УПРАВЛЕНЕЦ 2026. Том 17. № 3

DOI: 10.29141/2218-5003-2026-17-3-3 **EDN:** HLNYEJ
JEL Classification: Q54, Q56, G32

Governance and climate-related drivers of corporate sustainability

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Abstract. Corporate sustainability has gained increasing importance as firms face governance challenges and climate-related risks. Yet the joint impact of these factors remains insufficiently examined, creating a gap between theoretical propositions and empirical evidence. The study aims to investigate the relationship between firms' ESG performance and three determinants of corporate sustainability: climate change commercial risk opportunities, CEO-Chairman duality, and board gender diversity. Methodologically, the research rests on stakeholder theory, agency theory, and sustainability management. The study applies econometric analysis using the fixed effect regression with Driscoll–Kraay standard errors. The materials include firm-level sustainability data for 910 companies from seven advanced European economies for 2018–2023. The results suggest that firms engaging in the development of products or services aimed at addressing climate-related risks tend to exhibit stronger sustainability performance. In contrast, CEO-Chairman duality is linked to weaker sustainability outcomes, whereas higher levels of female representation on corporate boards are associated with enhanced sustainability performance. The three determinants are found to have the similar effects on corporate governance efficiency. Hence, firms that embrace these elements not only improve sustainability metrics, but also strengthen financial performance, competitiveness, and long-term resilience. The study contributes to the literature by clarifying the mechanisms, through which governance structures and climate strategies jointly influence corporate sustainability.

Keywords: corporate governance; ESG performance; sustainability; corporate social responsibility; climate innovation; CEO-Chairman duality; board gender diversity.

Article info: received September 17, 2025; received in revised form December 29, 2025; accepted March 19, 2026

For citation: Abdioglu N., Aytekin S. (2026). Governance and climate-related drivers of corporate sustainability. *Upravlenets / The Manager*, vol. 17, no. 3, pp. 36–53. DOI: 10.29141/2218-5003-2026-17-3-3. EDN: HLNYEJ.

Организационные и климатические драйверы корпоративной устойчивости

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Аннотация. Вопрос корпоративной устойчивости приобретает особую актуальность в контексте усиливающихся административных и климатических рисков, которые, несмотря на их растущее значение, остаются недостаточно исследованными в научной литературе. Статья направлена на изучение взаимосвязи между ESG-результативностью компаний и тремя детерминантами корпоративной устойчивости: климатическими инновациями, совмещением должностей генерального директора и председателя совета директоров, а также гендерным разнообразием совета директоров. Методологическая основа работы представлена теориями заинтересованных сторон, агентских отношений и концепцией устойчивого развития. В исследовании использован метод фиксированных эффектов со стандартными ошибками Дрисколла – Крея. Информационная база включает ESG-показатели 910 компаний из семи развитых стран Европы за 2018–2023 гг. Результаты показывают, что компании, разрабатывающие продукты или услуги, направленные на решение климатических проблем, демонстрируют более высокие показатели устойчивого развития. Также положительное влияние на данные параметры отмечается при увеличении доли женщин в составе совета директоров. В то же время концентрация функций генерального директора и председателя совета директоров в одних руках негативно сказывается на результатах деятельности компаний в области устойчивого развития. Установлено, что аналогичные эффекты рассматриваемых детерминант наблюдаются и для эффективности корпоративного управления. Таким образом, компании, интегрирующие данные элементы в свою деятельность, способны повысить не только метрики устойчивого развития, но и финансовые показатели, конкурентоспособность и долгосрочную резильентность. Исследование вносит вклад в развитие научной литературы, уточняя механизмы совместного влияния структур корпоративного управления и климатических стратегий на результаты устойчивого развития компаний.

Ключевые слова: корпоративное управление; ESG-результативность; устойчивость; корпоративная социальная ответственность; климатические инновации; двойственность CEO; гендерное разнообразие совета директоров.

Информация о статье: поступила 17 сентября 2025 г.; доработана 29 декабря 2025 г.; одобрена 19 марта 2026 г.

Ссылка для цитирования: Abdioglu N., Aytekin S. (2026). Governance and climate-related drivers of corporate sustainability // Управленец. Т. 17, № 3. С. 36–53. DOI: 10.29141/2218-5003-2026-17-3-3. EDN: HLNYEJ.

INTRODUCTION

Environmental, Social, and Governance (ESG) scores have become essential benchmarks for assessing corporate sustainability and ethical performance. They cover environmental stewardship, social responsibility, and governance quality, providing investors and stakeholders with insights into risks and opportunities associated with corporate practices. As responsible investment grows, ESG scores are becoming increasingly important for assessing long-term corporate resilience. This study inspects the relationship between ESG performance and three factors: climate change commercial risk opportunities (CCCRO), CEO-Chairman duality, and board gender diversity.

The three variables that are effective on ESG performance are chosen following stakeholder theory and agency theory. Their important effect on corporate sustainability in the European Green Deal is also taken into account. Firstly, CEO-Chairman duality is a proxy for corporate governance quality and it is used as a proxy for board independence and the ability to guide corporate sustainability decisions. Secondly, CCCRO is accepted as one of the determinants of sustainability to capture how firms respond to climate change commercial risk opportunities. Finally, board gender diversity is used as another corporate governance determinant of ESG performance since the literature shows that the more women appear in the boards, the more ethical judgement and strategic innovation occur. In sum, key governance and climate-related drivers of corporate sustainability are considered in this study, rather than trying to cover all possible firm characteristics.

Corporate sustainability requires balancing economic, social, and environmental priorities. Regulations, corporate culture, and innovation outline these practices, while ESG and corporate social responsibility (CSR) scores serve as widely used indicators [Reyes, Pérez, Coma, 2024; Clément, Robinot, Trespeuch, 2022]. Strong ESG performance is often linked to superior financial outcomes, reinforcing the integration of sustainability into strategy [Pu, 2023; Duan, Yang, Xiong, 2023; Chen, Song, Gao, 2023; Bagh et al., 2024b]. ESG scores also allow for cross-sector comparisons, helping investors and regulators identify risks, opportunities, and corporate accountability.

Among ESG dimensions, environmental factors are particularly critical. Metrics such as climate change, carbon emissions, biodiversity, and resource use directly influence scores [Yang, Hei, 2024; Kong, Li, Lei, 2024]. Firms with robust emission-reduction plans typically attain higher ESG ratings, demonstrating commitment to climate responsibility. However, ESG measurement implies challenges, including inconsistent data, lack of standardization, and risks of greenwashing, which undermine credibility [Aydoğmuş, Gülay, Ergun, 2022; Kathan et al., 2025]. Despite these concerns, ESG scores endure vital tools for shaping investment and driving sustainable corporate practices.

