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Special Issue Reprint

Corporate Governance, Social Responsibility, Innovation, and Sustainable Business Development Goals

Edited by
Akrum Helfaya and Ahmed About

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**Corporate Governance,
Social Responsibility, Innovation,
and Sustainable Business
Development Goals**

Corporate Governance, Social Responsibility, Innovation, and Sustainable Business Development Goals

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Preface to “Corporate Governance, Social Responsibility, Innovation, and Sustainable Business Development Goals”

This book introduces the key concepts and contemporary issues related to corporate governance, social responsibility, innovation, and sustainable business development goals. It highlights the importance of integrating these principles with modern business operations. On one side, corporate governance concerns how companies are directed and controlled, promoting accountability and creating long-term value. However, social responsibility goes beyond legal compliance, emphasizing a corporation’s commitment to societal well-being and responsible practices. Innovation is crucial for businesses to adapt, improve competitiveness, and create value through new ideas and processes. Sustainable business development goals aim to balance economic growth with social and environmental considerations, contributing to a more equitable and sustainable future. The book aims to explore these concepts, providing theoretical foundations, practical frameworks, and real-world examples to inspire responsible, innovative, and sustainable business practices.

Akrum Helfaya and Ahmed Aboud

Editors

Editorial

Editorial for the Special Issue “Corporate Governance, Social Responsibility, Innovation, and Sustainable Business Development Goals”

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1. Introduction

Corporate governance, social responsibility, and innovation play an important role in achieving sustainable business development goals (SDGs) [1–3]. The magnificent challenges that humankind faces, such as climate change and global warming, deforestation, biodiversity loss, hunger, poverty, inequality, racism, women abuse, child labor, shareholderism/wealth maximization, conflicts, and recent pandemics, deter the achievement of both corporate and national SDGs [4,5]. Sustainable corporations embed sustainable development agenda into their business models and make sustainability benefits a key objective of the new business era [6]. In this context, corporate managerial and investment choices consider not only the aspects of economic performance, but also their social and environmental performance [7]. Accordingly, sustainable business is an opportunity for corporations to enhance trust and create value on a wide scale. However, a sustainable business must be economically worthwhile, so that it can have a positive impact on corporate profitability, stimulating the long-term success and resilience of business companies and overall sustainable financial solidity [6,7].

Corporations are widely accredited as playing a crucial role in achieving SDGs, as they can promote responsible investments and integrate ethical, environmental, and social criteria into their investment strategies [6]. Corporate directors can use corporate governance mechanisms and innovation to support business projects and activities with a measurable long-term positive economic, social, and environmental impact [7]. Accordingly, additional research is needed regarding governance, sustainability, innovation, and SDGs.

With these premises, this Special Issue will contribute to the existing literature on corporate sustainability governance and innovation and SDGs. It will enhance our understanding of the potential contributions of sustainability governance and innovation practices to improve corporate sustainable financial performance and the accomplishment of the SDGs. It will also offer additional insights into the perception of sustainability governance, innovation, and SDGs of corporate directors, investors, and other stakeholders. Thus, the twenty-fifth articles that comprise the Special Issue cover a broad continuum of topics related to corporate governance, social responsibility, innovations, and SDGs. Generally speaking, there are a few articles that approach these topics from a theoretical view, while the other papers are empirical studies. The following two sections are brief summaries of the content of each of the articles published in this Special Issue.

2. Corporate Governance and Social Responsibility Practices

The first article (Contribution 1) reviewed the literature and stated that a generally accepted definition for understanding the concept of corporate sustainability (CS) is still

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missing. Considering the clear meaning of CS is of crucial importance for facilitating rational and efficient CS practices. The authors also proved that there is a lack of a sound theoretical foundation and of conceptual clarity of CS has been recognized as a key cause of unsatisfactory and unsuccessful sustainability decisions and actions by organizations. To address these gaps in the literature, the authors conducted an ontological analysis of the different and interrelated CS concepts in the CSR/sustainability literature. The authors found that the concept of CS is clearer than most authors argue and can be well-defined around its three pillars (e.g., environmental, social, and economic) to provide wide-scale and equal opportunities to future generations.

In the same vein, the second article (Contribution 2) claimed that corporate stakeholders highly considered the importance of corporate social and environmental activities on both societies and the environment, and therefore the notions of CSR, ESG, and corporate citizenship have received a great deal of attention in academia and industry. To understand and distinguish corporate responsibility approaches in the literature, the authors used text mining techniques to comprehensively analyze the summary information of 1235 research papers on these three notions. The findings of this article indicated that corporate citizenship is not only a high-level concept that involves ESG and CSR, but also a broad concept with missions that are associated with various societal matters. The findings also disclosed that employees, as the principal agents of corporate citizenship practice, are more critical than other stakeholders of corporate citizenship practice.

There is no doubt that different users of corporate reporting are looking for high-quality corporate financial and non-financial disclosure to make sound judgments of corporate performance and make rational investment decisions. Corporate reports, therefore, are seen as agents for contributing to a better future and hence could help in achieving sustainable development goals by publishing transparent non-financial disclosure. In this context, the third article (Contribution 3) states that accounting regulations of non-financial disclosure may be useful in enhancing the transparency of corporate reporting practices. Thus, the authors provide a systematic review to synthesize the literature from 2014 to 2021 on the patterns and trends relating to accounting and business regulations on non-financial disclosure in corporate reporting by companies. A thematic review of 62 articles identified 20 initial codes, which were then grouped into eight clusters: Directive 2014/95/EU, disclosure approaches, fiduciary duties of directors, stakeholder engagement, the effectiveness of disclosure regulations, the impacts of rules, the role of different actors and corporate accountability.

The increased focus on environmental (E), social (S), and governance (G) (ESG) disclosure has become an essential step to integrate sustainability practices into corporate culture to meet the expectations of stakeholders. Likewise, the social and environmental implications of corporate activities on the environment and neighboring societies have led to the growing demand for useful non-financial information. In this context, the fourth article (Contribution 4) investigated the impacts of the board's CSR strategy and orientation, adopting global reporting initiatives (GRI), and the country-cultural dimensions, based on Hofstede's measures of corporate ESG disclosure practices within Europe. Using a European dataset from Bloomberg and Refinitiv Eikon, the authors used a quantitative research methodology to test these micro- and macro-relationships through a statistical analysis of 7840 observations from European companies. The findings suggested that both board CSR orientation and strategy and the GRI have positive and significant impacts on the overall disclosure of ESG practices within Europe. Regarding the country-cultural dimensions, the authors found that individualism and feminine cultures are positively associated with increased levels of ESG disclosure. These findings shed light on factors affecting European ESG disclosure practices and could be of interest to sustainability reporters, standards setters, policymakers, and other stakeholders.

The fifth article (Contribution 5) explored and assessed the quality of the anti-corruption disclosure reporting practices of the large UK-quoted extractive companies from 2003 to 2019. Based on a set of reporting quality metrics from the environmental reporting literature, the authors investigated the trends in corruption reporting over time and the impact of

the introduction of the Act on reporting breadth and depth. They found that some of the metrics would appear to add more insight than others in this new context. The statistical results stated that the volume of reporting has grown over time, but this would seem to be in breadth, rather than more depth of the anti-corruption disclosure, etc. Consequently, there has been a step-change in corporate anti-corruption disclosure practice since the introduction of the 2010 UK Bribery Act, though concluding whether this has increased quality may depend on your perspective and interest as a reader of the anti-corruption information.

There is a growing trend in corporate bribery practices among employees, particularly from developing countries, where developed countries, including the USA, have huge interests in various aspects of national and international commerce. Therefore, the sixth article (Contribution 6) examined the impact of organisations' culture and outcome orientation, as well as the stability culture dimensions of Organization culture profile (OCP) on combating corporate bribery practices, as a part of corporate sustainability practices, and their subsequent impact on both organisational financial and non-financial performance. The paper surveyed mid-to-top level managers of a total of 201 organisations from Bangladesh. The research results provided evidence of the positive impact of both outcome orientation and stability of organisations' culture on fighting bribery practices. The findings also emphasized the positive impact of combating bribery practices on both organizations' financial and non-financial performance. Of course, these empirical findings contribute to the existing limited bribery-related corporate sustainability literature, with the aim of achieving suitable organisation culture to eliminate unethical business practices, such as corporate bribery practices.

The seventh article (Contribution 7) was conducted to investigate the asymmetric effects of the defense burden on environmental degradation, which has rarely been researched in the relevant literature. So, the authors used Panel ARDL and NARDL methodologies to analyze the period 1965–2018 for the 15 oldest members of NATO. On the one hand, the empirical findings of the panel ARDL analysis did not show any significant impact of the defense burden (ME) on carbon dioxide emissions (CO₂) in the long term. On the other hand, panel NARDL analysis proved that the impact of the defense burden on carbon emissions is asymmetric; a 1% negative change in ME leads to a 0.08% drop in CO₂ emissions in the long term, etc.

Small and medium enterprises (SMEs) jointly contributed to a significant proportion of greenhouse gas emissions and therefore, there is a need for urgent action to be taken by SMEs in the journey to fight climate change and achieve net zero. With this fact, the eighth article (Contribution 8) offered a comprehensive conceptual framework for SMEs to draw from in the journey toward net zero by synthesizing the academic and grey literature. By bringing together key strands of the literature, the authors developed a conceptual model that offered a clear pathway for SMEs to go on board to achieve their net zero plan. This framework encompasses understanding the position of the SME in the value chain, understanding the pressures from stakeholders, undertaking greenhouse gas accounting to measure current levels of carbon emissions, undertaking internal control towards the net zero agenda, etc. This model could also be used as an ongoing decision-making and constant improvement framework that will be an asset to SMEs. Generally, this article contributed to the sustainability literature by being the first to synthesize the academic and grey literature to develop a comprehensive conceptual framework for SMEs to achieve net zero target.

Considering the UN 2030 Agenda for Sustainable Development' and the associated 17 Sustainable Development Goals (SDGs), the ninth article (Contribution 9) explored CSR and related ethical and sustainable business policies and practices within UK-based global businesses. To achieve this aim, the research engaged senior CSR managers from UK global brand businesses to discuss their CSR perceptions and practices. The results revealed that global companies are reframing CSR within the broader concept of sustainability, guided by the SDGs, and are willing to give advice to SMEs as part of a broader supply chain col-

laboration process. The authors also asked their interviewees about their recommendations for SMEs and how to link these SDGs to their businesses, etc.

In the same context, the tenth article (Contribution 10) developed the multiple-theoretical framework of legitimacy, stakeholders, and voluntary perspective to evaluate the adoption of Vietnamese-listed firms to the 17 United Nations' SDGs. The primary objective research aim of this article is to employ manual content analysis to explore the status quo of the SDGs practices of the largest 100 Vietnamese listed firms on the two biggest Vietnamese stock exchanges (Ho Chi Minh Stock Exchange–HOSE and Hanoi Stock Exchange–HNX). Remarkably, the empirical findings proved that Vietnamese listed firms revealed “green talks” in their corporate reporting rather than “green actions”. Consequently, these findings encouraged companies to engage in SDGs through substantive sustainability strategies and need greater attention from governments, practitioners, and policymakers.

Similarly, the eleventh paper (Contribution 11) examined the extent of corporate governance disclosure on the websites of Indonesian and Malaysian FinTech companies and determined whether variation in the extent of corporate governance disclosure was influenced by the country and type of FinTech services or not. The authors analyzed the content of the websites of 148 Indonesian and 159 Malaysian corporations using a Modified Corporate Governance Disclosure Index (MoCGOvDi). This MoCGOvDi was created using the ASEAN Corporate Governance Scorecard and previous research. The research findings showed that the level of corporate governance disclosure was higher among Malaysian FinTech companies as a result of strong and forced pressure by government regulation. Furthermore, the level of corporate governance disclosure is low in both countries, which may delay the achievement of SDG No 16.

The twelfth article (Contribution 12) investigated the relationship between two characteristics of corporate governance (concentrated and state ownership) and firm financial performance in an emerging market, China. To test this relationship, the authors used a research sample of 234 Chinese firms with a total of 2340-year observations. The empirical findings stated that concentrated ownership is positively and significantly related to firm performance. Nevertheless, state ownership has a significant negative impact on firm performance. Further, the authors documented that the stock split reform has a substantial and positive impact on the ownership–corporate financial performance relationship. Such a positive relationship between ownership concentration and firm performance has increased following the split-share structure reform. While the negative relationship between state ownership and corporate financial performance has been mitigated following the split-share structure reform. This study offered some implications for regulators, investors, and researchers interested in examining emerging economies such as China.

Over the span of years, the CSR disclosure–firm risk relationship has boosted the dedicated interest of capital providers, bankers, regulators, debtholders, and academic scholars. Understanding such a dynamic relationship has increasingly attracted the attention of academics, practitioners, and policymakers. Yet, empirical research testing the relationship between CSR disclosure and firm risk over time is still in its early stage. Thus, this thirteenth article (Contribution 13) looks to contribute to the literature on firm risk and CSR disclosure by examining the effect of ESG disclosure on the cost of capital over time. The research paper examines a sample of 430 S&P 500 US firms observed over the 2011 to 2019 period. The empirical findings showed that the governance disclosure decreased the cost of capital during the first years, and in later years, the effect became positive. Over time, social disclosure increased the cost of capital. However, environmental disclosure showed a negative and significant impact on the cost of capital during the first years but no significant impact later in time. Of course, these findings contributed to explaining the dynamic effect of CSR disclosure, etc.

Although the influence of ownership structure on the level of cash holdings has been widely investigated, that of government ownership has been understudied. To fill this research gap, the fourteenth article (Contribution 14) employed a generalized method of

moments (GMM) estimation on the panel data of 107 Jordanian firms listed on the Amman Stock Exchange, to test the relationship between government ownership and the level of corporate cash holdings. The empirical results proved that companies with government ownership hold higher levels of cash and that such ownership creates agency problems. While other types of ownership such as individual, foreign, and block holders, were found to be insignificant. These findings afford a significant implication for policymakers and financial regulators in Jordan to reduce agency problems associated with government ownership. The government should also revise its ownership policy to ensure its purposes and expectations from such business ownership, etc.

Managers' religious values may affect their attitudes toward CSR activities in two ways: (1) religiosity is a key source of individual morals which serve as the foundation for the formation of individuals' attitudes, and (2) it symbolizes followers with principles by which to live. Accordingly, the fifteenth article (Contribution 15) studied the complex relationship between Islamic religious beliefs and CSR attitudes and behaviour. In this study, the authors defined four aspects of religiosity, four types of individual attitudes toward CSR, and five types of CSR behaviour. The empirical investigation of the responses of 274 questionnaires showed that there is a very different picture of the Islamic religiosity of the Egyptian managers, with low correlations between the cognitive, intrinsic, extrinsic, and behavioural aspects of religiosity. It also indicates that there are significant and negative impacts of Islamic religious beliefs on various types of CSR attitudes and behaviour. These findings afford some important implications for CSR scholars to use a multidimensional measure to assess the religious beliefs of managers and their impacts on CSR attitudes. Furthermore, these findings enhance corporate managers' awareness of the interconnection of their religiosity and CSR behaviour.

The sixteenth article (Contribution 16) empirically tested the effect of economic policy uncertainty on executives' self-interest behaviors, segregated the explicit self-interest behaviors from implicit ones, and then examined the moderating effect of internal control. The findings showed that rising policy uncertainty will inhibit explicit self-interest behaviors of executives, yet the implicit ones will be encouraged, and the internal control system can regulate the above effects. The authors also run some additional analysis that approved the above-mentioned effect. Therefore, both stable institutional investors and sound market competition can play an important role in governance. As a result, this study contributed to the literature on the influence of economic policy uncertainty on corporate governance practices.

3. Corporate Innovation and Sustainability Practices

Governance, corporate social responsibility (CSR), and innovation are interconnected aspects of corporate strategy and performance. Governance refers to the systems and processes through which companies are directed, controlled, and managed [3,6]. It encompasses the roles and responsibilities of the board of directors, management, and other stakeholders in decision-making and accountability. While CSR involves a company's commitment to conducting business ethically and responsibly, considering the impact of its operations on society, the environment, and stakeholders. It goes beyond legal requirements and aims to create a positive impact on society. Effective governance practices can provide the structure and framework for companies to prioritize and integrate CSR and innovation into their strategies. Moreover, CSR initiatives can also foster innovation by encouraging companies to identify and respond to emerging social and environmental trends. CSR practices can inspire creativity, collaboration, and the exploration of new business models that generate both social and economic value [2–4]. Moreover, innovation can contribute to CSR by enabling companies to develop sustainable solutions, reduce their environmental footprint, or create products and services that meet societal needs. Innovation-driven CSR initiatives can enhance a company's reputation, competitiveness, and long-term sustainability. The following papers address the interrelations between governance, CSR, and innovation arguing that, when effectively integrated, can drive

responsible and sustainable business practices while fostering creativity, competitiveness, and value creation for companies.

For instance, the seventeenth paper (Contribution 17) examines whether transformational leadership influences ESG performance in SMEs, whether organizational innovation mediates the relationship between transformational leadership and ESG performance, and the moderating effect of external social capital on transformational leadership and organizational innovation. Based on higher-order theory, resource-based theory, stakeholder theory, the results of the study indicate that transformational leadership has a positive effect on ESG performance, and that organizational innovation partially mediates the relationship between transformational leadership and corporate ESG performance. Furthermore, external social capital moderates the direct relationship between transformational leadership and organizational innovation and moderates the role of organizational innovation as a mediator between transformational leadership and ESG performance. This study adds to our further understanding of the relationship between transformational leadership and ESG performance in SMEs, expanding the antecedent research on ESG performance and providing a basis for sustainable SME development.

Linked to sustainable development and leadership, the eighteen paper (Contribution 18) investigates the association between executives' environmental protection background and corporate green innovation, as well as the mechanisms that influence this relationship. Drawing on the upper echelons theory, the study reveals a positive correlation between executives' environmental protection background and corporate green innovation. This positive relationship remains robust even when using alternative regression models and accounting for different measures of green innovation. Moreover, the findings indicate that media attention and board independence have a positive moderating influence on the relationship between executives' environmental protection background and green innovation.

Theoretically, the nineteenth article (Contribution 19) introduces a framework that examines the potential influence of board independence and the utilization of digital technology on a corporation's environmental performance. They used a sample of 53 publicly listed Italian companies is selected, and data on board composition, greenhouse gas emissions, and expenditures for Enterprise Resource Planning (ERP) digital technologies are collected over a five-year period. The results of the analysis partially support the predictions made in the framework. Specifically, a higher degree of board independence is associated with improved environmental performance. Their further analysis reveals that the environmental performance of companies is positively influenced by the use of digital technologies when these companies have a higher proportion of independent directors on their boards. This research contributes to our understanding of the determinants of Corporate Digital Responsibility (CDR), indicating that a greater presence of independent directors on a board has a positive impact on CDR.

Looking at the overborrowing issue in China, the twentieth article (Contribution 20) explores the impact of overborrowing in China's state-owned enterprises (SOEs) on their innovation spending. The study benefits from a theoretical model within the unique institutional context of China's banks, specifically focusing on the administrative-economic governance. By analyzing a longitudinal panel dataset of Chinese listed companies from 2012 to 2018, the study confirms that overborrowing acts as a mediator between state ownership and innovation expenditure, emphasizing the importance of improving the monitoring of banks to foster innovation in transitional economies. Furthermore, the study investigates the influence of political connections and managers' R&D experience in leveraging the innovation resources available to SOEs. The findings of this study reveal a negative impact of government intervention on the allocation of innovation resources and contribute to our understanding of the role of debt governance in promoting innovation in transition economies.

Focusing on the corporate strategy broadly, the twenty-first article (Contribution 21) employs propensity score matching, ordinary least squares, and quantile regression techniques to examine the relationship between voluntary disclosure of social responsibility and

innovation investment in enterprises. The findings reveal that when enterprises engage in voluntary disclosure of social responsibility, it leads to an increase in innovation investment. In other words, corporate social responsibility has a significant positive impact on both innovation and investment. However, as the level of innovation investment in enterprises increases, the impact of corporate social responsibility on innovation gradually diminishes. This research highlights the complex dynamics between social responsibility and innovation investment, providing insights into their interplay within corporate strategies.

While the twenty-second article (Contribution 22) focuses on the importance of environmental corporate social responsibility (CSR) for achieving economic benefits and sustainable development is a subject of great interest among theorists and practitioners. However, the specific relationship between environmental CSR and green innovation performance remains unclear. To address this research gap, this paper proposed a research model, incorporating the mediating effect of shared vision capability and the moderating effect of resource slack. The aim is to investigate the impact of environmental CSR on green innovation performance and to determine the conditions under which this relationship is most significant. The results of the study confirm a positive association between environmental CSR and green innovation performance. Additionally, shared vision capability was found to mediate the link between environmental CSR and green innovation performance. Furthermore, resource slack was found to have a statistically significant moderating effect on the relationship between environmental CSR and green innovation performance. These findings provide valuable insights for managers in formulating management policies related to environmental CSR, shared vision capability, and green innovation performance. By leveraging these insights, enterprises can work towards sustainable development and contribute to environmental friendliness in society as a whole.

The impact of innovation quality has become a growing concern in the academic industry. In previous studies, the impact of TMT experience heterogeneity on enterprise innovation quality has not been well explored. In the context of enterprise technologies and innovation, the twenty-third article (Contribution 23) argues that high-quality innovation can solve the “bottleneck” problem of key enterprise technologies and drive the high-quality development of enterprises. Based on the panel data of Chinese A-share listed companies, the following results were found (1) TMT functional experience heterogeneity positively affects partner diversity to promote innovation quality, while industrial experience heterogeneity shows the opposite result. (2) Enterprise partner diversity partially mediates the relationship between TMT experience heterogeneity and innovation quality. (3) TMT technological participation positively regulates the relationship between TMT experience heterogeneity and enterprise partner diversity.

In China, the Shanghai and Shenzhen Stock Exchanges implemented regulations in 2008 that require certain public firms to disclose their social and environmental governance information in annual reports. Therefore, the twenty-fourth article (Contribution 24) examines the impact of mandatory social and environmental regulations on firm innovation. Using a difference-in-differences approach with propensity score matching, the study finds that the firms subject to the regulations experience a significant increase in innovation, as indicated by a higher number of total patents and invention patents. Furthermore, the study reveals that the positive association between MSER and firm innovation is primarily driven by the CSR-improving effect and market-reaction effect. Specifically, the treatment firms demonstrate an enhancement in CSR performance and a decrease in transient institutional investors. These results highlight the role of MSER in fostering firm innovation and emphasize the importance of CSR and market dynamics in driving this relationship.

Green innovation plays a vital role in driving sustainable development and promoting green circular economic practices within businesses. It involves organizations considering environmental, social, and governance (ESG) aspects, and the resulting ESG advantages can serve as a catalyst for enterprises to undergo a green transformation. Focusing on that, the twenty-fifth article (Contribution 25) focuses on Chinese A-share listed companies from 2009 to 2020 to investigate the relationship between ESG rating performance and corporate

green innovation, as well as the boundary mechanisms that influence this relationship. The findings demonstrate that higher ESG ratings are associated with increased levels of green innovation among listed enterprises. Furthermore, the relationship between ESG ratings and green innovation is strengthened by the institutional environment and the availability of redundant organizational resources. This study provides empirical evidence supporting the positive impact of ESG ratings on green innovation within enterprises.

4. Conclusions, Practical Challenges, and Future Directions

In our view, the research papers in this Special Issue echo the multidimensional and inter-correlated nature of corporate sustainability governance factors and innovation strategies and the various ways in which they can be embedded into corporate business models and tactics at different levels and by different types of organizations to achieve the long-term sustainable development goals.

Practical challenges—In the last thirty years, both corporate governance and sustainability practices have faced some vital practical challenges. For example: – As firms are following different corporate governance codes and sustainability guidelines, they are beholding variations in their sustainability governance practices. Of course, this will affect the overall effectiveness of the governance system and the way of creating sustainable financial values for corporate stakeholders.

- i. As corporate sustainability is a voluntary-based practice in many countries, the sustainability reporters (i.e., firms) have a limited understanding of the scope and context of CSR such as non-financial disclosure, and of course, this will affect the overall quality of CSR reports.
- ii. The presence of voluntary sustainability frameworks (e.g., GRI, AA1000 APS) seriously affects the usefulness of these frameworks in helping corporations to achieve their sustainable development agenda, and therefore, many firms started to use these frameworks and sustainability reports as a “*greenwashing/green talk*” mechanism to manage the perceptions of their stakeholders.
- iii. The target audience of corporate sustainability reports) is another challenge for companies to meet the different expectations of their diverse stakeholders.
- iv. The confusion of reporting cycles, given the lack of mandatory reporting, especially in the era of integrated reporting and digitalization of corporate reporting.
- v. Reporting on companies’ commitment to meet national and global sustainability goals such as: fighting climate change, combatting corruption, increasing social justice and equality, eliminating forced labour and child labour, and implementing and achieving the 17 UN SDGs.
- vi. Measuring the impact of CSR initiatives and innovation projects can be complex. Quantifying social and environmental outcomes, as well as evaluating the success of innovation efforts, requires appropriate metrics and evaluation framework.
- vii. Innovation inherently involves risk and uncertainty. While CSR initiatives can also involve risk, the potential negative consequences of failure in CSR projects, such as reputational damage, can be significant. Balancing the risks associated with both innovation and CSR is a challenge.
- viii. Allocating resources, including time, funding, and talent, to both CSR initiatives and innovation projects can be a complex task. Limited resources may require trade-offs and prioritization between different initiatives.

Future directions—The future maintains promising scenarios for corporate sustainability governance frameworks. For instance, current sustainability governance developments and innovations suggest that implementing these governance frameworks will help the thinktank (i.e., boardroom members) to know how to lead their firms to create value in wide-scale success and engage with their societies to achieve the three pillars of sustainability, economic, environmental, and social performance). Hence, the future directions of corporate sustainability governance include:

- i. Convergence of the different corporate governance codes and sustainability frameworks to set generally accepted corporate governance rules and sustainability guidelines to be used by organizations across the globe.
- ii. In the new business era, policymakers, regulators, and standard setters should deal with the global pandemic of coronavirus and future similar outbreaks as a new systematic risk facing organizations, stakeholders, and the global community at large.
- iii. New corporate governance codes and sustainability framework should focus on embedding the integrating reporting and UN sustainable development goals into corporate business models and assist organizations to integrate sustainable financial pillars (e.g., economic, environmental, and social) into corporate strategy and risk management systems.
- iv. Politicians, civil society, activists, and media should shed light on the corporate directors' and decisions makers' attitudes and preferences when assessing corporate performance and taking decisions under uncertain conditions and turbulent times (e.g., financial crises, corporate scandals, business collapse, outbreak of dangerous diseases, and natural disasters, new national and global targets for tackling climate change problems, implementing sustainable development goals, etc.).
- v. The use of data analytics, artificial intelligence, and machine learning will enable companies to gain insights into their environmental impact and identify areas for improvement. Data-driven sustainability solutions can optimize energy consumption, reduce waste, and enhance resource efficiency.
- vi. Embracing the principles of the circular economy, where resources are used more efficiently, waste is minimized, and products are designed for durability and recyclability, will be a crucial direction for corporate green innovation. This includes exploring new business models such as product-as-a-service and implementing closed-loop supply chains.

Finally, we hope that the readers of the *Sustainability-MDPI* will find this special issue worth reading.

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2. Park, J.G.; Park, K.; Noh, H.; Kim, Y.G. Characterization of CSR, ESG, and Corporate Citizenship through a Text Mining-Based Review of Literature. *Sustainability* **2023**, *15*, 3892. <https://doi.org/10.3390/su15053892>
3. Mustafa Khan, N.J.; Mohd Ali, H. Regulations on Non-Financial Disclosure in Corporate Reporting: A Thematic Review. *Sustainability* **2023**, *15*, 2793. <https://doi.org/10.3390/su15032793>
4. Helfaya, A.; Morris, R.; Aboud, A. Investigating the Factors That Determine the ESG Disclosure Practices in Europe. *Sustainability* **2023**, *15*, 5508. <https://doi.org/10.3390/su15065508>
5. Ghazwani, M.; Whittington, M.; Helfaya, A. Assessing the Anti-Corruption Disclosure Practices in the UK FTSE 100 Extractive Firms. *Sustainability* **2023**, *15*, 5155. <https://doi.org/10.3390/su15065155>
6. Rahman, M.M.; Bhuiyan, F.; Samaduzzaman, M.; Mia, P.; Mahmood, I. Corporate Sustainability by Combating Bribery: The Role of an Organisation Culture and Its Impact on the Organisation's Performance. *Sustainability* **2023**, *15*, 6557. <https://doi.org/10.3390/su15086557>
7. Çolak, O.; Özuyar, S.E.G.; Bölükbaşı, Ö.F. Asymmetric Effects of the Defense Burden on Environmental Degradation: Evidence from NATO Countries. *Sustainability* **2023**, *15*, 573. <https://doi.org/10.3390/su15010573>

8. Olarewaju, T.; Dani, S.; Jabbar, A. A Comprehensive Model for Developing SME Net Zero Capability Incorporating Grey Literature. *Sustainability* **2023**, *15*, 4459. <https://doi.org/10.3390/su15054459>
9. Williams, S.; Murphy, D.F. Learning from Each Other: UK Global Businesses, SMEs, CSR and the Sustainable Development Goals (SDGs). *Sustainability* **2023**, *15*, 4151. <https://doi.org/10.3390/su15054151>
10. Helfaya, A.; Bui, P. Exploring the Status Quo of Adopting the 17 UN SDGs in a Developing Country—Evidence from Vietnam. *Sustainability* **2022**, *14*, 15358. <https://doi.org/10.3390/su142215358>
11. Susilowati, E.; Joseph, C.; Vendy, V.; Yuhertiana, I. Advancing SDG No 16 via Corporate Governance Disclosure: Evidence from Indonesian and Malaysian Fintech Companies' Websites. *Sustainability* **2022**, *14*, 13869. <https://doi.org/10.3390/su142113869>
12. Aboud, A.; Diab, A. Ownership Characteristics and Financial Performance: Evidence from Chinese Split-Share Structure Reform. *Sustainability* **2022**, *14*, 7240. <https://doi.org/10.3390/su14127240>
13. Khanchel, I.; Lassoued, N. ESG Disclosure and the Cost of Capital: Is There a Ratcheting Effect over Time? *Sustainability* **2022**, *14*, 9237. <https://doi.org/10.3390/su14159237>
14. Alkhataybeh, A.; AlSmadi, S.A.; Shakhatreh, M.Z.; Khataybeh, M.A. Government Ownership and Corporate Cash Holdings: Empirical Evidence from the Amman Stock Exchange. *Sustainability* **2022**, *14*, 11168. <https://doi.org/10.3390/su141811168>
15. Helfaya, A.; Easa, N.F. Islamic Religiosity and CSR Attitudes—The Case of Egyptian Managers. *Sustainability* **2022**, *14*, 11255. <https://doi.org/10.3390/su141811255>
16. Huang, H.; Liu, C.; He, Y. The Impact of Economic Policy Uncertainty on Executives' Self-Interest Behaviors: Evidence from China. *Sustainability* **2023**, *15*, 1815. <https://doi.org/10.3390/su15031815>
17. Zhu, J.; Huang, F. Transformational Leadership, Organizational Innovation, and ESG Performance: Evidence from SMEs in China. *Sustainability* **2023**, *15*, 5756. <https://doi.org/10.3390/su15075756>
18. Bai, X.; Lyu, C. Executive's Environmental Protection Background and Corporate Green Innovation: Evidence from China. *Sustainability* **2023**, *15*, 4154. <https://doi.org/10.3390/su15054154>
19. Napoli, F. Corporate Digital Responsibility: A Board of Directors May Encourage the Environmentally Responsible Use of Digital Technology and Data: Empirical Evidence from Italian Publicly Listed Companies. *Sustainability* **2023**, *15*, 2539. <https://doi.org/10.3390/su15032539>
20. Meng, Q.; Liu, Y.; Li, W.; Yu, M. Bonding or Indulgence? The Role of Overborrowing on Firms' Innovation: Evidence from China. *Sustainability* **2023**, *15*, 1079. <https://doi.org/10.3390/su15021079>
21. Chen, L.; Lim, S.H.; Xu, S.; Liu, Y. Corporate Social Responsibility and Innovation Input: An Empirical Study Based on Propensity Score-Matching and Quantile Models. *Sustainability* **2023**, *15*, 671. <https://doi.org/10.3390/su15010671>
22. Ruan, R.; Chen, W.; Zhu, Z. Linking Environmental Corporate Social Responsibility with Green Innovation Performance: The Mediating Role of Shared Vision Capability and the Moderating Role of Resource Slack. *Sustainability* **2022**, *14*, 16943. <https://doi.org/10.3390/su142416943>
23. Ma, R.; Lv, W.; Zhao, Y. The Impact of TMT Experience Heterogeneity on Enterprise Innovation Quality: Empirical Analysis on Chinese Listed Companies. *Sustainability* **2022**, *14*, 16571. <https://doi.org/10.3390/su142416571>
24. Cao, Z.; Mu, Y. Social and Environmental Regulations and Corporate Innovation. *Sustainability* **2022**, *14*, 16275. <https://doi.org/10.3390/su142316275>
25. Liu, H.; Lyu, C. Can ESG Ratings Stimulate Corporate Green Innovation? Evidence from China. *Sustainability* **2022**, *14*, 12516. <https://doi.org/10.3390/su141912516>

References

1. Aboud, A.; Diab, A. The Impact of Social, Environmental and Corporate Governance Disclosures on Firm Value: Evidence from Egypt. *J. Account. Emerg. Econ.* **2018**, *8*, 442–458. [[CrossRef](#)]
2. Aboud, A.; Diab, A. The Financial and Market Consequences of Environmental, Social and Governance Ratings: The Implications of Recent Political Volatility in Egypt. *Sustain. Account. Manag. Policy J.* **2019**, *10*, 498–520. [[CrossRef](#)]
3. Moussa, T.; Kotb, A.; Helfaya, A. An Empirical Investigation of U.K. Environmental Targets Disclosure: The Role of Environmental Governance and Performance. *Eur. Account. Rev.* **2021**, *31*, 937–971. [[CrossRef](#)]
4. Muñoz-Torres, M.J.; Fernández-Izquierdo, M.Á.; Rivera-Lirio, J.M.; Escrig-Olmedo, E. Can Environmental, Social, and Governance Rating Agencies Favor Business Models That Promote a More Sustainable Development? *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 439–452. [[CrossRef](#)]
5. Tarmuji, I.; Maelah, R.; Tarmuji, N.H. The Impact of Environmental, Social and Governance Practices (ESG) on Economic Performance: Evidence from ESG Score. *Int. J. Trade Econ. Financ.* **2016**, *7*, 67. [[CrossRef](#)]

6. Helfaya, A.; Moussa, T. Do Board's Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence. *Bus. Strategy Environ.* **2017**, *26*, 1061–1077. [[CrossRef](#)]
7. Ellili, N.O.D. Impact of ESG Disclosure and Financial Reporting Quality on Investment Efficiency. *Int. J. Bus. Soc.* **2022**, *22*, 1094–1111. [[CrossRef](#)]

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Article

Clarifying the Concept of Corporate Sustainability and Providing Convergence for Its Definition

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Abstract: Organizations are under mounting pressure to adapt to and to adopt corporate sustainability (CS) practices. Notwithstanding the increasing research attention given to the subject and the meaningful theoretical contributions, it is claimed that a definition, and a commonly accepted understanding of the concept of corporate sustainability, is still missing. Alignment on the meaning of CS is of critical importance for enabling coherent and effective practices. The lack of a sound theoretical foundation and of conceptual clarity of corporate sustainability has been identified as an important cause of unsatisfactory and fruitless actions by organizations. To address the questions “What is Corporate Sustainability?” and “Is it true there is a lack of convergence and clarity of the concept?”, we perform an ontological analysis of the different and interrelated concepts, and a necessary condition analysis on the key constitutive features of corporate sustainability within the academic literature. We demonstrate that the concept of corporate sustainability is clearer than most authors claim and can be well defined around its environmental, social and economic constitutive pillars with the purpose to provide equal opportunities to future generations.

Keywords: corporate sustainability; concept of corporate sustainability; definition of corporate sustainability; sustainable development; CSR

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1. Introduction

Corporate sustainability (CS) is the new paradigm for global business models. In order to determine success, an organization needs to give careful consideration to changes in the environmental and societal trends. Current understanding of the concept of corporate sustainability is regarded as too fragmented and aleatory to advance towards a coherent and homogeneous implementation of corporate sustainability practices in business activities [1]. General agreement exists regarding the primary importance of clarifying the concept of corporate sustainability for guiding the audience and enabling effective practices [2].

In recent years, there has been a proliferation of studies around the subjects of sustainability, corporate sustainability, sustainable development, ESG, CSR and other associated terminologies [3]. Similarly, there has been a proliferation of initiatives to address the subject, both from a reporting and implementation standpoint. The Global Reporting Initiative, the SASB Sustainability Accounting Standard Board, the Sustainable Development Goals, the COP 21, and the Zero Emissions target are only a few examples.

It is important to acknowledge that the subject has a wide scope and is complex in nature [4]. Moreover, it is revolutionary in its mission, as it challenges some of the core foundations of the capitalist system on which much of the world economy has been based during the last two hundred years. This is perhaps one of the root causes for the perceived and lasting confusion as to what corporate sustainability is and what it entails.

The primary objective of this research is to build the concept of corporate sustainability with the aim to bring clarity to its meaning and convergence for its definition. This is

important for two major reasons. First, the concept is of global relevance, spans across economies and sectors, and theoretical guidance is necessary for aligning the efforts. Second, the lack of clarity of the concept leads to a variety of interpretations and this has been identified in the literature as a cause for ineffective and arbitrary practices. We believe the efforts detailed herein represent a substantial contribution to increasing the understanding of corporate sustainability, and in therefore aligning the view various stakeholders have, in enabling effective action within the corporate world, and directing future research focus.

To build the concept of corporate sustainability we use the guiding principles set forth by Gary Goertz [5]. In his book, *Social Science Concepts and Measurement*, Gary Goertz [5] extensively elaborates on how to build concepts in social science. He asserts that concepts are fundamentally about meaning, semantics and ontology. "They are theories about the fundamental constitutive elements of a phenomenon". Goertz's analysis draws from John Stuart Mill's System of Logic [6], according to which: "To define, is to select from among all the properties of a thing, those which shall be understood to be designated and declared by its name; and the properties must be well known to us before we can be competent to determine which of them are fittest to be chosen for this purpose"; as well as from Aristoteles's perspective on definitions, which advocates that good definitions give the sets of necessary and jointly sufficient conditions for a concept.

Although not directly linked to the guiding principles set forth by Goertz [5], a recent study by Meuer et al. [2] stands out for following a similar approach to building the concept of CS by identifying its constitutive elements. Based on an Aristotelian perspective of definitions, which proposes to reduce concepts to their essential attributes, Meuer et al. [2] identified 33 new definitions, from a systematic literature review between 1983 and 2018, and deconstructed the concept into its essential components: the genus as the family of objects to which corporate sustainability belongs; and three differentiae: the specificity of sustainable development, the level of ambition, and the level of integration. Together, these essential attributes allowed the authors to develop a conceptual space labelled the "corporate sustainability cube", in which all definitions of corporate sustainability can be allocated and systematically compared. The remarkable contribution of Meuer et al. [2] has encountered three relevant limitations. First, it did not focus on the question of "what is" corporate sustainability. Instead, it provided a framework for analyzing and comparing definitions of corporate sustainability. Simply, the difficulty would be on how to assess the level of ambition and integration when the object of that ambition and integration "corporate sustainability" has not been qualified in its meaning, constituents, and highest extension [5]. Second, based on Aristoteles's teaching that "a definition is a phrase signifying a thing's essence" [7], they restricted the analysis to definitions only. However, concepts are not the same as definitions, and studying concepts by analyzing definitions is not correct [5]. A definition is a set of terms employed to refer to an object. They do not inform on the use of the concept nor lead to reflection. In this context, the analysis of the definitions of corporate sustainability described in academic and scientific publications is incomplete to study the "meaning" of the concept "sustainability" [8]. Third, the word-by-word coding approach of the definition is subject to interpretation and could be misleading when analyzed in isolation.

