not exhibit any difference. The findings show no significant difference in the impact on Indian SMEs' sustainable innovation capacity and firm performance between CEO duality and those with a board of directors (CEO non-duality) for corporate ownership and control.

CEO duality and board size have a similar effect on Indian SMEs. In early-stage SMEs, agile and speedy decision-making is essential. Duality allows the CEO to make quick decisions without long board debates, improving decision-making efficiency. The board of directors' makeup may affect supervision and control mechanisms. Regarding variation caused by CEO duality, the board of directors may perform similarly. Thus, Indian SMEs may choose their governance strategy.

SMEs frequently need to be improved regarding resources, such as restricted financial and human resources. CEO duality can be a pragmatic solution where maintaining distinct positions for the chair

and CEO could be resource-intensive for small firms. CEOs are more involved in daily operations in SMEs due to a smaller executive staff (Khandelwal et al., 2023). Following SMEs' entrepreneurial ethos, CEO duality allows the CEO to monitor operations directly and address difficulties quickly, which helps firms swiftly respond to market changes and uncertainty. In SMEs, the CEO often has a closer relationship with customers, suppliers, and employees and also directly addresses stakeholder concerns and builds relationships. Entrepreneurs with a compelling vision found and led many SMEs as dual CEOs, which helped them to implement their vision without a chairperson backing an alternative path. A separate chair may cost more for SMEs. CEO duality minimises overhead expenses, making it a cost-effective governance structure for resource-constrained SMEs (Pasko et al., 2021).

Examining the impact of board size in the context of firm size may offer additional insights into governance dynamics, as there is no mean difference between CEO duality and firms with boards of directors. When analysing variations in firm size among varying board size levels, nested analysis of variance (ANOVA) can offer significant insights when dealing with hierarchical or nested data structures. This is particularly true when investigating the connection between firm size and board size to determine whether board size variations occur or are constant across various firm size categories. The results of the nested ANOVA on sustainable firm performance impacting firm size (small firm, $n = 183$, and medium firm, $n = 89$) and board size (*BSIZE* zero, $n = 41$; *BSIZE* 2–5, $n = 75$; *BSIZE* 6–9, $n = 96$; *BSIZE* above 13, $n = 47$) shows no difference in firm performance based on board size (*BSIZE* (*FSIZE*) F-statistic = 1.282, p-value = 0.279; *FSIZE* F-statistic = 3.898, p-value = 0.097). The results show that the board size does not affect sustainable firm performance; subsequently, the CEO duality and board size had similar effects on sustainable firm performance. There might be variations depending on the unique circumstances and are influenced by elements relevant to the industry. Therefore, it is crucial to explore how contextual factors impact the relationship between sustainability and governance structures, given the diversity of businesses and their particular issues.

CEO duality and adequate board size can speed up decision-making in SMEs, where speed is often needed. SMEs with limited resources may benefit from CEO duality, which reduces the need for additional leadership. It lowers overhead costs compared to large enterprises with complex governance structures. Entrepreneurs with a compelling vision often lead SMEs, resulting in CEO duality, and a small board size helps entrepreneurs drive the firm towards their goal. Positive theoretical implications explain why huge board size affects Indian SMEs' sustained firm success differently from small board size. The upper echelons theory claims that senior executives' experiences and cognitive frameworks substantially impact a firm's outcomes (Hambrick & Mason, 1984). Boards with more members may have more cognitive frameworks for action. However, integrating various ideas into a strategic vision takes time and effort. RDT states enterprises seek to reduce external resource dependence (Pfeffer & Salancik, 1978).

Owing to their limited resources, SMEs may prefer board sizes that align with the ideals of resource efficiency and autonomy. The combination of CEO duality and the presence of board members also exists, where independent directors play the moderating role (Tejedo-Romero & Araujo, 2023). Regardless of board size, firms with directors benefit from varied viewpoints. This can sometimes delay decision-making. Optimal board size can boost resource efficiency, corporate ownership, and control in Indian SMEs with limited resources. Communications of the small board of directors, using the Delphi method (also known as Estimate-Talk-Estimate or ETE), improve communication and teamwork.

Policy implications allow firms to improve governance ownership and control, optimise board structures, and use informal networks to innovate and operate sustainably. Implementing CEO duality successfully requires periodic board performance evaluations. Continuous review keeps the board's framework supportive of organisational goals (Huse, 2007). When duality occurs, firms should establish clear norms for CEO and board chair duties. Well-defined roles minimise disputes and improve decision-making (Hermalin & Weisbach, 2003). SME owners should implement performance metrics and accountability systems that support sustainable practices and innovation goals (Mackey et al., 2007).

The size of a board of directors can influence a firm's decision-making and performance; therefore, maintaining an appropriate balance is critical (Yermack, 1996). Even with CEO duality, a well-structured and independent board of directors can offer efficient oversight (Baysinger & Hoskisson, 1990). Promoting diverse board membership, including gender, experience, and abilities, by encouraging informal networks through regular events, mentoring programs and collaboration platforms can promote innovation, leading to sustainable firm performance (Perrault, 2015).