Climate change itself embodies both risks and opportunities. Extreme weather can disrupt supply chains and threaten operational stability, raising firms' risk profiles. Conversely, climate challenges encourage innovation in renewable energy, sustainable agriculture, and green technologies [Yao, 2025]. Corporate governance plays a decisive role in shaping responses. Research shows that CEO-Chairman duality often reduces environmental oversight and increases carbon emissions, reflecting weaker governance [Akhtar, Abdullah, 2025]. In contrast, gender-diverse boards promote innovation, inclusivity, and long-term sustainability strategies, enhancing ESG outcomes [García-Sánchez et al., 2023; Hidayah, Nugroho, Mais, 2023].

This study contributes to the literature by analysing 910 firms across seven European countries (France, Germany, Italy, the Netherlands, Spain, Sweden, and the UK) between 2018 and 2023. A key innovation is the introduction of CCCRO, a novel variable measuring the extent to which firms develop new products or services to address climate risks [Ramos-García, López-Martín, Arguedas-Sanz, 2023]. Results indicate that firms engaging with climate-related risks and opportunities achieve higher ESG scores. Those that disclose climate information or innovate towards climate solutions show superior sustainability performance.

The findings also emphasize the positive role of board gender diversity. Female directors bring diverse skills, ethical orientation, and broader perspectives, enhancing governance quality and firm responsiveness to sustainability concerns [Ben-Amar, McIlkenny, 2015]. Prior studies confirm that gender-diverse boards are more effective in addressing climate change and stakeholder expectations. By encouraging inclusivity and ethical leadership, board diversity directly supports stronger ESG results and improved corporate reputation.

Conversely, CEO-Chairman duality exerts a negative influence on corporate sustainability. Concentrating authority in a single individual heightens agency conflicts, reduces accountability, and prioritizes personal or short-term interests over long-term ESG investments [Bhaskar, Bansal, Pandey, 2024]. Empirical evidence shows that dual leadership weakens governance structures, undermines climate initiatives, and erodes stakeholder trust. This reinforces calls for separating the CEO and chairman roles to improve transparency and strengthen sustainability practices.

By integrating CCCRO, gender diversity, and CEO duality into the analysis, this study provides fresh insights into corporate sustainability under the European Green Deal (post-2020). While earlier research typically examined governance variables in isolation, our study highlights how climate-related innovation and board structures jointly shape ESG outcomes. The results suggest that firms disclosing climate risks, fostering gender diversity,

and avoiding concentrated leadership are better positioned to achieve sustainable performance.

In conclusion, ESG scores have become indispensable for assessing corporate sustainability, guiding investment, and promoting accountability. Despite methodological challenges and risks of greenwashing, they remain valuable indicators of environmental responsibility, social commitment, and governance quality. This study underscores that climate innovation (CCCRO), board diversity, and governance structure are critical determinants of ESG performance. Firms that embrace these elements not only improve sustainability metrics but also strengthen financial performance, competitiveness, and long-term resilience.

To observe the impact of corporate governance quality and climate-related innovation on corporate sustainability performance is the purpose of this paper. Furthermore, how effective is CCCRO, CEO-Chairman duality, and board gender diversity on corporate sustainability performance is also investigated. In addition, the governance pillar score (GOV) is a replication of success of corporate decision-making, accountability, and board oversight. This score shows the impact of managerial and board structures on sustainability. This research also focuses on the relationship between climate and governance dimensions.

It should be highlighted that corporate sustainability is inclined by a wide range of factors, including firm size, ownership structure, financial constraints, etc. This study does not aim to provide an exhaustive model of all determinants of corporate sustainability. Instead, it deliberately focuses on a selected set of climate-related and governance factors that are theoretically grounded and particularly relevant in the European context. By controlling key firm-level characteristics, the analysis isolates the partial effects of climate-related strategic orientation and internal governance mechanisms on sustainability performance.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Corporate sustainability is influenced by many factors; however, this study concentrates on the relationships between corporate sustainability and CCCRO, CEO-Chairman Duality and Board Gender Diversity.

The effect of climate change commercial risk opportunities on corporate sustainability performance. To frame the determinants of corporate sustainability, this study draws on stakeholder theory and legitimacy theory. Stakeholder theory argues that firms improve their sustainability practices to meet the expectations of their stakeholders, such as investors, customers, and regulators. Legitimacy theory complements this by suggesting that firms engage in ESG initiatives to gain or maintain social acceptance. Additionally, the resource-based view of the firm helps explain how board gender diversity contributes to competitive advantage through knowledge diversity and ethical orientation.

Over the past few years, the linkage between climate change and corporate governance has grown in importance on the economic front, especially concerning corporate sustainability performance. The surge of climate change as an urgent global concern has, therefore, put in place new approaches towards the operational frameworks of corporations, expectations from investors, and broad-based responsibilities for sustainable development. In conditions when stakeholders are pressing for greater transparency and accountability, there has emerged one of the utmost needs to evaluate climate-related risks and opportunities. In this section, we review the opportunities that emanate from climate change and their influence on corporate sustainability.

The relationship between climate change commercial risk and corporate sustainability performance is at the heart of issues about corporate risk management. According to [Bao et al., 2024], the change in corporate sustainability significantly increases corporate risk, particularly for the non-state-owned and heavily polluting enterprises. This reiterates how fraught with risk it is to do business in a way that neglects the growing environmental standards. For example, low ESG scoring firms may face increased cost of capital as a punishment from regulators alongside other forms of penalties due to poor climate risk management with attendant reputation damage to endanger their long-run sustainability.

Alternatively, climate change and its influence also present various opportunities that can positively affect corporate sustainability. Innovations will be created by industries as they provide solutions for the climate and at the same time add value. For example, the agricultural sector typically faces climate vulnerability but currently affords resource sustainability that ensures food security with the least ecological footprint. Upgrading livelihoods for the farmers also subsidizes positively to corporate sustainability since the performance of the firms shows investment in sustainable practices [Li et al., 2024].

Covering climate change risks and opportunities in corporate sustainability assessments remains challenging. Lack of consistent ESG measurement and reporting results in inconsistent data and partial comparability across companies and industries. Furthermore, varying levels of vulnerability to climate risks further confound the expansion of solid ESG strategies, generating uncertainty for investors. According to the 2021 report by the OECD, market operations for ESG investing still show inconsistency alignment with climate transition purposes. Current research, particularly on non-state-owned enterprises, seeks to create a more robust framework for addressing climate-related risks and opportunities [Oliver Yébenes, 2024]. Such attempts allow firms to enterprise more effective ESG methods, promote climate-oriented innovation, and ultimately improve sustainability performance [Ramos-García, López-Martín, Arguedas-Sanz, 2023]. From these perspectives the first hypothesis is as follows:

H1: *Climate change commercial risk opportunities positively affect corporate sustainability performance.*

Interconnection between CEO-Chairman duality and corporate sustainability. The issue of the Chief Executive Officer (CEO)-Chairman duality has arguably become one of the most controversial issues that have dominated the corporate governance discourse with implications about firm performance and accountability. An instance of the duality is created when the CEO happens to be the chairman of the board. These issues relate to the efficacy of board monitoring as well as conflicts of interest. This means that firms seeking proper alignment with practices related to sustainability need to know the association between CEO-Chairman duality and corporate sustainability performance. This section sets the objective of pursuing an evaluation of how CEO-Chairman duality affects the outcomes of corporate sustainability performances especially in developed economies.