To overcome these limitations, our research extends on the work of Meuer et al. [2], and is based on the guiding principle by Gary Goertz [5] on how to construct social science concepts. It:

1. Broadens the analysis to the meanings of corporate sustainability alongside their definitions,
2. Performs an ontological analysis through a historical excursion into the evolution of corporate sustainability and its associated concepts, and
3. Performs a necessary condition analysis to identify the constitutive components of the concept of corporate sustainability.

The results are aimed at answering the questions: “What is Corporate Sustainability?” and “Is it indeed true there is a lack of convergence and clarity over its concept?”. The objective is not to develop a novel concept of corporate sustainability, which would increase the multitude of interpretations and reinforce the existing issues, but to align the different perspectives to a commonly accepted understanding of the concept through the scientific rigor of the necessary condition analysis and the guiding principles of Gary Goertz, which are specifically tailored for building concepts in social science. Given the significance, the broadness and the transformational nature of the subject, both in businesses and societies, providing a unified theoretical underpinning is critical for enabling consistent practices within practitioners and for leading future research focus towards the areas of implementations and measurability of corporate sustainability. Concepts need to be clearly developed and properly defined to be able to be applied, implemented and measured.

The remainder of the paper is structured as follows. Section 2 provides a review of the existing literature on the interpretations of the concept of CS and of the claimed lack of conceptual clarity, and associated consequences. Within this session, we provide an ontological analysis of corporate sustainability by means of an historical excursion as well as a review of the main identified themes around the conceptualization and evolution of CS. Section 3 explains the methodology for finding the constitutive features of CS through the necessary condition analysis outlined by Jan Dul [9]. Section 4 presents the results and discusses the findings; and Section 5 provides the conclusions.

2. Literature Review

In a study published by Montiel and Delgado-Ceballos [1], it was observed that a standardized definition of corporate sustainability does not exist. The study analyzed a variety of studies published on the subject, from 1995 to 2013, and concluded that the field of corporate sustainability is still evolving, and different approaches to define, theorize and measure it have been used. Similarly, Hahn et al. [10], highlighted the diversity of scholarly enquiry on corporate sustainability and concluded that given the complexity and diverse nature of corporate sustainability conceptual and definitional convergence is unlikely to happen. Confirming the variety of definitions and different understandings of corporate sustainability, Bergman et al. [11] identified three conceptual types of CS and nine sub-types. There is corporate sustainability in relation to corporate responsibility; meaning either identification, or distinction of the two concepts, or their causal interdependence. There are also mono-focal definitions of corporate sustainability; CS as moral leadership, or as corporate strategy. Finally, inclusive approaches to corporate sustainability: CS as a holistic concept, as part of the renowned Triple Bottom Line, as a financial incentive, or as an indexing exercise. In 2018, Frecè and Harder [12] analyzed that “Although a plethora of alternatives exists, companies often base their sustainability efforts more or less explicitly on the definition of the Brundtland Commission”. According to the Brundtland report—the first document that introduced the “sustainable development” concept [12]—businesses are said to have a crucial role in managing the impact of population in ecosystems, resources, food security, and sustainable economies in order to decrease the pressure society places on the environment (WCED), 1987. As reported by many authors [1,13–16], the origin of the corporate sustainability concept is often linked to the Brundtland report’s definition of “sustainable development” as “development that meets the needs of the present without compromising the ability for future generations to meet their own needs”. Despite the popularity of the Brundtland’s definition, its efficacy in giving practical guidance to organizations has often been questioned. Marshall and Brown [17] explained that even though it is the definition par excellence, it fails to provide any guidance for action. Banerjee et al. [18] asserted that it is rather a slogan that emphasizes development via a capitalist notion instead of undertaking a real eco-centric approach. Frecè and Harder [12] identified the inappropriateness of transposing the definition from a socio-political context to a corporate context, highlighting how this resulted in the lack of a sound theoretical foundation, which made the concept of corporate sustainability arbitrary. In 2022, Costa et al. conducted a

literature review to integrate the different perspectives in order to broaden the understanding of the concept, on the premise that the diversity of research from the different fields has created confusion surrounding sustainability, corporate sustainability and corporate social responsibility [19].

The lack of a sound theoretical foundation and of conceptual clarity for corporate sustainability has been identified as the most important cause of unsatisfactory or ineffective actions by organizations for the betterment of society and the environment. Christen and Schmidt [20] have suggested that disagreement about the idea of sustainability results in the unsatisfactory situation that the sustainability idea is limited by arbitrariness and therefore loses its action guiding power. Through a meta-analysis of the different conceptions of sustainability, they concluded that arbitrariness is encountered on three different levels: in the designation of the subject field, in the characterization of sustainability science and consequently in providing a basis to assess policies. They provided a framework to structure an inclusive discourse on sustainability. Landrum [21] observed how everything business had done to this point would be classified as reducing unsustainability instead of creating sustainability. This inadequate approach, he argued, is primarily due to a restricted understanding of the meaning of corporate sustainability. Swarnapali [16] highlighted anecdotal evidence on how the lack of clarity over the meaning of corporate sustainability to researchers led to ambiguity in the CS field. On the same note, Salas-Zapata and Ortiz-Muñoz [8], indicated that lack of clarity entails problems for researchers since it can generate contradictory discourses which hinder operationalization and affect validity of the studies undertaken. Lack of clarity would also make it difficult to turn the discourse into decision-making actions, as well as interventions to reduce “unsustainability” [22]. Lankoski [23] identified business sustainability as an “essentially contested concept”, which hinders the achievement of a transition towards sustainability. He demonstrated how different conceptions resulted in different, at times incompatible, and yet legitimate interpretations of sustainability with significant consequences for management and outcomes. Meuer et al. [2] argued that the ambiguous impact of corporate sustainability relates to lack of clarity around the essence of CS. The lack of definitional clarity and the conflation of sustainability, corporate social responsibility, and similar terms give companies significant freedom to choose the sustainability items that best fit their corporate interests [13]. Until researchers can clearly differentiate between corporate sustainability from noncorporate sustainability practices, it will be difficult to evaluate whether firms are seriously embracing corporate sustainability objectives or simply engaging in greenwashing practices [24].

The consequences over the absence of conceptual clarity are well documented [2,8,13,16,22–24] and were made explicit at least ten years ago by Smith and Sharitz [25]: “The lack of clear definition means that there are no clear and unanimous guidelines of how companies should adopt sustainability”. Subsequently, there has been an effort in the research focus to clarify the different interpretations of corporate sustainability and to integrate the various viewpoints. However, given the complexity surrounding corporate sustainability, a variety of different approaches have been adopted. Some authors focused on defining corporate sustainability in the realm of strong sustainability versus weak sustainability (see page 10 for definitions of weak and strong sustainability), highlighting how economic activity should be bounded within environmental limits [21,26,27] or on grounding corporate sustainability in the different organizational theoretical foundations such as stakeholder theory (corporate players must look beyond profit making goals and seek positive results for all stakeholders), institutional theory (corporate players must incorporate the latest practices to increase legitimacy and survival prospects), or resource-based theory (corporate players must use resources in a way that improves effectiveness of achieving superior competitive advantage) [10]. Other authors focused on defining sustainability through an in-depth semantic and historical analysis of the different terminologies related to sustainability [28–31] or through the identification of the key elements necessary for integrating it into corporate practices [3,4,15,32,33].

It is critical to observe that despite the proliferation of remarkable studies on the concept of corporate sustainability, conclusions remain that the concept is elusive and unclear. Jeremy Caradonna, the most read author on sustainability [14], sees this broadness as enriching the debate and offering different perspectives. However, trying to solve the conceptual issue by joining increasingly different debates and by creating own unique definitions unquestionably increases confusion [34]. There is rising clamor for bringing clarity to the concept of corporate sustainability to enable better understanding and consequently more reliable implementation [2,4,13]. See Figure 1 for different approaches for analyzing CS and conclusions.

References	Objective / Approach	Conclusion
Christen & Schmidt, (2012)	Present a new meta perspective for conceptualizing sustainability to solve for the problem of arbitrariness which leads to the serious problem of the concept losing its ambition to steer action	Concludes that the problem of arbitrariness is encountered on three different levels; in the designation of the subject field, in the characterisation of sustainability science and indirectly in providing a basis to assess policies. This underlines the framework's usefulness of structuring the discourse on sustainability
Mentiel & Delgado-Ceballos, (2014)	Literature Review article to bring a better understanding to the field of Corporate Sustainability	A standardized definition of CS does not exist. CS has been conceptualized using different approaches: 1. phenomena driven analysis not framed within traditional approaches drawing conclusions within the observed phenomena, 2. Framed within organizational theories: stakeholders, resource based etc, 3 New theoretical frameworks
Lankoski, (2016)	Unpacks the contested concept of CS into three constituents: management relevant dimension, substitutability and goal orientation	Concludes that the concept of sustainability is interpreted in quite different ways, which hinders the achievement of the sustainability transition. Introduces a novel typology for categorizing conceptions of sustainability into eight basic types to improve clarity to the concept and build a common frame of reference
Ransal & Song, (2017)	Investigate the difference between Corporate Sustainability and Corporate Responsibility	Findings confirm the convergence of the two concepts and authors claim that this has confused constructs and vacated vast tracts of unexplored territory
Begman et al., (2017)	Empirical analysis of the relevant academic literature on CS using Content Configuration Analysis	The findings reveal three conceptual types and nine subtypes of CS
Hahn et al., (2017)	Illustrate the diversity of scholarly enquiry in the field of CS and the various angles that authors adopt by analysing six articles which are relevant to the subject of CS	Given the complex and diverse nature of corporate sustainability, further definitional and conceptual convergence seems unlikely to happen. Diversity of views to be celebrated as a fruitful way to foster novel insight in the field
Swamapudi, (2017)	Review of 50 articles from 2002 to 2016 summarizing the CS evolution, definitions, measures and applied theories	The findings highlight that corporate sustainability field is still evolving and then different approaches have been used to define, measure and theorize corporate sustainability. Overall, review evidences that a commonly agreed definition of sustainability is lacking.
Frecc & Harder, (2018)	Explain how the current approaches to address the definitional gaps in Corporate Sustainability are insufficient for enabling implementation in Corporate practices, by analyzing the sustainability practices of 50 companies in Switzerland	Companies often base their sustainability effort based on the definition of the Brundtland Commission, which shows conceptual problems when removed from its original context of social policies and transposed to the corporate context. Companies are more willing to engage in new norms when they are presented in specific form and with limited scope
Landrum, (2018)	Address the CS paradox: increasing appreciation of the subject versus poor improvements in the results through an integration of 22 micro and macro level models of stages of development from the literature	The various streams of literature on Corporate Sustainability are not integrated. Proposes a unified model of stage of CS that broadens the current narrowly constricted understanding of Corporate Sustainability
Sala-Zapata & Ortiz-Muñoz, (2018)	Analysis of the meanings conveyed by the concept of sustainability according to researchers. The uses that researchers make of the term sustainability were employed to reveal such meanings.	The ambiguity of the concept of sustainability is a problem faced by researcher. The existence of definitions that are not operative, diverse and some times contradictory represents a difficulty for the election of suitable concept of sustainability. The analysis identifies four uses of Sustainability: set of ecological criteria, vision of human kind, object, approach; and concludes that the meanings of the concepts are neither many nor ambiguous
Ashrafi et al., (2019)	Explore contributions of theories of the firm in explicating why and how integrating corporate social responsibility (CSR) and corporate sustainability (CS) into business strategic decisions and operation processes helps to improve the viability of corporations.	Findings corroborate the proposition that the three theories of resource-based, institutional and stakeholder could be used as the primary approach to explain corporate recognition of the need for CSR and CS, and further build a coherent platform to support corporate choice and adoption of CSR and CS in business strategy
Shah & Rahim, (2019)	Literature review to address the ambiguities of the conceptual understanding of CS	Corporate sustainability is still considered to be a vague concept and no consensus has been developed by the scholars on single definition.
Meurer et al., (2020)	Address the lack of conceptual clarity of the concept of CS by adopting the Aristotelian perspective on definitions, one that promotes reducing concepts to their essential attributes	Argues that the criticism of CS practices failing to effectively contribute to sustainable development is due to the fundamental ambiguity around the nature of corporate sustainability. Develops the CS Calve framework to compare CS definitions
Urdan & Laoma, (2020)	Clarify the elusive and complex definitions and uses of Sustainability and CSR by reviewing the nomenclature from academics, corporation, and business and society course textbooks	Sustainability and CSR are commonly and frequently used interchangeably not only in academic research and the classroom but also by textbook authors and business reports. Student work is heavily influenced by corporate terminology, which supersedes textbook, nomenclature, and classroom instruction. Call for future research to delve into the issue of clarifying the definitional complexity and conflation.

Figure 1. Overview of approaches for analyzing CS and conclusions.

2.1. Ontological Analysis of Corporate Sustainability

2.1.1. Sustainability, Sustainable Development and Corporate Sustainability

The literature on the conceptual history of “sustainability” is relatively small, but it shows a general agreement regarding its roots [14]. The origin of the sustainability discourse can be traced back to the 18th and 19th centuries in Europe, when economists started to write about the risks of forest depletion and the impact of population growth [35]. At the start of the 19th century, the protectionist and conservationist movement born in the United States, began to pay heed to the preservation of nature, as a result of the rise of romanticism, which brought attention to the appreciation of natural beauty [14]. It was only after the second world war that environmental considerations were regarded as necessary for the survival of society [36]. The book *Silent Spring* by Rachel Carson [37],

documenting the damage of pesticides on the environment, is said to have kickstarted the post war environmentalist movement [14]. The new generation of environmental activists no longer viewed the world as divided into the two distinct domains of human and nature, but rather as deeply interconnected [38]. The report *The Limits to Growth* [39] issued by the Club of Rome—a elitist club made of leading global representatives—was acclaimed for its daring conclusions that if growth trends continued at the same pace, the limits to growth on the planet would be reached within one hundred years. The report analyzed the possibility to alter the growth trend and to establish conditions for ecological and economic stability that were “sustainable” further into the future and called for immediate action. The word “sustainability” was first used in 1972 in the context of man’s future in the British book *Blueprint for Survival*, and later used by the United Nations in 1978 in the context of “eco-development” [40]. It was the World Commission on Environment and Development (WCED)’s Brundtland report titled *Our Common Future*, in 1987, which introduced the popularized term “sustainable development”. The WCED argued that economic development was necessary for improving human life and prosperity, but taxing on natural systems. The erosion of natural systems would ultimately undermine future economic and social development, as well as compromise opportunities for future generations [30].

The Brundtland report was cathartic in two ways. First, for the introduction of the concept of “sustainable development”; and second, for the introduction of social considerations in the concept of sustainability. The concept sustainable development was derived from different approaches. Some argued environmental responsibility was operationalized within companies to avoid sanctions related to environmental laws, and others argued the environmental responsibility responded to moral obligations [41]. The fundamental assumption of growth underlying economic development is challenged by sustainability scholars, who highlighted the natural limits. These scholars took issue with the predominance of financial performance and asked to consider the impact on the broader system [30]. The variety of interpretations of the concept is so wide that there were at least seventy different definitions of sustainable development by 1992 [42], which increased to over three hundred by 2007 [43]. This is perhaps due to the complexity of integrating social and environmental dimensions while still promoting economic development [14,31]. Tøllefsen et al. [14] analyzed how the concept of sustainable development has become a magic concept. Magic concepts outline common characteristics of certain buzzwords within public management and they all have four characteristics in common:

- Broadness: they have a large scope with multiple, overlapping and sometimes conflicting definitions;
- Normative Attractiveness: they have an overwhelmingly positive connotation—it is hard to be against them;
- Implication of Consensus: they deny or downplay the existence of conflicting interests; and
- Global Marketability: they are known and used by practitioners and academics [44].

Tøllefsen [14] argued that the Brundtland’s report was what made sustainability into a magic concept. While since its origin, the meaning of sustainability was monothematically associated with the environment, the Brundtland definitions included additional constituents such as social considerations and conflicting objectives such as “sustainable” and “development”. According to Rist [45], “The height of absurdity was reached when the Brundtland Commission tried to reconcile the contradictory requirements to be met in order to protect the environment and, at the same time, to ensure the pursuit of economic growth that was still considered a condition for general happiness” (p. 21). An overarching definition of sustainability remains elusive and context dependent [13]. One of the most commonly reported contradictions is the understanding of sustainability and sustainable development. Many authors [22,46–48] claim that the term is an oxymoron, since sustainable development is unsustainable from the perspective of economic growth [49]. An important contribution from Salas-Zapata and Ortiz-Muñoz [8] revealed, however, that when looking at the concept of sustainability from the perspective of its meaning, rather

than uniquely from its definitions, the concept is less ambiguous and can be employed to refer to four aspects: a set of social and ecological guiding criteria for human action, a goal of human kind, an object—meaning referents or entity that exist and can be represented—and an approach of study. “Notwithstanding the many definitions of sustainable development and the ongoing discourse, the Brundtland Report has contributed to conceptualizing the concept and forcing it to the top of the agenda of the UN and other multilayer organizations” [31]. The second groundbreaking contribution was the inclusion of social considerations into the sustainability concept, which was previously exclusively associated with environmental connotations. The concept of social responsibility had been up to that point a distinct concept from sustainability, with different roots and interpretations.

An important extension of the concept of sustainable development is the concept of corporate sustainability. Corporate sustainability is understood as the transfer of the concept of sustainable development to the corporate level [50]. Many authors documented how the definition of corporate sustainability is adopted from the concept of sustainable development as the application of sustainable development at the corporate level, including the short-term and long-term economic, environmental, and social aspect [10,16,29,31,33,50–52]. In fact, one of the most cited definitions of corporate sustainability is from Dyllick and Hockerts [53], who transposed the definition of sustainable development from the Brundtland’s report to corporate and defined corporate sustainability as “meeting the need of a firm’s direct and indirect stakeholders, without compromising its ability to meet the needs of future stakeholders as well”. In this definition, the target audience changed from “future generations” to “stakeholders” to adapt to the corporate dimension. The importance of corporate sustainability has been underscored by the United Nations’ establishment of a global association of companies and NGOs that follow the universal principles of the UN Global Compact in their activities and strategic orientations (UN 2013: 4). These defined corporate sustainability as a concept that gives a company long-term value in financial, social, environmental, and ethical terms [31].

2.1.2. Corporate Social Responsibility

The origins of corporate social responsibility (CSR) are traced to the Great Depression, embedded in the concepts of philanthropy, social give back, code of conduct, community service, and corporate managers as public trustees [54]. In a series of articles published by Yale Law Review, Berle [55] stated that responsibility could be understood as “Corporate powers equals powers in trust” for shareholders. Dodd [56] replied by asking “for whom are corporate managers trustees”, and argued that managers were statesmen to use their power for the betterment of society [29]. Due to the difficulties of the Great Depression, CSR failed to gain traction until the fifties [57]. In 1953, with his book *Social Responsibilities of the Businessman*, Howard Bowen marked the modern era of CSR [31]. By enquiring on how CSR can help business to reach the goal of social justice and economic prosperity beyond the benefits to shareholders, Bowen asserted the essential role of corporate world in the economy and in society. He highlighted how the decisions of businessmen have direct bearing on the quality of our lives. However, as individual businessmen represent only a small fraction of the economy, they fail to see how their actions relate to the broader economy. Nonetheless, if added together, the decisions of a businessman determine important matters such as the amount of employment and prosperity, the rate of economic progress, the distribution of income and the organization of industry and trade. Therefore, a businessman, by virtue of his strategic position and considerable decision-making power, is obligated to consider social consequences when making private decisions. They have social responsibilities that go beyond obligations to owners and shareholders [24]. A list of responsibilities of the businessman was proposed based on the need to take the social context into consideration at that time, and it included aspects such as: high standard of living, economic progress and stability, personal security, order and justice, freedom, development of the individual person, community improvement, national security and personal integrity. Some goals were found to be mutually conflicting, and this was addressed within the principle that businessmen should not disregard socially accepted values or

place their own values above those of society [24]. In 1960, Davis developed the “Iron Law of Responsibility”, which held that the social responsibility of businessmen needs to be commensurate with their social power. As the concept continued to develop, it was also losing any clear meaning. Votaw [58] observed how the concept could convey different ideas of legal responsibility or liability, infer socially responsible behavior in an ethical sense, imply charitable contribution, or essentially be a synonym of legitimacy. In the late fifties, the concept started to attract criticism. Theodore Levitt stressed the risk of pursuing ambiguous corporate objectives and openly raised concern [31]. This criticism was later formalized by Milton Friedman in 1970. Friedman took the opposite view of Bowen [24], did not recognize the critical role of corporates in society and affirmed that the only responsibility of a corporate is to its shareholders. He highlighted the danger of distracting managers from profit making goals and of inappropriate potential misappropriation of shareholder’s money by executive managers in the name of CSR to advance their own social and political careers [31]. However, his mostly overlooked position is that ‘increasing profit’ may only be achieved by confirming to the basic rules of society, embodied in law and ethics [29]. As a counterargument, Edward Freeman stated that a corporate main responsibility is to its stakeholders, articulating how the inclusion of stakeholders, defined as “any group or individual who can affect or is affected by the achievement of the organization’s objectives”, in strategic management can mitigate corporate risk [59]. The eighties and nineties experienced a continued shift within the CSR literature, from a focus on ethics to a performance orientation and from a macro to a micro level application, such as at the corporate level [57]. The argument of positive linkage between stakeholder interests and CSR gained ground [60–63]; and most of the research that followed supported that CSR is in a business’s long-term self-interest: the so called “enlightened self-interest” to be socially responsible [64]. The concept of corporate social performance was introduced by Ackerman [31] to refer to the capacity of a corporate to respond to social pressure. Carroll [58] articulated “the pyramid of CSR” constituted by three components: an economic one, a legal one, and an ethical-philanthropic one. The economic component indicates that society expects corporations to make a profit and in the process of pursuing profit they are expected to abide by laws established by the society’s legal system. Ethical and discretionary philanthropic components suggest a responsibility that extends beyond meeting minimum legal requirements. As an extension of the pyramid of CSR, Wood [65] explained the dimensions of the CSP model and clearly included the environmental assessments in the company’s responsiveness to society. By the end of the nineties the inclusion of environmental aspects into CSR gained widespread recognition [31]. After the articulation of the concept sustainable development by the WCED’s report, sustainable development was explicitly linked to CSR with the introduction of the Triple Bottom Line (TBL), in 1998 by John Elkington. The TBL directed corporate responsibility put emphasis on the simultaneous pursuit of economic prosperity, environmental quality, and social equity. Consequently, CSR started more actively to embrace environmental aspects [31]. In the definition of CSR provided by the European Commission, CSR was seen as covering wider responsibilities beyond solely economic aims and business obligations, and these responsibilities were summarized as social and environmental obligations [66].

Although the concepts of responsibility and sustainability have different roots, responded to different needs and emerged at different times, they both shared a common interest in the relationship between business and society and spoke to the same audience [30]. See Figure 2 for evolution of the main concepts.

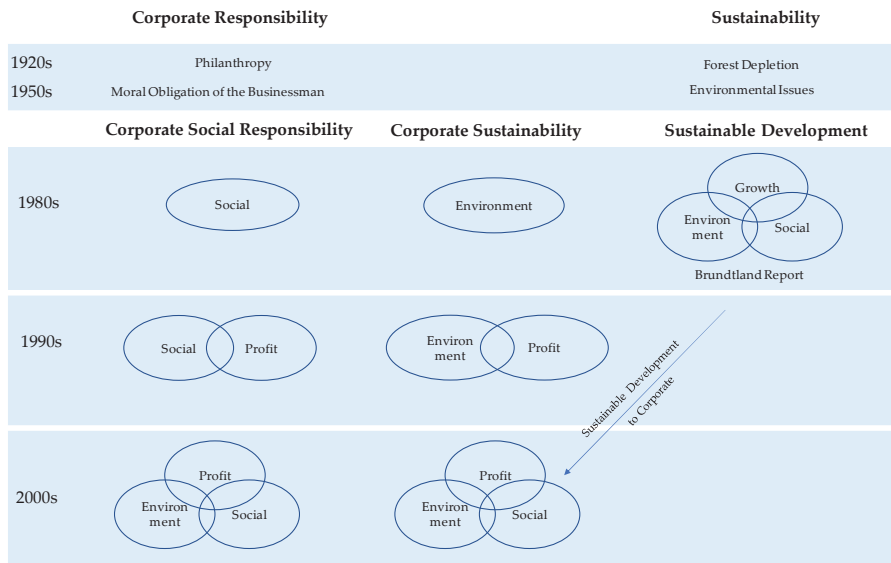


Figure 2. Evolution of the main concepts.

2.1.3. Identified Themes around the Evolution of the Concept Corporate Sustainability

Through a critical reading of the recent literature on corporate sustainability, we observe the evolution of three major themes. First, proponents of convergence in the concept corporate sustainability to include multiple components, versus skeptical authors who argue convergence is not possible. Second, a divergent view of the role of corporates in the achievement of sustainable development as a primary actor versus that of an indirect contributor. Third, there is a continued debate over the sustainability dilemma.

On the topic of the convergence versus divergence of the different dimensions of corporate sustainability, two opposite views were taken by scholars. As the issues surrounding the concept of corporate sustainability are complex and far reaching, Amini and Bienstock [4] called for an integration of the variety of different perspectives in a multidimensional and comprehensive definition of corporate sustainability. Adopting a similar view, Christen and Schmidt [20] proposed an approach that sought to integrate the various viewpoints into an inclusive definition and explanatory framework of corporate sustainability. Costa et al. created a simplified framework that sought to integrate the different perspectives in order to broaden the understanding of Corporate Sustainability [19]. At the opposite end, based on a historical perspective, philosophical analysis and on the impact of changing context and values systems, according to Marrewijk, a one-solution fits all concept of corporate sustainability is not reasonable [67,68]. On the same note, Hahn et al. [10] analyzed six papers related to corporate sustainability and observed that the different angles that the authors adopted promised important contributions. However, they concluded that given the complexity and diverse nature of the concept of CS, further definitional and conceptual convergence seemed unlikely to happen. On the integration of the different elements of sustainability and responsibility in the concept of corporate sustainability Bansal and Song [30] offered a peculiar perspective. They took the position that convergence should not be celebrated as the blurring between responsibility and sustainability has “caused confusion and stunted growth in the field”. Nonetheless, their analysis showed conceptual convergence of the two concepts in four dimensions: construct definition, ontological assumptions, nomological networks, and construct measurement. It seems that regardless of the philosophical discourse, actual convergence towards the integration of the different viewpoints and elements is already happening.

With reference to the second theme, in the same study of Bansal and Song [30], by answering the questions “what is a firm, how does it operate and who it responds to”, they observed how early responsibility researchers viewed a firm as a social actor among the various stakeholders, while early sustainability researchers saw firms as a system nested within other systems. The ontological position converged towards the end of the nineties so that both responsibility and sustainability researchers saw the firm as responsible to a broad range of demands and constituencies. Despite the claimed convergence, recent literature interprets the role of firms differently. Starting from the assumption that organizations cannot become sustainable, Frecè and Harder [12] argued that organizations simply contribute to the large system in which sustainability may or may not be achieved [69]. They propose a value-based definition of corporate sustainability that can act as a provider of guiding principles for sustainability policies to define activities that aim to “restitute and compensate”. Sheehy and Farneti [29] described how CSR refers exclusively to activities conducted by business organizations and the results from their operations, while sustainability may operate solely as a description without imposing any obligation on organizations. The extent of collaboration among social, political, and economic actors, together with the ambition of the vision and approach to integration, are said to differentiate between the weak and strong sustainability concept. O’Riordan [70] identified four worldviews of environmentalism: Gaianism, Communalism, Accommodation, and Intervention. In the first two, humans are regarded as part of nature. In the second two, humans are in control of nature. Pearce [71] notes that these four worldviews correspond to the sustainable development literature positions known as weak and strong sustainability [72]. Weak sustainability requires production to remain intact so as to satisfy human wants [46]. In weak sustainability, humans control nature and have the ability to develop technological solutions to substitute natural capital by human made capital [73]. This is a safe position that accommodates the environmental issues without renouncing economic growth and giving away power and control [70]. Strong sustainability instead, implies that economic activity is bound by environmental limits [74]. Within this view, human made capital cannot substitute natural resources, which must therefore be preserved and not utilized at a greater pace than they can be replaced [71]. The position of strong sustainability is more ambitious, values cooperation and views economic and social aspects strongly connected [70]. Strong and weak sustainability are criticized for failing to achieve sustainable development, as weak sustainability fails to conserve nature and strong sustainability fails to promote development [75]. Current corporate sustainability developments are framed around weak sustainability. This explains the lack of environmental progress despite the increasing focus on CS [21]. Corporate sustainability is focused on the business case and ignores larger global concerns, because business, not societal or ecological interests, define the parameters of sustainability [21]. This view reaffirms the critical role of corporate players in achieving sustainability. Even by adopting the best existing practices of the leading companies, the world would still be moving towards degradation [76]. This is due to a constricted view of corporate sustainability that focused on weak sustainability [75,77]. The debate over weak versus strong sustainability frames the premises over the theme of the sustainability dilemma. Many forms of development erode the environmental resources upon which they are based [20]. The dominant capitalist system has enabled humans to become somehow dominant over nature, while the future of humankind depends on preserving nature. The goals of continually maximizing profits and stimulating economic growth and consumption as a measure of prosperity and wellbeing implicitly declares human need and human created needs superior to all other things in the environment. Even intuitively, the opposite is true. The economic activity is intrinsically bound within the environmental limits. A livable planet is a precondition for humankind to continue to thrive. Within the environmental boundaries, we need a cohesive and inclusive society to organize production and consumption in order to ensure prosperity for the current and future generations [78]. The WCDE stated that the “environment does not exist as a separate sphere from human action, ambitions, and needs. The developmental and

environmental crisis are apprehended as interlocking crises". This view takes the social and the natural realm to be two interrelated systems [20]. The sustainability problem is well documented in the literature, but no attempts have been made yet to resolve them. If concepts and constructs are not defined clearly, scholars fail to build theory, communicate effectively and think creatively [79]. Further conceptual clarity is required.

3. Methodology

Concepts are an answer to the "what is" question and they are about meaning, semantic and ontology [5]. Developing valid concepts for social science involves analyzing descriptive, normative, and causal aspects, concurrently. To answer the "what is" question, one must identify the necessary and jointly sufficient conditions which constitute the defining features of the concept [5]. To look for the constitutive elements of the concept of corporate sustainability, we use the Necessary Condition Analysis (NCA) methodology brought forward by Jan Dul [9], according to which, a condition is necessary when its absence results in the absence of the phenomenon. Therefore, the condition is necessary for the presence of the phenomenon. Such hypotheses are rarely formulated and tested in organizational sciences, and are different from conventional analysis where the complex interrelation of all factors attempts to explain the presence of the outcome in a probabilistic relationship. NCA ignores the causality that predicts the presence of the outcome with a large number of factors and only makes simple theoretical statements to predict the guaranteed absence of the outcome when the condition is absent [9]. The method is intuitive and straightforward, it triggers a new way of theoretical thinking that is based on necessity logic and it works in isolation from the rest of the causal structure, that is why it is necessary [9]. When searching the constitutive features, we are not concerned with the level of presence of the condition, but with whether the condition is present or not. Therefore, in the dichotomous interpretation of Dul's [9] framework, the condition [X] and the outcome [Y] can assume only two values: absent or present. The contingency matrix, represented below, is a common way to present dichotomous necessary conditions [9]. The dashed lines are the 'ceiling lines' that separate the area with observations from the area without observations. For a condition to be necessary, the top left square requires to be empty, meaning there are no observations where the condition [X] is absent and the outcome [Y] is present, therefore the condition is necessary. Necessity does not equal sufficiency: the condition can be present, yet the outcome can be absent—bottom right square. The set of all necessary and jointly sufficient conditions constitute the concept [5]. See Figure 3.

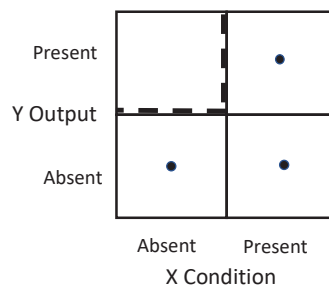


Figure 3. Contingency Matrix.

To build the hypothesis over the potential necessary conditions, we draw the data from the extensive systematic literature review performed by Meurer et al. [2] on corporate sustainability between 1983 and April 2018, which provides 101 articles. We extend the review until December 2021, with additional 31 articles for a total of 132 articles. See Figure 4. We adopted Meurer et al.'s [2] literature review, as they engaged in a similar mission of identifying the essential attributes of corporate sustainability with the aim

to provide conceptual clarity. The purpose and the selection criteria of their articles are therefore pertinent and adherent to ours.

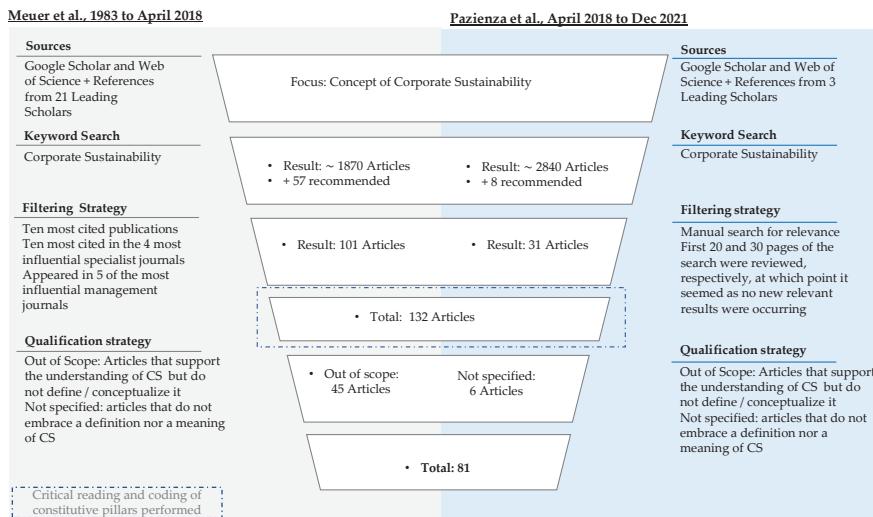


Figure 4. Data search strategy and qualification criteria.

To identify the necessary conditions of the concept of Corporate Sustainability, we focused on the ‘What’ question [9], and prescind from the ‘How’ and ‘Why’ questions. In addition, as definitions, which in the context of CS can also be contested and conflicting, transcend the required analysis over meaning and context [5,73,80–82] to build complete concepts we analyze all 132 papers, even if they do not provide a definition. To this point, for example, one of the most cited definitions of corporate sustainability is from Dyllick and Hockerts [53]: “Corporate sustainability can be defined as meeting the needs of a firm’s direct and indirect stakeholders such as shareholders, employee, clients, pressure groups, communities, etc. without compromising its ability to meet the needs of future stakeholders as well” (p. 131). When reading the full article, the authors performed a considerable amount of analysis on the natural and social capital elements of corporate sustainability, which are not mentioned in the definition. Other examples include Sterman [83]: ‘Sustainability initiatives that are framed as also helping to heal the world’ (p. 3), which does not provide any indication of what it takes to heal the world

Dul [9] suggests two ways for testing or inducing necessary conditions with the data sets of observation. Either only successful cases—where the output is present—are purposely sampled and the omni-presence of the condition is an indication of necessity, or only cases with the absence of the condition are selected and the absence of the outcome is an indication of the necessity. Given the complexity and magnitude of the concept, we adopted the first approach, and built the following framework for guiding the allocation of papers into the contingency matrix—See Figure 5.

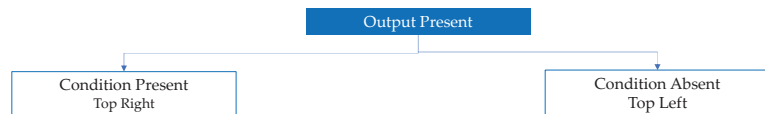
Principle 1: Based on lessons drawn from the ontological analysis, we classified a paper as ‘present output’ when CSR, business sustainability, and other similar terminologies were used as to relate to the concept of the sustainability of a corporate, and treated it as ‘absent output’ when they meant to talk about some specific without a link to the concept of corporate sustainability. For example, Dahlsrud [84], Kleine [85], and Cheng [86], use CSR as the broader terminology for corporate sustainability, and they are treated as output present. Articles such as Delmas [87], Herva [88], and Ehrenfeld [89] that meant to talk specifically about the environmental aspects of a corporate with no reference to corporate sustainability are treated as output absent. Articles that are not specifically aimed

at clarifying the concept of corporate sustainability are included as ‘present output’ when they clearly embrace a definition or a specific meaning of CS for their analysis.

Principle 2: Articles that have corporate sustainability in their discussion, but do not espouse any of the existing definition or meaning of CS are treated as ‘outcome absent’ and ‘condition absent’. This last point is necessary to allow for the reconciliation of the full number of the analyzed papers. We assume that something does not exist if its meaning is not defined or spelled out. For example, to explain corporate sustainability, Ahi [27,90], Urdan [13], and Swarnapali [16] mention a few definitions, but do not clarify which one of those will be used for their analysis, and they are therefore treated as output absent. Conversely, papers of Boiral [90] that speak of auditing practices in sustainability, or Figge [91] that talk about sustainability value added measurement, embrace a specific meaning of CS, and are treated as output present.

Principle 3: Articles that do not have CS as a core subject but are rather useful for its understanding are treated as output absent. See Figure 4 for qualification criteria.

1. Articles that have CS as a core subject and embrace a meaning or definition



2. Articles that have CS as a core subject but Do Not embrace a meaning or definition



3. Articles that do not have CS as a core subject

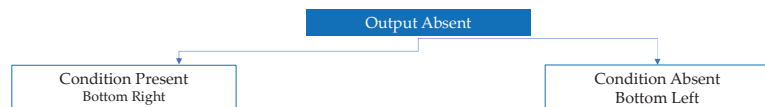


Figure 5. Framework for allocating the articles in the contingency matrix.

When looking for the constitutive features, words with similar meaning are coded within their macro, most used, terminology. For example, ecology and nature are coded within environment, profit and organizational objectives are coded within economic, and organizational culture is coded within governance.

We performed three rounds of reviews and coding, through repeated critical reading, to confirm the findings and to ensure consistency with the guidelines. The third round was performed after confirming the validity of the scoping and allocation with Professor Jan Dul.

Based on the ontological analysis of the concepts of CS as well as on the frequency of the constitutive features cited in the literature, we formulate the hypothesis as follows: Constitutive features of CS may have Environmental, Social, Economic, Governance and Time dimensions.

The environmental dimension refers to the preservation of natural resources: when the production system utilizes more energy and materials that can be reproduced and when more emissions are emitted that can be absorbed, the industrial system becomes ecologically unsustainable [92]. The social dimension refers to the corporate responsibility to achieve a balance between a firm’s economic operations and the society’s aspiration and requirements for community welfare: social responsibility occurs when business firms, through the decisions and policies of its executive leaders, consciously and deliberately act to enhance the social well-being of those whose lives are affected by the firm’s economic operations [54].

The Economic dimension refers to the viability of a company from profitability standpoint: “Economically sustainable companies guarantee at any time cashflow sufficient to ensure liquidity while producing a persistent above average return to their shareholders” [53]. The Governance dimension refers to the arrangements a company needs to establish in order to guarantee the integrity of the organization as well as the integrity of internal management processes [93]. The Time dimension refers to the ability of firms to respond to short-term financial needs without compromising theirs, or others, ability to meet their future needs [94].