Informal social networks facilitate information sharing and creation, which boosts a firm's success (Cross & Cummings, 2004), encouraging organisations to adopt governance systems that are consistent with their culture and goals. Aligning governance with organisational culture boosts performance and creativity (Finkelstein et al., 2008). Successfully addressing CEO duality, board size, and informal social networking to preserve firm performance and innovation needs a comprehensive and sophisticated plan. Although academics can give broad insights and suggestions, policy implementation may vary by the organisation (public vs. private) and jurisdiction.

## 6. CONCLUSION

There is a nuanced argument over the impact of informal networking on sustainable innovation and firm performance, board size, and CEO duality in the context of Indian SMEs. The study highlights the necessity of a customized and situation-specific approach to corporate governance policies. The synthesis of existing research and theoretical viewpoints indicates that promoting informal networking, maintaining CEO duality, and choosing the right board size can all positively impact the long-term development and capacity for innovation of Indian SMEs. A cohesive strategic

vision, expedited decision-making, and practical resource utilization are just a few benefits that CEO duality may provide when properly managed and in keeping with firm culture and objectives. Establishing a harmonious equilibrium between the CEO and board chair positions and a distinct demarcation of duties is essential for guaranteeing efficient governance in the presence of CEO duality (Hermalin & Weisbach, 2003).

The second component of corporate governance, i.e., the optimal board size, is a crucial aspect that must be able to adjust to SMEs' specific requirements and intricacies. Studies indicate that smaller boards can be nimbler and more efficient in their use of resources, creating a favourable atmosphere for innovation and long-term success. Similarly, when informal social networking is fostered within an organization, it can act as a catalyst for exchanging knowledge, cooperation, and generating new ideas. This aligns with the concept of SCT, highlighting the significance of interpersonal relationships in achieving organizational success (Nahapiet & Ghoshal, 1998; Cross & Cummings, 2004).

Given that SMEs are the foundation of the Indian business environment, it is crucial to implement policies that prioritize adaptability, provide explicit standards for governance, and emphasize the distinctive advantages of smaller organizations. By addressing CEO duality, optimizing board arrangements, and promoting informal networks, we can tap into the natural adaptability and entrepreneurial drive of Indian SMEs to achieve long-term development and innovation. These observations emphasize the significance of a comprehensive and situation-aware strategy for governing policies, acknowledging the distinct attributes and difficulties Indian SMEs encounter in achieving sustainable firm performance and innovation.

To further develop, context-specific studies and additional empirical investigations are necessary to expand the understanding of research due to the intricate nature of these linkages. Subsequent investigations should examine the influence of CEO duality on precise performance indicators in Indian SMEs, taking into account differences in industries and phases of organisational development. Research on the optimal board size in various organisational contexts and how informal networking enhances creativity in Indian SMEs is essential for improving governance regulations. These observations emphasise the intricate nature of governing dynamics in the SME sector and highlight the necessity for further research that explores the complexities of CEO duality, optimal board size, and informal networking. Given SMEs' significant role in India's economy, enhancing our comprehension of governance characteristics related to these businesses is crucial. This understanding is essential for developing policies that promote sustainable performance and innovation across different sectors.

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**APPENDIX.** PARTIAL LEAST SQUARES STRUCTURAL EQUATION MODELING FORMULATION

**Notation:**

- *SFP*: Sustainable firm performance (dependent variable);
- *ISN$_1$*: Informal social networking (scaled independent variable);
- *DUAL$_2$*: CEO duality (categorical independent variable);
- *BSIZE$_3$*: Board size (categorical independent variable);
- *SIC*: Sustainable innovation capabilities (mediator).

**Structural model:**

$$SFP = \beta_0 + \beta_1 ISN_1 + \beta_2 DUAL_2 + \beta_3 BSIZE_3 + \beta_4 SIC + \varepsilon_Y \tag{1}$$

$$SIC = \beta_0 + \beta_1 ISN_1 + \varepsilon_M \tag{2}$$

where,

- the arrows indicate directional relationships, and $\beta$ represents the path coefficients to be estimated;
- $\varepsilon_Y$ and $\varepsilon_M$ represent the error terms associated with the respective latent variables (*Y* and *M*).

**Indicator models:**

For observed variables that indicate underlying constructs, indicator models are used. For instance, if *Y* is assessed using multiple observable variables (indicators), the indicator model for *Y* could be represented as follows:

$$SFP = \lambda_{SFP1} \times SFP_1 + \lambda_{SFP2} \times SFP_2 + \cdots + \lambda_{SFPn} \times SFP_n + \zeta_{SFP} \tag{3}$$

where,

- $SFP_1, SFP_2, \ldots SFP_n$ are observed variables representing *SFP*;
- $\lambda_{SFP1}, \lambda_{SFP2}, \ldots \lambda_{SFPn}$ are the loadings of the indicators on the latent variable *SFP*;
- $\zeta_{SFP}$ represents the unique variance or error associated with *SFP*.

**Methods for managing categorical variables:**

PLS-SEM usually uses a two-step process for categorical variables such as CEO duality and board size:

- *Formative measurement model:* Represents each category variable using a collection of dummy indicators. The category variable is represented by a latent variable created using these indications.
- *Integration into the structural model:* Latent variables derived from the formative measurement model are then integrated into the structural model, where their associations with other variables are assessed.