Research in CEO-Chairman duality places more emphasis on its effect on the quality of control of the board since an active CEO may take over the board discussions and decisions to personal interests rather than the interests of the stakeholders [Freire, 2019]. By concentrating on the views of developing countries, where the rules for corporate management may be very different from those in advanced economies, the research underlines situational aspects that can either worsen or lessen the dangers linked to having a dual role. Grasping this information is key; good management of a board is a vital part in promoting clear and responsible actions in firms, thus boosting the quality of corporate management overall [Ali et al., 2022].

One of the emerging issues in corporate social responsibility is the effect of CEO-Chairman duality on corporate sustainability practices. The paper [Ahmad, Afzalur, Gow, 2017], which covers public listed companies in Malaysia, relates directly to this point in defining the relation between CEO duality and CSR reporting. Moreover, firms characterized by CEO-Chairman duality may adopt a more short-term, financially driven orientation, potentially at the expense of long-term sustainable development and corporate social responsibility. This tendency suggests that founder-led firms can exhibit distinct sustainability behaviours, thereby rendering the relationship between leadership duality and CSR more nuanced and context-dependent.

The assessment of ESG metrics is essential for measuring firms' obligation to sustainable practices. The indicators, such as greenhouse gas emissions, diversity ratios, and tax contributions, evaluate environmental, social, and governance performance and reveal how CEO-Chairman duality may affect sustainability outcomes [Treepongkaruna et al., 2024]. Evidence displays that strong sustainability governance advances ESG scores, highlighting the need for transparent rule structures, particularly in dual leadership settings, where concentrated power can significantly influence ESG strategies [Alhazemi, 2025].

CEO-Chairman duality is often connected to lower environmental scores, as merging both roles may prioritize short-term profitability over environmental protection [Arici, Aladag, Koseoglu, 2024]. While its negative impact is clear for the "E" dimension, effects on governance and social aspects are less apparent. This raises concerns about the ability of dual leadership structures to support balanced sustainability, suggesting the need for stronger governance frameworks.

Although widely studied, few works use ESG or CSR scores directly as dependent variables, and existing findings remain inconsistent. Some studies report negative impacts of CEO duality [Husted, de Sousa-Filho, 2019; Endrikat et al., 2020; Bhaskar, Bansal, Pandey, 2024], while others suggest positive relations [Nguyen, Nguyen, 2023; Tamimi, Sebastianelli, 2017]. The divergence stems from theoretical perspectives: agency theory sees centralized authority as potentially enhancing efficiency and performance [Jensen, Meckling, 1976; Mohapatra et al., 2025; Mubeen et al., 2021; Guillet et al., 2013; Phama, Phama, 2020], whereas stewardship theory emphasizes pro-social behaviour and predicts weaker ESG outcomes under duality [Donaldson, Davis, 1991; Davis, Schoorman, Donaldson, 1997; Krause, 2017]. Therefore, we form our second hypothesis as follows:

H2: *There is a negative relationship between CEO-Chairman duality and corporate sustainability performance.*

The effect of board gender diversity on corporate sustainability performance. The role of gender diversity in corporate governance has evolved from a marginal issue to a central element of debates on ethics and performance. Women's representation in decision-making not only reflects equity but also significantly affects sustainability outcomes. Theoretical frameworks such as stakeholder theory and the resource-based view suggest that diverse boards better capture stakeholder interests and improve ESG practices [Hassan, Marimuthu, 2014; Zhu et al., 2022]. Studies confirm that firms with more women directors achieve higher ESG scores and adopt forward-looking sustainability strategies, while CEO duality can weaken this positive effect [Belghiti-Mahut, Eidson, 2024; Odriozola, Blanco-González, Baraibar-Diez, 2024].

Despite the benefits, barriers such as male-dominated recruitment networks and persistent gender bias, especially in developing countries, limit women's board representation [Young et al., 2024]. Measures like diversity targets, disclosure rules, and private initiatives are needed to overcome these obstacles [Denis, 2022]. Evidence further shows that female directors foster inclusive cultures, enhance ESG disclosure, and prioritize social responsibility, leading to stronger overall performance [Ben-Amar, Chang, McIlkenny, 2017; Boubakri et al., 2021; Michelon,

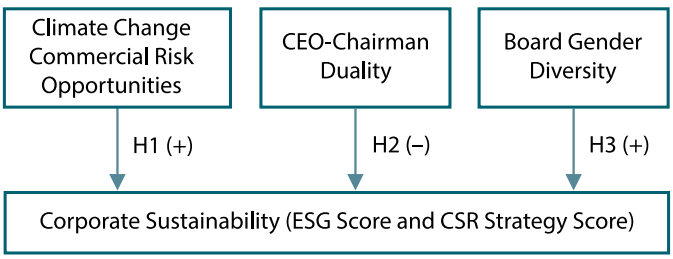
Parbonetti, 2012; Perryman, Fernando, Tripathy, 2016; Qiu et al., 2023; Fleitas-Castillo et al., 2025; Byron, Post, 2016; Menicucci, Paolucci, 2024]. From this argument, we form our third hypothesis as follows:

H3: *Board gender diversity has a positive impact on corporate sustainability performance.*

MATERIALS AND METHODS

Data source. This paper analyses the factors that impact corporate sustainability performance in a selection of developed countries. The decision to concentrate on the advanced economies stems from the fact that they have well-established regulations and policies related to ESG factors. Furthermore, firms in these countries tend to have more experience integrating sustainability into their business models, providing a better context for examining long-term sustainability factors. We use international data of 910 unique firms from seven different developed countries (France, Germany, Italy, the Netherlands, Spain, Sweden, and the United Kingdom) which have ESG data. The firms from these countries are used in the analyses because of the data availability in the Refinitiv Eikon database during the 2018–2023 period. The common feature of these nations is that they have remarkable corporate governance traditions. Although not every EU member state could be included due to data coverage constraints, the sample reflects Europe's key corporate and economic region. The companies in the sample represent all eleven Global Industry Classification Standard (GICS) sectors: Industrials (21.5%), Financials (17.9%), Consumer Discretionary (13.7%), Materials (9.8%), Information Technology (8.4%), Health Care (7.9%), Consumer Staples (6.4%), Energy (5.2%), Communication Services (4.1%), Utilities (3.0%), and Real Estate (2.1%).