4. Results & Discussion

Based on the pre-established guidelines, 81 papers qualify as output present for espousing a definition or embracing a meaning of corporate sustainability. See Figures 4 and 5. This is explained by the fact that the selected 132 papers also included articles there were simply instrumental for understanding the concept of corporate sustainability and did not necessarily express a definition or interpretation of corporate sustainability. Within these 81 papers, the dimensions of Environmental and Social are always present. This makes Environment and Social considerations necessary conditions, and therefore constitutive features of the concept of corporate sustainability. There are three papers where the outcome of CS is present and the aspect of ‘Economic’ was not explicitly mentioned as a constitutive feature. Additionally, the findings show that Time and Governance are not necessary conditions of the concept of CS, as, respectively, 65 and 76 papers define corporate sustainability without consideration to the Time and Governance dimensions. See Figure 6 for results.

Environment	Social	Economic	Time	Governance
81	81	78	16	5

Figure 6. Number of articles that mention a specific pillar as constitutive to the concept of CS.

Contingency matrixes are presented in Figure 7. Since we adopted the approach of selecting and analyzing cases with positive outputs, the bottom part of the contingency matrix is theoretically not relevant. Nonetheless, we report the findings for completeness of information. The list of the 132 papers with reference to the identified constitutive features can be found in the Supplementary Material.

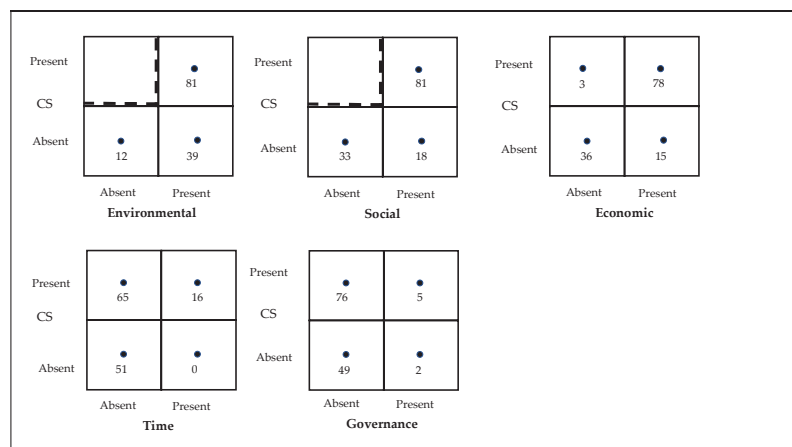


Figure 7. Contingency matrixes outputs.

That the environmental dimension of the concept of corporate sustainability is a necessary condition is perhaps of no surprise. As observed in the historical evolution, the concept was clearly born out of environmental considerations, and consistently carries

this dimension through until today. It is of interest, however, to observe how the social dimension, which is typical of the concept corporate social responsibility, has become a necessary condition of corporate sustainability, cementing the convergence of the concepts of responsibility and sustainability. Based on the findings, to be sustainable, corporates need to jointly consider environmental and social issues. The results over the Economic dimension need deeper consideration. It cannot be disregarded that 78 out of 81 papers regard Economic as a necessary condition. The famous three pillars of the Triple Bottom Line are very well known to include the Economic dimension. The Brundtland report, which launched the concept of sustainable development, put economic development at the core of the concept. The absence of Economics in a limited number of articles can be explained by a few factors. With the foundation of the Global Reporting Index, an international organization that promotes standardization of sustainability reporting, the ESG (Environmental, Social, Governance) approach was developed. The GRI took it as a given that companies need to be financially viable if they want to survive, and for this reason replaced the Economic dimension with the Governance dimension [93]. Since then, it has become popular within some corporates to report corporate sustainability in terms of ESG, especially after the support received by the UN “Principles for Responsible Investment”, whose members voluntarily commit to consider ESG criteria in their investment decision and to align the reporting practice accordingly. Nonetheless, the GRI themselves include Economic guidelines in their universal standard for reporting corporate sustainability (GRI 201 to GRI 207), confirming the centrality of this dimension in the concept of corporate sustainability. Furthermore, we argue that some authors focused on defining the ‘sustainability’ aspect of CS taking the Economic one as a given attribute of the definition of corporate operations. Specifically, the papers that do not mention Economic as a constitutive features of CS are: Kim and Lyon [95] who used ESG; Griffiths and Petrick [96], who investigated which organizational architectures can best facilitate the implementation of ecological and human sustainability, concerning with the new aspects of sustainability; and Cheng [86], who reported the definition of the European Commission, (2001) in the Green Report: “voluntary integration of social and environmental concerns in the companies’ operations and in the interaction with stakeholders” (p. 2). The same report, however, clearly cites in multiple parts of the document the centrality of the Economic dimension. The same definition is, in fact, reported by Van Marrewijk [68] with extensive analysis and inclusion of the Economic dimension.

In the literature, the Economic dimension has been defined/treated within three connotations: 1. The need to be profitable, 2. The need to reduce short term maximization of profits for the benefit of longer-term benefits, and 3. The impact of the Economic dimension on the Environmental and Social ones. The need to be profitable is intrinsic in the concept of a corporate entity—without sustained profits—a company ceases to exist. If a company ceases to exist, there are no longer Environmental and Social considerations associated to a corporate. The need to reduce short term profit maximization for longer term benefits and durability is at the very core of the Brundtland definition that started the concept of sustainable development, where environmental and social needs were counterposed to the need of guaranteeing human wellbeing through economic growth, both for the current and future generations. This states the centrality of the Economic dimension. On this note, it is important to clarify that within the concept of Corporate Sustainability, the Economic dimension is not and should not be associated with the traditional connotation of profit maximization, but with the notion of sustained profitability, which enables organizations to survive in the future. The third understanding relates to the sustainability dilemma, which indicates the unbound equilibrium between conflicting goals of economic growth with environmental and social preservation. Without the goal of profitability, environmental and social preservation become easier tasks. However, if without profitability the company ceases to exist and there is no longer damage done to the environment and society, therefore the Environmental and Social dimensions from a corporate standpoint are no longer applicable. In addition, equally to traditional statistical analysis where there is a tolerance

for a 5% deviation, NCA allows for explainable outliers. Our deviation falls within the usual 5% level. In view of the explainable outliers and based on the normative analysis of the Economic dimension, we judiciously include the Economic dimension within the set of necessary conditions.

The dimension of Governance and Time clearly do not appear as a constitutive feature of corporate sustainability, and the respective hypothesis are therefore rejected. In fact, we argue that, although some authors specifically indicated them as foundational to the concept, Governance pertains to the realm of 'How' to implement corporate sustainability and Time pertains to the realm of 'Why' it is convenient or necessary to implement CS practices. Governance is a set of rules, practices, and processes, used to direct and manage a company. Governance is one of the organizational tools that can be used for enabling the implementation of CS practices, and it is an enabler rather than an end goal. The Time dimension explains the need to sustain the economic results, environmental protection, and social responsibility, as further as possible in the future. It responds to the question 'why' by clearly spelling out the importance of retaining the capability of satisfying the needs of the future generation: we need to implement CS practices to give future generations access to the same benefits as ours. It has been referenced in some of the articles as "leading a desirable future state for all stakeholders" [97], "intergenerational fairness" [75], "protecting, sustaining, and enhancing the human and natural resources that will be needed in the future" [52], and "resources must be distributed at macro levels across time" [94]. The Time dimension offers the purpose of corporate sustainability. Arguably the generally limited emphasis in the literature on the Time dimension, not necessarily as a constitutive feature, can be interpreted as one of the root causes of the CS business paradigm not living up to its promises. Losing sight of the purpose and therefore of the reasons whereby transformation is needed can cause delays and complacency with the status-quo.

What Is Corporate Sustainability?

Based on the ontological and NCA analysis, it is acceptable to conclude that the concept of corporate sustainability is made of the Environmental, Social and Economic pillars and that corporate sustainability is a new business paradigm that requires attention to Environmental, Social and Economic dimensions to be able to provide for current and future generations. We claim, the presence of the identified constitutive pillars are not only necessary but also jointly sufficient on the basis that no other constitutive pillars were found in the analysis of the academic literature of the last 30+ years. Furthermore, the necessity of the identified conditions implies no substitutability between them. This means that, greater attention to one dimension cannot compensate for the absence another. Each one of the three determinants must be in place, as there is no additive causality that can compensate for the absence of a necessary cause. Necessary causality is expressed as a multiplicative phenomenon [5]. $CS = Environment \times Social \times Economic$. If one dimension goes to zero, CS becomes zero, and it is therefore absent.

Based on this finding, we can observe that when we look at the defining feature of corporate sustainability: the 'What'; and transcend from the 'How' and 'Why', the concept of corporate sustainability is not controversial, nor unclear, but rather well defined over the three pillars of Economic, Environmental and Social dimensions. Establishing this clarity over the concept of corporate sustainability is extremely important as the alleged absence of common understanding of what CS is, has been indicated as hindering its implementation and its measurability. Although the results may seem trivial, they address the continued claim of lack of clarity over the concept of corporate sustainability and call for researchers to find alignment towards what has already been achieved: convergence on 'What' is corporate sustainability and focus future research on what it still is a source of confusion and contention which is 'How' to integrate corporate sustainability and perhaps 'Why'. The "How" is particularly problematic, as it requires a paradigm shift of the way managers conduct and conceive business, of the way corporate players are organized and perform, of the way results are understood and reported, as well as analysis is conducted

over the unresolved issues regarding trade-offs between its elements. Starting from the now clearly defined concept of corporate sustainability research should focus on 'How' to implement and how to measure it to facilitate its integration into business practices. Possible observation over the lack of novelty of the results, in fact, reinforces the argument that the convergence of the concept over its constitutive pillars is established.

5. Conclusions

Literature on corporate sustainability has increased considerably in the last two decades, confirming the importance of the concept as a paradigm shift in the way we conduct business and understand the relations between production, society and the environment. Despite the increasing contribution toward clarifying the concept of corporate sustainability, conclusions continue to be drawn that the concept is still elusive and unclear, and therefore open to interpretation in its applicability. We conducted an ontological analysis of the concepts of sustainability, corporate social responsibilities and corporate sustainability and showed how the concepts have converged to include the Environmental, Social and Economic dimensions. Furthermore, to look for the constitutive pillars of corporate sustainability, we performed a Necessary Condition Analysis, which looks at the constant presence of the condition (the constitutive element) in the presence of output (the concept). We built the hypothesis around the Environmental, Social, Economic, Governance and Time dimensions and demonstrated that the concept of corporate sustainability is clearly constructed around the Environmental, Social and Economic dimensions. We explained how the lack of clarity is rather related to the methodologies for integrating CS into company's operations, of which Governance is an important enabler. We highlighted how the literature has lost sight of the Time dimension, which provides the purpose of CS and explains the reason and the urgency for systematically applying CS practices in the business world. To make corporate sustainability effective we do need to look at 'Why CS is important'. This is not always been clearly or sufficiently specified in the literature and it is critical to achieve a system wide sustainability. We, therefore, defined corporate sustainability as the new business paradigm that requires attention to Environmental, Social and Economic dimensions to be able to provide for current and future generations. The utilization of the NCA methodology is new and brings a new theoretical foundation to the concept as well as scientific evidence over its constitutive features. We call for researchers to refrain from further developing novel interpretations of corporate sustainability, which would continue to increase confusion over the concept, and to focus on the area that require attention and additional contribution, which is how to implement corporate sustainability. The performed analysis is simple, the results straightforward, and the observed conclusions important. To further validate the findings, we suggest performing the analysis to include empirical practices along with the theoretical underpinning. Future research focus can also be on the meaning and definition of the environmental, social and economic pillars, as they are pluriform and multidimensional; as well as their measurability, which is a key enabler for integration and accountability.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su14137838/s1>, Table S1: List of 132 articles with coding of corporate sustainability.

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References

- Montiel, I.; Delgado-Ceballos, J. Defining and Measuring Corporate Sustainability: Are We There Yet? *Organ. Environ.* **2014**, *27*, 113–139. [[CrossRef](#)]
- Meuer, J.; Koelbel, J.; Hoffmann, V.H. On the Nature of Corporate Sustainability. *Organ. Environ.* **2020**, *33*, 319–341. [[CrossRef](#)]
- Sanchez-Planelles, J.; Segarra-Oña, M.; Peiro-Signes, A. Building a Theoretical Framework for Corporate Sustainability. *Sustainability* **2020**, *13*, 273. [[CrossRef](#)]
- Amini, M.; Bienstock, C.C. Corporate Sustainability: An Integrative Definition and Framework to Evaluate Corporate Practice and Guide Academic Research. *J. Clean. Prod.* **2014**, *76*, 12–19. [[CrossRef](#)]
- Goertz, G. Social Science Concepts and Measurement. Available online: <https://press.princeton.edu/books/hardcover/9780691205465/social-science-concepts-and-measurement> (accessed on 16 May 2022).
- Mill, J.S. *A System of Logic: Ratiocinative and Inductive*; Originally Published in 1843; University Press of the Pacific: Honolulu, HI, USA, 2002; p. 622.
- Cohen, M.; Nagel, E. An Introduction to Logic and Scientific Method. *Nature* **1935**, *135*, 51. [[CrossRef](#)]
- Salas-Zapata, W.A.; Ortiz-Muñoz, S.M. Analysis of Meanings of the Concept of Sustainability. *Sustain. Dev.* **2019**, *27*, 153–161. [[CrossRef](#)]
- Jan Dul—Necessary Condition Analysis—Erasmus Research Institute of Management—ERIM. Available online: <https://www.erim.eu.nl/necessary-condition-analysis/personal-pages/jan-dul/> (accessed on 16 May 2022).
- Editorial, G.; Hahn, T.; Figge, F.; Alberto Aragón-Correa, J.; Sharma, S. Advancing Research on Corporate Sustainability: Off to Pastures New or Back to the Roots? *Bus. Soc.* **2017**, *56*, 155–185. [[CrossRef](#)]
- Bergman, M.M.; Bergman, Z.; Berger, L. An Empirical Exploration, Typology, and Definition of Corporate Sustainability. *Sustainability* **2017**, *9*, 753. [[CrossRef](#)]
- Frecè, J.T.; Harder, D.L. Organisations beyond Brundtland: A Definition of Corporate Sustainability Based on Corporate Values. *J. Sustain. Dev.* **2018**, *11*, 184. [[CrossRef](#)]
- Urdan, M.S.; Luoma, P. Designing Effective Sustainability Assignments: How and Why Definitions of Sustainability Impact Assignments and Learning Outcomes. *J. Manag. Educ.* **2020**, *44*, 794–821. [[CrossRef](#)]
- Tøllefsen, T. Sustainability as a “Magic Concept”. Available online: <https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=11308354&AN=150379838&h=71Rq6kCmpF%2fv8SOKgJ5At%2f6SR1mu%2be4UPCLL6jTUoCsMZoj%2fBOfM3EerTJWIBIYjLhZsdKVAPYez49hV5xj5A%3d%3d&cr=c&resultNs=AdminWebAuth&resultLocal=ErrCrINotAuth&crhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d11308354%26AN%3d150379838> (accessed on 16 May 2022).
- Kantabutra, S.; Ketprapakorn, N. Toward a Theory of Corporate Sustainability: A Theoretical Integration and Exploration. *J. Clean. Prod.* **2020**, *270*, 122292. [[CrossRef](#)]
- Swarnapali, R. Corporate Sustainability: A Literature Review. 2017. Available online: https://www.researchgate.net/publication/317428267_Corporate_sustainability_A_Literature_review (accessed on 16 May 2022).
- Pdxscholar, P.; Marshall, S.; Brown, D.; Marshall, R.; Brown, D. The Strategy of Sustainability: A Systems Perspective on Environmental Initiatives. *Calif. Manag. Rev.* **2003**, *46*, 101–126.
- Banerjee, S.B. Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature. *Organ. Stud.* **2003**, *24*, 143–180. [[CrossRef](#)]
- Costa, A.J.; Curi, D.; Bandeira, A.M.; Ferreira, A.; Tomé, B.; Joaquim, C.; Santos, C.; Góis, C.; Meira, D.; Azevedo, G.; et al. Literature Review and Theoretical Framework of the Evolution and Interconnectedness of Corporate Sustainability Constructs. *Sustainability* **2022**, *14*, 4413. [[CrossRef](#)]
- Christen, M.; Schmidt, S. A Formal Framework for Conceptions of Sustainability—A Theoretical Contribution to the Discourse in Sustainable Development. *Sustain. Dev.* **2012**, *20*, 400–410. [[CrossRef](#)]
- Landrum, N.E. Stages of Corporate Sustainability: Integrating the Strong Sustainability Worldview. *Organ. Environ.* **2018**, *31*, 287–313. [[CrossRef](#)]
- Bolis, I.; Morioka, S.N.; Sznclwar, L.I. When Sustainable Development Risks Losing Its Meaning. Delimiting the Concept with a Comprehensive Literature Review and a Conceptual Model. *J. Clean. Prod.* **2014**, *83*, 7–20. [[CrossRef](#)]
- Lankoski, L. Alternative Conceptions of Sustainability in a Business Context. *J. Clean. Prod.* **2016**, *139*, 847–857. [[CrossRef](#)]
- Bowen, H. *Social Responsibilities of the Businessman*, 1st ed.; Harper: New York, NY, USA, 1953.
- Smith, P.A.C.; Sharic, C. The Shift Needed for Sustainability. *Learn. Organ.* **2011**, *18*, 73–86. [[CrossRef](#)]
- Nikolaou, I.E.; Tsalis, T.A.; Evangelinos, K.I. A Framework To Measure Corporate Sustainability Performance A Strong Sustainability-Based View of Firm. *Sustain. Prod. Consum.* **2019**, *18*, 1–18. [[CrossRef](#)]
- Ahi, P.; Searcy, C.; Jaber, M.Y. A Quantitative Approach for Assessing Sustainability Performance of Corporations. *Ecol. Econ.* **2018**, *152*, 336–346. [[CrossRef](#)]

28. Jerónimo Silvestre, W.; Antunes, P.; Leal Filho, W. The Corporate Sustainability Typology: Analysing Sustainability Drivers and Fostering Sustainability at Enterprises. *Technol. Econ. Dev. Econ.* **2018**, *24*, 513–533. [\[CrossRef\]](#)
29. Sheehy, B.; Farneti, F. Corporate Social Responsibility, Sustainability, Sustainable Development and Corporate Sustainability: What Is the Difference, and Does It Matter? *Sustainability* **2021**, *13*, 5965. [\[CrossRef\]](#)
30. Bansal, P.; Song, H.C. Similar But Not the Same: Differentiating Corporate Sustainability from Corporate Responsibility. *Acad. Manag. Ann.* **2016**, *11*, 105–149. [\[CrossRef\]](#)
31. Ashrafi, M.; Magnan, G.M.; Adams, M.; Walker, T.R. Understanding the Conceptual Evolutionary Path and Theoretical Underpinnings of Corporate Social Responsibility and Corporate Sustainability. *Sustainability* **2020**, *12*, 760. [\[CrossRef\]](#)
32. Schrippe, P.; Ribeiro, J.L.D. Preponderant Criteria for the Definition of Corporate Sustainability Based on Brazilian Sustainable Companies. *J. Clean. Prod.* **2019**, *209*, 10–19. [\[CrossRef\]](#)
33. Lozano, R. Addressing Stakeholders and Better Contributing to Sustainability through Game Theory. Available online: https://www.academia.edu/1514216/Addressing_Stakeholders_and_Better_Contributing_to_Sustainability_through_Game_Theory (accessed on 16 May 2022).
34. Farley, H.M.; Smith, Z.A. *Sustainability: If It's Everything, Is It Nothing?* 2nd ed.; Series: Critical Issues in Global Politics; Abingdon; Oxon: New York, NY, USA, 2020; ISBN 9781351124928.
35. Grober, U. *Sustainability: A Cultural History*; UIT Cambridge Ltd.: Chicago, IL, USA, 2012; ISBN 9780857840462.
36. Robinson, J. Squaring the Circle? Some Thoughts on the Idea of Sustainable Development. *Ecol. Econ.* **2004**, *48*, 369–384. [\[CrossRef\]](#)
37. Lozano, R. Proposing a Definition and a Framework of Organisational Sustainability: A Review of Efforts and a Survey of Approaches to Change. *Sustainability* **2018**, *10*, 1157. [\[CrossRef\]](#)
38. Johnson, E.W.; Greenberg, P. The US Environmental Movement of the 1960s and 1970s: Building Frameworks of Sustainability. In *Routledge Handbook of the History of Sustainability*; Routledge: Abingdon, UK, 2017; pp. 137–150. [\[CrossRef\]](#)
39. Meadows, D.H.; Meadows, D.L.; Randers, J.; Behrens, W.; Club of Rome; Potomac Associates. *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*; Potomac Associates: Washington, DC, USA, 1974; ISBN 0876639015.
40. Kidd, C.V. The Evolution of Sustainability. *J. Agric. Environ. Ethics* **1992**, *5*, 1–26. [\[CrossRef\]](#)
41. Andrushkiv, B.; Melnyk, L.; Palianytsia, V.; Sorokivska, O.; Sherstiuk, R. Prospects for Implementation of Corporate Environmental Responsibility Concept: The Eu Experience for Ukraine. *Indep. J. Manag. Prod.* **2020**, *11*, 600. [\[CrossRef\]](#)
42. Carson, R. *Silent Spring*; Smithsonian Institution: Washington, DC, USA, 1962.
43. Johnston, P.; Everard, M.; Santillo, D.; Robert, K.H. Reclaiming the Definition of Sustainability (7 Pp). *Environ. Sci. Pollut. Res. Int.* **2007**, *14*, 60–66. [\[CrossRef\]](#)
44. Pollitt, C.; Hupe, P. Talking About Government. *Publ. Cover. Public Manag. Rev.* **2011**, *13*, 641–658. [\[CrossRef\]](#)
45. Rist, G.D. As a buzzword. In *Deconstructing Development Discourse Buzzwords and Fuzzwords*, 21st ed.; Cornwall, A., Eade, D., Eds.; Oxfam GB: Oxford, UK, 2010.
46. Daly, H.E. Steady-State Economics versus Growthmania: A Critique of the Orthodox Conceptions of Growth, Wants, Scarcity, and Efficiency. Available online: <https://www.jstor.org/stable/4603736> (accessed on 16 May 2022).
47. Mebratu, D. Sustainability and Sustainable Development: Historical and Conceptual Review. *Environ. Impact Assess. Rev.* **1998**, *18*, 493–520. [\[CrossRef\]](#)
48. Redclift, M. Sustainable Development (1987-2005): An Oxymoron Comes of Age. *Sustain. Dev.* **2005**, *13*, 212–227. [\[CrossRef\]](#)
49. Sarkar, S.; Searcy, C. Zeitgeist or Chameleon? A Quantitative Analysis of CSR Definitions. *J. Clean. Prod.* **2016**, *135*, 1423–1435. [\[CrossRef\]](#)
50. Roblek, V.; Bach, M.P.; Meško, M.; Kresal, F. Corporate Social Responsibility and Challenges for Corporate Sustainability in First Part of the 21st Century. *Cambio. Riv. Sulle Trasformazioni Soc.* **2020**, *10*, 31–46. [\[CrossRef\]](#)
51. Dyllick, T.; Muff, K. Clarifying the Meaning of Sustainable Business: Introducing a Typology From Business-as-Usual to True Business Sustainability. *Organ. Environ.* **2016**, *29*, 156–174. [\[CrossRef\]](#)
52. Steurer, R.; Langer, M.E.; Konrad, A.; Martinuzzi, A. Corporations, Stakeholders and Sustainable Development I: A Theoretical Exploration of Business–Society Relations. *J. Bus. Ethics* **2005**, *61*, 263–281. [\[CrossRef\]](#)
53. Dyllick, T.; Hockerts, K. Beyond the Business Case for Corporate Sustainability. *Bus. Strategy Environ.* **2002**, *11*, 130–141. [\[CrossRef\]](#)
54. Frederick, W.C. *Corporation, Be Good!: The Story of Corporate Social Responsibility*; Dog Ear Publishing: Indianapolis, IN, USA, 2006; ISBN 1598581031.
55. Berle, A.A. Corporate Powers as Powers in Trust. *Harv. Law Rev.* **1931**, *44*, 1049. [\[CrossRef\]](#)
56. Dodd, E.M. For Whom Are Corporate Managers Trustees? *Harv. Law Rev.* **1932**, *45*, 1145. [\[CrossRef\]](#)
57. Carroll, A.B.; Shabana, K.M. The Business Case for Corporate Social Responsibility: A Review of Concepts, Research and Practice. *Int. J. Manag. Rev.* **2010**, *12*, 85–105. [\[CrossRef\]](#)
58. Carroll, A.B. Corporate Social Responsibility: Evolution of a Definitional Construct. *Bus. Soc.* **1999**, *38*, 268–295. [\[CrossRef\]](#)
59. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Pitman: Boston, MA, USA, 1984.
60. Griffin, J.J.; Mahon, J.F. The Corporate Social Performance and Corporate Financial Performance Debate: Twenty-Five Years of Incomparable Research. *Bus. Soc.* **1997**, *36*, 5–31. [\[CrossRef\]](#)
61. Waddock, S.A.; Graves, S.B. The Corporate Social Performance–Financial Performance Link. *Strateg. Manag. J.* **1997**, *18*, 303–319. [\[CrossRef\]](#)

62. Margolis, J.D.; Walsh, J.R.; Adler, P.; Aldrich, H.; Andreasen, A.; Austin, J.; Behling, C.; Cohen, M.; Dolan, B.; Gentile, M.; et al. Misery Loves Companies: Rethinking Social Initiatives by Business. *Adm. Sci. Q.* **2003**, *48*, 268–305. [\[CrossRef\]](#)
63. Orlitzky, M.; Schmidt, F.L.; Rynes, S.L. Corporate Social and Financial Performance: A Meta-Analysis. *Organ. Stud.* **2003**, *24*, 403–411. [\[CrossRef\]](#)
64. Baumol, W.J. Enlightened Self-Interest and Corporate Philanthropy. In *A New Rationale for Corporate Social Policy*; Committee for Economic Development: New York, NY, USA, 1970; pp. 3–19.
65. Wood, D.J. Corporate Social Performance Revisited. *Acad. Manag. Rev.* **1991**, *16*, 691. [\[CrossRef\]](#)
66. European Commission. *Corporate Social Responsibility Main Issues*; Office for Official Publications of the European Communities: Brussels, Belgium, 2002; Available online: [https://www.europarl.europa.eu/meetdocs/committees/deve/20020122/com\(2001\)366_en.pdf](https://www.europarl.europa.eu/meetdocs/committees/deve/20020122/com(2001)366_en.pdf) (accessed on 16 May 2022).
67. van Marrewijk, M.; Werre, M. Multiple Levels of Corporate Sustainability. *J. Bus. Ethics* **2003**, *44*, 107–119. [\[CrossRef\]](#)
68. van Marrewijk, M. Concepts and Definitions of CSR and Corporate Sustainability: Between Agency and Communion. *J. Bus. Ethics* **2003**, *44*, 95–105. [\[CrossRef\]](#)
69. Jennings, P.D.; Zandbergen, P.A. Ecologically Sustainable Organizations: An Institutional Approach. *Acad. Manag. Rev.* **1995**, *20*, 1015–1052. [\[CrossRef\]](#)
70. O’Riordan, T. The Challenge for Environmentalism. In *New Models in Geography*, 1st ed.; Peet, R., Thrift, N., Eds.; Unwin Hyman: London, UK, 1989.
71. Pearce, D.; Turner, R.K.; Riordan, T.O.; Atkinson, G. *Blueprint 3: Measuring Sustainable Development*; Earthscan: London, UK, 1993; ISBN 9781853831836.
72. Roome, N.J. Looking Back, Thinking Forward: Distinguishing between Weak and Strong Sustainability. *Oxf. Handb. Bus. Nat. Environ.* **2012**, *620*–629.
73. Ott, K.; Muraca, B.; Baatz, C. Strong Sustainability as a Frame for Sustainability Communication. In *Sustainability Communication*; Springer: Dordrecht, The Netherlands, 2011; pp. 13–25. [\[CrossRef\]](#)
74. Hediger, W. Reconciling “Weak” and “Strong” Sustainability. *Int. J. Soc. Econ.* **1999**, *26*, 1120–1144. [\[CrossRef\]](#)
75. Gladwin, T.N.; Kennelly, J.J.; Krause, T.-S. Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *Acad. Manag. Rev.* **1995**, *20*, 874. [\[CrossRef\]](#)
76. Hawken, P. *The Ecology of Commerce: A Declaration of Sustainability*; Harper Business: New York City, NY, USA, 1993; Volume 11, ISBN 0887306551.
77. Shrivastava, P. Environmental Technologies and Competitive Advantage. *Strateg. Manag. J.* **1995**, *16*, 183–200. [\[CrossRef\]](#)
78. Schoenmaker, D.; Schramade, W. Principles of Sustainable Finance. Available online: <https://global.oup.com/academic/product/principles-of-sustainable-finance-9780198869818?lang=en&ccc=nl> (accessed on 16 May 2022).
79. Suddaby, R. Editor’s Comments: Construct Clarity in Theories of Management and Organization. *Acad. Manag. Rev.* **2010**, *35*, 346–357.
80. Dobson, A. Environment Sustainable: An Analysis and a Typology. *Environ. Politics* **1996**, *5*, 401–428. [\[CrossRef\]](#)
81. Chalmers, A.F.; Alan, F. *What Is This Thing Called Science?* Hackett Publishing: Cambridge, MA, USA, 1999; ISBN 9780335201099.
82. Hjørland, B. Concept Theory. *J. Am. Soc. Inf. Sci. Technol.* **2009**, *60*, 1519–1536. [\[CrossRef\]](#)
83. Sterman, J.; Amengual, M.; Gibbons, R.; Gulati, R.; Henderson, R.; Jay, J.; Keith, D.; King, A.; Lyeis, J.; Reppenning, N.; et al. Stumbling towards Sustainability. *Lead. Sustain. Chang.* **2015**, 50–80. Available online: <https://www.hbs.edu/faculty/Shared%20Documents/conferences/2013-change-and-sustainability/Sterman.pdf> (accessed on 12 February 2022).
84. Dahlsrud, A. How Corporate Social Responsibility Is Defined: An Analysis of 37 Definitions. *Corp. Soc. Responsib. Environ. Manag.* **2008**, *15*, 1–13. [\[CrossRef\]](#)
85. Kleine, A.; von Hauff, M. Sustainability-Driven Implementation of Corporate Social Responsibility: Application of the Integrative Sustainability Triangle. *J. Bus. Ethics* **2009**, *85*, 517–533. [\[CrossRef\]](#)
86. Cheng, B.; Ioannou, I.; Serafeim, G. Corporate Social Responsibility and Access to Finance. *Strat. Manag. J.* **2014**, *35*, 1–23. [\[CrossRef\]](#)
87. Delmas, M.A.; Toffel, M.W. Organizational Responses to Environmental Demands: Opening the Black Box. *Strateg. Manag. J.* **2008**, *29*, 1027–1055. [\[CrossRef\]](#)
88. Herva, M.; Franco, A.; Carrasco, E.F.; Roca, E. Review of Corporate Environmental Indicators. *J. Clean. Prod.* **2011**, *19*, 1687–1699. [\[CrossRef\]](#)
89. Ehrenfeld, J.; Hoffman, A.J. *Flourishing: A Frank Conversation about Sustainability*; Stanford University Press: Redwood City, CA, USA, 2013; ISBN 9780804784146.
90. Boiral, O.; Gendron, Y. Sustainable Development and Certification Practices: Lessons Learned and Prospects. *Bus. Strategy Environ.* **2011**, *20*, 331–347. [\[CrossRef\]](#)
91. Figge, F.; Hahn, T. Sustainable Value Added—Measuring Corporate Contributions to Sustainability beyond Eco-Efficiency. *Ecol. Econ.* **2004**, *48*, 173–187. [\[CrossRef\]](#)
92. Ayres, R.U.; van den Bergh, J.C.J.M.; Gowdy, J.M. Strong versus Weak Sustainability: Economics, Natural Sciences, and Consilience. *Environ. Ethics* **2001**, *23*, 155–168. [\[CrossRef\]](#)
93. Beckmann, M.; Hielscher, S.; Pies, I. Commitment Strategies for Sustainability: How Business Firms Can Transform Trade-Offs Into Win-Win Outcomes. *Bus. Strategy Environ.* **2014**, *23*, 18–37. [\[CrossRef\]](#)

94. Bansal, P.; DesJardine, M. Business Sustainability: It Is about Time. *Strateg. Organ.* **2014**, *12*, 70–78. [[CrossRef](#)]
95. Kim, E.H.; Lyon, T.P. Greenwash vs. Brownwash: Exaggeration and Undue Modesty in Corporate Sustainability Disclosure. *Organ. Sci.* **2015**, *26*, 705–723. [[CrossRef](#)]
96. Griffiths, A.; Petrick, J.A. Corporate Architectures for Sustainability. *Int. J. Oper. Prod. Manag.* **2001**, *21*, 1573–1585. [[CrossRef](#)]
97. Funk, K. Sustainability and Performance. *MIT Sloan Manag. Rev.* **2003**, *44*, 65–70.

Article

Characterization of CSR, ESG, and Corporate Citizenship through a Text Mining-Based Review of Literature

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Abstract: As the social and environmental roles of companies have been emphasized by various stakeholders, the concepts of CSR (corporate social responsibility), ESG (environmental, social, governance), and corporate citizenship have received a great deal of attention in academia and industry. To understand and distinguish corporate responsibility approaches in the literature, this study employs text mining techniques to comprehensively analyze the summary information of 1235 articles (i.e., title, abstract, and keywords) on CSR, ESG, and corporate citizenship. First, frequently occurring terms in text datasets related to CSR, ESG, and corporate citizenship are analyzed to extract conceptual commonalities and differences. Then, correlated topic modeling is applied to the collected text datasets to identify underlying topics widely discussed in CSR, ESG, and corporate citizenship related studies. The results of this study show that corporate citizenship is not only a high-level concept that encompasses ESG and CSR, but also a broad concept with missions that are associated with various societal areas. The findings from this study also reveal that employees, as the principal agents of corporate citizenship practice, are more critical than other stakeholders of corporate citizenship practice.

Keywords: corporate citizenship; CSR; ESG; text mining; correlated topic modeling

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1. Introduction

Recently, the concept of corporate citizenship that discusses corporate responsibilities and roles has received increasing attention from academia and corporate leaders. Corporate citizenship has been conceptualized with various definitions in the literature. For example, corporate citizenship was addressed as the fulfillment of responsibilities for four faces (i.e., economic, legal, ethical, and philanthropic faces) [1], the extent to which companies satisfy economic, legal, ethical, and discretionary responsibilities associated with stakeholders [2], understanding and managing an organization to minimize negative and maximize positive societal impacts [3], and connecting corporate activities to social accountability for mutual benefits [4].

Although the concepts of corporate citizenship in the literature have subtle differences across the definitions, they are generally related to concepts such as *social responsiveness*, *social contribution*, *sustainability*, and *relationship* [5–7]. However, these concepts require further clarification for companies and amplify the abstract conceptualization of corporate citizenship. This hampers companies to successfully implement the role of corporate citizenship for various stakeholders. Moreover, other corporate values closely associated with corporate citizenship such as CSR (Corporate Social Responsibility), sustainable management, ESG (Environmental, Social, and Governance), social value [8] make understanding corporate citizenship more difficult in companies.

Nowadays corporate citizenship has become an integral part of doing business that can be seen as a broad spectrum of business roles in societies beyond existing approaches such as sustainability, CSR, and ESG [9]. Despite the importance of corporate citizenship, research for the conceptualization and characterization of corporate citizenship from an academic point of view is still insufficient due to conceptual abstraction and various proximity concepts regarding corporate citizenship. This is not irrelevant to the fact that the use of the corporate citizenship term was mainly initiated by business practitioners [10]. In addition, the main contexts and keywords using various terms referring to corporate citizenship were defined differently by each research field and scholar [8]. This is because scholars in various fields conceptualized corporate citizenship in various ways according to changes in social structures and business environments from their viewpoints in business.

In order to expand and develop corporate citizenship to a higher level, it is necessary to scrutinize latent contexts and concepts accumulated in existing corporate citizenship research. To facilitate this process, this study aims to characterize corporate citizenship and its two close concepts (i.e., CSR and ESG) through the text mining of relevant research articles; this research contributes to expand the scope of academic research on corporate citizenship by extracting underlying meanings and topics addressed in an abundant collection of relevant research articles. For this, each text dataset (i.e., title, keywords, and abstract) of research articles for CSR, ESG, and corporate citizenship is respectively modeled to extract frequently occurring terms and latent topics. Then, differences and commonalities among CSR, ESG, and corporate citizenship are investigated based on text mining results to propose more general and comprehensive concepts and characteristics of corporate citizenship for future uses in practice.

2. Literature Review

CSR has been discussed for more than half a century. Carroll [11] proposed a pyramid model of CSR that points out firms' legal, ethical, and philanthropic responsibilities based on economic responsibility. After Carroll's seminal work, the definition of CSR often includes managerial and social terms such as influence, social impact, system, and strategy. For example, Aguilera et al. [12] addressed that CSR is a long-term strategy to realize universal values in strategy and management. It means that CSR is a leading business activity to go beyond simple charity because it is a task that fundamentally changes strategy, management, corporate culture, and even corporate identity.

Various definitions of CSR in the literature also take a viewpoint of harmonious development for economy, society, and environment by emphasizing non-financial performance in common [13,14]. The key elements of non-financial performance are characterized as ESG, which consists of environmental, social, and governance criteria and their sub-factors to evaluate investments based on companies' responsible impacts [15]. The importance of ESG performance has been emphasized in recent practice in that non-financial performance based on ESG factors positively impacts corporate sustainability [16–18]. Barko et al. [19] argued that when a company does not consider all economic, social, and environmental aspects, it will engage in unsustainable management and be at risk.

In recent years, the discourse that demands publicity and ethical and philanthropic responsibility as social responsibility for companies is expanding socially, and the focus of CSR is gradually expanding to the concept of corporate citizenship. The concept of corporate citizenship includes an assumption that companies have an obligation to devote themselves to public goods like citizens in modern society [5]. Therefore, corporate citizenship refers to a series of socio-economic activities that firms perform to fulfill its roles and obligations as a member of society [6]. Previous studies interchangeably used the terms CSR and corporate citizenship (e.g., [9,20,21]) as an equivalent view between the two concepts proposed by Matten and Crane [5].

Several academic studies and practitioners' articles have attempted to analyze similarities and differences between CSR and corporate citizenship and between CSR and ESG. For example, corporate citizenship emphasizes management of internalities (i.e., companies'

rights and duties), while CSR focuses on management of externalities for companies [10]. ESG helps measure or quantify social initiatives, while CSR makes companies accountable for their social commitments in a qualitative way [22]. Rendtorff [23] discussed corporate citizenship, CSR, corporate governance in terms of business legitimacy by emphasizing different stages of cognitive, pragmatic, moral legitimacy for proactive corporate citizenship. Costa et al. [24] considered ESG as a tool to control sustainability practices, and claimed that CSR along with environmental management and value creation are interconnected to achieve corporate sustainability.

As various concepts and approaches relevant to corporate sustainability have been addressed in the literature, there have been attempts to employ text mining to effectively characterize sustainability concepts in a large set of relevant articles or documents. Mazza et al. [25] identified 11 CSR related topics by applying the Latent Dirichlet Allocation (LDA) method to CSR communication data of five energy companies on Twitter. Goloshchapova et al. [26] analyzed European and United Kingdom CSR reports through LDA to extract underlying topics, and they identified commonly addressed topics as well as sector-specific topics in CSR reports. Kiri and Nozaki [27] employed text mining based on word frequency and divergence to characterize ESG activities stated in Japanese CSR reports. Parra et al. [28] employed supervised and unsupervised machine learning methods for text data in corporate citizenship reports of seven major American companies to identify how corporate citizenship issues have been handled over time.

The aforementioned efforts to build a distinction of different corporate sustainability terminologies helped researchers understand various social responsibility and accountability concepts. However, previous studies subjectively defined those concepts and assigned related corporate sustainability theories to each terminology based on perceived theoretical similarities and differences from each author's individual point of view. Therefore, unclear boundaries across CSR, ESG, and corporate citizenship are still a major concern due to the lack of in-depth discussion of comprehensively structuring those concepts from objective point of view. In this regard, this study uses a more scientific and quantitative approach—text mining for analyzing a number of research articles associated with three different labels—CSR, ESG, and corporate citizenship—to effectively and objectively capture underlying concepts addressed in CSR, ESG, and corporate citizenship research fields.

3. Methods

This study characterizes distinct properties of CSR, ESG, and corporate citizenship by extracting keywords and latent topics in the relevant literature through the term-frequency analysis [29] and CTM (Correlated Topic Modeling) [30] of text mining. CTM is useful to extract latent topics in a document set by considering possible correlations between latent topics based on the probabilistic modeling of term frequency in the document set [30]. The meta-analysis of existing literature review methods mostly categorizes and conceptualizes key topics in a literature set through an ad-hoc manner or prior knowledge as a top-down approach [31]. In contrast, a text-mining approach can derive underlying characteristics and topics in a literature set based on the object text information of an abundant literature set; meaningful contexts in a large document set that are difficult to be manually captured can be effectively extracted for analysis. From this point of view, this study analyzes concepts and contexts for corporate citizenship, CSR, and ESG based on text information in relevant large literature sets through text mining. The text mining approach of this study aims to clarify differences in corporate citizenship, CSR, and ESG.

First, SSCI (Social Science Citation Index) journal articles with keywords of “corporate citizenship”, “CSR”, and “ESG” were identified through the Web of Science article database [32]. A total of 1235 journal articles (i.e., 701 articles for CSR, 296 articles for ESG, and 238 articles for corporate citizenship) published from 1990 to June 2021 were considered for text mining. The title, keywords, and abstract of articles in each group (i.e., CSR, ESG, corporate citizenship) were extracted and saved into “txt” files for the input data of text mining for CSR, ESG, corporate citizenship, respectively.

Then, the following pre-processing procedure were performed to refine original text data for text mining [33]. First of all, raw text data from original documents were refined by removing unnecessary elements (i.e., characters, figures, numbers, punctuations, and whitespaces). Then, stop-words that do not provide meaningful information in text (e.g., “a” and “the”) were removed from the text data. In addition, words with the same root were transformed to the same term (i.e., stemming). Common terms that appear frequently in a small document group represent more distinguished features than terms occurring in all the documents [34]. To reflect this, very frequently occurring terms across articles were removed based on the term frequency-inverse documents frequency method, where the importance of a term inversely decreases according to the number of documents that contain the term [35]. The pre-processing procedure was performed for the text data of each literature group by following the manual of the *tm* package for the R statistical software [36] and guidelines provided by Grün and Hornik [37].

Through the above pre-processing procedure, a document-term matrix to represent each literature group was generated by the *tm* package for text mining. As an initial text mining analysis, frequent terms occurring terms in each literature group were investigated; word clouds to visualize the top 50 frequent stemmed terms and the top 20 frequent terms within each literature group were respectively analyzed to identify the characteristics of each literature group. Next, the *topicmodels* package for the R statistical software [38] was applied to the pre-processed text data for CTM to extract hidden topics within each literature group. CTM is based on an unsupervised machine learning algorithm in which the number of derived topics should be predefined before modeling. This study set the number of topics to five to facilitate the interpretation and comparison of topic modeling results. In order to interpret latent topics, this study further reviewed the frequent terms and articles associated with each derived topic from CTM results.

4. Results

4.1. Term Frequency Analysis

The word clouds in Figure 1 represent visualized term membership in each CSR, ESG, and corporate citizenship research group. In each word cloud, larger terms represent more frequently occurring terms in the associated article group. When comparing frequent terms in CSR, ESG, and corporate citizenship articles, the most noticeable difference is that ESG research contains many financial or accounting terms: terms stemmed from “investment”, “report”, “disclosure”, and “risk”. In addition, the frequent terms associated with ESG are significantly different from the frequent terms in corporate citizenship and CSR. The corporate citizenship and CSR related literature sets seem to share common terms stemmed from “sustainability” and “firm”, but a significant difference is observed in the frequency of major terms. For example, the most frequent stemmed terms in the corporate citizenship literature are in the order of “sustain (e.g., sustainability)”, “CSR”, “ethic”, “firm”, “compani (e.g., company)”, and “global”. However, the CSR literature has the most frequent terms in the order of “CSR”, “firm”, “perform (e.g., performance)”, and “environment”. Figure 2 shows a Venn diagram created for the top 20 most frequent terms in each article set to further examine the commonalities and differences between the literature groups. “CSR”, “industri (industry)”, and “report” are terms that are commonly observed across the CSR, ESG, and corporate citizenship groups. Specific keywords for each topic are also observed in Figure 2. For example, corporate citizenship literature stands out for ethics, political/politics, and employees; CSR is for business, supply chain, consumer; and ESG is for investment, risk, fund, and social responsibility investment. The frequent terms in the overlapped areas show that studies in CSR, ESG, and Corporate Citizenship share similar research themes and foci. At the same time, each research stream has specific aspects that can be inferred from the frequent terms only appearing in each domain. The term frequency of each term in Figure 2 is shown in Table 1.

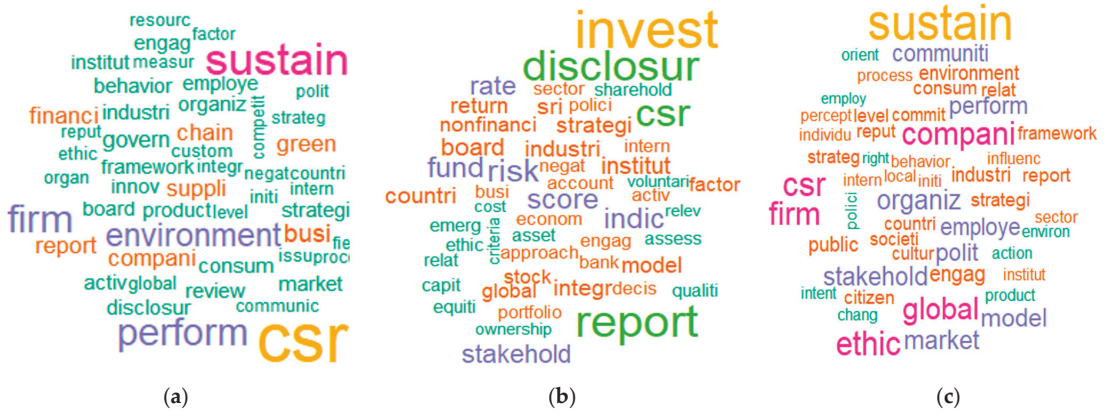


Figure 1. Word cloud of top 50 frequent stemmed terms in CSR, ESG, and corporate citizenship literatures: (a) CSR; (b) ESG; and (c) Corporate citizenship.

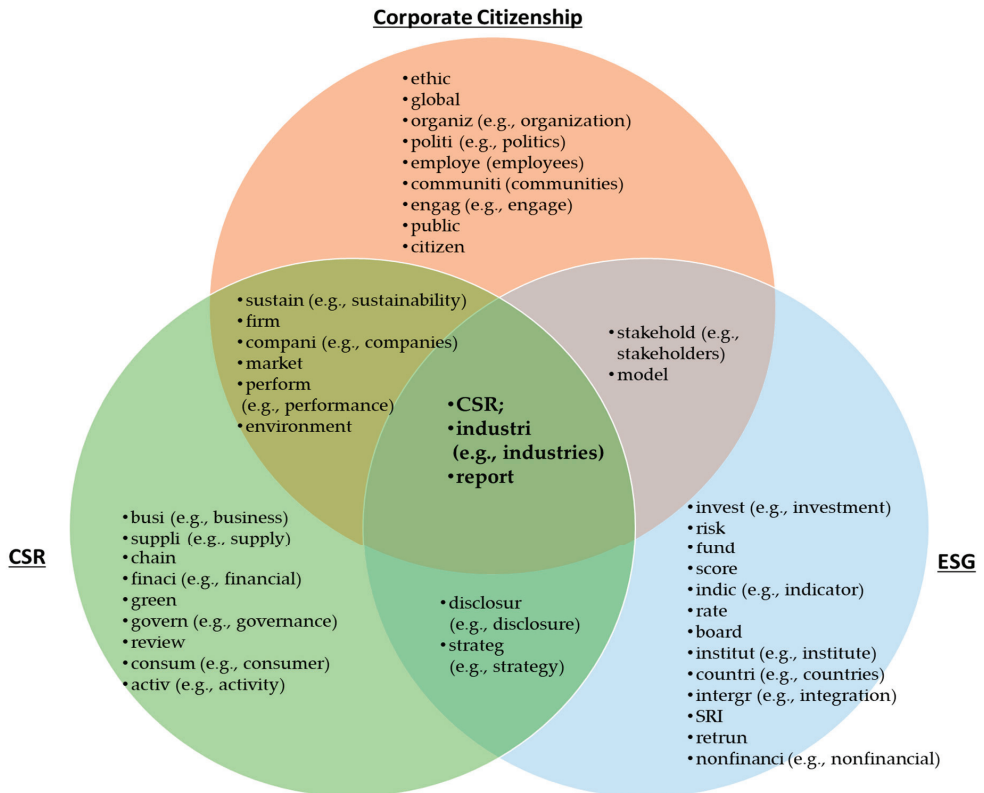


Figure 2. Venn diagram of top 20 frequent terms in CSR, ESG, corporate citizenship literature sets.

Table 1. Frequency of top 20 most frequent stemmed terms in CSR, ESG, corporate citizenship literature sets.

CSR	ESG	Corporate Citizenship
csr (2082), sustain (1196), firm (986), firm (986), perform (922), environment (728), busi (467), suppli (415), chain (410), report (392), fianci (391), green (388), compani (384), govern (335), market (319), industri (312), review (311), disclour (299), consum (294), activ (288), strategi (281)	invest (415), report (335), disclour (323), csr (288), risk (205), fund (178), score (175), indic (173), rate (151), stakehold (141), board (137), institut (134), industri (127), countri (122), integr (119), sri (118), model (117), strategi (112), nonfinanci (98), stock (96), global (91)	sustain (283), csr (182), ethic (172), firm (166), compani (164), global (148), organiz (125), stakehold (124), market (124), model (116), perform (107), polit (106), employe (100), communiti (99), engag (89), public (81), environment (73), industri (73), report (72), citizen (71)

4.2. Correlated Topic Modeling

Tables 2–4 show the CTM results that provide clues to understand what themes and topics have been studied in the three article groups. Five topics generated from CTM for each literature group were labelled based on frequent terms and articles associated with each topic.

In the CSR literature, the first topic (i.e., CSR-1 in Table 2) is associated with the largest number of the CSR articles (i.e., 31.7% of all the CSR related papers). The key frequent terms associated with this topic are *sustainability*, *business*, *review*, *framework*, *integration*, and *field*, etc. Various papers within this topic mainly attempt to review existing works and thereby to conceptualize a framework for CSR. For instance, the article of Carroll (2015), which is highly correlated with this topic, summarized a history of the concept of CSR and its framework for business-in-society relationships. He also introduced future scenarios of CSR and its parallel notions. This shows that efforts to conceptualize CSR have been widely discussed in the literature. The second topic (i.e., CSR-2) includes keywords such as *performance*, *environment*, *financial*, *governance*, *market*, *industries*, and *strategic*, etc. The literature on this topic shows a positive relationship between CSR and firm financial performance. Other topics are related to the various prerequisites such as governance, disclosure, and the role of the board of directors for successfully implementing CSR (i.e., CSR-3), CSR and various stakeholders, especially the relationship with and influence of employees and customers (i.e., CSR-4), and effects of CSR disclosure on corporate performance (i.e., CSR-5).

Table 2. Interpreted topics to characterize CSR based on CTM.

Topic ID	Frequently Used Terms (Expressed by Example Original Words)	Interpreted Topic Label	Number of Articles	Representative Reference
CSR-1	sustainability, supply, chain, business, review, framework, integration, global, field, environment	Definition of CSR and conceptualization of CSR framework	222	Carroll [39]
CSR-2	performance, environment, financial, governance, market, board, industries, strategic, institution, innovation	Relationship between CSR and corporate financial performance	138	Doh et al. [40]
CSR-3	report, green, disclosure, environment, capital, companies, voluntarily, sustain, qualities, accountability	Antecedents of CSR	55	Frias-Aceituno et al. [41]
CSR-4	CSR, consumer, behavior, organization, employees, customer, ethics, companies, perceived, mediates	Relations between CSR and stakeholders	135	Farooq et al. [42]
CSR-5	CSR, firm, activity, engage, politics, countries, negative, rate, benefit, internal	Effects of CSR disclosure on corporate performance	151	Chen et al. [43]

Table 3 presents the resultant five latent topics extracted from the ESG literature. The number of ESG-related studies has rapidly increased in recent years especially since 2018. Overall, the ESG literature is closely associated with topics for the financial performance of corporate activities to achieve social and environmental benefits. The first topic in the ESG literature (i.e., ESG-1) is interpreted from its associated 68 papers. This topic is associated with the largest number of all the considered ESG related articles; 68 out of 295 ESG related papers (=23.1%) are identified as handling this topic. Most of the associated articles handle main criteria for SRI (social responsible investing) as ESG elements. These elements include not only financial performance of companies but also non-financial ESG elements, which show ESG investment foci for organizations' sustainability. The second topic (i.e., ESG-2) is related to the role of managers and board of directors in ESG investment with high-probability terms such as *disclosure*, *board*, *nonfinancial*, *CSR*, *director*, *independent*, and *direct*, etc. For example, the literature in this topic examines the relationships between corporate governance and sustainability by focusing on role of directors and officers in corporations (e.g., Crifo et al. [44]). The articles in the third topic (i.e., ESG-3) discusses the relationship between ESG and corporate performance. The topic is related to frequent words such as report, risk, indicator, model, strategic, cost, and equities, etc. The literature shows how ESG disclosure impacts firm performance and proposes a nomological network of the antecedents, boundary conditions, and various outcomes of ESG disclosure. Moreover, various internal and external environmental factors of companies affecting ESG (i.e., ESG-4) and the relationship between ESG and corporate financial performance (i.e., ESG-5) form representative research topics in the ESG-related studies.

Table 3. Interpreted topics to characterize ESG based on CTM.

Topic ID	Frequently Used Terms (Expressed by Example Original Words)	Interpreted Topic Label	Number of Articles	Representative Reference	
ESG-1	invest, fund, SRI, portfolio, criteria, decision, ethical, return, conventional, factor	ESG and social responsible investing (SRI)	68	Alda [45]	
ESG-2	disclosure, score, board, bank, nonfinancial, CSR, director, independent, diverse, direct	Role of management in ESG investment	59	Crifo et al. [44]	
ESG	ESG-3	report, risk, indicator, integrated, model, strategic, assess, cost, equities, economic	Relationship between ESG disclosure and performance	55	Burke et al. [46]
ESG-4	CSR, rate, institution, report, engage, ownership, account, agency, qualities, stakeholder	Internal and external environmental factors affecting ESG	49	Ortas et al. [47]	
ESG-5	stakeholder, countries, internal, stock, policies, activity, return, global, industries, shareholder	Relationship between ESG and corporate financial performance	64	Capelle-Blancard et al. [48]	

Finally, the results in Table 4 show the main topics of the corporate citizenship literature. The first topic (i.e., CC-1) represents research about executives and employees' perceptions, attitudes, and roles of corporate citizenship, which can be inferred from its associated terms such as *organization*, *employees*, *behavior*, *performance*, *intention*, *commitment*, *consumer*, and *ethics*, etc. Many studies in this topic applies a previously proposed concept of corporate citizenship based on a political theory perspective [5]. For example, Rego et al. [21] suggested extended dimensions of corporate citizenship that includes employees' perceptions of corporate responsibilities of their organizations. The second topic is the role of corporate citizenship of employee relations (i.e., CC-2), which can be inferred from its associated terms such as *reputation*, *relations*, *employees*, *moral*, *individual*, *engage*, *right*, and *human*, etc. This topic has the highest percentage of the membership (=29.8%) in the corporate citizenship related articles. The main theme of the above two top-

ics indicates the importance of executives and employees who play active role in corporate citizenship practice.

The third topic is related to corporate citizenship definition from a global and local perspective (i.e., CC-3), consisting of studies dealing with the practices and approaches of corporate citizenship by global companies. The literature in this topic shows that corporate citizenship approaches have flourished not only in local companies and but also in multinational companies. Indeed, the term corporate citizenship is getting more widely used nowadays due to its voluntary nature in society. The fourth topic is related to maintaining and exercising social influence, which form main keywords in corporate citizenship research (i.e., CC-4). The topic is related to the importance of active roles and commitment in a company as a citizen in society. The fifth topic represents the role of corporate citizenship as a strategic act of a company (i.e., CC-5). For example, research in this topic combines a framework of corporate citizenship with corporate strategies and business models (e.g., Googins [49]). The articles in this group include key terms such as *firm, stakeholder, model, ethics, performance, product, and strategy*, etc.

Table 4. Interpreted topics to characterize corporate citizenship (CC) based on CTM.

Topic ID	Frequently Used Terms (Expressed by Example Original Words)	Interpreted Topic Label	Number of Articles	Representative Reference
CC-1	organization, employees, behavior, performance, intention, model, commitment, consumer, ethics, orientation	Employees' perception, attitudes, and roles toward corporate citizenship	45	Rego et al. [21]
CC-2	reputation, relations, employees, measure, moral, individual, engage, right, environment, human	Effect of corporate citizenship on employee relations	71	Dawkins [50]
CC-3	sustain, global, communication, initiative, local, industries, internal, enterprise, tool, companies	Definition of corporate citizenship from a global and local perspective	23	Logsdon and Wood [51]
CC-4	companies, politics, ethics, citizen, environment, CSR, global, market, countries, public	A company that pursues and exercises social influence	69	Nyberg and Murray [52]
CC-5	firm, CSR, stakeholder, model, strategies, ethics, performance, product, strategy, level	Corporate citizenship as a strategic role	30	Arora and Ali Kazmi [53]

In summary, the CTM results reveal that the overall trend ESG studies are significantly different from CSR and corporate citizenship. ESG related studies mainly handles topics related to sustainable corporate activities that affect the performance of stakeholders. Although CSR and corporate citizenship studies commonly include various topics under the big themes of sustainability and responsibility, the main focus of the related works is different between the two research streams. CSR studies more emphasize corporate mandatory responsibility and promotion of CSR activities for corporate performance than corporate citizenship studies. However, corporate citizenship research focuses more on corporate ethicality itself and corporate's social influence in a political way.

5. Discussion and Conclusions

This study comprehensively identified research concepts and topics that have been handled in the CSR, ESG, and corporate citizenship domains. To facilitate the analysis process, this study employed the text mining techniques to extract frequently appearing terms and latent topics in the large number of research articles related to CSR, ESG, and corporate citizenship. The term-frequency analysis results showed that the CSR, ESG, and corporate citizenships not only share key terms that imply conceptual commonalities but also have distinct key terms that describes specific foci. Moreover, the CTM results clearly

addressed that the CSR, ESG, corporate citizenship domains have different scopes and scales, which indicates the necessity of a new framework not only to present the meanings and definitions of CSR, ESG, and corporate citizenship but also to clarify conceptual relationships among CSR, ESG, and corporate citizenship.

The definitions of the three themes (i.e., CSR, ESG, corporate citizenship) given by scholars in previous studies are as follows. First, CSR mainly talks about corporate economic, legal, ethical, and philanthropic obligations as summarized by the CSR's pyramid model [1,11,54]. ESG indicates that companies perform environmental, social, governance related activities as obligations for social welfare and sustainable and long-term wealth of stakeholders [55]. Corporate citizenship is defined as "the extent to which businesses assume the economic, legal, ethical, and discretionary responsibilities imposed on them by their stakeholders" [7] (p. 38). Due to the redundancy and ambiguity of the boundaries of CSR, ESG, and corporate citizenship, scholars still mix these labels to characterize corporate responsibility concepts.

However, the text mining results of many research works relevant to CSR, ESG, and corporate citizenship in this study suggest that there are implicit but clear differences among CSR, ESG, and corporate citizenship. CSR mainly refers to corporate activities focusing on responsibilities and obligations, while ESG mainly refers to corporate ESG-related activities for the performance of companies, shareholder, and stakeholders. In addition, corporate citizenship mainly refers to voluntary and ethical activities of a company for its positive social influence.

Based on the results, the current study suggests that the concept of "corporate citizenship" is not only a high-level concept that encompasses ESG and CSR, but also a broad concept with missions that should affect various areas of society. The text mining results of this study implies that "employees" as the main agents of corporate citizenship practice is the most important factor among various stakeholders of corporate citizenship. Above all, it can be seen that the main role of corporate citizenship is for companies to exert more active social influence in a political way. Therefore, corporate citizenship should be different from CSR and ESG; corporate citizenship needs to be based on more active and leading corporate strategies and to be embodied as an organizational culture for all employees. In terms of social influence (politics), corporate activities should help other organizations become corporate citizenship since the word "citizenship" includes the concepts of win-win, symbiosis, and coexistence.

Corporate Citizenship Management Standards (CCMS) [56] established by POSCO, a global major steel-manufacturing company in Republic of Korea, are a representative example to support the findings of this study. For example, CCMS includes many keywords of corporate citizenship we found through this study. The most frequent words appeared in CCMS were 'society', 'value', 'safety', 'customer', 'product', 'growth', 'activity', 'business', 'citizen', etc. These words are regarded as keywords that represent POSCO's management philosophy (i.e., corporate citizenship). There are considerable overlaps between the keywords in CCMS and the frequent terms in the corporate citizenship literature identified from this study. For instance, 'society', 'community', 'action', 'initiative', 'employee', 'change', and 'environment' are commonly identified keywords. This shows that the conceptualization of corporate citizenship through the text mining of related research articles in this study is in line with actual practice for corporate citizenship in business.

This study has a limitation in that the text mining techniques were conducted only with the titles, abstracts, and keywords of each paper. However, this was also an intentional approach to minimize the noise of data when the whole manuscript was considered for analysis. The current study focused on the difference among corporate citizenship, CSR, and ESG, but more specific research and practical implications can be drawn if more specific contents such as comparison with various similar concepts, definitions of each topic, and measures are investigated through text mining. Corporate citizenship research requires both quantitative and qualitative approaches as widely studied in CSR research. Specifically, corporate citizenship research will also require various studies to establish its concepts and

frameworks. In addition, research on the development of corporate citizenship measures is also needed to further refine and materialize the concept of corporate citizenship.

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References

- Carroll, A.B. The four faces of corporate citizenship. *Bus. Soc. Rev.* **1998**, *100–101*, 1–7. [CrossRef]
- Maignan, I.; Ferrell, O.C.; Hult, G.T.M. Corporate citizenship: Cultural antecedents and business benefits. *J. Acad. Mark. Sci.* **1999**, *27*, 455–469. [CrossRef]
- Marsden, C.; Andriof, J. Towards an understanding of corporate citizenship and how to influence it. *Citizsh. Stud.* **1998**, *2*, 329–352. [CrossRef]
- Waddell, S. New institutions for the practice of corporate citizenship: Historical, intersectoral, and developmental perspectives. *Bus. Soc. Rev.* **2000**, *105*, 107–126. [CrossRef]
- Matten, D.; Crane, A. Corporate citizenship: Toward an extended theoretical conceptualization. *Acad. Manag. Rev.* **2005**, *30*, 166–179. [CrossRef]
- Gardberg, N.A.; Fombrun, C.J. Corporate citizenship: Creating intangible assets across institutional environments. *Acad. Manag. Rev.* **2006**, *31*, 329–346. [CrossRef]
- Maignan, I.; Ferrell, O.C. Antecedents and benefits of corporate citizenship: An investigation of French businesses. *J. Bus. Res.* **2001**, *51*, 37–51. [CrossRef]
- Okoye, A. Theorising corporate social responsibility as an essentially contested concept: Is a definition necessary? *J. Bus. Ethics* **2009**, *89*, 613–627. [CrossRef]
- Waddock, S. The development of corporate responsibility/corporate citizenship. *Organ. Manag. J.* **2008**, *5*, 29–39. [CrossRef]
- Valor, C. Corporate social responsibility and corporate citizenship: Towards corporate accountability. *Bus. Soc. Rev.* **2005**, *110*, 191–212. [CrossRef]
- Carroll, A.B. The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Bus. Horiz.* **1991**, *34*, 39–48. [CrossRef]
- Aguilera, R.V.; Rupp, D.E.; Williams, C.A.; Ganapathi, J. Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations. *Acad. Manag. Ann.* **2007**, *32*, 836–863. [CrossRef]
- Ben-Amar, W.; Chang, M.; McIlkenny, P. Board gender diversity and corporate response to sustainability initiatives: Evidence from the carbon disclosure project. *J. Bus. Ethics* **2017**, *142*, 369–383. [CrossRef]
- Latapí Agudelo, M.A.; Jóhannsdóttir, L.; Davídsdóttir, B. A literature review of the history and evolution of corporate social responsibility. *Int. J. Corp. Soc. Responsib.* **2019**, *4*, 1–23. [CrossRef]
- Li, T.-T.; Wang, K.; Sueyoshi, T.; Wang, D.D. ESG: Research progress and future prospects. *Sustainability* **2021**, *13*, 11663. [CrossRef]
- Taliento, M.; Favino, C.; Netti, A. Impact of environmental, social, and governance information on economic performance: Evidence of a corporate ‘sustainability advantage’ from Europe. *Sustainability* **2019**, *11*, 1738. [CrossRef]
- Ye, C.; Song, X.; Liang, Y. Corporate sustainability performance, stock returns, and ESG indicators: Fresh insights from EU member states. *Environ. Sci. Pollut. Res.* **2022**, *29*, 87680–87691. [CrossRef] [PubMed]
- Kluza, K.; Ziolo, M.; Spoz, A. Innovation and environmental, social, and governance factors influencing sustainable business models—Meta-analysis. *J. Clean. Prod.* **2021**, *303*, 127015. [CrossRef]
- Barko, T.; Cremers, M.; Renneboog, L. Shareholder engagement on environmental, social, and governance performance. *J. Bus. Ethics* **2022**, *180*, 777–812. [CrossRef]
- Mirvis, P.; Googins, B. Stages of corporate citizenship. *Calif. Manag. Rev.* **2006**, *48*, 104–126. [CrossRef]
- Rego, A.; Leal, S.; Pina e Cunha, M. Rethinking the employees’ perceptions of corporate citizenship dimensionalization. *J. Bus. Ethics* **2011**, *104*, 207–218. [CrossRef]
- What’s the Difference between CSR and ESG? Available online: <https://www.alva-group.com/blog/whats-the-difference-between-csr-and-esg/> (accessed on 18 November 2022).
- Rendtorff, J.D. The Concept of Business Legitimacy: Corporate Social Responsibility, Corporate Citizenship, Corporate Governance as Essential Elements of Ethical Business Legitimacy. In *Responsibility and Governance: The Twin Pillars of Sustainability*; Crowther, D., Seifi, S., Wond, T., Eds.; Springer: Singapore, 2019; pp. 45–60.

24. Costa, A.J.; Curi, D.; Bandeira, A.M.; Ferreira, A.; Tomé, B.; Joaquim, C.; Santos, C.; Góis, C.; Meira, D.; Azevedo, G.; et al. Literature Review and Theoretical Framework of the Evolution and Interconnectedness of Corporate Sustainability Constructs. *Sustainability* **2022**, *14*, 4413. [CrossRef]
25. Mazza, R.; Zavarrone, E.; Olivieri, M.; Corsaro, D. A text mining approach for CSR communication: An explorative analysis of energy firms on Twitter in the post-pandemic era. *Ital. J. Mark.* **2022**, *2022*, 317–340. [CrossRef]
26. Goloshchapova, I.; Poon, S.-H.; Pritchard, M.; Reed, P. Corporate social responsibility reports: Topic analysis and big data approach. *Eur. J. Financ.* **2019**, *25*, 1637–1654. [CrossRef]
27. Kiriu, T.; Nozaki, M. A text mining model to evaluate firms' ESG activities: An application for Japanese firms. *Asia-Pac. Financ. Mark.* **2020**, *27*, 621–632. [CrossRef]
28. Parra, C.M.; Tremblay, M.C.; Paul, K.; Castellanos, A. Exploratory content analysis using text data mining: Corporate citizenship reports of seven US companies from 2004 to 2012. *J. Corp. Citizsh.* **2017**, *2017*, 106–151. [CrossRef]
29. Zhang, Y.; Jin, R.; Zhou, Z.-H. Understanding bag-of-words model: A statistical framework. *Int. J. Mach. Learn. Cybern.* **2010**, *1*, 43–52. [CrossRef]
30. Blei, D.M.; Lafferty, J.D. A correlated topic model of science. *Ann. Appl. Stat.* **2007**, *1*, 17–35. [CrossRef]
31. Guerreiro, J.; Rita, P.; Trigueiros, D. A text mining-based review of cause-related marketing literature. *J. Bus. Ethics* **2016**, *139*, 111–128. [CrossRef]
32. Web of Science™. Available online: <https://www.webofscience.com/wos/woscc/basic-search> (accessed on 18 November 2022).
33. Haddi, E.; Liu, X.; Shi, Y. The Role of text pre-processing in sentiment analysis. *Procedia Comput. Sci.* **2013**, *17*, 26–32. [CrossRef]
34. Robertson, S. Understanding inverse document frequency: On theoretical arguments for IDF. *J. Doc.* **2004**, *60*, 503–520. [CrossRef]
35. Salton, G.; Buckley, C. Term-weighting approaches in automatic text retrieval. *Inf. Process Manag.* **1988**, *24*, 513–523. [CrossRef]
36. tm: Text Mining Package. Available online: <https://cran.r-project.org/web/packages/tm/index.html> (accessed on 18 November 2022).
37. Grün, B.; Hornik, K. topicmodels: An R package for fitting topic models. *J. Stat. Softw.* **2011**, *40*, 1–30. [CrossRef]
38. topicmodels: Topic Models. Available online: <https://cran.r-project.org/web/packages/topicmodels/index.html> (accessed on 18 November 2022).
39. Carroll, A.B. Corporate social responsibility: The centerpiece of competing and complementary frameworks. *Organ. Dyn.* **2015**, *44*, 87–96. [CrossRef]
40. Doh, J.P.; Howton, S.D.; Howton, S.W.; Siegel, D.S. Does the market respond to an endorsement of social responsibility? The role of institutions, information, and legitimacy. *J. Manag.* **2010**, *36*, 1461–1485. [CrossRef]
41. Frias-Aceituno, J.V.; Rodriguez-Ariza, L.; Garcia-Sanchez, I.M. The role of the board in the dissemination of integrated corporate social reporting. *Corp. Soc. Responsib. Environ. Manag.* **2013**, *20*, 219–233. [CrossRef]
42. Farooq, O.; Rupp, D.E.; Farooq, M. The multiple pathways through which internal and external corporate social responsibility influence organizational identification and multifoci outcomes: The moderating role of cultural and social orientations. *Acad. Manag. J.* **2017**, *60*, 954–985. [CrossRef]
43. Chen, Y.-C.; Hung, M.; Wang, Y. The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. *J. Account. Econ.* **2018**, *65*, 169–190. [CrossRef]
44. Crifo, P.; Escrig-Olmedo, E.; Mottis, N. Corporate governance as a key driver of corporate sustainability in France: The role of board members and investor relations. *J. Bus. Ethics* **2019**, *159*, 1127–1146. [CrossRef]
45. Alda, M. The environmental, social, and governance (ESG) dimension of firms in which social responsible investment (SRI) and conventional pension funds invest: The mainstream SRI and the ESG inclusion. *J. Clean. Prod.* **2021**, *298*, 126812. [CrossRef]
46. Burke, J.J.; Hoitash, R.; Hoitash, U. Auditor response to negative media coverage of client environmental, social, and governance practices. *Account. Horiz.* **2019**, *33*, 1–23. [CrossRef]
47. Ortas, E.; Gallego-Álvarez, I.; Álvarez, I. National institutions, stakeholder engagement, and firms' environmental, social, and governance performance. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 598–611. [CrossRef]
48. Capelle-Blancard, G.; Crifo, P.; Diaye, M.-A.; Oueghlissi, R.; Scholtens, B. Sovereign bond yield spreads and sustainability: An empirical analysis of OECD countries. *J. Bank. Financ.* **2019**, *98*, 156–169. [CrossRef]
49. Googins, B. The journey towards corporate citizenship in the United States: Leader or laggard? *J. Corp. Citizsh.* **2002**, *Spring 2002*, 85–101.
50. Dawkins, C.E. Labored relations: Corporate citizenship, labor unions, and freedom of association. *Bus. Ethics Q.* **2012**, *22*, 473–500. [CrossRef]
51. Logsdon, J.M.; Wood, D.J. Business citizenship: From domestic to global level of analysis. *Bus. Ethics Q.* **2002**, *12*, 155–187. [CrossRef]
52. Nyberg, D.; Murray, J. Corporate politics in the public sphere: Corporate citizenspeak in a mass media policy contest. *Bus. Soc.* **2020**, *59*, 579–611. [CrossRef]
53. Arora, B.; Ali Kazmi, S.B. Performing citizenship: An innovative model of financial services for rural poor in India. *Bus. Soc.* **2012**, *51*, 450–477. [CrossRef]
54. Carroll, A.B. Corporate social responsibility: Evolution of a definitional construct. *Bus. Soc.* **1999**, *38*, 268–295. [CrossRef]

55. Mohammad, W.M.W.; Wasiuzzaman, S. Environmental, Social and Governance (ESG) disclosure, competitive advantage and performance of firms in Malaysia. *Clean. Environ. Syst.* **2021**, *2*, 100015. [[CrossRef](#)]
56. CCMS Introduction. Available online: <http://corporatecitizenship.posco.com/citizen/eng/simin/s919e1000500c.jsp> (accessed on 14 February 2023).

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Article

Regulations on Non-Financial Disclosure in Corporate Reporting: A Thematic Review

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Abstract: There is a growing call globally for corporations to improve transparency in corporate reporting, along with the surge of enhancing disclosure of non-financial information. Companies are seen as agents for contributing to a better future, and hence could assist in achieving the sustainable development goals (SDGs) 2030, via transparent non-financial disclosure. This review paper is premised on the fact that laws on non-financial disclosure may be useful in enhancing the transparency of companies' conducts. Hence, this systematic review aims to synthesize the literature from 2014 to 2021 on the patterns and trends relating to regulations on non-financial disclosure in corporate reporting by companies. A keyword search followed by filters provided by the Web of Science Core Collection and SCOPUS databases resulted in a total of 369 documents being found. A total of 62 articles were reviewed after manual filtering and exclusion. A thematic review of these 62 articles identified 20 initial codes, which were then grouped into eight clusters: Directive 2014/95/EU, disclosure approaches, fiduciary duties of directors, stakeholder engagement, the effectiveness of disclosure regulations, the impacts of rules, the role of different actors and corporate accountability. The paper finds that the patterns and trends in the review set the path for future research on laws of non-financial disclosure, as they serve as a guideline for researchers for future studies.

Keywords: corporate reporting; disclosure obligations; non-financial disclosure; non-financial reporting; sustainability reporting; SDGs; sustainable development

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1. Introduction

Corporate reporting is a mechanism for improving companies' transparency regarding non-financial information and for continuously engaging with the stakeholders [1]. Companies worldwide are now required or encouraged to disclose non-financial information, accentuating the significance of reporting. The accountability of companies extends towards the other stakeholders via non-financial disclosure obligations [2]. Furthermore, disclosure could assist the stakeholders in monitoring companies' conduct and actions. The stakeholders also demand companies' assistance in achieving sustainable development goals (SDGs) [3], indicating the importance of companies' contributions towards a sustainable future. The SDGs were introduced in 2015 to ensure a sustainable future for all, and they are interconnected goals intended to address social, economic and environmental challenges, and attain sustainable development [4]. Involvement of all members of society, especially companies, is needed to ensure the successful implementation of the SDGs agenda [5,6]. To achieve sustainability through SDGs, companies are vital and necessary actors because of their impact on society, the economy and the environment [7]. The SDG framework provides guidelines for companies aligning their business practices towards sustainable development [6]. Hence, this provides opportunities for companies to contribute to successfully addressing sustainable development challenges [4]. This is because SDGs entail companies incorporating sustainability considerations into their decision-making, creating awareness among the stakeholders on their corporate contribution to SDGs [4,8].

The SDG Compass listed reporting as one of the five vital steps to ensure the successful implementation of the SDG Agenda [9]. Costa et al. [4] highlighted the necessity of guiding companies towards transparency in SDGs reporting, in presenting their contributions towards sustainable development. Elalfy et al. [6] also emphasize the need for more research regarding factors that can affect SDG reporting. Another study indicates regulatory enforcement's significance in ensuring satisfactory SDG disclosure [10]. This evidence supports the role of regulations in managing issues relating to non-financial information disclosures. In addition, a study found that a clear legal requirement on sustainability reporting is needed to ensure better compliance [11], emphasizing the relevancy of the law in governing non-financial disclosures.

Amongst the SDGs that have been recognized by scholars that companies could contribute are Decent Work and Economic Growth (SDG 8), Responsible Consumption and Production (SDG 12) and Climate Action (SDG 13 [7,12,13]). Countries around the world have taken action regarding sustainable development. For example, companies in France must disclose information regarding their conduct towards the environment and society [14]. Berger-Walliser and Shrivastava [14] observed that in the United Kingdom, large companies are obligated to disclose information about their conduct affecting the environment, social, community, and human rights issues in addition to the strategies to address those matters. In India, the government requires that companies develop corporate social-responsibility policies, and failing to adhere to the minimum requirements would subject them to clarification [15]. In Malaysia, the stock exchange, Bursa Malaysia, has required publicly listed companies to publish a sustainability statement in their annual report, which encompasses "a narrative statement of the listed issuer's management of material economic, environmental and social risks and opportunities". In this sense, it is also essential to see the significant role of integrated reporting, since it offers holistic financial and non-financial information. Adopting integrated reporting improves information transparency, boosts brand value and reputation, decreases financial asymmetries, and increases the organization's market worth [16].

Review studies on non-financial information have focused on providing a general view of the current state of academic study on this topic, such as the principal subjects of non-financial research, the methodologies employed, and the changes in the literature regarding non-financial information [17–19]. Some studies reviewed the literature from a specific aspect, such as the relationship between stakeholder engagement and non-financial disclosure [20], the benefits of reporting non-financial information [21] and the quality of non-financial disclosure [22]. Nevertheless, reviews that aim to provide focused findings under the theme of regulations on non-financial information are currently lacking. This statement is evidenced by a bibliometric analysis that presents the six most examined subjects under the topic of non-financial information: determinants, essence, reporting practices, integrated reporting, environmental disclosures, and consequences of reporting. The findings presented show that there is an evident lack of review studies that focus specifically on finding the current state of the art under the topic of regulations for non-financial information.