Overall, the cross-country and cross-sector diversity of the dataset strengthens the external validity of the empirical findings and provides a comprehensive picture of firm-level sustainability performance across Europe's varied institutional environments. The final sample consist of 5,460 firm-year observations spanning the years 2018 to 2023. The theoretical framework of the study is shown in Figure, and the variables used are given in Table 1.



The research model
Модель исследования

Table 1 – Variables used in the study
Таблица 1 – Переменные исследования

Variables	Proxy
Environment, social and governance score	ESG
CSR strategy score	CSR
Climate change commercial risks opportunities	CLIMATE
CEO-Chairman duality	CEO
Board gender diversity	BOARD
Intangibility ratio	INTANG
Capital expenditures ratio	CAPEX
Return on assets	ROA
Enterprise value / Market capitalisation	EV
Book value per share	BV

Note: This table shows the names and proxies for the variable used in the baseline analysis.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

Regarding firm-level corporate sustainability, the main variable of interest is ESG scores of the selected firms. Moreover, the CSR strategy serves as an alternative measure of corporate sustainability in the robustness tests. Data on sustainability, along with other firm-level information, are sourced from the Refinitiv Eikon database, which provides annual reports on sustainability, governance, and accounting for each firm. The common feature of the firms is that they publish ESG information so that they have the disclosure and transparency requirements of Refinitiv. Since Refinitiv uses a standardized, rule-based quantitative approach to create ESG indicators, the firms can be compared in terms of their ESG performance. Corporate websites, CSR and sustainability statements and annual reports are used to get information about ESG. Publicly available information is used to obtain ESG score. Refinitiv reviews and verifies more than 450 separate ESG data points. ESG data has three pillar scores: environmental, social and governance. The ESG variable is a weighted combination of these three pillar scores. This variable shows the sustainability performance of the related firm.

Following prior studies, the company's sustainability is verified as the ESG score and CSR Strategy scores [Imperiale, Pizzi, Lippolis, 2023; Arayssi, Jizi, Tabaja, 2020; Shaukat, Qiu, Trojanowski, 2016]. The ESG score is a representation for a company's ESG performance and efficiency; its value varies between 0 and 100. The environmental metric contains how the actions of a firm influence air, land and water, and total ecosystems. The metric relates to resource utilization, decreases in emissions and waste, and environmentally-driven innovations. Additionally, the social metric approximates a business's volume to establish trust and loyalty among its workforce, customers, and the broader community. Workforce, human rights, community, and product responsibility are four

fundamental dimensions of this metric. The governance metric perceives the systems and procedures that a firm uses to confirm that the board's actions are aligned with the interests of shareholders. Management and control, shareholder rights, and the CSR strategy are the three primary dimensions of this metric [Khoury, Nasrallah, Alareeni, 2023]. In addition, the CSR strategy score duplicates a company's ability to integrate economic, social, and environmental factors into its everyday decision-making. This measure specifies how successfully sustainability principles are fixed within a firm's management systems and strategic direction based on the 2018 Thomson Reuters ESG scoring framework. Moreover, CSR signifies a management viewpoint that integrates social and environmental attentions into repetitive business operations in line with the definition provided by the United Nations Industrial Development Organization[1]. In study, the CSR strategy score is used as a practical meter of how firmly sustainability values are secure in a business's operational and strategic actions.

ESG signifies the measurable results of a company's overall sustainability performance, while CSR indicates a company's strategy for sustainability and ethical impact [Kazmierczak, 2022]. While ESG scores measure a firm's actual performance across environmental, social, and governance metrics, the CSR strategy score replicates the firm's public commitment and disclosures related to sustainability. The two are complementary but distinct: ESG is performance-oriented, while the CSR strategy is reporting-oriented. We use both to capture a more holistic view of sustainability and test robustness accordingly. The governance pillar, used in further analysis, focuses solely on structural governance mechanisms and is separated from environmental and social dimensions.

CCCRO, CEO-Chairman duality and board gender diversity are the main independent variables used in three different analyses separately. CCCRO is the degree to which a firm creates new products or services to combat the risks of climate change within the company's existing business model. It serves as a measure to identify potential variations in regulatory frameworks and markets, while evaluating differences in credit risk [Ramos-García, López-Martín, Arguedas-Sanz, 2023]. This study focuses on the provisional and deliberate scopes of climate change rather than its instant physical or environmental values. CCCRO captures how companies recognize, release, and respond to business risks and opportunities developing from the low-carbon transition. To signify this theory analytically, a dummy variable, CLIMATE, is developed. It equals 1 when a firm clearly discusses climate-related business considerations in its public reports, and 0 otherwise. This indicator imitates a company's practical carriage towards the risks and opportunities of the climate transition and is theoretically stranded in stakeholder theory and legitimacy theory. Year fixed effects are also included in the empirical models to control broader macroeconomic actions and pandemic-related conflicts that may have affected corporate behaviour over the study period.

Furthermore, CEO-Chairman duality refers to the scenario in which the CEO of a company also holds the position of chairman of the board of directors. To quantify this, a dummy variable labelled CEO is used, where a value of 1 indicates the presence of duality, and 0 indicates its absence. Board gender diversity is assessed by calculating the proportion of female members on the board.

We include firm-specific control variables in the analyses which are intangibility ratio, capital expenditures ratio, return on assets, enterprise value/market cap, and book value per share. Intangibility ratio is equal to the ratio of the intangible assets to total assets of the firm. Capital expenditures ratio is equal to capital expenditures in a company divided by total assets of the company. Return on assets is the ratio of the net income of the company to its total assets. Enterprise value is equal to enterprise value of the related firm divided by its market cap.

Research methodology. This study utilizes panel data to examine the factors influencing corporate sustainability performance in selected developed countries. The following models are used in the analysis:

$$ESG_{f,t} = \alpha_0 + \alpha_1 CLIMATE_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \\ + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (1)$$

$$ESG_{f,t} = \alpha_0 + \alpha_1 CEO_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \\ + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (2)$$

$$ESG_{f,t} = \alpha_0 + \alpha_1 BOARD_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \\ + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (3)$$

where the variables are for each firm f at time t; $\varepsilon_{f,t}$ is the error term; α_0 indicates the constant term; $\alpha_1, \alpha_2, \ldots, \alpha_6$ are the coefficients for each variable. The description of each variable is shown in Table 1.

While corporate sustainability is influenced by numerous firm-level, institutional, and macroeconomic factors, incorporating all potential determinants into a single empirical model may lead to over-parameterization and loss of interpretability. Therefore, this study adopts a parsimonious and theory-driven modelling approach, focusing on a limited set of climate-related and governance variables, whose effects can be cleanly identified. Other relevant influences are addressed through firm fixed effects, year fixed effects, and a comprehensive set of control variables capturing financial performance, investment structure, and asset characteristics. This approach follows standard practice in the sustainability and corporate gov-

[1] United Nations Industrial Development Organization. (2020). UNIDO's Corporate Social Responsibility (CSR) Programme: Reaching Out to Small and Medium-Sized Enterprises Worldwide. https://downloads.unido.org/ot/38/92/3892640/84703_Background_Paper__LAC_Roundtable.pdf.

ernance literature and allows for isolating the partial effects of the variables of interest.