Therefore, a thematic review is conducted to synthesize literature from 2014 until early 2021 on the patterns and trends relating to regulations for non-financial information in corporate reporting by companies, based on the premise that they may be useful in improving the transparency of companies' conduct, ensuring the achievement of the SDGs agenda. This thematic review aims to synthesize the literature on non-financial disclosure regulations, to determine the themes for future studies by considering its importance in ensuring the successful implementation of SDGs. A thematic review of 62 articles identified 20 initial codes, which were then grouped into eight clusters: Directive 2014/95/EU, disclosure approaches, fiduciary duties of directors, stakeholder engagement, the effectiveness of disclosure regulations, the impacts of rules, the role of different actors and corporate accountability, setting the path for future studies. The focus on the literature that discusses regulations of non-financial information is beneficial because of the fact that it provides

a clear direction regarding underexplored issues within this theme. This paper offers a narrow and focused view of disclosure regulations, rather than a broad view of what has been researched relating to non-financial information. Hence, this paper is unique, as it focuses on the underexplored aspect of non-financial information from the regulation perspective rather than providing a general review of what is in the literature.

The remainder of this paper is structured as follows. Section 2 discusses the research background and, consequently, the research question. Section 3 explains the research methodologies. Section 4 discusses the findings, while Section 5 proceeds with the discussion and potential future studies. Finally, Section 6 concludes the study.

2. Research Background and Research Question

Non-financial disclosure is usually considered a voluntary obligation by nature, which could lead to mitigated benefits of disclosure, owing to transparency and irrelevancy disadvantages [5]. Venturelli et al. [5] confirm that regulation enhances the quality of non-financial disclosure. It is also widely accepted in the literature that regulation could improve the quality of non-financial disclosure [23]. Regulation is desirable for voluntary disclosure, since the latter may lack accuracy, neutrality and comparability [24,25]. A study has shown that disclosure in countries with regulation regarding non-financial information, such as France, is of higher quality than in those without regulation [25].

Another study exploring how the top 50 Australian companies disclose their commitment to addressing SDGs highlighted the potential need for regulation in administering non-financial information disclosure [26]. A study by Mion and Adauì [27] that conducted a content analysis of the sustainability-reporting practices of Italian and German companies in the lists of top stock exchanges found that regulation does enhance the quality of sustainability reporting [27]. Muserra et al. [23] concluded that regulation for mandatory non-financial disclosure, in this context, the Italian decree, has the potential to support information transparency and shift to sustainable business models. A study that investigated how Directive 2014/95/EU may influence the listed Italian companies' corporate practices found that the non-financial reporting obligations can facilitate a company's sustainability path, guaranteeing transparency and greater stakeholder-engagement [24]. In another study, the researchers demonstrated that the French parliamentary regime is more successful in prompting environmental disclosures than the Canadian market mechanisms [25]. In addition, Steuer and Troger [28] contended that regulations could support sustainable transition, since they can compel uniform and comparable disclosure of raw data.

Furthermore, Ho and Park [29] claimed that disclosure laws should be considered when developing the best approaches for enhancing the quality and value of non-financial information. Another study in China provided an interesting perspective, as their results demonstrate that firms in polluting industries considerably improved their financialization behaviors due to implementing the new Environmental Protection Law [30]. These findings provide impetus for further research in understanding the role of regulation in non-financial disclosure [31]. Therefore, in light of the above, we can assume that regulations encourage transparency and quality of non-financial information, which supports SDG attainment and responsible investing.

To reiterate, there is a need for further research relating to regulations governing non-financial disclosure. It is pertinent to see the patterns of potential research relating to non-financial disclosure regulation to see the gap or where more research should be conducted in the future. It is essential to provide consistent findings in studies on non-financial disclosure regulations, as this will act as a guideline for countries in deciding whether to adopt a mandatory or voluntary approach when it comes to the disclosure of non-financial information. Furthermore, the stakeholders are increasingly interested in how companies align their business strategies with the SDGs [32]. Disclosure on these matters is essential, because it provides monitoring power on the part of the stakeholders of companies' contributions towards sustainable development [32]. Hence, with the aim to

synthesize the literature on non-financial information regulations to identify underexplored themes under this subject, we formulate the following research question:

RQ: What are the patterns and trends in the literature relating to regulations on non-financial information in corporate reporting by companies, from 2014 to early 2021?

The term “non-financial information” has no widely agreed definition, and is thus open to interpretations [33]. However, for the purposes of this paper, we concur with Tarquinio and Posadas’ [33] findings that this term is frequently used to refer to information about society and the environment, including corporate social responsibility (CSR) issues, information about intellectual capital, and information that is not included in financial statements.

3. Materials and Methods

This paper adopts a thematic review of articles with the help of ATLAS.ti version 9 software, as introduced by Zairul [34], applying thematic analysis to the literature. Thematic analysis generates codes and later themes [35], due to the synthesis review of the relevant literature. Themes indicate broader context patterns that could help answer the research-question themes [35] and better understand a particular phenomenon. These themes assist in structuring the presentation of findings in a research theme [35]. The appeal of thematic analysis is that it gives researchers room to actively interpret the data by generating the codes, and later the themes, rather than searching for themes in the data [35].

In the first step, the authors adopted the identification-of-keywords process. The identification process started with finding the synonyms, related terms, and relevant keywords for the main keywords of the study [36], which were “corporate law, sustainability reporting, company, and corporate disclosure”. Identifying relevant keywords helped in varying the keywords to search for relevant documents for the study. Then, the authors conducted a paper search in the WOS Core Collection database. Finally, the authors extracted articles published in the WOS Core Collection database using search strings in the Basic Search tool, resulting in 573 documents (refer to Table 1).

The Boolean operator OR was used to maximize the search of records. Truncation * was also used in this search, as it enables the function to search different forms of words, hence increasing the possibility of extracting more documents from the search. Then, the refinement of the results followed through the manipulation of the filters provided by the database, which produced 358 papers. The manipulation of the year of publication was to be from the year 2014 to early 2021. The selection of relevant articles starting in 2014 coincides with the introduction of the International Integrated Reporting Framework, which has combined financial and non-financial information in one comprehensive report since December 2013, and which sparked the authors’ interest in studying the academic literature relating to this development. The filter of document types applies to the inclusion of articles and early-access only. Therefore, the filtering excludes this study’s book chapters, book reviews, proceeding papers, reviews, and editorial materials. Next, whenever applicable, the articles are in English, to enable the researcher to better comprehend.

The authors used the search strings with the exact keywords used in the WOS Core Collection database in the Scopus database, and this search resulted in 11 documents being found. No filter was applied in the Scopus database, contrary to the WOS Core Collection database. This result was because only 11 papers were found that included articles from 2014 to the present, and all 11 documents are in English and journal article form.

The authors then manually filtered the documents by reading the article’s title and abstract, known as the eligibility process [37]. The filtering process excluded articles that did not focus on regulations or laws relating to corporate reporting. Examples include an article that examined financial performance after implementing integrated reporting [38]. Also excluded was an article investigating the relationship between board gender diversity with sustainability disclosure [39]. The list extended to the work identifying the link between sustainability reporting and firm value [40,41] and investigating the factors influencing companies in disclosing non-financial information [42]. This filtering resulted in only

71 articles being selected for review. The 71 articles were then exported to the Mendeley reference-manager software. In Mendeley, the exclusion applies to nine more articles because of duplication and relevancy issues, resulting in 63 articles being subjected to thematic analysis in ATLAS.ti version 9 software (see Figure 1).

Table 1. Search strings from WOS Core Collection and Scopus.

WOS Core Collection	<p>TOPIC: ("corporate law ** OR "company law ** OR "securities law ** OR "regulation ** OR "regulatory approach ** OR "regulatory measure ** OR "disclosure regulation ** OR "securities regulation ** AND "corporate governance") AND TOPIC: ("corporate reporting" OR "sustainability reporting" OR "CSR reporting" OR "integrated reporting" OR "voluntary reporting" OR "corporate social reporting" OR "environmental reporting" OR "non-financial reporting" OR "integrated sustainability reporting" OR "corporate responsibility report" OR "triple bottom line reporting" OR "sustainable development reporting" AND "companies" OR "firm ** OR "corporation ** OR "organi *ation **") AND TOPIC: ("corporate disclosure ** OR "corporate transparency ** OR "corporate accountability" OR "corporate sustainability" OR "CSR disclosure ** OR "mandatory disclosure ** OR "voluntary disclosure ** OR "sustainability disclosure ** OR "ESG disclosure ** OR "non-financial disclosure ** OR "sustainability disclosure ** OR "non-financial information")</p>
Scopus	<p>TITLE-ABS-KEY ("corporate law ** OR "company law ** OR "securities law * OR "regulation ** OR "regulatory approach ** OR "regulatory measure ** OR "disclosure regulation ** OR "securities regulation** AND "corporate governance") AND TITLE-ABS-KEY ("corporate reporting" OR "sustainability reporting" OR "CSR reporting" OR "integrated reporting" OR "voluntary reporting" OR "corporate social reporting" OR "environmental reporting" OR "non-financial reporting" OR "integrated sustainability reporting" OR "corporate responsibility report" OR "triple bottom line reporting" OR "sustainable development reporting" AND "companies" OR "firm ** OR "corporation ** OR "organi *ation **") AND TITLE-ABS-KEY ("corporate disclosure ** OR "corporate transparency" OR "corporate accountability" OR "corporate sustainability" OR "CSR disclosure ** OR "mandatory disclosure ** OR "voluntary disclosure ** OR "sustainability disclosure ** OR "ESG disclosure ** OR "non-financial disclosure ** OR "sustainability disclosure ** OR "non-financial information")</p>

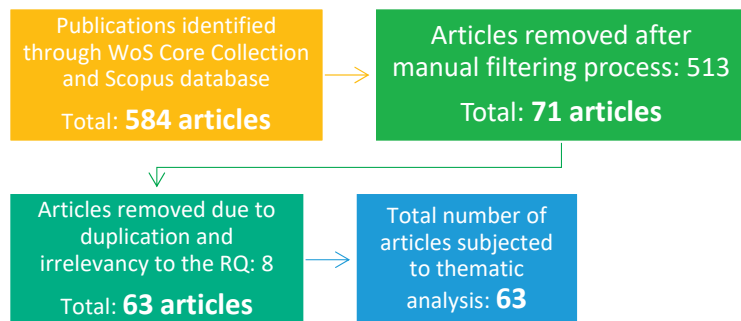


Figure 1. Article-search process as adapted from Zairul [34].

The 63 articles were exported to ATLAS.ti version 9 software as primary documents, grouped into author, issue number, periodical, publisher, volume, and year of publication. This grouping helps analyze articles according to their published year (Zairul, 2020). Next, the relevant papers were sorted one by one, for coding. In the first round of coding themes, 20 codes were formed. Finally, these codes were grouped into eight significant clusters of themes based on their categories. During this manual sorting, another paper was excluded because of a duplication issue. These themes relate to the research question, "what are the patterns and trends in the literature relating to regulations on non-financial information in

corporate reporting by companies from 2014 to early 2021?" The findings are presented in two parts: the quantitative and the qualitative findings.

4. Findings

4.1. Quantitative Findings

Table 2 depicts the number of publications per journal. We selected journals with two or more articles published on non-financial information regulations because the majority (35 journals) published one study from the selected years. *Sustainability* was the journal with the highest number of publications, with seven papers. It published articles on the issue of non-financial information regulations four years in a row, from 2017 to 2020. Journals published on disclosure laws on non-financial information do not necessarily have to be pure legal journals. The journals include *Accounting in Europe*, *Business Strategy and the Environment*, *Journal of Business Ethics*, *Meditari Accountancy Research* and *Sustainability*. The results implied that the requirement of disclosures on non-financial information is also a concern and of interest to other disciplines beyond the legal fraternity. This trend indicates the importance of disclosing non-financial information and how to manage it to ensure its effectiveness. The findings also highlighted the disciplines interrelating with disclosure laws on non-financial information, including accounting, business management, ethics, and the economy.

Table 2. The total number of publications per journal from 2014 to early 2021.

Journal	Documents
<i>Accounting in Europe</i>	2
<i>Accounting, Economics and Law: A Convivium</i>	2
<i>American Business Law Journal</i>	2
<i>Business Strategy and the Environment</i>	2
<i>European Company and Financial Law Review</i>	2
<i>International Journal of Law and Management</i>	4
<i>Journal of Business Ethics</i>	2
<i>Meditari Accountancy Research</i>	3
<i>Sustainability</i>	7
<i>Yale Journal on Regulation</i>	2

Source: WoS and Scopus database.

Figure 2 shows that the number of papers discussing non-financial information regulations generally increased from year to year. However, only one article was found to be published in 2021, as this review paper covers publications until March 2021. Nevertheless, seeing the trend in 2020, the authors anticipated that more publications would follow on this issue as the year progressed, considering its importance.

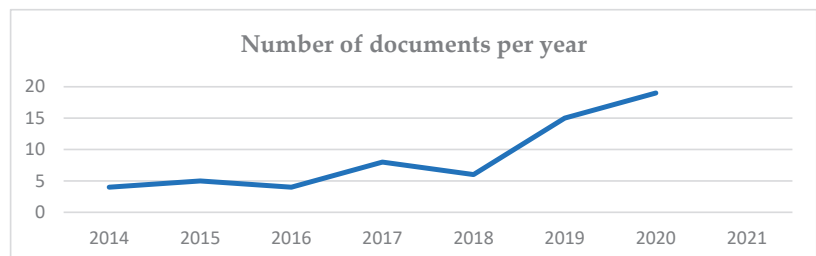


Figure 2. Number of documents by year.

Findings on the publications according to country can assist other researchers in identifying the researched areas and determining future research areas [43]. Based on the findings in Figure 3, researchers focused on the issue of non-financial information regulations in China, European Union countries in groups, Italy, the United Kingdom, and the United States. The publication containing studies on the European Union countries in groups continued every year from 2014 to 2020. However, in 2017, no study related to this matter was conducted in European Union countries. Nevertheless, studies were conducted in European Union member-states individually; Italy, Poland, and Romania, in 2017. The study on European Union countries in 2014 unsurprisingly discussed the integration of sustainability information in corporate reporting. It analyzed how legislation could support integrated reporting [44], considering that the introduction of < IR > Framework was in December 2013. The study conducted in China in 2014 investigated the relationship between regulatory pressures exerted by the government on the breadth of corporate social-responsibility reports [45].

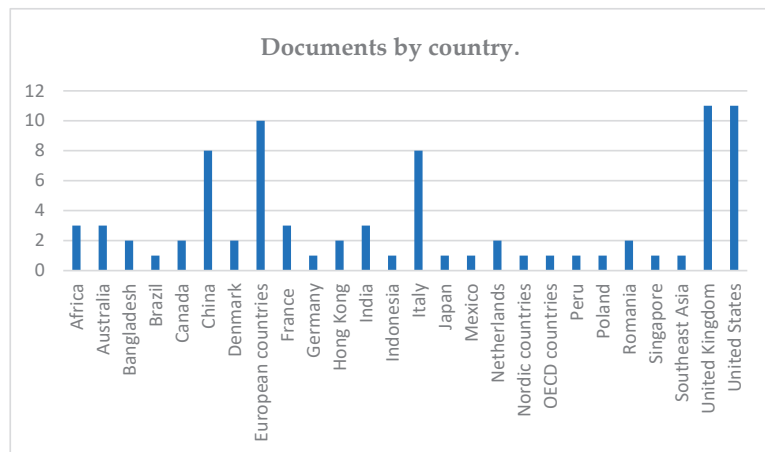


Figure 3. Documents by country.

There were two studies conducted in the Netherlands in the year 2014. The studies deliberated on using extraterritoriality and soft law in admonishing companies that disregarded human rights in their operation [46], and examined the effect of the regulatory environment on the application of integrated reporting [44]. The study conducted in Africa in 2014 intended to make companies accountable for false and misleading statements voluntarily published by them [47]. Interestingly, there has been no study on non-financial information regulations in Africa for four years consecutively, after 2014. The most probable reason for this absence lies in the fact that in that most studies conducted in Africa focused on examining the acceptance of integrated reporting. Examples include works that examined first, the development of integrated reporting by companies [48,49]; second, the challenges in preparing integrated reports [50]; third, the potential of integrated reporting in developing value-creation [51]; and fourth, the application of <IR> principles to sustainability disclosures [52], rather than scrutinizing the impacts of regulations on non-financial disclosures. A study conducted in the United Kingdom in the year 2014 focused on the area of corporate accountability regarding human-rights violations [46].

In 2015, the number of publications relating to non-financial information regulation increased to 11. Nevertheless, they then went down to only five publications in 2016, where the studies were conducted in Canada, China, European Union countries in groups, India, and the United States. However, the number of publications relating to this matter surged to 24 in 2019. There were four studies in the United Kingdom and three in both Italy and the United States. Therefore, inspecting the issues explored and discussed by these

studies is interesting. A study in the United Kingdom focused on corporate accountability for labour standards, precisely the Modern Slavery Act 2015 [53]. The subsequent study examined the effects of mandatory disclosure under the Companies Act 2006, Regulations 2013, on disclosed sustainability-information [54]. Another study examined how the United Kingdom adopted the 2014/95/EU Directive into their legal system [55], while Ho and Park [29] investigated the approaches by the United Kingdom regarding ESG matters.

Studies in the United States investigated the disclosure approaches to ESG matters [29], corporate accountability of companies that failed to disclose critical climate-change information [56] and the potential of disclosure mechanisms in ensuring the preservation of human rights by companies [57]. As for the studies in Italy, the researchers explored the level of the legal-system adaption to the requirements of the 2014/95/EU Directive [55], the quality of non-financial information after the implementation of the Legislative Decree 254/2016 [58] and the effects of the introduction of mandatory non-financial-reporting obligations by the 2014/95/EU Directive [27]. It is noteworthy that the studies conducted in the United Kingdom and the United States overlapped in one area relating to corporate accountability, implying concern by the scholars.

Another significant finding presented in Figure 3 is a lack of studies in countries aside from the United Kingdom, the United States, European countries, and China. Only three studies relating to disclosure laws were conducted in Southeast Asian countries. Mohan [59] supports the National Action Plans by Southeast Asian countries generally to take cognizance of the international standards for uniformity among these countries, especially on corporate accountability. A study in Singapore examined the effects of mandatory sustainability-reporting-requirements on the stock market [60]. A study in Indonesia investigated the relationship between government regulations and the extent of sustainability-information disclosure [61]. There has been no study in Brunei, Myanmar, Cambodia, Timor-Leste, Laos, Malaysia, the Philippines, Thailand, or Vietnam. Therefore, researching these countries regarding disclosure laws on non-financial information would be of significance and interest.

4.2. Qualitative Findings

The second part of the findings focuses on the qualitative discoveries derived from the ATLAS.ti version 9 software. Eight themes or patterns have been identified in trying to answer the research question. The themes identified are fiduciary duties of directors, corporate accountability, disclosure approaches, stakeholder engagement, the effectiveness of regulatory interventions, the impact of regulations, Directive 2014/95/EU, and the role of different actors, as presented in Figure 4.

Despite being subject to the same category, there are different groupings for the themes of Directive 2014/95/EU, the impacts of regulations, and regulatory interventions' effectiveness. The basis for such differentiation lies in the fact that Directive 2014/95/EU attracts a specific discussion. On the other hand, the other two themes touched on other disclosure laws, such as the United Kingdom Modern Slavery Act 2015 and the Bribery Act 2010. The articles grouped under the impact of regulations discussed the effect of regulations on different constructs, such as quality of reporting, the quantity of reporting, and corporate behaviour. The articles grouped under the theme of the effectiveness of regulatory interventions discussed the extent or effectiveness of a specific disclosure law in administering non-financial disclosures in corporate reporting. Several articles were grouped under more than one theme. The qualitative findings then proceeded as follows, for the analysis of each theme.

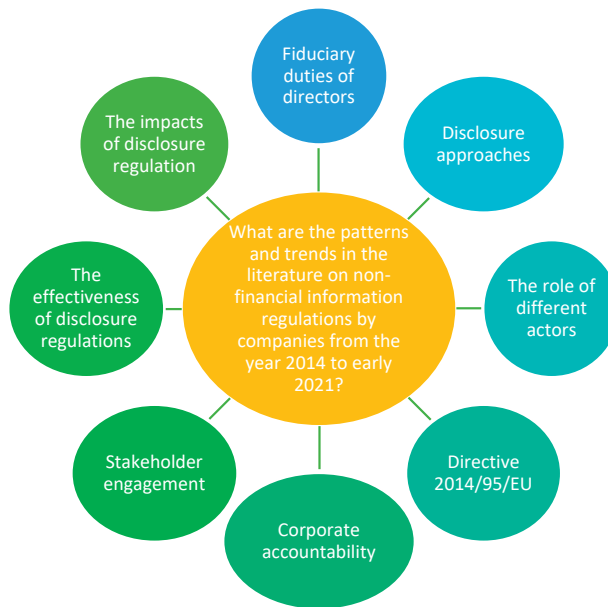


Figure 4. The patterns and trends in the literature on non-financial information regulations. Source: Authors' interpretation from the documents synthesized from WoS and Sco-pus database.

4.2.1. Fiduciary Duties of Directors

Based on the 62 articles reviewed, one of the patterns in the literature relating to regulations on non-financial information by companies is related to directors' fiduciary duties as shown in Figure 5. The theme of directors' fiduciary duties revolved around the extent of directors' fiduciary duties in executing responsibilities under non-financial disclosure reporting. From the sixty-two articles reviewed, only two articles discussed directors' fiduciary duties. Therefore, this pattern is unique; it stands for a theme independently, and does not belong to any other pattern.

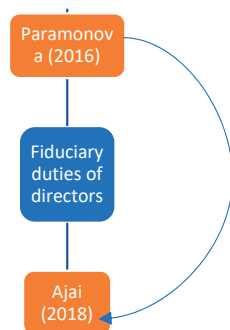


Figure 5. Papers under the theme of fiduciary duties of directors [62,63].

Paramonova [62] conducted a study to interpret the meaning of acting in the 'corporation's best interest' in an interdisciplinary approach. The lawmakers' meaning was criticized as being vague in their provision of clear guidelines to companies executing their responsibilities. A study by Ajai [63] conducted in Nigeria aimed to formulate a conceptual framework for the director's fiduciary duty to uphold corporate sustainability. Ajai [63] expands the study by Paramonova [62], to develop a conceptual framework. As only two

studies discussed the area relating to directors' fiduciary duties from a legal context, it is contended that future studies in other jurisdictions would benefit the academic world. In addition, one study emphasizes a need to clarify fiduciary duties in line with the evolving trend of sustainability in the corporate setting [64].

4.2.2. Corporate Accountability

Based on Figure 6, ten studies relate to corporate accountability. Publications within the corporate-accountability theme generally discuss a company's responsibility under non-financial disclosures.

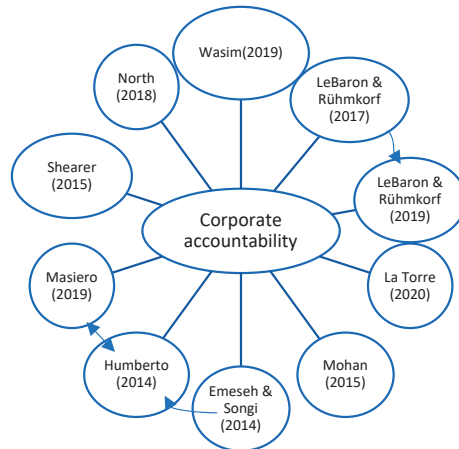


Figure 6. Papers under the theme of corporate accountability [46,47,53,56,59,65–69].

A study by Emeseh and Songi [47] in Africa explored the possibilities of improving the effectiveness of making companies accountable by their own voluntarily made statements in reports. A study by Humberto [46] supported the basis of the previous research by Emeseh and Songi [47], examining measures to hold companies accountable for their human-rights abuses. In 2015, there were two studies regarding corporate accountability in Southeast Asia [59], and another in the United States [69]. Mohan [59] argued for the embedding of international practices into local laws and policies via national action plans, which could effectively mitigate human-rights violations if properly constructed and implemented. At the same time, the study by Shearer [69] focused on lead, asbestos, and fossil industries, through lawsuits.

Next, only one study discussed the theme of corporate accountability in 2017, which was on regulatory approaches to promote accountability through the United Kingdom Modern Slavery Act 2015 and the United Kingdom Bribery Act 2010 [66]. LeBaron and Rühmkorf [53] continued the basis of the study in the year 2017, by explicitly investigating the regulatory processes that prompted the implementation of the United Kingdom Modern Slavery Act 2015. Another study considered the basis that can be used in a lawsuit by a plaintiff against a company relating to non-disclosure of climate change information [56]. Next, Masiero et al. [68] discussed how relational connectivity could enhance a company's accountability via Directive 2014/95/EU, which is in line with the study conducted by Humberto [46]. Both studies aimed to enhance the effectiveness of making a company accountable for non-financial disclosure issues. The latest research on the theme of corporate accountability was in the year 2020, and examined the concept of accountability within the context of Directive 2014/95/EU on non-financial information [67].

These findings on the corporate-accountability theme make the literature's patterns and trends more apparent. Future research may address loopholes by discussing, for example, using different concepts or theories to enhance the company's accountability.

Furthermore, future research may also look at the role of securities law in improving a company's responsibility. The above analysis shows that Directive 2014/95/EU is the most researched law on non-financial disclosure by companies.

4.2.3. Disclosure Approaches

The following pattern or trend is disclosure approaches as presented in Figure 7. The papers grouped under this theme examine disclosure approaches by countries in managing non-financial information by suggesting recommendations for improving the law or applying new theories in addressing transparency issues. For example, one study discussed the disclosure approaches in the United States and European jurisdictions, specifically the United Kingdom and France, and the transparency model for human-rights protection for companies' activities [70]. Another study examined the disclosure provisions in the United Kingdom Code of Corporate Governance as a case study [65]. At the same time, Berger-Walliser and Scott [71] reviewed the legalization of corporate social responsibility in the United States, the European Union, and China.



Figure 7. Papers under the theme of disclosure approaches [29,65,70–77].

It is intriguing to see that those studies relating to the theme of disclosure approaches started in 2018, whilst there are none consecutively in the years 2014, 2015, 2016 and 2017. This theme started to gain popularity from 2018 to 2020, when six papers in 2020 examined issues concerning this theme. In the year 2019, Ho and Park [29] proposed reforming the disclosure framework by suggesting the amalgamation of public regulations and private ordering, and in that attempt the researchers conducted their investigation in the United States, South Africa, Brazil, the European Union, the United Kingdom, Hong Kong, and China. This study is the only publication related to this theme of disclosure approaches in 2019.

The number of papers published in the year 2020 surged to six, and from observation, the concerns of each study were different. Hence, it is essential to present the purpose of the papers published in 2020, to observe the areas discussed and investigated. Kinderman [72] investigated the link between corporate social-responsibility performance and supranational-law support regarding disclosures in the Nordic countries. Next, Lipton [77] discussed the importance of stakeholder-oriented disclosure, while Saleem et al. [76] examined the evolution of French corporate-governance law, including exposures using the collaboration approach. Mangan et al. [73] explored the content disclosed under mandatory and voluntary disclosures in the marijuana industry in Canada. One study explained why the United States still relies heavily on private ordering in managing non-financial disclosures, and suggested possible reforms [75]. This study by Ho [75] can explain more about the study by Berger-Walliser and Scott [71] that explored the norms in the United

States regarding corporate social responsibility. Lastly, Abela [74] focused on business-model disclosures by examining the consistency of data obtained from industry players to conceptualise business models in the literature.

Based on the literature review on disclosure approaches, one possible future study is to examine disclosure approaches of integrated reporting. A study in the South African context suggested that the mandatory adoption of integrated reporting could be the driver for potential enhanced alignment with the SDGs [7], which requires further examination from the legal aspect on other jurisdictions. In addition, a company's direction in reporting should be beneficial to the other stakeholders rather than the investors alone [78], indicating the significance of integrated reporting.

4.2.4. Stakeholders' Engagement

The next theme established by utilizing the functions provided by ATLAS.ti version 9 is stakeholders' engagement as seen in Figure 8. Out of 62 articles, only two are grouped under this theme, despite its importance, which shows that this theme is under-explored [79].

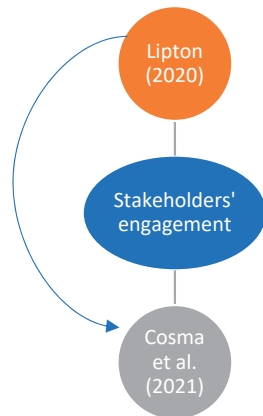


Figure 8. Papers under the theme of stakeholders' engagement [77,79].

From 2014 to early 2021, the literature that discussed this theme started in 2020, when Lipton [77] examined the feasibility of a stakeholder-oriented disclosure approach. Next, Cosma et al. [79] studied stakeholder engagement in European banks to determine the impacts of regulations on stakeholder engagement, and expanded the study by Lipton [77] as they looked into another angle relating to stakeholders' engagement. Finally, a study highlighted the importance of stakeholder engagement in achieving the SDGs [80], suggesting vital future studies under this theme, particularly from a legal perspective. A possible future study under this theme would be to develop the study by Cosma et al. [79] to investigate the impacts of disclosure regulations on the stakeholder-engagement process in other sectors.

4.2.5. The Effectiveness of Regulatory Interventions

As shown in Figure 9, several papers discuss the theme of the effectiveness of regulatory interventions. These papers generally aim to investigate how effective regulatory interventions are towards the more successful implementation of social-responsibility performance and enhanced transparency of information disclosure.

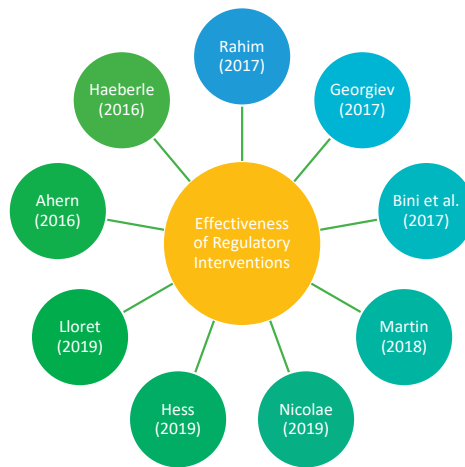


Figure 9. Papers under the theme of the effectiveness of regulatory interventions [57,70,81–87].

One study scrutinized the efficacy of disclosures under Directive 2014/95/EU in achieving sustainability and transparency [86]. Another study explored the extent to which regulations can enhance social-responsibility performance in RMG industries using a new governance approach [81], which extended the parameter of the study carried out by Ahern [86]. Next, Haerberle [87] studied the selective-disclosure rule by the SEC that is said to cause the underproduction of corporate information, hence intending to explore one new mechanism: constructing an information market to address the issue. Georgiev [82] expanded the study by Haerberle [87] when he examined the deficiencies of SEC disclosure rules. Georgiev [82] specifically studied materiality standards that led to the underproduction of information by large companies. Bini et al. [83] examined the effectiveness of regulations on management-commentary disclosure in Italy. Nicolae [84] expanded this further, by evaluating the efficiency of the Australian Corporations Act 2001 in improving climate-change performance by companies. The study examined the synergy between the said act and the Global Reporting Initiative (GRI). Lloret et al. [85] contradicted the study objective of Nicolae [84], demonstrating that regulatory interventions in curbing greenhouse-gas emissions impair sustainable behaviour by companies in Mexico, instead of promoting them. This study by Lloret et al. [85] is unique, as it challenges the assumption that regulations could encourage sustainable corporations.

Another study in line with Lloret et al. [85] is a study by Martin [70] that investigated whether disclosure laws effectively address human-rights issues or can be manipulated to improve a company's image. Martin [70] paved the way for future studies with a more critical question on the truth of a company's disclosure. A study by Hess [57] supported the basis of the study carried out by Martin [70], as it examined the potential effect of non-financial information regimes on human rights issues, and highlighted several problems regarding this type of disclosure, such as selective disclosure and impression management. Therefore, based on the literature that revolved around the theme of the effectiveness of regulatory interventions, it is observed that these papers are concerned with whether disclosure regulations can effectively realize sustainability goals.

4.2.6. The Impacts of Regulations

Based on Figure 10, it is unsurprising that most of the articles reviewed revolved around regulation impacts. It is only natural for researchers to investigate and examine the effects of disclosure laws on various constructs. Among the observations based on the literature review on this theme is that several studies aimed to find the relationship between disclosure regulations and the quality and quantity of sustainability reporting [27,45,61,88–94].



Figure 10. Papers under the theme of the impact of regulations [24,27,44,45,54,55,58,60,61,66,72,79,88–104].

For example, Zheng et al. [45] examined the association between regulation pressure and a companies' decision to report, and the comprehensiveness of the reporting. Szabó and Sørensen [88] investigated the possible impacts of Directive 2014/95/EU on the quantity of non-financial information disclosure and its consistency and comparability. Next, Venturelli et al. [5] analyzed the extent of non-financial information disclosed by Italian companies after the assimilation of Directive 2014/95/EU into Legislative Decree 254. In contrast, Mion and Loza Adai [27] explored the effects of Directive 2014/95/EU on the quality of sustainability reporting produced by Italian and German companies. Tarquinio et al. [94] also examined Directive 2014/95/EU, looking at how it influenced the number of sustainability disclosures by Italian companies. Faisal et al. [61] studied the effects of disclosure regulations on the extent of sustainability information by companies in Indonesia, and Loza Adai [91] studied the consequences of sustainability disclosure requirements on the quality of sustainability reporting in Peruvian companies.

A study by Tiron-Tudor et al. [90] provides fresh insight, as it analyzed the extent of sustainability disclosure by Romanian listed companies before and after implementing Directive 2014/95/EU, where most studies investigated the after-effects of disclosure regulations. A survey by Nicolò et al. [93] examined the relationship between Directive 2014/95/EU and the extent of sustainability disclosures by state-owned enterprises that issued integrated reporting; this study also provides a new perspective, as most studies do not focus on disclosures in integrated reporting.

Interestingly, while most of the literature discussed the after-effects of the introduction of disclosure regulations, Dumitru et al. [101] chose to investigate the quality of non-financial information by companies in Romania and Poland before the introduction of Directive 2014/90/EU. At the same time, Carini et al. [98] also examined sustainability disclosures by oil and gas companies before the introduction of Directive 2014/95/EU. These studies are of importance in assisting us to see clearly how companies change and adapt to comply with the Directive after its introduction, and whether the regulations play a significant role in ensuring sustainability-disclosure compliance by companies.

Another observation is that several studies focused on examining the impacts of sustainability-disclosure regulations on corporate behavior [45,66,92,100,102]. For example, Dong and Xu [102] explored the effects of CSR regulations on CSR disclosure practices in mining companies in China and LeBaron, and Rühmkorf [66] studied the impact of the UK Modern Slavery Act 2015 UK Bribery Act 2010 on corporate behavior. Next, Liu et al. [100] examined the effect of the Australian National Greenhouse and Energy Reporting Scheme on the voluntary disclosure of climate-change information. Finally, Guo and Yang [99] investigated the impact of SEC Guidance 2010 on corporate social-responsibility reporting. These studies chose specific regulations regarding disclosure to examine its effects on corporate practice.

Chakraborty [89] then examined the level of corporate social-responsibility performance and disclosure by banks listed on the Dhaka Stock Exchange. Jackson et al. [92] expanded the prior study by examining the effects of non-financial disclosure regulations on corporate social responsibility in 24 OECD countries. Aureli et al. [24] explored the impacts of mandatory non-financial disclosure, specifically on corporate practices of Italian-listed companies that did not disclose sustainability information before the transposition of Directive 2014/95/EU. Several studies examine a specific response from companies because of disclosure regulations. For example, Hummel and Rötzel [54] investigated the effects of the disclosure regulations on the greenhouse-gas emissions introduced under the United Kingdom Companies Act 2006 Regulations 2013 towards companies' practices. Hong et al. [104] considered how sustainability disclosure regulations affected companies' disclosures on green innovation. A study by Lu et al. [95] provides an interesting angle in examining the impact of sustainability reporting regulations on companies in China that are not subjected to disclosure regulations, as most studies investigated the effect of regulations on the subjected entities. Finally, a study by Cosma et al. [79] expanded the previous studies. It examined the impact of the introduction of Directive 2014/95/EU on stakeholders' engagement process by European banks, which the prior literature under this theme did not discuss.

Next, several studies explored the interrelation between disclosure regulations and stock value or a company's investment [60,97]. For example, Liu et al. [60] explored the impacts of sustainability reporting regulations on the stock markets of Singapore and Hong Kong, and Cordazzo et al. [97] investigated the effects of mandatory disclosure regulations on the value of non-financial information of Italian-listed companies for investors. Cousins et al. [96] then examined the impact of the United Kingdom Modern Slavery Act 2015 on stock prices. These studies signified the importance of upholding shareholders' interest in companies by prioritizing their investment returns.

A few studies aimed to investigate selected countries' reactions to the introduction of Directive 2014-95/EU. For instance, Camilleri [103] explored how some European Union member-states reacted and adapted to Directive 214/95/EU. Then, Aureli et al. [55] studied the transposition of Directive 2014/95/EU into the United Kingdom, France and Italy's legal systems using the fit/misfit theory. Next, Kinderman [105] aimed to explore governments' position, specifically France, Germany, and the United Kingdom, towards Directive 2014/95/EU, and analyzed the factors influencing their preferences and the prospect of regulatory harmonization.

From observation, a possible future study under this theme would be to expand the research by Kinderman [105] by investigating Southeast Asian countries' approaches and

preferences in introducing regulations on non-financial information by companies, as most studies focused on European countries.

4.2.7. Directive 2014/95/EU

From Figure 11, considerable literature revolved around the Directive 2014/95/EU theme. This tendency is because most studies relating to non-financial information were conducted in European countries. Some aimed to examine the impacts of Directive 2014/95/EU towards corporate behavior, the quantity and quality of sustainability reporting, stock prices and countries' reactions and preferences [5,27,55,88,93,94,105,106].



Figure 11. Papers under the theme of Directive 2014/95/EU [5,24,27,55,67,68,72,79,86,88,90,93,94,97,98,101,105,107].

For example, Szabó and Sørensen [88] conducted a study investigating the application scope of Directive 2014/95/EU and its enforcement, as well as examining the likely impacts of this Directive on the quality and quantity of sustainability reporting. Next, Ahern [86] examined the effectiveness of Directive 2014/95/EU in ensuring corporate transparency and sustainability. Then, La Torre et al. [107] aimed to shed light on future corporate-reporting research induced by Directive 2014/95/EU. Masiero et al. [68] investigated the possibility of relational connectivity in improving the accountability of companies with the assistance of Directive 2014/95/EU. La Torre et al. [67] expanded the prior study by Masiero et al. [68], looking into corporate accountability by examining the accountability concept within the context of Directive 2014/95/EU, to provide insights for future research.

4.2.8. The Role of Different Actors

This theme looked for papers that elaborated on the interactions between various actors with non-financial information regulations. Actors could mean the industry, the government, the society or the NGOs.

Based on Figure 12, only two articles discuss the role of different actors, whereas Camilleri [106] studied the role of government in formulating corporate social-responsibility policies in enhancing corporate disclosures, transparency, and accountability towards the stakeholders. Then, LeBaron and Rühmkorf [53] explored the interactions between the industry, NGOs, and the government on the stringency of the United Kingdom Modern Slavery Act 2015. Hence, it is intriguing to examine the role of these actors towards

other specific non-financial disclosure regulations by expanding the study by LeBaron and Rühmkorf [53]. One study highlights the significant role of NGOs in achieving environmental sustainability goals [108], indicating their possible participation in implementing SDG policies.



Figure 12. Papers under the theme of the role of different actors [53,103].