The results of the F-test specify that the fixed effects model is the more suitable choice compared to the OLS model. Besides, it is found that random effects model is not as appropriate for our analysis as a result of the Breusch-Pagan Lagrange multiplier test. Thus, we use the fixed effects model. The Hausman test [1978] is applied, and the null hypothesis is rejected. As a result, the fixed effects model is found to be appropriate for the analyses. The fixed effects model is crucial for controlling time-invariant features of the firms and reducing omitted variable bias. Moreover, to address unobserved time-based effects, we include year fixed effects in the analyses. The fixed effect method is critical for handling time-invariant features of the companies and minimizing omitted variable bias. The analysis provides strong support for the fixed effects model, particularly in situations, where the number of units (*N*) in the panel dataset is considerably greater than the number of time periods (*T*). As a result, we prudently assess any possible destructions of the assumptions underlying the regression model. We reject the null hypothesis since the Modified Wald test releases evidence of heteroscedasticity. Moreover, the outcomes from the Durbin–Watson and Baltagi–Wu LBI tests, which are both less than 2, specify notable issues with autocorrelation in the model. Finally, Pesaran's [2004] test for cross-sectional dependence confirms the existence of cross-sectional dependence in the data. In light of these findings, we employ Driscoll–Kraay standard errors in the regressions to effectively address these issues and ensure the robustness of our results.

RESEARCH RESULTS AND DISCUSSION

Descriptive statistics. Table 2 presents descriptive statistics of the dependent and independent variables of this study. The average firm in our sample has the ESG score of 59.51 and the CSR score of 56.11. The data suggest that the ESG score ranges between 95.39 and 0.99. Furthermore, the CSR score ranges between 0 and 99.81. Apparently, the average firm in the sample shows high sustainability scores. In terms of board diversification, the descriptive analysis proves low participation of female directors on the boards. The average firm has a board gender diversity of 34.52 which ranges between 0 and 80%. Therefore, the firms in our sample do not give too much importance to gender diversity in the board of directors. In comparison, another corporate governance variable CEO-Chairman duality has an average of 0.20. This variable ranges between 0 and 1. The duality ratio is currently low, with the majority of companies distinguishing between the roles of CEO and chairman. Additionally, the average value for CCCRO stands at 0.81; this variable ranges between 0 and 1. Therefore, most of the firms are capable of creating new products or services to combat the risks of climate change within the company's existing business model.

Table 3 shows the Pearson correlation coefficients of the variables. None of the correlation coefficient has a value of above 0.80, suggesting no severe multicollinearity problem. In addition, the VIF values below 10 confirm that there is not any multicollinearity issue. According to Table 3, among the variables which have significant coefficients (p-value < 0.1) BOARD and CLIMATE have positive relations with ESG aligning with H3 and H1, respectively. Furthermore, among the control variables INTANG has negative correlation with ESG. However, ROA and BV have positive relationships with ESG. Furthermore, when we examine the association of the variables with the second dependent variable CSR, we report that BOARD and CLIMATE variables have positively significant relationships with CSR. While INTANG negatively affects CSR, CAPEX demonstrates a positive relationship with CSR.

Table 2 – Descriptive statistics
Таблица 2 – Описательная статистика

Variables	*N*	Mean	SD	Min.	Max.
ESG	5,460	59.51	18.97	0.99	95.39
CSR	5,460	56.11	29.60	0.00	99.81
CEO	5,460	0.20	0.40	0.00	1.00
BOARD	5,459	34.52	12.44	0.00	80.00
CLIMATE	5,460	0.81	0.40	0.00	1.00
INTANG	4,948	0.09	0.11	0.00	0.84
CAPEX	4,678	0.03	0.06	0.00	2.55
ROA	5,424	0.04	0.14	–4.11	2.37
EV	5,322	1.67	3.51	0.01	189.72
BV	5,425	21.99	181.02	–2,800.95	6,854.92

Note: This table shows the summary statistics of the variables used in the analyses. The names of the variables are given in Table 1.
Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

Table 3 – Pearson correlation matrix
Таблица 3 – Матрица корреляции Пирсона

Variables	ESG	CSR	CEO	BOARD	CLIMATE	INTANG	CAPEX	ROA	EV	BV
ESG	1	–	–	–	–	–	–	–	–	–
CSR	0.6987*	1	–	–	–	–	–	–	–	–
CEO	0.0329	–0.0312	1	–	–	–	–	–	–	–
BOARD	0.2873*	0.1738*	0.0905*	1	–	–	–	–	–	–
CLIMATE	0.3917*	0.3627*	0.0615*	0.1346*	1	–	–	–	–	–
INTANG	–0.0478*	–0.0752*	0.0272	0.0144	–0.0701*	1	–	–	–	–
CAPEX	–0.0071	0.0408*	0.0428*	–0.0384*	–0.0104	–0.0273	1	–	–	–
ROA	0.0379*	0.0329	–0.0016	0.0844*	0.0587*	–0.0256	–0.1344*	1	–	–
EV	0.0192	0.0106	0.0479*	–0.0035	0.0307	–0.0426*	0.0194	–0.0811*	1	–
BV	0.0572*	0.0254	0.0410*	0.0319	0.0274	–0.0089	–0.0049	0.0068	–0.0651*	1

Note: This table reports the Pearson correlation coefficients of the variables used in the analyses. (*) indicates statistical significance at 10% level.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

Main findings. Table 4 reports the fixed effect regression results, with Driscoll–Kraay standard errors, analysing the factors effective on corporate sustainability performance of the firms. Column (1) examines the relationship between ESG performance and opportunities related to climate change commercial risks. The findings indicate a positive correlation between the CLIMATE and ESG variables, which supports hypothesis H1. CCCRO pertain to how a company creates new products or services that tackle climate change risks, while incorporating these initiatives into its current business model [Ramos-García, López-Martín, Arguedas-Sanz, 2023]. Climate change risks are likely to harm the reputation of the company as consumer and community attitudes become more sensitive to healthy and sustainable actions of the organization. Growing awareness in climate issues increases scrutiny of corporate behaviour; therefore, reputational risks may be formed when firms do not effectively participate in environmental actions [Xue et al., 2025]. In addition, climate risk means risks of financial, social, or environmental harm resulting from climate change and could take various forms including penalties by the regulators, disruption in the supply chain, extra operating costs, etc. All these calls for proactive identification and action to protect the market of the firm and the long-term viability of the business. Climate change offers new business opportunities that organizations can exploit to improve their performance on ESG measures and, therefore, improve their business strategy [Bagh, Fuwei, Khan, 2024a]. The company's quality in supplying information on risks and opportunities of climate can place a major role in attracting investors, lenders, and other key stakeholders by providing important metrics about the company's sustainability commitments. As such, the transformation of the drawbacks that the firms face in these climate crises into opportunities stands as a distinct business model

Table 4 – Factors affecting ESG of the sample firms
Таблица 4 – Факторы влияния на ESG-принципы компаний выборки

Variables	ESG		
	CLIMATE (1)	CEO (2)	BOARD (3)
CLIMATE	2.485** [0.016]	–	–
CEO	–	–1.237** [0.030]	–
BOARD	–	–	0.121*** [0.000]
INTANG	–4.110*** [0.000]	–4.560*** [0.000]	–4.495*** [0.000]
CAPEX	–1.852* [0.068]	–1.869* [0.052]	–1.399* [0.084]
ROA	–0.303 [0.371]	–0.415 [0.325]	–0.867** [0.020]
EV	0.024 [0.663]	0.0007 [0.990]	0.053 [0.452]
BV	0.001*** [0.010]	0.001*** [0.004]	0.001*** [0.000]
Constant	53.994*** [0.000]	56.836*** [0.000]	59.850*** [0.000]
N	4,424	4,424	4,424
Year FE	Yes	Yes	Yes

Note: This table reports regression results of fixed effect panel regression by using Driscoll–Kraay standard errors. Dependent variable is ESG in all of the regressions. (*), (**), (***) indicate statistical significance at 10%, 5%, and 1% levels, respectively. *N* is the number of observations. Year fixed effects (Year FE) are included in the regressions. Numbers in parentheses are *p*-values.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

for other firms. Firms that produce products and services that can remove these risks by seizing these chances have to rate well in terms of environmental, social, and governance practices. In this scenario, the firms in question register an increase in their ESG ratings. Although ESG scores include general climate-related performance metrics, the CLIMATE variable captures firm-specific innovation activities, such as the development of green products and services, making it conceptually distinct. VIF analysis confirms there is no multicollinearity between ESG and CLIMATE, supporting the robustness of our model.

In column (2) of Table 4, the impact of CEO-Chairman duality on ESG scores of the firms is investigated. According to Table 4, CEO-Chairman duality negatively affects the ESG performance of the firms in the developed countries, supporting H2. This result is consistent with the literature, such as [Ahmad, Afzalur, Gow, 2017; Ahmad, Yaqub, Lee, 2024; Nguyen, Nguyen, 2023; Tamimi, Sebastianelli, 2017]. When power is centralized in the hands of the CEO, it mostly emphasizes only operational efficiency and profitability without including corporate sustainability. The firms that separate the CEO and Chairman functions tend to disclose more information about their sustainability actions, since the board can demand that the management explains issues regarding sustainability. Such separation improves variety of views in governance and supports new and more successful strategies towards sustainability [Ahmad, Afzalur, Gow, 2017]. This result is also in line with the principles of agency theory. By holding the positions of CEO and chairman simultaneously, the CEO of the company has remarkable influence on the agency. Agency theory suggests that a powerful CEO may act opportunistically, engaging in entrenchment to serve personal interests rather than those of shareholders; they allocate resources towards strategies that maximize personal benefits rather than distribute them equitably, which makes them less inclined to invest in sustainability activities [Bhaskar, Bansal, Pandey, 2024]. Based on this discussion, it is plausible to find a negative relationship between CEO and ESG variables.

In column (3) of Table 4, the impact of board gender diversity on ESG score is investigated. Regression results show that as board gender diversity increases, the ESG performance increases as well. The female participation in the board positively enhances the corporate sustainability. This finding provides support for H3. Since diverse boards have better access to information about composite spheres of the stakeholders' interests, corporate policies and practices conforming to ESG criteria improve. As gender diversity on corporate boards increases, the ESG performance improves [Zhu et al., 2022]. Ben-Amar and McIlkenny [2015] explain this positive impact of gender diversity with the diverse skill and expertise the female directors contribute to the board. Their demonstration of strong commitment to ethical standards is also effective in this relation. Ciocirlan and Pettersson [2012] indicate that concerns of female directors about pollution and climate change contribute to the sustainability scores of the firms they work for. According to Arayssi, Dah and Jizi [2016], women on board meet a business need for enhanced board effectiveness. Our result about board gender diversity's positive impact on corporate sustainability is consistent with [Yilmaz et al., 2023; Arayssi, Jizi, Tabaja, 2020; Odriozola, Blanco-González, Baraibar-Diez, 2024; Darmawan, 2024].

We also attempted to investigate the impact of the independent variables on governance pillar score (GOV). By using this variable, we only consider the corporate governance performance of the sample firms. GOV is a key metric that evaluates the effectiveness of a company's systems and processes. It also demonstrates the firm's ability to manage its rights and responsibilities through best management practices, fostering incentives that drive long-term shareholder value [Yilmaz et al., 2023]. Table 5 presents the results of fixed effect model (with Driscoll–Kraay standard errors) which uses GOV as a dependent variable.

Table 5 – The factors affecting GOV in the sample firms
Таблица 5 – Факторы влияния на эффективность управления (GOV) в компаниях выборки

Variables	GOV		
	CLIMATE (1)	CEO (2)	BOARD (3)
CLIMATE	1.887** [0.024]	–	–
CEO	–	–3.812** [0.000]	–
BOARD	–	–	0.220*** [0.000]
INTANG	–7.574*** [0.002]	–8.007*** [0.001]	–7.840*** [0.003]
CAPEX	–0.705 [0.521]	–0.744 [0.481]	0.127 [0.927]
ROA	–7.803*** [0.000]	–7.804*** [0.000]	–8.673* [0.000]
EV	0.404*** [0.000]	0.319*** [0.000]	0.450*** [0.000]
BV	0.003*** [0.004]	0.003*** [0.009]	0.004*** [0.000]
Constant	51.256*** [0.000]	54.158*** [0.000]	53.319*** [0.000]
N	4,424	4,424	4,424
Year FE	Yes	Yes	Yes

Note: This table reports regression results of fixed effect panel regression by using Driscoll–Kraay standard errors. Dependent variable is GOV in all of the regressions. (*), (**), (***) indicate statistical significance at 10%, 5%, and 1% levels, respectively. *N* is the number of observations. Year fixed effects (Year FE) are included in the regressions. Numbers in parentheses are *p*-values.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

According to Table 5, CLIMATE has a positive relationship with the corporate governance performance of the firms. Thus, the firms that take actions to reduce the climate risk have higher corporate governance performance. In addition, the CEO variable negatively affects corporate governance performance of the selected firms, which is consistent with the agency theory. CEO-Chairman duality again results in entrenchment and agency conflicts that cause a lower level of corporate governance performance. Finally, the BOARD variable positively affects corporate governance performance of the firms. The female participation in boards results in their positive contributions to the board. Hence, it enhances corporate governance performance of the firms. This result is consistent with dependency theory which states that diversity in the board can encourage more logical thinking and promote high-quality decision-making [Zaid et al., 2020].