5. Discussion and Future Studies

This review paper highlighted the quantitative and qualitative findings derived from the ATLAS.ti version 9. The perks of utilizing this software in conducting a thematic review are that it assists in document management and makes it easier for the researcher to identify the themes, by coding the relevant sentences relevant to answer the research question posed above. This review paper identified eight themes or patterns to answer the research question: fiduciary duties of directors, corporate accountability, disclosure approaches, stakeholder engagement, the effectiveness of regulatory interventions, the impact of regulations, Directive 2014/95/EU, and the role of different actors. The categorization of themes helps researchers perceive the popularly discussed patterns among scholars, and would assist in determining the gap in the literature relating to corporate disclosure regulations. For example, there is a lack of research into corporate disclosure laws in Southeast Asia countries. No analysis has yet been carried out on the disclosure regulations in Brunei, Myanmar, Cambodia, Timor-Leste, Laos, Malaysia, the Philippines, Thailand, or Vietnam. Future research should address this gap. Hence, conducting studies on corporate disclosure laws in these countries would be essential. To reiterate, most of the studies relating to regulations of non-financial information were conducted in European countries and revolved around Directive 2014/95/EU. This finding emphasizes the need to conduct studies in other jurisdictions, considering that all the United Nations member states have adopted the 2030 Agenda for sustainable development, not only the European countries.

Furthermore, only two studies discussed the theme of directors' fiduciary duties, and these were in Canada and Nigeria. More research needs to be carried out to explore the extent to which a director can be made accountable regarding non-financial information disclosure, as this area is still under-explored and vague. Therefore, it is contended that future research concerning this area in other jurisdictions worldwide would be valuable to the academic world. Next, many opportunities are available to examine various concepts or theories to enhance a company's accountability. The issue of a company's accountability is an ever-revolving subject, considering that companies' conduct can affect their surroundings significantly, emphasizing the need for more studies in this area. In addition, the securities law should be examined, as it is also relevant in improving a company's responsibility.

Another possible future study based on thematic review findings would be on disclosure approaches of integrated reporting. It was found that the studies grouped under the theme disclosure-approach research focused on sustainability reporting. This finding is

intriguing, since that integrated reporting is said to be the trend for corporate reporting. Furthermore, it was found by one study that companies that publish integrated reports tend to consider the SDGs when providing non-financial information [109]. Hence, it is suggested that more studies relating to disclosure regulations should also focus on integrated reporting.

A following possible future study would be to expand the research by Cosma et al. [79] to investigate the impacts of disclosure regulations on the stakeholder-engagement process in other sectors besides the financial industry. This trend is crucial, as the other industries or sectors also impact their surroundings tremendously. Another suggestion for future studies would be to expand the research by Martin [70] by investigating the extent of companies' disclosure and discussing potential ways to address the information gap. This study would enlighten the issue of why and how a company manipulates or cherry-picks data to enhance and protect its image and, if possible, provide recommendations to address this problem. Next would be to expand the study by Kinderman [105] by exploring Southeast Asian countries' approaches and preferences in introducing regulations on non-financial information by companies, as most studies focused on European countries. More studies in the Southeast Asian countries would contribute to a better and more precise understanding of their approaches, and consequently provide suggestions to improve the existing model relating to attaining the SDGs, for example. Lastly, a future study could also be conducted to examine the role of industry players, NGOs, and the government towards specific non-financial disclosure regulations by furthering the research by LeBaron and Rühmkorf [53]. The comprehension of the role of different actors in facilitating compliance with non-financial information disclosure regulations would contribute significantly to the regulators' management of companies.

Our thematic analysis contributes to creating a frame of reference for the state of knowledge in this research area, and can direct researchers in the design of future studies. However, this study is subject to several limitations. First, the Web of Science and Scopus databases were used to gather the publications for the study. Without a doubt, they represent the best-indexed databases. Future studies, however, might use additional databases such as Google Scholar, Westlaw, and LexisNexis, to obtain better results. Second, the sample data spans from early 2021 to 2014. Therefore, even though the timing attempts to provide a recent account of the recent reflection, a longer term is required. Nevertheless, despite the aforementioned limitations, this paper is still relevant in contributing to the academic literature and practice. Results presented as themes in this paper can serve as a clear guideline to others for the underexplored area on the regulations of non-financial information.

6. Concluding Remarks

As an actively intensifying area for research, the reporting requirement for non-financial information requires a robust direction for further exploration. A thematic review paper is extremely helpful in addressing gaps to contemplate future studies. Thus, this thematic review paper on the patterns and trends in the literature relating to regulations on non-financial information in corporate reporting by companies from 2014 to early 2021 would assist other researchers in investigating more in this area, considering the heightened importance and awareness of sustainability issues globally, which is also evidenced by the SDGs 2030 Agenda. A study found that corporate involvement in contributing to the SDGs is still limited [110]. Thus, further research should also investigate this. Non-financial information disclosed in corporate reporting would enhance the transparency of companies' business models so they could be better aligned with the SDGs. Furthermore, the IIRC envisages integrated reporting, which integrates financial and non-financial information to act as a mechanism that could align corporate behavior with the SDGs [111]. Therefore, the role of non-financial reporting should not be underestimated, including the regulations governing it.

From a managerial-implication perspective, this study may be useful for companies to pursue strategies to enhance the transparency of non-financial disclosures. Managers should consider this an opportunity to boost their companies' value and ultimately assist in sustainable development. It is critical to implement SDGs into business models [112]. Companies must consider the business risks associated with failing to plan for the SDGs in the long term [113]. Furthermore, managers should be aware that disclosure could prevent companies from sanctions under mandatory non-financial information regulations. Companies must respect the laws to be considered corporate citizens [16]. In addition, due to the rising demands of stakeholders for non-financial information from companies, it is critical to meet the stakeholders' needs to maintain their respectable image and preserve trust within society. In addition, transparency of non-financial information could improve the ability to predict high-growth companies, which is essential for stakeholders such as investors who seek to invest, and the policymakers who formulate effective frameworks to support sustainable development [114].

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References

- Oncioiu, I.; Popescu, D.-M.; Aviana, A.E.; Șerban, A.; Rotaru, F.; Petrescu, M.; Marin-Pantelescu, A. The Role of Environmental, Social, and Governance Disclosure in Financial Transparency. *Sustainability* **2020**, *12*, 6757. [\[CrossRef\]](#)
- Adams, C.; Zutshi, A. Corporate Social Responsibility: Why Business Should Act Responsibly and Be Accountable. *Aust. Account. Rev.* **2004**, *14*, 31–39. [\[CrossRef\]](#)
- Diaz-Sarachaga, J.M. Shortcomings in Reporting Contributions towards the Sustainable Development Goals. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1299–1312. [\[CrossRef\]](#)
- Costa, R.; Menichini, T.; Salierno, G. Do SDGs Really Matter for Business? Using GRI Sustainability Reporting to Answer the Question. *Eur. J. Sustain. Dev.* **2022**, *11*, 113. [\[CrossRef\]](#)
- Venturelli, A.; Caputo, F.; Cosma, S.I.; Leopizzi, R.; Pizzi, S.I. Directive 2014/95/EU: Are Italian Companies Already Compliant? *Sustainability* **2017**, *9*, 1385. [\[CrossRef\]](#)
- Elalfy, A.; Weber, O.; Geobey, S. The Sustainable Development Goals (SDGs): A Rising Tide Lifts All Boats? Global Reporting Implications in a Post SDGs World. *J. Appl. Account. Res.* **2021**, *22*, 557–575. [\[CrossRef\]](#)
- Corvino, A.; Doni, F.; Martini, S.B.S.B. Corporate Governance, Integrated Reporting and Environmental Disclosure: Evidence from the South African Context. *Sustainability* **2020**, *12*, 4820. [\[CrossRef\]](#)
- Gurviš-Suits, N.A.; Lvova, A.-L. Importance of Integrating SDGs Into Business Process by Telecommunication Operators: Opinion of Estonian Customers. *Eur. Integr. Stud.* **2021**, *1*, 221–230. [\[CrossRef\]](#)
- Garrido-Ruso, M.; Aibar-Guzmán, B.; Monteiro, A.P. Businesses' Role in the Fulfillment of the 2030 Agenda: A Bibliometric Analysis. *Sustainability* **2022**, *14*, 8754. [\[CrossRef\]](#)
- Erin, O.A.; Bamigboye, O.A. Evaluation and Analysis of SDG Reporting: Evidence from Africa. *J. Account. Organ. Chang.* **2021**, *18*, 369–396. [\[CrossRef\]](#)
- Alshbili, I.; Elamer, A.A.; Moustafa, M.W. Social and Environmental Reporting, Sustainable Development and Institutional Voids: Evidence from a Developing Country. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *28*, 881–895. [\[CrossRef\]](#)

12. Fonseca, L.; Carvalho, F. The Reporting of SDGs by Quality, Environmental, and Occupational Health and Safety-Certified Organizations. *Sustainability* **2019**, *11*, 5797. [\[CrossRef\]](#)
13. Zhou, M.; Govindan, K.; Xie, X. How Fairness Perceptions, Embeddedness, and Knowledge Sharing Drive Green Innovation in Sustainable Supply Chains: An Equity Theory and Network Perspective To. *J. Clean. Prod.* **2020**, *260*, 120950. [\[CrossRef\]](#)
14. Berger-Walliser, G.; Shrivastava, P. Beyond Compliance: Sustainable Development, Business, and Proactive Law. *Geo. J. Int'l L.* **2015**, *46*, 417–474.
15. Choudhury, B. Social Disclosure. *Berkeley Bus. Law J.* **2016**, *13*, 183–216.
16. Hichri, A. Corporate Governance and Integrated Reporting: Evidence of French Companies. *J. Financ. Report. Account.* **2022**, *20*, 472–492. [\[CrossRef\]](#)
17. Erkens, M.; Paugam, L.; Stolowy, H. Non-Financial Information: State of the Art and Research Perspectives Based on a Bibliometric Study. *Comptab. Control Audit* **2015**, *21*, 15–92. [\[CrossRef\]](#)
18. Fortuna, F.; Testarmata, S.; Sergiacomi, S.; Ciaburri, M. Mandatory Disclosure of Non-financial Information: A Structured Literature Review. In *CSR, Sustainability, Ethics and Governance*; Springer: Cham, Switzerland, 2020; pp. 95–128.
19. Grueso-Gala, M.; Zornoza, C.C. A Bibliometric Analysis of the Literature on Non-Financial Information Reporting: Review of the Research and Network Visualization. *Cuad. Gest.* **2022**, *22*, 175–192. [\[CrossRef\]](#)
20. Zarzycka, E.; Krasodomska, J.; Dobija, D. Stakeholder Engagement in Corporate Social Practices and Non-Financial Disclosures: A Systematic Literature Review. *Cent. Eur. Manag. J.* **2021**, *29*, 112–135. [\[CrossRef\]](#)
21. Krištofik, P.; Lament, M.; Musa, H. The Reporting of Non-Financial Information and the Rationale for Its Standardisation. *E M Ekon. Manag.* **2016**, *19*, 157–175. [\[CrossRef\]](#)
22. Fiandrino, S.; Gromis di Trana, M.; Tonelli, A.; Lucchese, A. The Multi-Faceted Dimensions for the Disclosure Quality of Non-Financial Information in Revising Directive 2014/95/EU. *J. Appl. Account. Res.* **2022**, *23*, 274–300. [\[CrossRef\]](#)
23. Muserra, A.L.; Papa, M.; Grimaldi, F. Sustainable Development and the European Union Policy on Non-Financial Information: An Italian Empirical Analysis. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 22–31. [\[CrossRef\]](#)
24. Aureli, S.; Del Baldo, M.; Lombardi, R.; Nappo, F. Nonfinancial Reporting Regulation and Challenges in Sustainability Disclosure and Corporate Governance Practices. *Bus. Strateg. Environ.* **2020**, *29*, 2392–2403. [\[CrossRef\]](#)
25. Chelli, M.; Durocher, S.; Fortin, A. Normativity in Environmental Reporting: A Comparison of Three Regimes. *J. Bus. Ethics* **2018**, *149*, 285–311. [\[CrossRef\]](#)
26. Lodhia, S.; Kaur, A.; Chinthana Kuruppu, S. The Disclosure of Sustainable Development Goals (SDGs) by the Top 50 Australian Companies: Substantive or Symbolic Legitimation? Substantive or Symbolic Legitimation. *Meditari Account. Res.* **2022**; ahead of print. [\[CrossRef\]](#)
27. Mion, G.; Loza Aduai, C.R. Mandatory Nonfinancial Disclosure and Its Consequences on the Sustainability Reporting Quality of Italian and German Companies. *Sustainability* **2019**, *11*, 4612. [\[CrossRef\]](#)
28. Steuer, S.; Tröger, T.H. The Role of Disclosure in Green Finance. *J. Financ. Regul.* **2022**, *8*, 1–50. [\[CrossRef\]](#)
29. Ho, V.H.; Park, S.K. ESG Disclosure in Comparative Perspective: Optimizing Private Ordering in Public Reporting. *Univ. Pennsylvania J. Int. Law* **2019**, *41*, 249–328.
30. Xie, G.; Yang, Y.; Jiang, K.; Chen, Z. The Effect of the New Environmental Protection Law on Corporate Financialization in China. *Environ. Sci. Pollut. Res.* **2022**, *29*, 83596–83611. [\[CrossRef\]](#)
31. Bebbington, J.; Kirk, E.A.; Larrinaga, C. The Production of Normativity: A Comparison of Reporting Regimes in Spain and the UK. *Accounting Organ. Soc.* **2012**, *37*, 78–94. [\[CrossRef\]](#)
32. García-Sánchez, I.M.; Rodríguez-Ariza, L.; Aibar-Guzmán, B.; Aibar-Guzmán, C. Do Institutional Investors Drive Corporate Transparency Regarding Business Contribution to the Sustainable Development Goals? *Bus. Strateg. Environ.* **2020**, *29*, 2019–2036. [\[CrossRef\]](#)
33. Tarquinio, L.; Posadas, S.C. Exploring the Term “Non-Financial Information”: An Academics’ View. *Meditari Account. Res.* **2020**, *28*, 727–749. [\[CrossRef\]](#)
34. Zairul, M. A Thematic Review on Student-Centred Learning in the Studio Education. *J. Crit. Rev.* **2020**, *7*, 504–511. [\[CrossRef\]](#)
35. Clarke, V.; Braun, V. Thematic Analysis. In *Encyclopedia of Critical Psychology*; Springer: New York, NY, USA, 2014; pp. 1947–1952.
36. Mohamed Shaffril, H.A.; Ahmad, N.; Samsuddin, S.F.; Samah, A.A.; Hamdan, M.E. Systematic Literature Review on Adaptation towards Climate Change Impacts among Indigenous People in the Asia Pacific Regions. *J. Clean. Prod.* **2020**, *258*, 120595. [\[CrossRef\]](#)
37. Mohamed Shaffril, H.A.; Samsuddin, S.F.; Abu Samah, A. The ABC of Systematic Literature Review: The Basic Methodological Guidance for Beginners. *Qual. Quant.* **2020**, *55*, 1319–1346. [\[CrossRef\]](#)
38. Albitar, K.; Hussainey, K.; Kolade, N.; Gerged, A.M. ESG Disclosure and Firm Performance before and after IR. *Int. J. Account. Inf. Manag.* **2020**, *28*, 429–444. [\[CrossRef\]](#)
39. Al Fadli, A.; Sands, J.; Jones, G.; Beattie, C.; Pensiero, D. Board Gender Diversity and CSR Reporting: Evidence from Jordan. *Australas. Account. Bus. Financ. J.* **2019**, *13*, 29–52. [\[CrossRef\]](#)
40. Marcia, A.; Callaghan, C.; Maroun, W. Value Relevance and Corporate Responsibility Reporting in the South African Context: An Alternate View Post King-III. *S. Afr. J. Econ. Manag. Sci.* **2015**, *18*, 500–518. [\[CrossRef\]](#)
41. Horn, R.; De Klerk, M.; De Villiers, C. The Association between Corporate Social Responsibility Reporting and Firm Value for South African Firms. *S. Afr. J. Econ. Manag. Sci.* **2018**, *21*, a2236. [\[CrossRef\]](#)

42. Nuswantara, D.A.; Pramesti, D.A. Corporate Social Responsibility Regulation in the Indonesian Mining Companies. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 161–169. [\[CrossRef\]](#)
43. Soriya, S.; Rastogi, P. A Systematic Literature Review on Integrated Reporting from 2011 to 2020. *J. Financ. Report. Account.* **2021**, *20*, 558–579. [\[CrossRef\]](#)
44. Lambooy, T.; Hordijk, R.; Bijveld, W. Communicating about Integrating Sustainability in Corporate Strategy: Motivations and Regulatory Environments of Integrated Reporting from a European and Dutch Perspective. In *Critical Studies on Corporate Responsibility, Governance and Sustainability*; Emerald Group Publishing Ltd.: Bingley, UK, 2014; Volume 6, pp. 217–255. ISBN 9781783507955.
45. Zheng, L.; Balsara, N.; Huang, H. Regulatory Pressure, Blockholders and Corporate Social Responsibility (CSR) Disclosures in China. *Soc. Responsib. J.* **2014**, *10*, 226–245. [\[CrossRef\]](#)
46. Humberto, C.R. Developments in Extraterritoriality and Soft Law: Towards New Measures to Hold Corporations Accountable for Their Human Rights Performance? *Anu. Mex. Derecho Int.* **2014**, *14*, 727–763. [\[CrossRef\]](#)
47. Emeseh, E.; Songi, O. CSR, Human Rights Abuse and Sustainability Report Accountability. *Int. J. Law Manag.* **2014**, *56*, 136–151. [\[CrossRef\]](#)
48. Clayton, A.F.A.; Rogerson, J.M.J.; Rampedi, I. Integrated Reporting vs. Sustainability Reporting for Corporate Responsibility in South Africa. *Bull. Geogr.* **2015**, *29*, 7–17. [\[CrossRef\]](#)
49. Rowbottom, N.; Locke, J. The Emergence of <IR>. *Account. Bus. Res.* **2016**, *46*, 83–115. [\[CrossRef\]](#)
50. McNally, M.-A.; Cerbone, D.; Maroun, W. Exploring the Challenges of Preparing an Integrated Report. *Meditari Account. Res.* **2017**, *25*, 481–504. [\[CrossRef\]](#)
51. McNally, M.A.; Maroun, W. It Is Not Always Bad News: Illustrating the Potential of Integrated Reporting Using a Case Study in the Eco-Tourism Industry. *Account. Audit. Account. J.* **2018**, *31*, 1319–1348. [\[CrossRef\]](#)
52. Kılıç, M.; Kuzeý, C. Assessing Current Company Reports According to the IIRC Integrated Reporting Framework. *Meditari Account. Res.* **2018**, *26*, 305–333. [\[CrossRef\]](#)
53. LeBaron, G.; Rühmkorf, A. The Domestic Politics of Corporate Accountability Legislation: Struggles over the 2015 UK Modern Slavery Act. *Socio-Econ. Rev.* **2019**, *17*, 709–743. [\[CrossRef\]](#)
54. Hummel, K.; Rötzel, P. Mandating the Sustainability Disclosure in Annual Reports—Evidence from the United Kingdom. *Schmalenbach Bus. Rev.* **2019**, *71*, 205–247. [\[CrossRef\]](#)
55. Aureli, S.; Magnaghi, E.; Salvatori, F. The Role of Existing Regulation and Discretion in Harmonising Non-Financial Disclosure. *Account. Eur.* **2019**, *16*, 290–312. [\[CrossRef\]](#)
56. Wasim, R. Corporate (Non) Disclosure of Climate Change Information. *Columbia Law Rev.* **2019**, *119*, 1311–1354.
57. Hess, D. The Transparency Trap: Non-Financial Disclosure and the Responsibility of Business to Respect Human Rights. *Am. Bus. Law J.* **2019**, *56*, 5–53. [\[CrossRef\]](#)
58. Caputo, F.; Leopizzi, R.; Pizzi, S.; Milone, V. The Non-Financial Reporting Harmonization in Europe: Evolutionary Pathways Related to the Transposition of the Directive 95/2014/EU within the Italian Context. *Sustainability* **2019**, *12*, 92. [\[CrossRef\]](#)
59. Mohan, M. Corporate Accountability in Southeast Asia: National Action Plans for Responsible Business Conduct under International Law. *J. East Asia Int. Law* **2015**, *8*, 9–28. [\[CrossRef\]](#)
60. Liu, F.H.M.; Demeritt, D.; Tang, S. Accounting for Sustainability in Asia: Stock Market Regulation and Reporting in Hong Kong and Singapore. *Econ. Geogr.* **2019**, *95*, 362–384. [\[CrossRef\]](#)
61. Faisal, F.; Situmorang, L.S.; Achmad, T.; Prastiwi, A. The Role of Government Regulations in Enhancing Corporate Social Responsibility Disclosure and Firm Value. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 509–518. [\[CrossRef\]](#)
62. Paramonova, E. Steering Toward “True North”: Canadian Corporate Law, Corporate Social Responsibility, and Creating Shared Value. *Mcgill Int. J. Sustain. Dev. Law Policy* **2016**, *12*, 23–46.
63. Ajai, O. Developing a Corporate Director’s Internal Fiduciary Duty to Promote Corporate Sustainability: A Comparative Survey of Hard and Soft Laws Benchmarking Nigerian Law. *Int. J. Bus. Gov. Ethics* **2018**, *13*, 170–198. [\[CrossRef\]](#)
64. Kibsey, S.; Kibsey, S.D.; Addas, A.; Krosinsky, C. The Evolving Risk Management Opportunity and Thinking Sustainability First. In *Ecological, Societal, and Technological Risks and the Financial Sector*; Palgrave Studies in Sustainable Business in Association with Future Earth; Palgrave Macmillan: Cham, Switzerland, 2020; pp. 123–139. [\[CrossRef\]](#)
65. Shearer, C. On Corporate Accountability: Lead, Asbestos, and Fossil Fuel Lawsuits. *NEW Solut. A J. Environ. Occup. Health Policy* **2015**, *25*, 172–188. [\[CrossRef\]](#)
66. LeBaron, G.; Rühmkorf, A. Steering CSR Through Home State Regulation: A Comparison of the Impact of the UK Bribery Act and Modern Slavery Act on Global Supply Chain Governance. *Glob. Policy* **2017**, *8*, 15–28. [\[CrossRef\]](#)
67. Masiero, E.; Arkhipova, D.; Massaro, M.; Bagnoli, C. Corporate Accountability and Stakeholder Connectivity. A Case Study. *Meditari Account. Res.* **2019**, *28*, 803–831. [\[CrossRef\]](#)
68. La Torre, M.; Sabelfeld, S.; Blomkvist, M.; Dumay, J. Rebuilding Trust: Sustainability and Non-Financial Reporting and the European Union Regulation. *Meditari Account. Res.* **2020**, *28*, 701–725. [\[CrossRef\]](#)
69. Martin, J. Hiding in the Light: The Misuse of Disclosure to Advance the Business and Human Rights Agenda. *Columbia J. Transnatl. Law* **2018**, *56*, 530–592. [\[CrossRef\]](#)
70. North, G. Are Corporate Governance Code Disclosure and Engagement Principles Effective Vehicles for Corporate Accountability? The United Kingdom as a Case Study. *Deakin Law Rev.* **2018**, *23*, 177–208. [\[CrossRef\]](#)

71. Berger-Walliser, G.; Scott, I. Redefining Corporate Social Responsibility in an Era of Globalization and Regulatory Hardening. *Am. Bus. Law J.* **2018**, *55*, 167–218. [\[CrossRef\]](#)
72. Kinderman, D. The Tenuous Link between CSR Performance and Support for Regulation: Business Associations and Nordic Regulatory Preferences Regarding the Corporate Transparency Law 2014/95/EU. *Bus. Polit.* **2020**, *22*, 413–448. [\[CrossRef\]](#)
73. Lipton, A. Not Everything Is About Investors: The Case for Mandatory Stakeholder Disclosure. *Yale J. Regul.* **2020**, *37*, 499–572. [\[CrossRef\]](#)
74. Saleem, I.; Lamarque, E.; Hasan, R. State and Self-Regulation for Better Governance: An Implication of Collibration. *Int. J. Law Manag.* **2020**, *63*, 172–194. [\[CrossRef\]](#)
75. Mangel, C.; Paduano, A.; Paduano, B.; Hadzurik, J.; Leggio, J.; Russo, K. Smoke and Mirrors? Disclosures in the Marijuana Industry in Canada. *Account. Perspect.* **2020**, *19*, 149–179. [\[CrossRef\]](#)
76. Ho, V.H. Non-Financial Reporting & Corporate Governance: Explaining American Divergence & Its Implications for Disclosure Reform. *Account. Econ. Law A Conviv.* **2020**, *10*, 1–29. [\[CrossRef\]](#)
77. Abela, M. Paradise Lost: Accounting Narratives without Numbers. *Account. Econ. Law A Conviv.* **2020**, *10*. [\[CrossRef\]](#)
78. Morros, J. The Integrated Reporting: A Presentation of the Current State of Art and Aspects of Integrated Reporting That Need Further Development. *Intang. Cap.* **2016**, *12*, 336–356. [\[CrossRef\]](#)
79. Cosma, S.; Leopizzi, R.; Pizzi, S.; Turco, M. The Stakeholder Engagement in the European Banks: Regulation versus Governance. What Changes after the NF Directive? *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1091–1103. [\[CrossRef\]](#)
80. Jun, H.; Kim, M. From Stakeholder Communication to Engagement for the Sustainable Development Goals (Sdgs): A Case Study of Lg Electronics. *Sustainability* **2021**, *13*, 8624. [\[CrossRef\]](#)
81. Ahern, D. Turning Up the Heat? EU Sustainability Goals and the Role of Reporting under the Non-Financial Reporting Directive. *Eur. Co. Financ. Law Rev.* **2016**, *13*, 599–630. [\[CrossRef\]](#)
82. Rahim, M.M. Improving Social Responsibility in RMG Industries Through a New Governance Approach in Laws. *J. Bus. Ethics* **2017**, *143*, 807–826. [\[CrossRef\]](#)
83. Haerberle, K.S. Making a Market for Corporate Disclosure. *Yale J. Regul.* **2016**, *35*, 383–436. [\[CrossRef\]](#)
84. Georgiev, G.S. Too Big to Disclose: Firm Size and Materiality Blindspots in Securities Regulation. *UCLA Law Rev.* **2017**, *64*, 602–682.
85. Bini, L.; Dainelli, F.; Giunta, F. Is a Loosely Specified Regulatory Intervention Effective in Disciplining Management Commentary? The Case of Performance Indicator Disclosure. *J. Manag. Gov.* **2017**, *21*, 63–91. [\[CrossRef\]](#)
86. Nicolae, M. Corporate Disclosure on Climate Change: Evaluating the Australian Domestic Legal Framework’s Ability to Oversee and Enforce Disclosures Made by Corporate Entities Participating in Voluntary International Disclosure Regimes. *Environ. Plan. Law J.* **2019**, *36*, 229–241.
87. Lloret, A.; Domenge, R.; Castro-Hernández, M. Regulatory Limits to Corporate Sustainability: How Climate Change Law and Energy Reforms in Mexico May Impair Sustainability Practices in Mexican Firms. *Systems* **2019**, *7*, 3. [\[CrossRef\]](#)
88. Szabó, D.G.; Sørensen, K.E. New EU Directive on the Disclosure of Non-Financial Information (CSR). *Eur. Co. Financ. Law Rev.* **2015**, *12*, 307–340. [\[CrossRef\]](#)
89. Chakraborty, A. Impact of Statutory Regulation and Key Internal Factors on Firm’s Corporate Social Responsibility. *Int. J. Law Manag.* **2019**, *61*, 517–529. [\[CrossRef\]](#)
90. Tiron-Tudor, A.; Nistor, C.S.; Țețegnescu, C.A.; Zanellato, G. Encompassing Non-Financial Reporting in A Coercive Framework for Enhancing Social Responsibility: Romanian Listed Companies’ Case. *Amfiteatru Econ.* **2019**, *21*, 590–606. [\[CrossRef\]](#)
91. Loza Adauí, C.R. Sustainability Reporting Quality of Peruvian Listed Companies and the Impact of Regulatory Requirements of Sustainability Disclosures. *Sustainability* **2020**, *12*, 1135. [\[CrossRef\]](#)
92. Jackson, G.; Bartosch, J.; Avetisyan, E.; Kinderman, D.; Knudsen, J.S. Mandatory Non-Financial Disclosure and Its Influence on CSR: An International Comparison. *J. Bus. Ethics* **2020**, *162*, 323–342. [\[CrossRef\]](#)
93. Nicolò, G.; Zanellato, G.; Tiron-Tudor, A. Integrated Reporting and European State-Owned Enterprises: A Disclosure Analysis Pre and Post 2014/95/EU. *Sustainability* **2020**, *12*, 1908. [\[CrossRef\]](#)
94. Tarquinio, L.; Posadas, S.C.; Pedicone, D. Scoring Nonfinancial Information Reporting in Italian Listed Companies: A Comparison of before and after the Legislative Decree 254/2016. *Sustainability* **2020**, *12*, 4158. [\[CrossRef\]](#)
95. Dumitru, M.; Dyduch, J.; Gușe, R.-G.R.-G.; Krasodomska, J. Corporate Reporting Practices in Poland and Romania—An Ex-Ante Study to the New Non-Financial Reporting European Directive. *Account. Eur.* **2017**, *14*, 279–304. [\[CrossRef\]](#)
96. Carini, C.; Rocca, L.; Veneziani, M.; Teodori, C. Ex-Ante Impact Assessment of Sustainability Information—The Directive 2014/95. *Sustainability* **2018**, *10*, 560. [\[CrossRef\]](#)
97. Dong, S.; Xu, L. The Impact of Explicit CSR Regulation: Evidence from China’s Mining Firms. *J. Appl. Account. Res.* **2016**, *17*, 237–258. [\[CrossRef\]](#)
98. Liu, Z.; Abhayawansa, S.; Jubb, C.; Perera, L. Regulatory Impact on Voluntary Climate Change-Related Reporting by Australian Government-Owned Corporations. *Financ. Account. Manag.* **2017**, *33*, 264–283. [\[CrossRef\]](#)
99. Guo, Y.; Yang, D.C. Does the 2010 SEC Climate Change Disclosure Guidance Change Firms’ Corporate Social Responsibility Reporting? *Int. J. Bus.* **2017**, *22*, 25–40.
100. Hong, M.; Drakeford, B.; Zhang, K. The Impact of Mandatory CSR Disclosure on Green Innovation: Evidence from China. *Green Financ.* **2020**, *2*, 302–322. [\[CrossRef\]](#)

101. Lu, T.; Sivaramakrishnan, K.; Wang, Y.; Yu, L. The Real Effects of Mandatory Corporate Social Responsibility Reporting in China. *Prod. Oper. Manag.* **2020**, *30*, 1493–1516. [[CrossRef](#)]
102. Cordazzo, M.; Bini, L.; Marzo, G. Does the EU Directive on Non-financial Information Influence the Value Relevance of ESG Disclosure? Italian Evidence. *Bus. Strateg. Environ.* **2020**, *29*, 3470–3483. [[CrossRef](#)]
103. Cousins, P.; Dutoirdoir, M.; Lawson, B.; Neto, J.Q.F. Shareholder Wealth Effects of Modern Slavery Regulation. *Manag. Sci.* **2020**, *66*, 5265–5289. [[CrossRef](#)]
104. Camilleri, M.A. Environmental, Social and Governance Disclosures in Europe. *Sustain. Account. Manag. Policy J.* **2015**, *6*, 224–242. [[CrossRef](#)]
105. Kinderman, D. The Challenges of Upward Regulatory Harmonization: The Case of Sustainability Reporting in the European Union. *Regul. Gov.* **2020**, *14*, 674–697. [[CrossRef](#)]
106. Camilleri, M.A. Valuing Stakeholder Engagement and Sustainability Reporting. *Corp. Reput. Rev.* **2015**, *18*, 210–222. [[CrossRef](#)]
107. La Torre, M.; Sabelfeld, S.; Blomkvist, M.; Tarquinio, L.; Dumay, J. Harmonising Non-Financial Reporting Regulation in Europe: Practical Forces and Projections for Future Research. *Meditari Account. Res.* **2018**, *26*, 598–621. [[CrossRef](#)]
108. Sathasivam, K.; Abu Bakar, R.; Che Hashim, R. Embracing Organisational Environmental Sustainability: Experiences in Green Human Resource Management. *Bus. Strateg. Dev.* **2021**, *4*, 123–135. [[CrossRef](#)]
109. Curtó-Pagès, F.; Ortega-Rivera, E.; Castellón-Durán, M.; Jané-Llopis, E. Coming in from the cold: A longitudinal analysis of SDG reporting practices by Spanish listed companies since the approval of the 2030 agenda. *Sustainability* **2021**, *13*, 1178. [[CrossRef](#)]
110. van der Waal, J.W.H.; Thijssens, T. Corporate Involvement in Sustainable Development Goals: Exploring the Territory. *J. Clean. Prod.* **2020**, *252*, 119625. [[CrossRef](#)]
111. Lakshan, A.M.I.; Low, M.; de Villiers, C. Management of Risks Associated with the Disclosure of Future-Oriented Information in Integrated Reports. *Sustain. Account. Manag. Policy J.* **2021**, *12*, 241–266. [[CrossRef](#)]
112. Silva, S. Corporate Contributions to the Sustainable Development Goals: An Empirical Analysis Informed by Legitimacy Theory. *J. Clean. Prod.* **2021**, *292*, 125962. [[CrossRef](#)]
113. Singhania, M.; Saini, N. Quantification of ESG Regulations: A Cross-Country Benchmarking Analysis. *Vision* **2022**, *26*, 163–171. [[CrossRef](#)]
114. Coad, A.; Srhoj, S. Catching Gazelles with a Lasso: Big Data Techniques for the Prediction of High-Growth Firms. *Small Bus. Econ.* **2020**, *55*, 541–565. [[CrossRef](#)]

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Article

Investigating the Factors That Determine the ESG Disclosure Practices in Europe

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Abstract: The increased focus on environmental (E), social (S), and governance (G) (ESG) disclosure has become a necessary step toward the integration of sustainability practices into firms' culture to meet the expectations of stakeholders. The social and environmental implications of firm activities on the environment and surrounding communities have led to the growing demand for useful non-financial information. This paper investigates the impacts of the board's corporate social responsibility (CSR) strategy and CSR orientation, GRI, and the country-cultural dimensions, based on Hofstede's measures of ESG disclosure practices within Europe. Using a European dataset from Bloomberg and Refinitiv Eikon, this paper adopts a quantitative research methodology to test the research hypotheses through a statistical analysis of 7840 observations from European companies to analyze the extent of the relationship between micro- and macro-variables and the disclosure of company ESG. Our findings suggest that both board CSR orientation and strategy and the GRI have positively and significantly affected the overall disclosure of ESG practices within Europe. When examining country-cultural dimensions, we find that individualism and feminine cultures are positively associated with increased levels of ESG disclosure. Our findings shed light on factors affecting ESG disclosure practices within Europe and could be of interest to companies, policy makers, and other stakeholders.

Keywords: ESG disclosure; board CSR orientation; board CSR strategy; global reporting initiative; country-cultural dimensions; Europe

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1. Introduction

It is undeniable that non-financial information produced by companies has gained an increasing interest in the research sphere of accounting and sustainability in recent years [1–5]. The reporting of this sustainability information is prepared through information on corporate social performance (CSP), sustainability strategy, and goals evaluated by ESG factors [6]. This increase in reporting of nonfinancial information originates from increased societal attention and demand on how firms operate, with society questioning how firm activities affect the environment [1–5]. This need for transparency from larger stakeholders leads to the need for comparable non-financial information to assess company sustainability performance [7]. The inclusion of sustainability reports includes information related to emissions, waste, human rights, and corporate governance factors that are not captured in financial reports [2,3,5]. Sustainability reports target a wider audience of users, from governments to investors, customers, suppliers, and employees [4]. ESG disclosure scores are practices that can be used to satisfy investors' information needs requirements. At a firm level, an increased level of non-financial information mitigates risk and can increase corporate financial performance from risk mitigation due to the reduction of the cost of capital by disclosing more non-financial information [8]. As suggested by Ioannou and Serafeim, the disclosure of ESGs varies between firms and countries [9]. Therefore, this

research will further this investigation to determine factors that affect ESG disclosure practices in Europe. Within the Europe region, European managers view ESG practices in a different way. Influenced by country-level factors such as cultural systems, the differences in ESG disclosure practices create an interesting discussion and analysis. The absence of the standardization of ESG reporting requires an investigation into why firms disclose ESG information and what factors play a mediating role in this disclosure [8].

In light of this, the study aims to investigate the determinants that affect higher levels of ESG disclosure. In this research paper, we investigate the impact of the CSR orientation of the board, the CSR strategy of the board, the GRI and the country–culture dimensions on the level of ESG disclosure practices of firms in Europe. When analyzing board characteristics, we expect there to be a link between board orientation and its three components, the presence of an audit committee with financial expertise, board independence, and if there is gender diversity in the board, captured by the works of Liao et al. [10]. Previous studies by Shaukat et al. have suggested that these three board attributes increase firm CSR activities and their environmental performance [11]. Further research on the orientation of the CSR board from Helfaya and Moussa suggests that a strong level of board orientation is more likely to be more environmentally responsible. Therefore, ESG scores have become a key component of CSR [12,13]. Additionally, Shaukat et al. use the board CSR strategy score and find that firms with a more clear and comprehensive CSR strategy lead to higher environmental performance due to long-term orientation. This long-term orientation means that ESG areas are considered [10]. In recent years, numerous studies have measured and evaluated the impact of both firm (i.e., micro-level) and country (i.e., macro-level) factors on ESG disclosure practices. However, these micro and macro factors that jointly affect such levels of ESG disclosure remain unexplored, as there are an increasing number of factors that affect such levels, especially in cross-country studies. Alternatively, disclosed ESG information can affect the value of the firm if investors see such information as greenwashing risks faced by the firm [5]. Cucari et al. highlights the importance of CSR influences, such as the role of the CSR committee and the number of women on the board, having influence on ESG scores in an Italian context [12]. Toumi et al. explore the region of origin of the director for CSR disclosure linking with its cultural context by separating the representation between Anglo–American and European directors in France [14].

Based on a sample of 784 European firms during the period of 2011 and 2020, this paper makes several contributions to the literature. Although this previous literature on ESG disclosure is a highly researched field, we argue that the use of country–culture dimensions based on Hofstede’s cultural dimensions dummy variables, adapted from Li et al.’s classifications of Hofstede’s 2010 descriptive values, adds a new contribution to the literature, as previous studies use index numbers [15]. Second, the relationship between our impacts on CSR characteristics and ESG disclosure scores further expands the theoretical contribution of the CSR literature to the CSR strategy and orientation within CSR research [14].

Our results indicate that effective CSR-orientated firms that consider long-term strategies and promote a high level of board CSR orientation and a high level of CSR strategy led to a positive effect on the quality of ESG disclosure. Furthermore, the existence of a firm that follows the GRI guidelines has a significant effect on the level of ESG disclosure within our sample. Within this research, we further present the study not only with ESG as a whole component but within the individual pillars. We find that ESG disclosure is intricately linked to these internal characteristics that are linked to CSR-orientated directors creating such a positive link. Within the cultural element of this research, our results indicate that firms headquartered within cultural dimensions that exhibit feminine with long-term collaborative concern for social and environmental issues see an increased level of ESG disclosure scores. This research also further strengthens the link between firm and country-level attributes and ESG quality disclosure scores. These results support the theories of legitimacy, stakeholder, signaling, agency, and institutional. Thus, this paper extends the predicative power to these overlapping theories. Our research findings provide

a link between both firm-level and country-level factors that affect the level of European ESG disclosure practices.

The remainder of this paper is structured as follows. Section 2 presents the relevant review of the literature, followed by a discussion of the theoretical framework and the development of the main research hypotheses in Section 3. Section 4 describes the research methodology. Section 5 discusses our empirical results, followed by concluding remarks in Section 6.

2. Literature Review

The term ‘ESG’ was introduced in 2004 in ‘Who Cares Wins’ and was introduced to find ways to incorporate the aspects of ESG into the capital market [16]. From this point on, ESG is seen as an extension of traditional CSR and socially responsible investment (SRI) [1,2]. The growing public awareness of corporate recognition of actions toward the planet has led to this increase in the implementation of sustainability strategies. Within this, an increasing number of firms have now revealed their ESG information to the public [8]. The concern around ESG issues has grown into the realm of climate change, concern over poor working conditions such as safety violations, etc. [17]. Interest in ESG is also seen from the corporate perspective, identified by the Governance and Accountability Institute. For example, in their 2018 report, the institute found that 86% of the S&P 500 companies released sustainability reports [18]. These figures reflect the increase in sustainability reporting growth and how disclosure of ESG has become a tool for communicating sustainability activities [5,9]. This increase in the number of standalone sustainability reports published and/or CSR sections in annual reports is not only seen by investors and corporate management [18]; Helfaya and Whittington note that disclosure of ESG is desirable both from a private and public perspective. From a theoretical point of view, the link between the integration of the ESG strategy and cultural values can be seen [19]. From a theoretical point of view, the link between the integration of the ESG strategy and cultural values can be seen. Toumi et al. note that the cultural system within the country has effects on managerial decision-making processes [14]. This is further examined by Baldini et al. note that culture affects voluntary and mandatory disclosure of sustainability information [20]. Ioannoi and Serafeim note that within countries operating with a low level of social cohesion and unequal distribution of opportunities, managers feel a greater obligation within key stakeholders to enforce key increase in corporate disclosure through ESG reporting [9]. There are motivations behind reporting on ESG practices, within the capital markets; such disclosure is seen as effective risk management tool [1].

2.1. Importance of ESG Disclosure

Growing concerns about corporate CSR and sustainable development practices have been of central importance in meeting stakeholders’ expectations [21]. Therefore, the integration of a sustainable business strategy into the culture of the organization is believed to fulfil the varied expectations of stakeholders. Integration of ESG into strategic business operations has become vital when evaluating a firm’s performance [21]. In this vein, socially responsible investing is an investment strategy that considers two main components: (1) sustainable financial return, which focusses on long-term financial performance to create shareholder value; (2) nonfinancial returns to protect the interests of no shareholder stakeholders [22]. Therefore, stakeholders are increasingly exerting pressure on companies to minimize their negative impacts on society. Stakeholders also exert pressure to report increasingly detailed information on said practices through ESG disclosure [23]. This increased level of transparency ensures that companies act visibly and report on their activities, holding companies responsible for their actions [2,4]. Within this, the Sustainability Accounting Standards Board (SASB) developed ESG financial materiality standards. Khan et al. propose that the value of ESG is industry-sensitive and may not be important in some industries [24]. Furthermore, Williams also found this link within the disclosure of ESG and materiality within industries [25]. The work of Schiehl et al.’s integrated SASB content

analysis and identified stock price information is sensitive to ESG disclosure components. This indicates that industry-specific materiality should be considered in sustainability reports [26]. The findings also suggest that as ESG disclosure is industry-driven, stakeholders base non-equal weights on ESG disclosure based on the industry they are in, i.e., high or low industry impact.

Disclosure of ESG has become increasingly important for the reputation, brand image, and investment decision-making of a firm [27]. The ESG activities of a firm are considered crucial to institutional and individual investors, as disclosure of ESG serves the opportunities and risks faced by the firm. For example, Ellili's study states that investors now use ESG information to decide whether to invest in a firm or not. Consequently, ESG disclosure plays an important role in the growing need to satisfy investors' demands for non-financial information and corporate compliance, such as the GRI sustainability reporting framework [28]. The interplay between firm-level and country-level attributes is also significant within ESG disclosure performance. For example, Schiehl et al. found that cross-national governance has equated governance effectiveness with shareholder wealth. Within other cross-country literature [29], the research found that investor protection from the firm ownership structure is important for higher levels of governance within firms. The overall governance of the firm is highly influenced by voluntary codes, relationships, and the social norms seen in the country headquarters that establish the president for the internal governance systems in place [29]. In fact, there are several sustainability reporting frameworks, such as GRI and the International Integrated Reporting Council (IIRC) framework that covers ESG; these frameworks aim to provide reliable reporting guidelines that create comparability between firms [30]. However, the production of reports means that an effective corporate governance system must be in place. These build trust with end users of this information that fosters innovation in the capital market through the achievement of sustainable financial performance [31]. The overall objective of the disclosure of ESG used as a sustainable development mechanism is to create a long-term solution to the needs of society and protect the ecosystem [32]. Within the global sustainability agenda, the mitigation of climate change and the social shift to social and governance factors have become permanent characteristics of investors [33]. Furthermore, the 'Triple Bottom Line' model aims to protect and sustain society and the environment for future generations by achieving positive *profit*, making *people* happy and protecting the *planet* (i.e., 3Ps). This also involves maximizing the objective of market capitalization [34]. The focus on sustainability strategy means that it must be financially secure to create long-term value from reducing environmental impact through product innovation and activities to create a strategy that creates a competitive advantage. In summary, disclosure of ESG is considered necessary to create sustainable growth and provide market metrics for investment decisions [32].

2.2. EU Context of Sustainability

In light of significant differences in mentalities between different member states, the current EU framework on the disclosure of non-financial information does not provide a one-size-fits-all reporting of corporate narratives [35]. The perception of European governments is drawn from a myriad of intelligent and reflexive tools and guidance for responsible business practices that are continually drawn from EU institutions [35]. In the same context, Deegan states, governments tend to believe that social and environmental practices should remain voluntary and be determined by capital market forces and take the side of businesses when it comes to expanding corporate accountability [36]. In addition, social and environmental practices have been criticized in the social accounting literature for their lack of relevance and for their failure to affect sustainable development [36,37]. In the past, ESG disclosure has been offered on a voluntary basis in addition to traditional regulations to address domestic and global issues. In the absence of regulation for companies, there is limited motivation and incentive for companies to disclose more ESG information [38]. Furthermore, societies pay the benefits of ESG disclosures, and the company pays the cost of preparing and publishing this ESG information to the public [38]. This absence of regulation means that individual rating

agencies have different weightings for ESG disclosure, therefore ratings for the same company due to different weightings, and decreased comparability between different rating agencies, as the information is based on different key words creating biases [39].

The importance and need for non-financial information for internal and external stakeholders has increased [40]. Within the European context, on 12 June 2013, the EU adopted Directive 2013/50/EU, which amended the previous transparency directive 92004/109/EC [41]. This amendment addressed stakeholders' concerns that ESG disclosure practices should be required in conjunction with mandatory financial requirements for EU firms [41]. The implementation of the revised EU Directive 95/2014 is the first towards the transition from voluntary to mandatory reporting requirements of nonfinancial information. The purpose of this European Directive is to increase the overall integration of nonfinancial information into business strategies that enable the monitoring and communication of suitability efforts through this mandatory reporting [42]. This EU Directive also encompasses a broader strategy for promoting CSR within European firms. This creates a strong instrument for a more proactive system, where a softer approach to non-financial reporting has not been as effective with CSR integration [43]. In general, this directive requires large and listed companies with more than 500 employees in Europe to address nonfinancial issues such as social themes, staffing issues, human and labor rights, diversity policies, and business practices [43]. Cooper and Owen, for example, debate the choice between mandatory and voluntary reporting based on the EU directive. The authors argue that it is difficult to gauge the correct level of detail of the mandatory requirements in each included company [44]. This lack of sufficient information leads to a failure to change the regulation. However, one of the key points behind the EU Directive (2014/95/EU) is that all countries must follow the same rules for ESG information to increase the comparability and usefulness of the information for stakeholders [43].

3. Theoretical Framework and Hypothesis Development

3.1. Theoretical Framework

Research on ESG disclosure has increased significantly in recent years with a multiple theoretical framework underpinning research such as agency, stakeholder, signaling, institutional, and legitimacy theory. Agency theory stresses the existence of agency problems and information asymmetry between principals (i.e., shareholders) and agents (i.e., managers) [8]. According to agency theory, the principal delegates management power to the agent, who should be in the best interest of the principal, but usually pursues his own objectives to determine the interests of the principal [45], while stakeholder theory suggests that all actors of the firm should be accountable to shareholders and other stakeholders [46]. Moreover, signaling theory is concerned with market signals to address information asymmetry, which increases the likelihood of informed decisions between two parties. Scott and Meyer suggest that there are organizational practices adopted because they correspond to institutionalized expectations that are not under firm control. This is closely related to the theory of legitimacy, as firms constantly seek to ensure that they operate within the limits of social norms [47]. Therefore, in this study, we adopted a multi-theoretical framework that comprises agency, stakeholder, signaling, institutional, and legitimacy theory to understand ESG disclosure practice and its determinants in Europe. Firstly, agency theory is one of the most widely used theoretical perspectives to explain the relationship between corporate governance characteristics and corporate disclosure practices [7]. Agency theory is frequently related to ESG disclosure practices and their impact on corporate performance [31]. This theory argues that managers engage in ESG activities and disclosure to pursue their wishes. Moral hazards, for example, occur in the presence of asymmetry information, where management (the agent) knows more information about the company and decides to withhold this information from investors (the principal) [48]. Regarding ESG disclosure, firms disclose additional information to increase communication between management and investors, minimising the principal-agent problem [49]. In this regard, the disclosure of ESG information represents a tool capable of reducing information asymmetry, therefore

mitigating risk [48]. Managers who disclose their ESG performance can reduce exposure to future risks, such as environmental risk, litigation costs, and bad reputation [50].

Second, stakeholder theory focuses on the need to manage stakeholder expectations, which have the power to provide firms with the required resources (e.g., financial, manufacturing, social, human, and environmental capitals) which are essential to ensure the going concern of the business [49]. Stakeholder theory promotes the use of an internal management tool which focusses on strategies towards non-financial goals such as seeking to improve social welfare and surrounding environments. Such value maximizing governance practices can incorporate shareholder values due to good management practice [51,52].

Third, signaling theory is concerned with reducing information asymmetry. With this, the increase in communication channels increases the information available between the company and the users, thus reducing the information asymmetry [52]. The end user of this information chooses how to interpret the information, the signal sent by the company [53]. ESG disclosure information is used as a tool to provide voluntary information on sustainability efforts and disclosure of ESG performance indicators [54]. Flynn and Thornton argued that signaling theory suggests that voluntary disclosure decisions lead to value-related information on ESG performance. This voluntary nonfinancial disclosure helps investors predict economic earnings; therefore, firms use it to signal their sustainability achievements, legitimize their existence, and maintain or regain their corporate reputation [12,55].

Fourth, institutional theory is a frequently adopted framework in the literature on ESG, since disclosure of ESG plays an important role in portraying the reputation of corporate sustainability [56]. Therefore, institutional theory reflects the impact of social and environmental performance on corporate success [57]. Campbell notes that within the institutional theory paradigm, companies are perceived as economic units operating within such frameworks constructed by institutions with expectations [56]. Firms that operate in countries with similar institutional structures tend to adopt similar behavior forms, such as ethical behavior. Scott considers ethical behavior a normative institution, as it includes informal rules associated with morals and values [58].

Finally, from a legitimacy perspective, corporate legitimacy is gained by releasing more useful information on ESG that helps stakeholders assess the impact of their companies on society and the environment [12]. Reber et al. found that sustainability reporting is a key form of corporate communication that companies engage in with their strategic objective, thus increasing the legitimacy of the firm [59]. Using ESG reporting, organizations such show the public their compliance with societal norms [11]. Therefore, legitimacy theory is an important motivator for companies to disclose more ESG information to legitimize their existence and achieve sustainable growth through the social acceptance of their communities [11]. This disclosure of ESG can be used to convince societies that companies are working in accordance with their social norms to meet their expectations [50].

Based on the above discussion, this study will use these five theories to provide explanations for the ESG disclosure practices of EU companies. Therefore, these five theories are connected to each other to create a structure for the disclosure of the ESG of firms. Therefore, the disclosure of ESG can be used to convince the society that companies are working in accordance with social expectations [11]. Figure 1 represents the four following hypotheses with firm and board level drivers of ESG and country cultural drivers.

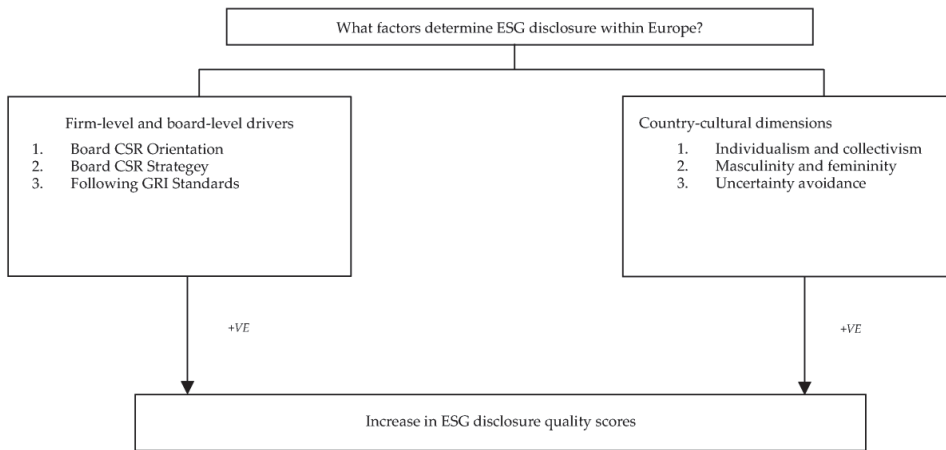


Figure 1. Research schema of expected relationship between firm-level and country-level cultural dimensions and ESG disclosure quality scores.

3.2. Hypothesis Development

3.2.1. Board CSR Orientation

Board CSR orientation is known as corporate directors' acknowledgment of the importance of the environmental concerns facing their companies [12]. Helfaya and Moussa found that board CSR orientation enhances sustainability activities and performance of companies [12]. Previous studies suggest that corporate board characteristics may be present among directors who have a positive impact on firm ESG disclosure practices, such as board independence, gender diversity, and the presence of at least one financial expert in the audit committee [11,12]. In the following, we discuss the rationale for the inclusion of each of the three characteristics of the board.

Board Independence—From an agency perspective, Fama and Jensen state that boards should consist of a greater proportion of non-executive directors (NEDs) to aid in decision-making as well as an increased level of monitoring potential conflicts of interest between managers and shareholders [60]. In fact, corporate executives have the ability and potential to be more attentive to short- and medium-term financial goals, while NEDs may feel that social and environmental issues are as important as profit maximization [60]. The presence of NEDs in boardrooms helps challenge decision-making, bringing different stakeholder perspectives [61]. Similarly, from the stakeholder perspective, greater board independence means that there are NEDs on the board who encourage management activities to maximize long-term value and higher levels of transparency [13]. Regarding ESG disclosure practices, previous literature has found that board independence plays a crucial role in mediating and promoting ESG disclosure practices to enhance transparency and build trust with stakeholders [62,63]. Similarly, Cuccari states that the more NEDs in the boardroom, the more investments in sustainability activities [13]. Both legitimacy and signaling theories support the debate that NEDs are very interested in considering the CSR activities and performance of their firms and, therefore, that they are disclosing more information about ESG to carry out their social and environmental responsibility to stakeholders [4,12]. Consequently, we argue that there is a positive association between the ESG disclosure score and the existence of board independence.

Board Gender Diversity—Boardroom gender diversity is increasingly recognized within the ESG and sustainability agenda. The role women play in corporate boardrooms is multifaceted [12]. First, according to the literature on board gender diversity, male directors are likely to be characterized by agentic attributes, while female directors have more communal characteristics [64]. In practical terms, women are concerned with the welfare of the entire society rather than shareholders; thus, women directors address the interests

of all stakeholders. Therefore, having more women on board affects the business agenda of their company with respect to social and environmental issues [65]. Second, compared to male directors, female directors have different experiences, as female directors tend to gain board experience with smaller firms [66]. This experience and diverse business background lead to contributing to the sustainability strategy and activities of their companies [67]. The presence of a female on board is also related to legitimacy, signaling, and institutional theory, as the presence is generally perceived as a signal of compliance with expectations of society, governance regulations, and capital markets requirements [67]. From the above, it is argued that board gender diversity is positively related to the ESG disclosure score [48,50].

The presence of financial expert in the Audit Committee—Iyer et al. define the presence of a financial expert in the audit committee as a director having an accounting or auditing background or any relevant financial experience [68]. It is argued that the efficiency of the audit committee is enhanced by the presence of at least one financial expert, as it ensures the effective operations of the audit committee and increases the effective monitoring of all financial matters [68]. In reality, boardroom directors with financial experience and qualifications will challenge managers and accounting and finance teams to comply fully with accounting standards and financial regulations to improve the credibility of all accounting records, including corporate reports [68]. In the same way as enhancing the credibility of corporate financial reporting, they will also consider other non-financial matters, including CSR reporting [48]. Previous empirical studies have shown a positive relationship between the presence of at least one financial expert on the audit committee and ESG disclosure scores [68]. According to both stakeholder and legitimacy theories, the presence of the financial expert in the audit committee will improve the quality of CSR disclosure practice [68]. In the same vein, the agency theory suggests that members with financial experience and qualifications will work to improve the ability of the audit committee to evaluate the judgments of auditors, and this can be an instrumental tool in controlling risk management, etc. [68]. Based on the above discussion, we expect a positive relationship between the board's CSR orientation and the ESG disclosure score. So, our first hypothesis is the following:

H1: *There is a positive association between board CSR orientation and ESG disclosure score.*

3.2.2. Board CSR Strategy

Board CSR strategy is defined by Banerjee, [69] (p. 106), as 'the extent to which environmental issues are integrated into a firm's strategic plans'. Firms should adopt an effective board CSR strategy to achieve their long-term strategic and sustainable business goals. Isaksson and Steimle provide evidence that companies with effective CSR strategies have better sustainability performance [70]. These results are also mirrored by the Helfaya and Moussa study which finds a positive association between effective board CSR strategies and corporate sustainability practices [12]. In fact, an effective CSR strategy on the board leads to better sustainability performance [12]. In relation to the theoretical framework, board CSR strategy has close ties to legitimacy theory as the presence of the board CSR strategy will help the corporate boardrooms to set and achieve their long-term goals and renew their licenses to operate [21]. This decision for a CSR strategy establishes a strategy to enhance the relationship between an organization and its stakeholders with which it operates according to stakeholder theory and legitimacy theory [71].

Based on the above debate, we expect a positive relationship between board CSR strategy and the ESG disclosure score. Accordingly, our second hypothesis is the following.

H2: *There is a positive association between the board's CSR strategy and the ESG disclosure score.*

3.2.3. Global Reporting Initiative

The GRI framework is for non-financial reporting that covers aspects of ESG reporting and performance. The GRI guidelines were initially published in 2000, with the purpose of supporting companies in creating sustainability reports that present the impacts of business

operations and activities on society and the environment [72]. The GRI is a voluntary sustainability reporting framework for organizations to prepare their sustainability reports [73]. Previous research indicates that the adoption of GRI sustainability reporting guidelines is on the rise and likely to increase despite current methodological difficulties and information gaps based on its voluntary reporting basis [73,74]. Based on the perspective of legitimacy theory, companies will legitimize their existence by following the GRI sustainability reporting guidelines to communicate their sustainability activities and performance, such as fighting climate change, respecting human and labor rights, fighting corruption, etc., to the public [75]. Similarly, according to signaling theory, companies can use GRI as an effective management tool to signal their commitment to long-term sustainability policies to meet the expectations of their stakeholders. Furthermore, such sustainable disclosure practices signal to stakeholders and society the strong corporate governance practices that are implemented that provide strong transparency, achieve long-term financial and non-financial goals, and improve overall participation of stakeholders [70].

On the basis of the above dialogue, we expect a positive relationship between the adoption of GRI and the ESG disclosure score. Therefore, our third hypothesis is the following.

H3: *There is a positive association between the adoption of the Global Reporting Initiative (GRI) and the ESG Disclosure Score.*

3.2.4. Country–Cultural Dimensions

Muttakin (p. 23) defines culture as ‘the collective programming of the mind that distinguishes the members of one human ground from those of another’ [76]. The author stated that these cultural dimensions such as the power distance index, individualism versus collectivism, uncertainty avoidance, masculinity versus femininity, long-term orientation versus short-term orientation, and indulgence versus restraint are integrated into consumer practices and corporate governance [76]. Drawing on these cultural dimensions, the current study encompasses three of the above six dimensions, namely (1) individualism and collectivism; (2) masculinity and femininity; and (3) uncertainty avoidance.

Individualism and collectivism—Individualism versus collectivism is related to the degree of independence among people in a society where society is seen as loosely knit and concerned with themselves and the immediate family [77]. Collectivism, in contrast, emphasizes the importance of community and community interest over individual interests and is expected to place the community first [77]. Shin et al. states that countries with higher collectivism, ESG practices are more likely to be embedded in societies obligations [78]. However, an individualism culture receives greater financial gains from disclosing ESG information.

Masculinity and Femininity—Raimo et al. notes that masculinity reflects a culture where there are dominant values present such as material goods and success [79]. In contrast, a feminine society reflects a more caring view and harmonization of the values and norms of others. At the firm level, masculine societies consider maximizing profits as social norm compared to feminine societies that focus on society members [79]. A feminine society may see the disclosure of ESG as an obligation to society; therefore, creates less incentive toward the disclosure of ESG as it is to maintain legitimacy rather than to create it [78]. Compared to a masculine society, ESG information is seen as a competitive advantage because the focus is placed on profit maximization for most firms. Shin et al.’s research found that masculine societies exhibit a stronger relationship between ESG performance and financial performance due to the competitive advantage seen by masculine cultures focusing on ESG disclosure cultures characterized by masculinity; thus, they are less likely to perceive ethical transgressions in business transactions, and this tolerance of unethical behavior creates conditions that are conducive to widespread corruption [80]. According to the adopted theoretical framework, institutional theory, for example, is considered ESG disclosure practice as an institutional factor that focusses on the role of social beliefs, values relations, and expectations constraints [80]. This argues that corporations are embedded in a nexus of formal and informal rules [81]. The dimensions of the country–culture are based

on Hofstede's constructs and represent a proxy for the deeper aspects of culture related to differences in institutional functioning. Within a femininity culture, the stakeholder perspective is characterized as femininity representing the social needs and harmonization of stakeholders at a holistic level.

Uncertainty avoidance low and high—Hofstede refers to uncertainty avoidance as 'the extent to which members of a culture feel threatened by uncertain or unknown situations' (p. 46). We base our country–culture dimensions on this [77]. Uncertainty avoidance deals with the tolerance of people for ambiguity and uncertainty. There is a strong positive correlation between risk taking attitude (i.e., uncertainty accepting behaviour) and unethical actions [82]. Singhapakdi's article concludes that there is a strong positive correlation between the attitude of people towards risk and unethical actions [81]. Uncertainty avoidant societies mean that risk taking is discouraged and societies are likely to have an increased demand for information. Countries with high uncertainty avoidance, such as Japan, prefer a structured environment such as a clear hierarchy, strict laws, and rules to minimize uncertainty. Therefore, a higher level of information on ESG is significantly associated with cultures characterized by a greater power distance (i.e., less likely to tolerate questionable business practices [83]). Within the theoretical framework adopted and the underpinning of uncertainty avoidance high and low, the institutional perspective is based on Hofstede's cross-country–cultural dimensions to successfully be perceived as legitimate actors [84].

Based on the above discussion, we expect a positive relationship between the cultural dimensions of the country and the ESG disclosure score. Consequently, our fourth hypothesis is divided into three sub-hypotheses as follows:

H4a: *There is a positive association between the country-level cultural dimension of individualism and the ESG disclosure score.*

H4b: *There is a positive association between the country-level cultural dimension of femininity culture and ESG disclosure score.*

H4c: *There is a positive association between the country-level cultural dimension of low uncertainty avoidance culture and ESG disclosure score.*

4. Research Methodology

4.1. Sample and Data

This study aims to investigate the ESG disclosure quality practices and its determinants in Europe. Europe was chosen on the basis of EU directive 95/2014. The introduction of this mandatory reporting for certain large organizations allows for their transition from voluntary to mandatory non-financial disclosure [85]. The current research is based on panel data from 784 companies covering the period 2011–2020. These sampled firms represent the highest market capitalization firms in each country headquartered in Europe as classified by the Refinitiv Eikon database. The sample represents the available data from 2011 to 2020 from Refinitiv Eikon based on highest market capitalization at the individual country of headquarters. For example, more data was available from companies with headquarters in the UK, than ones with company headquarters in the Czech Republic based on the highest market capitalization representative of each of the countries. The sample also includes Eastern and Western Europe, further affecting the distribution of the number of companies represented in each country. There are three main data sources used for the construction of the dataset. First, we gathered financial and non-financial information from both Refinitiv Eikon and Bloomberg databases. The main set of data was subsequently collected from Bloomberg, including governance factors such as the number of directors, the number of board meetings, etc. The Refinitiv Eikon database was used because it is the main international databank and comprises one of the most complete ESG databases, counting more than 450 different ESG metrics. This database has a strong and clear procedure for the availability of ESG data on its website and is frequently used by researchers [4,12,78]. Alongside these two databases, a third data supply was

used for macro-government data, the Worldwide Governance Indicators (WGI) project (<https://info.worldbank.org/governance/wgi/> accessed on 27 November 2022). The size of the research sample is designed to be the largest 100 companies within each country. However, after considering the unavailability of some data due to the study time period, 2011–2020, and the nature of sustainability reporting in certain countries, the final sample covers 21 European countries rather than 28 members. These companies are companies listed in the Refinitiv Eikon database with consolidated accounts. Table 1 below presents the distribution of the companies per country, totaling 21 countries and 784 firm observations. For each year of the sample, the number of observations is the same.

Table 1. Firms included in the sample per country.

Country	Number of Companies
Austria	23
Belgium	2
Czech Republic	2
Denmark	37
Finland	28
France	83
Germany	82
Greece	21
Hungary	3
Ireland	41
Italy	47
Luxembourg	15
The Netherlands	49
Norway	16
Poland	20
Portugal	7
Russia	28
Spain	46
Sweden	56
Switzerland	83
United Kingdom	94
Total 21	784

4.2. Dependent Variables

This study uses ESG disclosure scores collected from the Bloomberg database as the dependent variable. The breakdown of the score with the individual pillars of the environmental disclosure score, the social disclosure score, and the governance disclosure score is as follows. These scores also represent the quality of the disclosure of ESGs, as they reflect the in-depth coverage of ESG issues over more than 900 data points across varying indicators. So, the ESG disclosure score ranges from ‘0’ to ‘100’.

4.3. Independent Variables

The main independent variables used in this study combine both micro and macro variables with the use of social governance performance indicators. The micro-level variables are board CSR orientation, board CSR strategy, and the adoption of the GRI sustainability reporting guidelines, while the macro-level variables are country–cultural dimensions based on the work of Hofstede’s measures: individualism and collectivism, masculinity and femininity, and uncertainty avoidance. The study variables are explained in Table 2 below.

Table 2. Variable Definitions.

Variable	Definition	Details of Data Sources
ESGD	Bloomberg's environmental, social, and governance dataset. The combination of the three pillars.	Bloomberg and [8]
ED	The environmental disclosure score obtained from Bloomberg	Bloomberg and [8,20]
SD	The social disclosure score obtained from Bloomberg	Bloomberg and [8,20]
GD	The governance disclosure score obtained from Bloomberg.	Bloomberg and [8,20]
B_ORINT	The total score 0–3, the total of if there is an audit committee financial expertise present, board independence, and board gender diversity. A score of 0 is given if the firm has none of these characteristics, and a score of 3 is given if all 3 characteristics are seen.	Bloomberg and [12]
B_STRAT	A strategy score that reflects the practice of a company to communicate that it integrates the economic, social, and environmental dimensions into its daily decision making.	Refinitiv Eikon ASSET4 database and [11]
GRI	A dummy variable coded 1 if the firm is following the Global Reporting Initiative and 0 if the firm is not following the Global Reporting Initiative. GRI is a set of international standards that help organizations understand their impact on the environment, economy, and people.	Bloomberg and [12]
INDIV	A dummy variable coded 1 if the country is collectivist and 0 if it is from an individualist country. Collectivism refers to societies where the society is integrated into strong cohesive groups throughout their lifetimes. Individualism pertains to societies where ties between individuals are loose; people within the society look after themselves and their immediate family.	[77,86]
MAS	A dummy variable coded 1 if the country is feminine and 0 if it comes from a masculine country. Masculinity represents a society in which social gender roles are distinct, where men are supposed to be assertive and focus on material success. Women are supposed to be more modest and concern themselves with quality of life. Femininity stands for a society in which these social genders overlap, and both men and women are supposed to be modest and concerned with quality of life.	[77,86]

Table 2. Cont.

Variable	Definition	Details of Data Sources
UAI	A dummy variable coded 1 if the country has low uncertainty avoidance and 0 if there is high uncertainty avoidance. Uncertainty avoidance reflects the degree to which a culture embraces the uncertainty of the future. Low uncertainty avoidance societies maintain a more relaxed attitude, in which practice counts more than principles. Countries with a high uncertainty avoidance index maintains rigid codes of ethical behavior	[77,86]
CSR_COM	A dummy variable coded 1 if there is a CSR committee present, and 0 if no CSR committee is present. The CSR committee is an advisory committee to the board and management on policies and strategies that affect the social responsibility of firms.	Bloomberg and [12]
B_SIZE	The total number of directors on the board each year.	Bloomberg and [12]
B_MEET	The number of board meetings that take place in a year	Bloomberg and [12]
TQ	The ratio between the market value of physical assets and the replacement value.	Refinitiv Eikon ASSET4 database and [87]
ENFORCE	A measure of regulatory enforcement activities in the audit environment. Consider measures of economic growth and capital market development.	Worldwide Governance Indicators and [88]
REG_QUALITY	The perception of the ability of the government to formulate and implement sound policies and promote the development of the private sector. Scores range from approximately -2.5 for weak performance and 2.5 for strong governance performance.	Worldwide Governance Indicators and [88]

4.4. Control Variables

We used some control variables to avoid misspecification of the model and to limit its impact on the disclosure practices of ESG [48]. These control variables are the presence/absence of the CSR committee (CSR_Com), board size (B_SIZE), and the number of board meetings taken place in that reporting year (B_MEET). Tobin Q (TQ) to measure financial performance, enforcement index (ENFORCE) to measure the audit environment enforcement activities, and regulatory quality (REQ_QUALITY) to measure governments implementation of policies.

5. Results

5.1. Descriptive Statistics

Table 3 reports the descriptive statistics for all the variables used in the regression model. It is evident that the firms, overall, disclosed an average score of 48 of the total ESG disclosure score, with a minimum of 5.4 and a maximum score of 72 indicating the wide disclosure level in the quality of the disclosure score. We also find that the mean of environmental disclosure (ED) is 41 with ED ranging from a minimum of 2.3 to a maximum

of 74 scores, again indicating how firm disclosures are at both ends of the spectrum. These results are mirrored by social disclosure (SD), with a mean score of 52, which social disclosure varies from a minimum of 3.5 to a maximum of 82. Finally, governance disclosure (GD) in firms on average had a disclosure score of 52, with a minimum score of 2.3 and a maximum of 82. These results indicate within the sample that ESG disclosure still differs in results with, on average, governance disclosure having the highest level of disclosure quality score, suggesting that most firms adopt higher governance practices.

Table 3. Descriptive statistics.

Variable	Mean	Min.	Max.	SD
ESG	48	5.4	72	12
ED	41	2.3	74	14
SD	52	3.5	82	13
GD	63	23	82	8.4
B_ORINT	2.6	0	3	0.61
B_STRAT	7.6	0	12	3.7
GRI	0.66	0	1	0.47
INDIV	0.065	0	1	0.25
MAS	0.81	0	1	0.39
UAI	0.15	0	1	0.36
CSR_Com	0.39	0	1	0.49
B_SIZE	13	4	25	3.7
B_MEET	9.3	2	38	3.5
TQ	12	0.23	57	33
ENFORCE	17	12	22	2.9
REG_QUALITY	1.4	0.63	2	0.31

Table 3 further shows that the mean value of the CSR board orientation (B_ORINT) ranging from 0 to 3, has an average of 2.6. This is related to the results seen in Helfaya and Moussa [11], the results showed an average of 2.104 in their UK sample. The mean value for board CSR strategy (B_STRAT) is 7.6 with a range from 0 to 12. The mean value for GRI is 0.66 which has a range of 0 to 1. Regarding country–cultural dimensions, the mean values of individualism (INDIV) range from 0 to 1 with an average of 0.065. Masculinity (MAS) ranges from 0 to 1, respectively, and has an average of 0.81. The third dimension of country–cultural dimensions is uncertainty avoidance (UAI), with an average of 0.81 and a minimum and maximum ranging from 0 to 1.

Table 4 shows the correlation matrix for the variables used in our analysis. It is evident that the disclosure of ESG and the three individual pillars of ESG are significant and positively related to H1, H2, H3, and H4a, c. Table 4 also shows H4b with a negative correlation between GD and the dimension of masculinity and femininity (MAS). Table 4 further shows low correlations between the independent variables. This low correlation implies that multicollinearity is unlikely to be a concern for this dataset.

Table 4. Correlation matrix.

	ESGD	ED	SD	GD	B_ORINT	B_STRAT	INDIV	MAS	UAI	B_SIZE	B_MEET	TQ	ENFORCE	REG_QUALITY
ESGS	1													
ED	0.921 ***	1												
SD	0.701 ***	0.554 ***	1											
GD	0.579 ***	0.448 ***	0.291 ***	1										
B_ORINT	0.120 ***	0.135 ***	0.021	0.249 ***	1									
B_STRAT	0.437 ***	0.394 ***	0.229 ***	0.335 ***	0.254 ***	1								
INDIV	0.165 ***	0.163 ***	0.125 ***	0.081 **	−0.049	0.042	1							
MAS	0.285 ***	0.236 ***	0.293 ***	−0.063 *	−0.196 ***	−0.014	−0.099 ***	1						
UAI	−0.173 ***	−0.148 ***	−0.264 ***	−0.092 ***	0.165 ***	0.025	−0.110 ***	−0.342 ***	1					
B_SIZE	0.266 ***	0.257 ***	0.349 ***	0.108 ***	0.028	0.093 ***	0.114 ***	0.002	−0.224 ***	1				
B_MEET	0.008	0.009	0.016	−0.012	0.052	0.065 **	−0.021	0.045	0.198 ***	0.054 *	1			
TQ	0.066 **	0.096 ***	0.035	−0.044	0.034	0.029	−0.055 *	0.05	0.032	−0.009	0.013	1		
ENFORCE	−0.017	−0.034	0.053 *	0.074 **	0.154 ***	0.155 ***	−0.136 ***	−0.2722 ***	0.159 ***	−0.306 ***	0.149 ***	0.017	1	
REG_QUALITY	−0.075 **	−0.075 **	−0.188 ***	0.053 *	0.260 ***	0.210 ***	−0.171 ***	−0.192 ***	0.430 ***	−0.554 ***	0.130 ***	0.067 ***	0.483 ***	1

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

5.2. Regression Results and Discussion

Table 5 shows the regression results of examining the impact of board CSR orientation, board strategy, GRI, and country-cultural dimensions including individualism, masculinity or femininity, and uncertainty avoidance in the country on the disclosure of ESG information, and at an individual level of ED, SD, and GD scores.

Table 5. Regression results.

VARIABLES	ESG	ED	SD	GD
B_ORINT	0.0306 ** [1.996]	0.0564 ** [2.443]	−0.0281 [−1.041]	0.0456 *** [5.405]
B_STRAT	0.0322 *** [12.40]	0.0400 *** [10.22]	0.0059 [1.292]	0.0112 *** [7.846]
GRI	0.0487 ** [2.302]	0.0727 ** [2.279]	−0.00354 [−0.0951]	−0.00614 [−0.526]
INDIV	0.199 *** [5.491]	0.285 *** [5.225]	0.158 ** [2.472]	0.0299 [1.500]
MAS	0.290 *** [10.54]	0.386 *** [9.313]	0.422 *** [8.722]	−0.0176 [−1.162]
UAI	0.00451 [0.155]	−0.00997 [−0.227]	−0.106 ** [−2.072]	−0.0497 *** [−3.098]
CSR_Com	0.0337 * [1.661]	0.0962 *** [3.142]	−0.131 *** [−3.674]	0.00555 [0.496]
B_SIZE	0.0166 *** [5.171]	0.0242 *** [4.989]	0.0499 *** [8.817]	0.00287 [1.619]
B_MEET	−0.00758 *** [−2.842]	−0.0145 *** [−3.607]	−0.00573 [−1.219]	−0.00146 [−0.991]
TQ	0.000204 [0.770]	0.000608 [1.524]	0.000454 [0.974]	−0.000258 * [−1.766]
ENFORCE	0.0173 *** [4.663]	0.0277 ** [4.960]	0.0496 *** [7.603]	0.0014 [0.683]
REG_QUALITY	−0.0435 [−1.018]	−0.0534 [−0.829]	−0.0439 [−0.583]	0.00101 [0.0428]
Constant	2.718 *** [26.50]	2.077 *** [13.42]	2.170 *** [12.01]	3.833 *** [67.78]
Observations	930	930	930	930
R-squared	0.414	0.371	0.242	0.205
Year Fixed effect	Yes	Yes	Yes	Yes

Note: This table presents the analysis of the relationship between the ESG score, corporate governance, and country-level determinants. The panel fixed effect is used. t-statistics in brackets *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.2.1. Board CSR Orientation (H1)

The results show that the board's CSR orientation has a significant and positive association with the overall ESG disclosure score. This supports the hypothesis that there is a positive relationship between board CSR and the ESG disclosure score. Our evidence suggests that boardrooms with more independent directors, audit committee directors with financial expertise, and female directors on the board are significantly impactful in disclosing more sustainability information to the public. Our results suggest that within the scope of ESG, such board members focus more on the overall ESG with less attention to the social issues, as there is a focus more on the other levels, environmental, and governance ones. This result is consistent with previous studies [24,61]. Within the existence of the three fundamentals of board CSR orientation, our evidence supports Zhuang et al. that the presence of females on the board means that there are more communal characteristics, which increases the firm's sensitivity to environmental and sustainability issues for larger stakeholders [64]. Our results are also consistent with Iyer et al. that the presence of financial expertise means that such members can debate and challenge managers as to the greater scope of how such non-financial data are reported [67,68]. For example, Roberts et al. found that independent and diverse boards create greater representation, leading to

the encouragement of management activities to focus on longer-term value and a higher level of transparency at the top level [61]. The evidence of multivariate regression is consistent with the theory of stakeholders in that board independence plays a crucial role in mediating and promoting sustainability quality disclosure, further increasing transparency and increasing the trust of stakeholders [62,63]. Furthermore, legitimacy theory suggests that the presence of board independence, financial expertise, and females on the board means that firms follow corporate governance codes within board independence and promote gender equality at the boardroom level.

5.2.2. Board CSR Strategy (H₂)

The results show that the board CSR strategy has a significant and positive association with the disclosure of ESG quality as fundamental to the three pillars individually. This supports H₂ that there is a significant and positive association between board CSR strategy and ESG quality disclosure scores. Our evidence suggests that the presence of a CSR board strategy discusses environmental and social issues and integrates them into the firm's strategic plans. The results show that there is a positive association between the presence of a board strategy and the levels of ESG disclosure [72]. Specifically, Helfaya and Moussa find that there is an overall positive association between the presence of the board's CSR strategy and overall sustainable business practices [12]. Our evidence of an overall positive association is also consistent with findings from Wickert et al.; the presence of the board CSR strategy enhances the long-term relationship between organization and stakeholders due to the focus on CSR for wider stakeholders and for the internal organization [71]. The results also provide support for the theoretical frameworks for signaling and stakeholder theories. Within the presence and orientation of the CSR strategy, signaling theory maintains an instrumental view of CSR initiatives that determine the firm's strategy and create signals for capital markets [71]. Board CSR strategy also encompasses legitimacy theory as the firms seek legitimacy through the act of having a board CSR strategy of long-term sustainable goals for the organization [21].