Robustness tests. We perform a series of robustness tests to check the validity of our results. Firstly, Table 6 represents the robustness analysis results by using CSR strategy score as a proxy for corporate sustainability.

Table 6 – Robustness test results with the CSR strategy score
Таблица 6 – Результаты проверки на робастность с использованием показателя стратегии КСО

Variables	CSR		
	CLIMATE (1)	CEO (2)	BOARD (3)
CLIMATE	3.341*** [0.003]	–	–
CEO	–	0.561 [0.495]	–
BOARD	–	–	0.534*** [0.000]
INTANG	–13.996*** [0.000]	–14.661*** [0.010]	–14.536*** [0.000]
CAPEX	–1.656 [0.407]	0.383 [0.882]	–1.460 [0.431]
ROA	–4.592*** [0.001]	–2.814 [0.485]	–4.976*** [0.000]
EV	0.089 [0.266]	0.281 [0.215]	0.107 [0.179]
BV	–0.005*** [0.000]	–0.004 [0.300]	–0.005*** [0.000]
Constant	48.899*** [0.000]	63.517*** [0.000]	62.141*** [0.000]
FE	Yes	–	Yes
RE	–	Yes	–
N	4,424	4,424	4,424

Note: This table reports regression results of fixed effect (FE) by using Driscoll–Kraay standard errors and random effect (RE) panel regression. Dependent variable is CSR in all of the regressions. (*), (**), (***) indicate statistical significance at 10%, 5%, and 1% levels, respectively. *N* is the number of observations. Year fixed effects (Year FE) are included in the regressions. Numbers in parentheses are *p*-values.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

As per the study by Ovais [2018], the CSR strategy score acts as a quantitative tool that facilitates the evaluation and comparison of CSR initiatives among different firms. The methodologies used to estimate the CSR strategy scores are varied and composite, which highlights the difficulties associated with measuring corporate responsibility. It necessitates a comprehensive inspection of a firm's efforts and performance in ethical, social, environmental, and economic areas [Shukla, Geetika, Shukla, 2022]. Through the adoption of robust methodologies in the assessment of the CSR strategy scores, firms can increase their ability to be held accountable and also inspire a principle of improvement-innovation culture within the gamut of their social responsibilities. The effect that the CSR strategy scores have on business outcomes is very deep, since there have been several studies that show the relationship between CSR involvement and better performance at the organizational level. Lopez, Rangel and Fernández [2022] seek to confirm the fact that a sustained CSR strategy over time can bring about efficiency improvements in firms.

Column (1) of Table 6 uses CCCRO as independent variable and report a positive relationship with CSR which is consistent with the main results in Table 4. In column (3), the board gender variable is the independent variable and the table reports a positive impact of board gender on corporate sustainability, supporting H3. In the column (2), the CEO-Chairman duality variable is the independent variable. Unlike main results, no effect of this variable on corporate sustainability has been found.

Secondly, the existence of the endogeneity is tested and following it the GMM model is used as another robustness test. The static fixed and random effect model may not be enough to find the results if there exists endogeneity between our variables. To cope with this issue, we use GMM estimation. First, we compare the static and dynamic OLS models with the following equations:

$$CSR_{f,t} = \alpha_0 + \alpha_1 CLIMATE_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (4)$$

$$CSR_{f,t} = \alpha_0 + \alpha_1 CSR_{f,t-1} + \alpha_2 CLIMATE_{f,t} + \alpha_3 INTANG_{f,t} + \alpha_4 CAPEX_{f,t} + \alpha_5 ROA_{f,t} + \alpha_6 EV_{f,t} + \alpha_7 BV_{f,t} + \varepsilon_{f,t}, \quad (5)$$

$$CSR_{f,t} = \alpha_0 + \alpha_1 CEO_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (6)$$

$$CSR_{f,t} = \alpha_0 + \alpha_1 CSR_{f,t-1} + \alpha_2 CEO_{f,t} + \alpha_3 INTANG_{f,t} + \alpha_4 CAPEX_{f,t} + \alpha_5 ROA_{f,t} + \alpha_6 EV_{f,t} + \alpha_7 BV_{f,t} + \varepsilon_{f,t}, \quad (7)$$

$$CSR_{f,t} = \alpha_0 + \alpha_1 BOARD_{f,t} + \alpha_2 INTANG_{f,t} + \alpha_3 CAPEX_{f,t} + \alpha_4 ROA_{f,t} + \alpha_5 EV_{f,t} + \alpha_6 BV_{f,t} + \varepsilon_{f,t}, \quad (8)$$

$$CSR_{f,t} = \alpha_0 + \alpha_1 CSR_{f,t-1} + \alpha_2 BOARD_{f,t} + \alpha_3 INTANG_{f,t} + \alpha_4 CAPEX_{f,t} + \alpha_5 ROA_{f,t} + \alpha_6 EV_{f,t} + \alpha_7 BV_{f,t} + \varepsilon_{f,t}, \quad (9)$$

where the variables are for each firm *f* at time *t*; $\varepsilon_{f,t}$ is the error term; α_0 indicates the constant term; α_1, α_2, …, α_6 are the coefficients for each variable. The description of each variable is shown in Table 1.

Equation (5), (7) and (9) include the lagged dependent variable as an independent variable. These equations are accepted as dynamic OLS models. Equation (4), (6) and (8) are accepted as static OLS models. Table 7 reports the results of both static and dynamic OLS models. CSR is the dependent variable in all of the models and same independent variables are used as in Table 6. As seen from Table 7, the R-squared values of the dynamic OLS models are greater than the R-squared values of the static models, which shows the existence of reverse causality [Yilmaz et al., 2023]. In addition, the coefficient of the lagged dependent variable is significant in each of the models. Therefore, there is reverse causality in the models and there is a dynamic relationship between the dependent and independent variables. Since these results show the existence of endogeneity in the model, we apply GMM estimation. Table 8 shows the GMM regression results.

In order to deal with the endogeneity problem, we use Blundell and Bond [1998] two-step system GMM. Since our data includes a large number of firms and shorter time periods ($N > t$), using system GMM is appropriate for the models. Lagged values of the independent variables are used as instruments in the model. To test the validity of the instruments, Hansen test is applied. As seen from Table 8, the null hypothesis of Hansen test cannot be rejected, which means that the overidentification restrictions are valid. Therefore, the used instruments are valid. Furthermore, Table 8 shows that Arellano-Bond test AR(1) tests are significant and Arellano-Bond AR(2) tests are not significant in all of the models. Thus, the null cannot be rejected and it can be concluded that there is no serial correlation.

As Table 8 shows, all of our hypotheses hold when we apply GMM estimation. CLIMATE and BOARD variables positively affect CSR, and CEO variable negatively affects CSR. Therefore, our hypotheses still hold even we control for endogeneity. If the company cares about climate change risks, the sustainability performance of the company increases. Furthermore, the companies with more females on the board have higher sustainability performance. Finally, if there is CEO-Chairman duality in the selected companies, the sustainability performances of these companies decrease.

Table 7 – Results of static OLS and dynamic OLS models testing
Таблица 7 – Результаты тестирования статической и динамической МНК-моделей

Variables	CSR					
	OLS	Dynamic-OLS	OLS	Dynamic-OLS	OLS	Dynamic-OLS
L.CSR	–	0.710*** [0.000]	–	0.726*** [0.000]	–	0.714*** [0.000]
CLIMATE	22.431*** [0.000]	3.442 [0.000]	–	–	–	–
CEO	–	–	–4.689*** [0.000]	–2.019 [0.003]	–	–
BOARD	–	–	–	–	0.446*** [0.000]	0.201*** [0.000]
INTANG	–8.592*** [0.014]	–5.641** [0.023]	–11.737*** [0.001]	–5.926** [0.017]	–12.821*** [0.000]	–6.503 [0.008]
CAPEX	24.509*** [0.001]	5.225 [0.319]	26.102*** [0.001]	5.240 [0.318]	26.875*** [0.000]	5.923 [0.255]
ROA	1.571 [0.647]	–3.904 [0.110]	5.811* [0.10]	–3.375 [0.167]	1.811 [0.610]	–5.025** [0.039]
EV	0.711** [0.029]	0.403* [0.081]	1.025*** [0.003]	0.436* [0.059]	0.814** [0.015]	0.351 [0.127]
BV	0.001 [0.493]	0.001 [0.578]	0.003 [0.126]	0.001 [0.405]	0.002 [0.414]	0.001 [0.705]
Constant	39.032*** [0.000]	14.478*** [0.000]	57.931*** [0.000]	16.743*** [0.000]	42.137*** [0.000]	10.307 [0.000]
F–test *p*–value	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.10	0.55	0.01	0.55	0.05	0.55
N	4,424	4,423	4,424	4,423	4,424	4,423

Note: This table reports regression results of static OLS and dynamic OLS models. Dependent variable is CSR in all of the regressions. (*), (**), (***) indicate statistical significance at 10%, 5%, and 1% levels, respectively. *N* is the number of observations. Numbers in parentheses are *p*-values.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

Table 8 – Generalized method of moments (GMM) estimation results
Таблица 8 – Результаты оценки обобщенным методом моментов (ОММ)

Variables	CSR		
	CLIMATE	CEO	BOARD
	(1)	(2)	(3)
L.CSR	0.794*** [0.000]	0.794*** [0.000]	0.796*** [0.000]
CLIMATE	4.09* [0.09]	–	–
CEO	–	–1.648** [0.022]	–
BOARD	–	–	0.064* [0.07]
INTANG	2.037 [0.365]	1.421 [0.557]	–1.159 [0.623]
CAPEX	9.748 [0.320]	7.265 [0.350]	7.684 [0.329]
ROA	3.881 [0.199]	4.570 [0.234]	3.721 [0.304]
EV	0.169 [0.454]	0.274 [0.297]	0.245 [0.328]
BV	0.002 [0.371]	0.002 [0.270]	0.002 [0.416]
Constant	8.408*** [0.000]	12.273*** [0.000]	9.390*** [0.000]
AR(1) *p*-value	0.000	0.000	0.000
AR(2) *p*-value	0.576	0.629	0.622
Hansen *p*-value	0.141	0.175	0.182
N	3,557	3,557	3,557

Note: This table reports the GMM regression results. Dependent variable is CSR in all of the regressions. (*), (**), (***) indicate statistical significance at 10%, 5%, and 1% levels, respectively. *N* is the number of observations. Numbers in parentheses are *p*-values.

Source: The author's compilation and transformation of ESG and financial reports and indicators available in Refinitiv Eikon Database (2025).

CONCLUSION AND IMPLICATIONS

This study investigates some of the factors affecting corporate sustainability of the firms in seven developed countries (France, Germany, Italy, the Netherlands, Spain, Sweden, and the United Kingdom). By considering the period between 2018 and 2023, we make contributions to modern sustainability literature. A notable positive link between CCCRO and corporate sustainability is found in the analyses. As the sample firms create new products to struggle the risks of climate change, it adds to the sustainability performance of the firms. Firms in developed countries might concede this behaviour because reputational risks may increase when firms do not effectively participate in environmental actions.

In addition, two firm-level governance quality factors are considered effective on sustainability. First, CEO-Chairman duality is found to negatively affect corporate sustainability performance. Second, board gender diversity is proved to have a positive relationship with sustainability performance. Greater diversity of the board results in increased efficiency in the firms and these firms familiarize to varying requirements of the environment [Odriozola, Blanco-González, Baraibar-Diez, 2024]. Skill and expertise of female directors, their commitment to ethical standards, and their concerns about climate change are the other reasons behind the analyses results. Furthermore, this study finds that when the CEO also holds the position of chairman, the firm's sustainability performance tends to decline. The agency theory might be shown behind this result. For instance, they might engage in entrenchment to serve personal interests rather than those of shareholders. This behaviour results in lower sustainability performance.

The findings of this study have produced certain implications for investors and companies. By reporting the factors increasing the sustainability performance of the developed country firms, we give an important clue for the investors about where to invest. In order to attract foreign and institutional investors, the company should consider the factors we reported.

Research limitations. The first limitation is that this study analysed company data from only seven developed economies in Europe. Since there are 23 nations in the MSCI developed countries category, this analysis can be repeated for all of these countries in future studies. The second limitation is that the 910 companies whose data were analysed are from these seven different countries, and therefore, it is accepted that there are not sectoral effects. Therefore, the sectoral effects of the findings can be examined in future studies. Finally, since the sample size between 2018 and 2023 is relatively small, this remains an additional limitation. Because of the data limitation in the database concerning the sustainability data, we used 6 years data but other researchers can check their findings with a larger sample.

This study focuses on a specific set of governance and climate-related determinants and, therefore, does not account for all possible factors affecting corporate sustainability, such as ownership concentration, institutional ownership, regulatory enforcement or industry-specific dynamics. Future research may extend this framework by incorporating additional governance, financial, or institutional variables, as well as sectoral or country-level heterogeneity.

Policymakers and investors should prioritize firms that actively integrate climate innovation into their strategic planning. Regulators might also consider policies that incentivize gender-diverse boards, given their positive impact on sustainability outcomes. The results demonstrate that when the companies accept climate risks opportunities as their core business strategy, they obtain significant benefits. In addition, separating CEO and Chairman

roles leads to higher sustainability. Furthermore, when there is board gender diversity, there occurs more inclusive decision-making benefits and firms perform better. Overall, the results of this study show that sustainability is a governance challenge involving diverse boards, independent oversight, and a forward-looking approach to climate opportunities. ■

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