5.2.3. Global Reporting Initiative (H₃)

The results show that the impact of adopting the GRI initiative on ESG quality disclosure practices has mixed results for the regression analysis. Overall, Table 5 shows that GRI is not negatively significantly correlated to SD and GD. However, it is positively correlated with ESG and ED at a p-value of 0.01. The results suggest that there is a positive association between ESG and the ED pillar, since the GRI strongly focusses on environmental factors, while sustainability reporting is driven by following the GRI sustainability reporting guidelines. As there is a positive significant correlation between GRI and general disclosure of ESG, our evidence supports the previous literature that shows that the adoption of GRI increases disclosure scores for ESG [72]. Our results also support previous literature in which there are current methodological difficulties and information gaps within the voluntary disclosure of GRI, and this is seen through the mixed results of the disclosures [66,67]. The results also further support the theoretical framework of ESG disclosure for signaling and legitimacy theories since the following GRI reporting demonstrates effective management and long-term communication to develop further sustainability practices and overall stakeholder participation [70]. Sustainable disclosure practices signal to stakeholders and society the strong corporate governance practices that are implemented, providing strong transparency, long-term goals, and overall stakeholder engagement as such relating to the stakeholder theory.

5.2.4. Country-cultural Dimensions (H₄)

The results show that country-cultural dimensions have mixed results within the disclosure of ESG. Within the regressions, country-cultural dimensions adapt dummy variables based on Li et al. summary of cultural dimensions for the country [15]. Regarding Hypothesis 4a with individualism and collectivist country-cultural dimension, there is

a positive relationship with cultures with an individualism culture with a correlation of environmental disclosure score of 0.285, identifying how environmental disclosure is higher with individualism and is seen as the most important factor, within this culture, with respect to gaining the highest firm benefits. Regarding Hypothesis 4b, there is a positive association between femininity culture and the disclosure of ESG. However, there is no significant negative correlation with the GD score of -0.0175 . These results suggest that a culture of femininity is significant in the disclosure of ESG scores. This result is consistent with feminine societies that focus on other members of the society [8]. Our results mirror previous reports that a country with a feminine society may see ESG disclosure as an obligation to society; thus, this creates less incentive towards ESG disclosure as it is to maintain legitimacy rather than create it [78]. As such, a feminine society sees social needs and harmonization of stakeholders. For Hypothesis 4c, the association between low uncertainty avoidance and the ESG disclosure score is rejected, as there is only a significant level in the SD score. ESG and ESD are 0.00451 and -0.00997 , showing very low correlations with uncertainty and ESG disclosure scores. This result mirrors previous literature focused on the social pillar; uncertainty avoidant societies mean that risk-taking is discouraged, and societies are likely to have an increased demand for information focusing mainly on the social level of ESG disclosure as seen in our results [77]. The results provide further empirical support for our multi-theoretical framework, which provides insights into legitimacy and institutional theories. For example, the country-cultural dimensions of firms depend on the social structure already encompassed at the country-level. Keeping such practices provides legitimacy as it is following the norms of that culture. Table 5 shows that the overall disclosure of ESG is positively associated with the four hypotheses.

6. Conclusions

This study investigates the effects of the board CSR orientation, board CSR strategy, the adoption of the GRI sustainability reporting framework, and country-cultural dimensions, namely, individualism and collectivism, masculinity and femininity, and uncertainty avoidance, on ESG disclosure scores. Based on a European sample of 21 countries and 784 companies, we found that board CSR orientation, board CSR strategy, and GRI are positively and significantly related to the ESG disclosure score and positively and significantly related to the individual pillars of E, S, and G. Our findings also suggest that country-cultural dimensions have mixed results within the ESG quality disclosure score. These results lend support to the theoretical frameworks of agency, stakeholder, signaling, institutional, and legitimacy theories. Furthermore, boards with higher levels of CSR orientation, CSR strategy, and adoption of the GRI sustainability reporting framework are considered unique governance mechanisms that help firms disclose high-quality information on ESG at all levels [21]. Boards seeking these levels of higher CSR initiatives seek to develop prominent levels of legitimacy and stakeholder satisfaction by increasing transparency throughout the firm at all levels [12]. Our findings also suggest that country-cultural variables, such as femininity and individualistic culture, create higher levels of disclosure of ESG, which helps firms create higher levels of quality disclosure due to institutional pressures facing firms, albeit due to different pressures and responses [58]. The research also emphasizes the key interplay between firm-level and country-level cultural dimensions, suggesting that firms are influenced by the country-level governance factors as firm behavior tends to be in line with social norms, economic patterns, and investor protection of that country [29]. Firms with an individualistic culture are seen to have higher levels of ESG disclosure quality [29]. This study contributes to the literature by providing empirical evidence on the importance of a prominent level of adoption for the board's CSR strategy, the CSR orientation of the board, and the adoption of GRI sustainability reporting guidelines. At the country level for the European dataset, the study highlights the importance of three key county-cultural dimensions and their importance for the degree of quality disclosure of more ESG information in the European context. From an economic perspective, firms that follow and integrate CSR strategies into their operations are more

orientated to long-term responsible investments, which align with the broader objectives of society and thus increase financial returns due to rational investors [89].

Our findings have several implications for several groups. For example, internally for corporate directors, our results suggest that firms should consider the benefits of having high levels of board CSR strategy and board CSR orientation, establishing an effective corporate boardroom that has some directors with financial experience and qualifications, and the presence of female directors on the board to create higher levels of ESG disclosure scores. The presence of females on the board also creates several advantages for companies, such as setting and adopting new sustainability-orientated ideas to create long-term success [12,89]. The findings also disclose the main factors that are positive in the reporting of ESG. For example, following the GRI sustainability reporting guidelines, firms can increase their own ESG disclosure scores compared to their peers. Regulators and policymakers could set or reform their policies within countries that examine positively related country–cultural dimensions to introduce policies that mitigate the negative aspects of each country. This could include, within a masculine country, having more females on the board to contribute to the quality of the ESG quality reporting practices. This would potentially help mitigate the masculine characteristics of that country. For ESG and CSR scholars, the multitheoretical perspective and the European dataset used in this study could be used further to conduct further research to explore what other factors have contributed to ESG quality disclosures within Europe.

This paper is subject to a number of limitations and there are multiple avenues for future research. First, we examine a sample of 784 companies in 21 countries within Europe. Future research could examine all 44 European countries to generalize the results on a wide scale. Based on this, future research could also expand to large companies in emerging countries to determine whether micro- and macro-factors change when the sample countries change. This sample could also include country factors, such as the legal system, with a further longitudinal study. Moreover, our sample includes countries with few companies, such as Belgium and the Czech Republic, which may raise doubt about generalization in those countries. Second, in our analysis of board CSR orientation, the study uses female directors as a measure of board diversity, but this does not account for other measures of diversity within the boardroom. Diversity could be measured using other factors such as age, level of education, and ethnic group to see how this diversity plays a role in ESG disclosure [12]. Due to the growing interest in the materiality of ESG disclosure scores, further research could address this materiality as part of the quality of disclosure within firms [25]. Finally, within our research, we used only three out of the six Hofstede measures for country–cultural dimensions; in future research, all country–cultural dimensions could be used to provide more information on how culture affects ESG disclosure across different countries, rather than focusing solely on our country–culture dimensions. Moreover, endogeneity is an unavoidable issue in business research. Due to this, future research may consider an alternative research design to mitigate the potential endogeneity between ESG and governance and country-level variables.

Despite the limitations of this research, this study contributes to the literature by providing evidence that board CSR orientation, CSR strategy, and adoption of the GRI sustainability reporting framework have a significant and positive association with the quality of ESG quality disclosure scores.

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References

1. Aboud, A.; Diab, A. The Impact of Social, Environmental and Corporate Governance Disclosures on Firm Value: Evidence from Egypt. *J. Account. Emerg. Econ.* **2018**, *8*, 442–458. [CrossRef]
2. Aboud, A.; Diab, A. The Financial and Market Consequences of Environmental, Social and Governance Ratings: The Implications of Recent Political Volatility in Egypt. *Sustain. Account. Manag. Policy J.* **2019**, *10*, 498–520. [CrossRef]
3. Helfaya, A.; Whittington, M.; Alawattage, C. Exploring the Quality of Corporate Environmental Reporting: Surveying Preparers’ and Users’ Perceptions. *Account. Audit. Account. J.* **2019**, *32*, 163–193. [CrossRef]
4. Moussa, T.; Kotb, A.; Helfaya, A. An Empirical Investigation of U.K. Environmental Targets Disclosure: The Role of Environmental Governance and Performance. *Eur. Account. Rev.* **2021**, *31*, 937–971. [CrossRef]
5. Helfaya, A.; Bui, P. Exploring the Status Quo of Adopting the 17 UN SDGs in a Developing Country—Evidence from Vietnam. *Sustainability* **2022**, *14*, 15358. [CrossRef]
6. Muñoz-Torres, M.J.; Fernández-Izquierdo, M.Á.; Rivera-Lirio, J.M.; Escrig-Ólmedo, E. Can Environmental, Social, and Governance Rating Agencies Favor Business Models That Promote a More Sustainable Development? *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 439–452. [CrossRef]
7. Tarmuji, I.; Maelah, R.; Tarmuji, N.H. The Impact of Environmental, Social and Governance Practices (ESG) on Economic Performance: Evidence from ESG Score. *Int. J. Trade Econ. Financ.* **2016**, *7*, 67. [CrossRef]
8. Raimo, N.; Caragnano, A.; Zito, M.; Vitolla, F.; Mariani, M. Extending the Benefits of ESG Disclosure: The Effect on the Cost of Debt Financing. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1412–1421. [CrossRef]
9. Ioannis, I.; Serafeim, G. What Drives Corporate Social Performance? The Role of Nation-Level Institutions. *J. Int. Bus. Stud.* **2012**, *43*, 834–864. [CrossRef]
10. Liao, L.; Luo, L.; Tang, Q. Gender Diversity, Board Independence, Environmental Committee and Greenhouse Gas Disclosure. *Br. Account. Rev.* **2015**, *47*, 409–424. [CrossRef]
11. Shaukat, A.; Qiu, Y.; Trojanowski, G. Board Attributes, Corporate Social Responsibility Strategy, and Corporate Environmental and Social Performance. *J. Bus. Ethics* **2016**, *135*, 569–585. [CrossRef]
12. Helfaya, A.; Moussa, T. Do Board’s Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence. *Bus. Strategy Environ.* **2017**, *26*, 1061–1077. [CrossRef]
13. Cucari, N.; Esposito de Falco, S.; Orlando, B. Diversity of Board of Directors and Environmental Social Governance: Evidence from Italian Listed Companies. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 250–266. [CrossRef]
14. Toumi, N.B.F.; Khemiri, R.; Makni, Y.F. Board Directors’ Home Regions and CSR Disclosure: Evidence from France. *J. Appl. Account. Res.* **2022**, *23*, 509–539. [CrossRef]
15. Li, T.-T.; Wang, K.; Sueyoshi, T.; Wang, D.D. ESG: Research Progress and Future Prospects. *Sustainability* **2021**, *13*, 11663. [CrossRef]
16. Swiss Federal Department United Nations of Foreign Affairs and United Nations. Who Cares Wins: Connecting Financial Markets to a Changing World. 2004. Available online: https://www.unglobalcompact.org/docs/issues_doc/Financial_markets/who_cares_who_wins.pdf (accessed on 1 January 2023).
17. Singhanian, M.; Saini, N. Institutional Framework of ESG Disclosures: Comparative Analysis of Developed and Developing Countries. *J. Sustain. Financ. Investig.* **2021**, *13*, 519–559. [CrossRef]
18. Tamimi, N.; Sebastianelli, R. Transparency among S&P 500 Companies: An Analysis of ESG Disclosure Scores. *Manag. Decis.* **2017**, *55*, 1660–1680. [CrossRef]
19. Helfaya, A.; Whittington, M. Does Designing Environmental Sustainability Disclosure Quality Measures Make a Difference? *Bus. Strategy Environ.* **2019**, *28*, 525–541. [CrossRef]
20. Baldini, M.; Maso, L.D.; Liberatore, G.; Mazzi, F.; Terzani, S. Role of Country- and Firm-Level Determinants in Environmental, Social, and Governance Disclosure. *J. Bus. Ethics* **2018**, *150*, 79–98. [CrossRef]
21. Tanimoto, K. Do Multi-Stakeholder Initiatives Make for Better CSR. *Corp. Gov. Int. J. Bus. Soc.* **2019**, *19*, 704–716. [CrossRef]
22. Zumente, I.; Bistrowa, J. ESG Importance for Long-Term Shareholder Value Creation: Literature vs. Practice. *J. Open Innov. Technol. Mark. Complex.* **2021**, *7*, 127. [CrossRef]
23. Kotsantonis, S.; Pinney, C.; Serafeim, G. ESG Integration in Investment Management: Myths and Realities. *J. Appl. Corp. Financ.* **2016**, *28*, 10–16. [CrossRef]
24. Khan, A.; Muttakin, M.B.; Siddiqui, J. Corporate Governance and Corporate Social Responsibility Disclosures: Evidence from an Emerging Economy. *J. Bus. Ethics* **2013**, *114*, 207–223. [CrossRef]
25. Williams, Z.C. The Materiality Challenge of ESG Ratings. *Econ. Cult.* **2022**, *19*, 97–108. [CrossRef]
26. Schiehl, E.; Kolahgar, S. Financial Materiality in the Informativeness of Sustainability Reporting. *Bus. Strategy Environ.* **2021**, *30*, 840–855. [CrossRef]

27. Balmer, J. Corporate Identity, Corporate Branding and Corporate Marketing-Seeing through the Fog. *Eur. J. Mark.* **2001**, *35*, 248–291. [[CrossRef](#)]
28. Ellili, N.O.D. Impact of ESG Disclosure and Financial Reporting Quality on Investment Efficiency. *Int. J. Bus. Soc.* **2022**, *22*, 1094–1111. [[CrossRef](#)]
29. Schiehl, E.; Martins, H.C. Cross-national Governance Research: A Systematic Review and Assessment. *Corp. Gov. Int. Rev.* **2016**, *24*, 181–199. [[CrossRef](#)]
30. Lokuwaduge, C.S.D.S.; Heenetigala, K. Integrating Environmental, Social and Governance (ESG) Disclosure for a Sustainable Development: An Australian Study. *Bus. Strategy Environ.* **2017**, *26*, 438–450. [[CrossRef](#)]
31. Alsayegh, M.F.; Rahman, R.A.; Homayoun, S. Corporate Economic, Environmental, and Social Sustainability Performance Transformation through ESG Disclosure. *Sustainability* **2020**, *12*, 3910. [[CrossRef](#)]
32. De Lucia, C.; Paziienza, P.; Bartlett, M. Does Good ESG Lead to Better Financial Performances by Firms? Machine Learning and Logistic Regression Models of Public Enterprises in Europe. *Sustainability* **2020**, *12*, 5317. [[CrossRef](#)]
33. Hopwood, B.; Mellor, M.; O'Brien, G. Sustainable Development: Mapping Different Approaches. *Sustain. Dev.* **2005**, *13*, 38–52. [[CrossRef](#)]
34. Jamali, D. Insights into Triple Bottom Line Integration from a Learning Organization Perspective. *Bus. Process Manag. J.* **2006**, *12*, 809–821. [[CrossRef](#)]
35. Camilleri, M.A. Environmental, Social and Governance Disclosures in Europe. *Sustain. Account. Manag. Policy J.* **2015**, *6*, 224–242. [[CrossRef](#)]
36. Deegan, C. Twenty Five Years of Social and Environmental Accounting Research within Critical Perspectives of Accounting: Hits, Misses and Ways Forward. *Crit. Perspect. Account.* **2017**, *43*, 65–87. [[CrossRef](#)]
37. Schaltegger, S.; Bennett, M.; Burritt, R. Sustainability Accounting and Reporting: Development, Linkages and Reflection. An Introduction. *Sustain. Account. Rep.* **2006**, *31*, 1–33. [[CrossRef](#)]
38. Arvidsson, S. Communication of Corporate Social Responsibility: A Study of the Views of Management Teams in Large Companies. *J. Bus. Ethics* **2010**, *96*, 339–354. [[CrossRef](#)]
39. Abhayawansa, S.; Tyagi, S. Sustainable Investing: The Black Box of Environmental, Social, and Governance (ESG) Ratings. *J. Wealth Manag.* **2021**, *24*, 49–54. [[CrossRef](#)]
40. Almeyda, R.; Darmansya, A. The Influence of Environmental, Social, and Governance (ESG) Disclosure on Firm Financial Performance. *IPTEK J. Proc. Ser.* **2019**, *25*, 278–290. [[CrossRef](#)]
41. Cordazzo, M.; Bini, L.; Marzo, G. Does the EU Directive on Non-financial Information Influence the Value Relevance of ESG Disclosure? Italian Evidence. *Bus. Strategy Environ.* **2020**, *29*, 3470–3483. [[CrossRef](#)]
42. Di Vaio, A.; Palladino, R.; Hassan, R.; Alvino, F. Human Resources Disclosure in the EU Directive 2014/95/EU Perspective: A Systematic Literature Review. *J. Clean. Prod.* **2020**, *257*, 120509–120527. [[CrossRef](#)]
43. Doni, F.; Martini, S.B.; Corvino, A.; Mazzoni, M. Voluntary versus Mandatory Non-Financial Disclosure: EU Directive 95/2014 and Sustainability Reporting Practices Based on Empirical Evidence from Italy. *Meditari Account. Res.* **2020**, *28*, 781–802. [[CrossRef](#)]
44. Cooper, S.M.; Owen, D.L. Corporate Social Reporting and Stakeholder Accountability: The Missing Link. *Account. Organ. Soc.* **2007**, *32*, 649–667. [[CrossRef](#)]
45. Carnini Pulino, S.; Ciaburr, M.; Sveva Magnanelli, B.; Nasta, L. Does ESG Disclosure Influence Firm Performance? *Sustainability* **2022**, *14*, 7596.
46. Freeman, R.E. The Politics of Stakeholder Theory: Some Future Directions. *Bus. Ethics Q.* **1994**, *4*, 409–421. [[CrossRef](#)]
47. Scott, W.R.; Meyer, W.J. *Institutional Environments and Organizations: Structural Complexity and Individualism*; Sage: New York, NY, USA, 1994.
48. Manita, R.; Bruna, M.G.; Dang, R.; Houanti, L. Board Gender Diversity and ESG Disclosure: Evidence from the USA. *J. Appl. Account. Res.* **2018**, *19*, 207–224. [[CrossRef](#)]
49. Connelly, B.; Certo, T.S.; Dunae Ireland, R.; Reutzel, R.C. Signaling Theory: A Review and Assessment. *J. Manag.* **2011**, *37*, 39–67. [[CrossRef](#)]
50. Eccles, N.S.; Viviers, S. The Origins and Meanings of Names Describing Investment Practices That Integrate a Consideration of ESG Issues in the Academic Literature. *J. Bus. Ethics* **2011**, *104*, 389–402. [[CrossRef](#)]
51. Peng, L.S.; Isa, M. Environmental, Social and Governance (ESG) Practices and Performance in Shariah Firms: Agency or Stakeholder Theory? *Asian Acad. Manag. J. Account. Finance* **2020**, *16*, 1–34. [[CrossRef](#)]
52. Rezaee, Z. Business Sustainability Research: A Theoretical and Integrated Perspective. *J. Account. Lit.* **2016**, *36*, 48–64. [[CrossRef](#)]
53. Healy, P.M.; Palepu, K.G. Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *J. Account. Econ.* **2001**, *31*, 405–440. [[CrossRef](#)]
54. Lys, T.; Naughton, J.P.; Wang, C. Signaling through Corporate Accountability Reporting. *J. Account. Econ.* **2015**, *60*, 56–72. [[CrossRef](#)]
55. Thornton, P.H.; Flynn, K.H. Entrepreneurship, Networks, and Geographies. In *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction*; Springer: Boston, MA, USA, 2003.
56. Campbell, J.L. Why Would Corporations Behave in Socially Responsible Ways? An Institutional Theory of Corporate Social Responsibility. *Acad. Manag. Rev.* **2007**, *32*, 946–967. [[CrossRef](#)]

57. Bilyay-Erdogan, S. Corporate ESG Engagement and Information Asymmetry: The Moderating Role of Country-Level Institutional Differences. *J. Sustain. Financ. Investig.* **2022**, *1*, 1–37. [\[CrossRef\]](#)
58. Scott, W.R. *Institutions and Organizations: Ideas, Interests, and Identities*; SAGE Publications: New York, NY, USA, 2013. Available online: https://books.google.co.uk/books?hl=en&lr=&id=NbQgAQAQAQBAJ&oi=fnd&pg=PP1&dq=+Institutions+and+organizations+scott+2001&ots=hGVafGoi_E&sig=ItBTKCHceilRffis2nTtX4Qme9M&redir_esc=y#v=onepage&q=Institutions%20and%20organizations%20scott%202001&f=false (accessed on 10 January 2023).
59. Reber, B.; Gold, A.; Gold, S. ESG Disclosure and Idiosyncratic Risk in Initial Public Offerings. *J. Bus. Ethics* **2022**, *179*, 867–886. [\[CrossRef\]](#)
60. Fama, E.F.; Jensen, M.C. Agency Problems and Residual Claims. *J. Law Econ.* **1983**, *26*, 327–349. [\[CrossRef\]](#)
61. Roberts, J.; McNulty, T.; Stiles, P. Beyond Agency Conceptions of the Work of the Non-executive Director: Creating Accountability in the Boardroom. *Br. J. Manag.* **2005**, *16*, 5–26. [\[CrossRef\]](#)
62. Adams, R.B.; Licht, A.N.; Sagiv, L. Shareholders and Stakeholders: How Do Directors Decide? *Strateg. Manag. J.* **2011**, *32*, 1331–1355. [\[CrossRef\]](#)
63. Eagly, A.H.; Johannesen-Schmidt, M.C.; Engen, M.L. Van Transformational, Transactional, and Laissez-Faire Leadership Styles: A Meta-Analysis Comparing Women and Men. *Psychol. Bull.* **2003**, *129*, 569–591. [\[CrossRef\]](#)
64. Zhuang, Y.; Chang, X.; Lee, Y. Board Composition and Corporate Social Responsibility Performance: Evidence from Chinese Public Firms. *Sustainability* **2018**, *10*, 2752. [\[CrossRef\]](#)
65. Baxter, P.; Cotter, J. Audit Committees and Earnings Quality. *Account. Financ.* **2009**, *49*, 267–290. [\[CrossRef\]](#)
66. Homburg, C.; Stierl, M.; Bornemann, T. Corporate Social Responsibility in Business-to-Business Markets: How Organizational Customers Account for Supplier Corporate Social Responsibility Engagement. *J. Mark.* **2013**, *77*, 54–72. [\[CrossRef\]](#)
67. Rao, K.; Tilt, C. Board Composition and Corporate Social Responsibility: The Role of Diversity, Gender, Strategy and Decision Making. *J. Bus. Ethics* **2016**, *138*, 327–347. [\[CrossRef\]](#)
68. Iyer, V.; Bamber, M.; Griffin, J. Characteristics of Audit Committee Financial Experts: An Empirical Study. *Manag. Audit. J.* **2013**, *28*, 65–78. [\[CrossRef\]](#)
69. Banerjee, S.B. Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature. *Organ. Stud.* **2003**, *24*, 143–180. [\[CrossRef\]](#)
70. Isaksson, R.; Steimle, U. What Does GRI-reporting Tell Us about Corporate Sustainability? *TQM J.* **2009**, *21*, 168–181. [\[CrossRef\]](#)
71. Wickert, C.; Georg Scherer, A.; Spence, L.J. Walking and Talking Corporate Social Responsibility: Implications of Firm Size and Organizational Cost. *Manag. Stud.* **2016**, *53*, 1169–1196. [\[CrossRef\]](#)
72. Fonseca, A.; McAllister, M.L.; Fitzpatrick, P. Sustainability Reporting among Mining Corporations: A Constructive Critique of the GRI Approach. *J. Clean. Prod.* **2014**, *84*, 70–83. [\[CrossRef\]](#)
73. Solikhah, B. An Overview of Legitimacy Theory on the Influence of Company Size and Industry Sensitivity towards CSR Disclosure. *Int. J. Appl. Bus. Econ. Res.* **2016**, *14*, 3013–3023.
74. Baraibar-Diez, E.; Odriozola, M.D. CSR Committees and Their Effect on ESG Performance in UK, France, Germany, and Spain. *Sustainability* **2019**, *11*, 5077. [\[CrossRef\]](#)
75. Jo, H.; Harjoto, M.A. Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *J. Bus. Ethics* **2011**, *103*, 351–383. [\[CrossRef\]](#)
76. Muttakin, M.B.; Rana, T.; Mihret, D.G. Democracy, National Culture and Greenhouse Gas Emissions: An International Study. *Bus Strategy Environ.* **2022**, *31*, 2978–2991. [\[CrossRef\]](#)
77. Hofstede, G. Dimensionalizing Cultures: The Hofstede Model in Context. *Online Read. Psychol. Cult.* **2011**, *2*, 2307–0919. [\[CrossRef\]](#)
78. Shin, J.; Moon, J.J.; Kang, J. Where Does ESG Pay? The Role of National Culture in Moderating the Relationship between ESG Performance and Financial Performance. *Intern. Bus. Rev.* **2022**, *32*, 102071.
79. Raimo, N.; Vitolla, F.; Marrone, A.; Rubino, M. Do Audit Committee Attributes Influence Integrated Reporting Quality? An Agency Theory Viewpoint. *Bus Strategy Environ.* **2021**, *30*, 522–534. [\[CrossRef\]](#)
80. Yan, J.; Hunt, J. A Cross Cultural Perspective on Perceived Leadership Effectiveness. *A Cross Cult. Perspect. Perceived Leadersh. Eff.* **2005**, *5*, 49–66. [\[CrossRef\]](#)
81. North, D.C. A Transaction Cost Theory of Politics. *J. Polit.* **1990**, *2*, 355–367. [\[CrossRef\]](#)
82. Singhapakdi, A.; Kraft, K.L.; Vitell, S.J.; Rallapalli, K.C. The Perceived Importance of Ethics and Social Responsibility on Organizational Effectiveness: A Survey of Marketers. *J. Acad. Mark. Sci.* **1994**, *23*, 49–56. [\[CrossRef\]](#)
83. Ho, F.N.; Wang, D.H.-M.; Vitell, S.J. A Global Analysis of Corporate Social Performance: The Effects of Cultural and Geographic Environments. *A Glob. Anal. Corp. Soc. Perform. Eff. Cult. Geogr. Environ.* **2012**, *107*, 423–433. [\[CrossRef\]](#)
84. Suchman, M.C. Managing Legitimacy: Strategic and Institutional Approaches. *Acad. Manag. Rev.* **1995**, *20*, 571–610. [\[CrossRef\]](#)
85. Lombardi, R.; Cosentino, A.; Sura, A.; Galeotti, M. The Impact of the EU Directive on Non-Financial Information: Novel Features of the Italian Case. *Meditari Account. Res.* **2021**, *30*, 1419–1448. [\[CrossRef\]](#)
86. Roy, A.; Mukherjee, P. Does National Culture Influence Corporate ESG Disclosures? Evidence from Cross-Country Study. *Vision* **2022**, *3*, 09722629221074914. [\[CrossRef\]](#)
87. Velte, P. Does ESG Performance Have an Impact on Financial Performance? Evidence from Germany. *J. Glob. Responsib.* **2017**, *8*, 169–178. [\[CrossRef\]](#)

88. Brown, P.; Preiato, J.; Tarca, A. Measuring Country Differences in Enforcement of Accounting Standards: An Audit and Enforcement Proxy. *J. Bus. Financ. Acc.* **2014**, *41*, 1–52. [[CrossRef](#)]
89. Friede, G.; Busch, T.; Bassen, A. ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies. *J. Sustain. Financ. Investig.* **2015**, *5*, 210–233. [[CrossRef](#)]

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Article

Assessing the Anti-Corruption Disclosure Practices in the UK FTSE 100 Extractive Firms

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Abstract: This paper considers the anti-corruption disclosure reporting of the large UK-quoted extractive companies from 2003 to 2019. This period includes the introduction of the 2010 UK Bribery Act, which might be expected to influence corporate disclosure. It takes content analysis metrics from the environmental reporting literature, which is a more developed area of research, and considers an area with a higher volume of corporate disclosures. It applies these metrics to investigate the trends in corruption reporting over time and the impact of the introduction of the Act on reporting breadth and depth. We find that some of the metrics would appear to add more insight than others in this new context. We conclude that the volume of reporting has grown over time, but this would seem to be in breadth, more questions addressed rather than more depth to the answers given. There has been a step-change in reporting since the introduction of the Act, though concluding whether this has increased quality may depend on your perspective and interest as a user of the information.

Keywords: anti-corruption disclosure; corporate reporting quality; UK Bribery Act 2010; extractive industry

1. Introduction

The rising level of anti-corruption disclosure has attracted significant attention from state leaders, policymakers, academics, and company stakeholders [1–3]. Corruption may be defined in the simplest terms as the illicit pursuit of personal gain [4], while Transparency International [5] defines corruption as “the misuse of authority for private benefit”. Corruption is a global ethical problem with social and economic repercussions, including increasing corporate costs; undermining progress; negatively impacting the quality of life, education, and health systems; as well as increasing poverty and unemployment rates [3,4]. The cost of corruption to governmental organizations, businesses, and individuals is well documented in the literature [6,7]. In the last two decades, bankruptcy and financial scandals involving a variety of organizations have highlighted the prevalence of corruption and its impact [2]. The World Bank (2018) estimates that the various forms of corruption, including bribery, fraud, conflicts of interest, and the falsification of financial statements, cost over US\$ 1 trillion annually. It has been argued that the disclosure of corporate anti-corruption efforts is a useful tool in the battle against corruption [3,8,9].

Whilst it may be possible for individuals or companies in all industrial sectors to find opportunities for corrupt practices, in 2019, the IMF [10] singled out extractive industries as a possible corruption hotspot. Ref. [11] suggested that anti-corruption disclosure (ACD) would be more beneficial for this sector due to its businesses being characterized by high rent-seeking, high investment, and high-risk character. Ref. [12] studied the literature on extractive sector reporting and found a lack of research on the sector’s disclosure, providing further motivation for investigating this significant sector.

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Corporate reporting is questioned from a number of perspectives. Financial content has the longest reporting history and the greatest level of oversight and control from authorities. Still, failures of large companies on major stock markets, for example, Enron, Lehman Brothers, and WorldCom show that even the decision-making usefulness of financial reporting could not be relied upon. Recommendations from academics [13] and from professional standard setters such as [14,15] pointed to expanding the scope of what should be reported. This should include not just quantitative financial indicators that are clarified by narrative information but also value-creating factors that are not clearly reflected in financial statements [16,17]. Thus, annual reports should now contain narrative information about a range of factors, including a company's efforts to combat corruption [18,19]. The breadth and depth of information to disclose is a continuing debate. The need for "value relevance," often limited to the shareholder's perspective on value, could be a guiding principle for the decision to disclose non-financial content. However, research has found it difficult to find a clear link between such disclosure and share value [20]. From a broader economic perspective, non-financial disclosures have been found to have little effect on the economy [21,22].

In corporate reporting, anti-corruption disclosures are generally included within the broad category of non-financial disclosures as part of social disclosure, including employee information (gender pay gap, for example), social engagement, and modern slavery reporting. Such corporate ACD purports to inform investors and other stakeholders of a company's commitment to eliminating corruption and promoting transparency and accountability [9]. Conceptual and empirical research has examined corruption from a number of angles—for example, as a concept [23], its origins and consequences [24], its assessment [25], and how to prevent it [26]. Such research can be complicated by differing definitions of corporate corruption and differing requirements across national jurisdictions [9]. Despite these divergent stances, attempts to reduce corruption are generally increasing worldwide (see, for example, [4]).

Such complexity leads us to adopt a case study approach that should have value for wider jurisdictions [27]. This study seeks to investigate ACD within the extractives industry, including oil and gas extraction, focusing on large UK-listed companies. The introduction of the UK Bribery Act (2010) [28] provides an additional focus alongside broader international pressures on ACD from various transnational bodies. To investigate the story of ACD within the UK-listed extractive industry, we will employ metrics that have previously been applied to other areas of non-financial reporting, primarily environmental reporting, which is often significantly more voluminous.

Prior CSR literature has focused on environmental reporting where there is a developing history of significant disclosure running into potentially many pages in an annual report (see, for example, [18,29–32]). This study seeks to apply these measures to ACD, where quantity is much reduced, but it is still important to understand trends, diversity, and depth of corporations. Previous studies show that the choice of metric can lead to differing conclusions on the relative quality of corporate disclosure [30,31,33]. Hence, the FTSE100 extractive companies' anti-corruption disclosures are compared using six measures/indices of reporting quality from the previous environmental accounting research above. The present research divides these measures into two categories (unidimensional measures and compound/multidimensional measures) based on their complexity and dimensionality. There are two "quantity measurements" and one "scope measurement" that are used to measure the information quality in terms of size and coverage of relevant topics, and four compound metrics. The compound metrics have been taken from the literature: the [34] disclosure scoring method (ACHI); [32] quality index of environmental disclosure (SHI); and [35] total quality index (TQLI) [35].

Using a quantitative approach, this study shows that both the design of the quality measurement and the coverage of multiple quality characteristics substantially influence the quality scores and rankings of the sampled extractive firms. It is clear from this data that the quality measures' design impacts the reporting quality ratings [30,35,36]. There are

several consequences for a wide range of stakeholders. For both readers and assessors of corporate anti-corruption performance reports, reporting quality is a multifaceted concept covering many features, such as content, credibility, assurance services, and readable content using visual tools. Additionally, the ACD must be credible in order to be accepted by policymakers and standard-setting organizations such as the United Kingdom Bribery Act 2010 and third-party assurance (see, [30,31,37,38]). Anti-corruption reporters and their readers have a trust gap in practice. Thus, a consistent set of ACD guidelines and assurance standards must be established by policymakers, standard setters, and anti-corruption authorities to narrow this gap. Accordingly, the current research aims to answer the following two questions.

RQ1. *Can the deployment of reporting quality measures developed in the environmental reporting field enhance our understanding and interpretation of corruption-reporting quality and behavior?*

RQ2. *Does the use of these metrics provide consistent evidence that corporate ACD has responded to the introduction of the UK Bribery Act?*

This research is structured as follows. Section 2 presents the literature review, and then Section 3 explains the research methodology. The research findings are discussed in Section 4. Section 5 concludes the study.

2. Literature Review

This review first addresses ACD practices (Section 2.1), the issues in measuring “quality” (Section 2.2), assessing reporting quality (Section 2.3), and measures of reporting quality (Section 2.4).

2.1. Anti-Corruption Disclosure Practices

The UK was one of the first countries to take measures to tackle corruption by passing the Public Bodies Corrupt Practices Act 1889, the Prevention of Corruption Act 1906, and the Prevention of Corruption Act 1916, collectively known as the Prevention of Corruption Acts 1889 to 1916. These were replaced in 2010 by the UK Bribery Act. Many countries and international bodies have addressed the issue more recently, with the Organization for Economic Co-operation and Development’s (OECD) Convention on Combating the Bribery of Foreign Public Officials in International Business Transactions in 1999 focusing on the party offering the bribe. In 2003, the United Nations adopted its Compact Against Corruption (UNCAC), encouraging companies to fight corruption. Authors [5] stated that ACD was a vital element in fighting corruption [5].

Within this broader context, we will now give a brief review of recent corruption laws and disclosure requirements in the UK, with a focus on hegemonic perceptions of quality within corporate reporting generally. Defining quality is highly subjective and influenced by political considerations and culture, amongst other factors. Our concern here is to seek to assess quality, or at least factors that might be seen as proxies for quality, within a corporate reporting context. Whilst focused on financial reporting, it is useful to note that the International Accounting Standards Board (IASB) has struggled to be consistent in defining a framework to produce useful or high-quality financial reporting. Authors [5] sets the 2018 conceptual framework, which aims to:

“... develop Standards that bring transparency, accountability and efficiency to financial markets around the world. The Board’s work serves the public interest by fostering trust, growth and long-term financial stability in the global economy. The Conceptual Framework provides the foundation for Standards that: (a) contribute to transparency by enhancing the international comparability and quality of financial information, enabling investors and other market participants to make informed economic decisions ...” (from SP1.5, page 6)

Ref. [39] points out that the 2018 revision reversed guidance for standard setting that had been highlighted within the previous 2010 framework, with stewardship, prudence,

and reliability being either reintroduced or redefined in 2018. Authors [40] point out that the framework is only seeking to address the needs of “a very narrow set of financial market actors” (page 5) and, to be consistent with the extract from the framework above, must make the questionable assumption that such an approach is in the broader “public” interest. Hence, it may be assumed that the IASB would define quality in financial reporting, if not implicitly for all reporting, as focused on the needs of investors as primary stakeholders with others (customers, employees, social activists, etc.) assumed to gain from the focus on financial market actors. By merging with the Sustainability Accounting Standards Board (SASB) in 2022, the IASB has deepened its influence on social and environmental areas of reporting. The purpose and intent of such non-financial reporting are summarized as follows:

“SASB Standards identify the sustainability information that is financially material, which is to say material to understanding how an organization creates enterprise value. That information—also identified as ESG (environmental, social, and governance) information—is designed for users whose primary objective is to improve economic decisions.”

For more details, see SASB Standards and Other ESG Frameworks—SASB.

Whilst this merger was recently compared to the time of our case study, it does shed light on what we might expect to find within corporate reporting. Alongside such standards, countries also have differing corporate governance regimes. The 2018 UK code, the relevant governance regime at the end of the case period, does briefly mention other stakeholders with reference to the Companies Act (2006):

“The board should understand the views of the company’s other key stakeholders and describe in the annual report how their interests and the matters set out in section 172 of the Companies Act 2006 have been considered in board discussions and decision-making.” (Page 5. FRC, 2018)

Section 172 of the Act (From Companies Act 2006 (legislation.gov.uk), accessed on 28 January 2023. Note the Act is frequently revised, so 2006 is a time of reference rather than the last time it was amended) details the responsibility of directors regarding other stakeholders, including but not limited to employees, customers, suppliers, and creditors. Section 414 then details the non-financial disclosures required in a “Strategic Report,” and 414CB (from the Companies Act 2006 (legislation.gov.uk) accessed on 28 January 2023) specifically includes “anti-corruption and anti-bribery matters.” A report that does not include the elements detailed in 414 may lead to the prosecution of the directors, who might be liable to a fine. The Bribery Act 2010 (see the Bribery Act 2010 (legislation.gov.uk), accessed on 28 January 2023) itself is focused on defining the crime and the penalties (a fine or up to 12 months imprisonment) rather than the reporting.

This regulatory framework is not the only pressure on UK companies, with other non-governmental organizations with high profiles also calling on companies to report regularly and meaningfully on various themes. These include TI, GRI, and the UN through first their Millennial Goals and their successor, the Sustainable Development Goals.

None of the above is as straightforward as it might appear. Good news for one stakeholder might be bad or irrelevant for another; what is relevant for the long term might be seen as irrelevant in the short term if that was an investor’s focus, for example. As an example, regulators may perceive excellent clarity about bad bribery incidents as useful and beneficial, but managers and shareholders may find it undesirable, as a lack of awareness might be seen to benefit them. An employee might want to know information that informs them about the integrity, or lack of integrity, of their employer whilst being concerned that such news might have negative commercial consequences and consequential downsizing. Quality is concerned with an item’s suitability for its intended purpose, and stakeholders with variable objectives are unlikely to always have the same understanding of how the item can be implemented. This notion is well-known in the literature on accounting reporting [3,33,41–47]. The literature emphasizes the need to focus on the individual dimensions of disclosure quality (e.g., quantity, breadth, depth, and time) to gain a deep

understanding of reporting quality. Therefore, the amount of disclosure (the most common metric in the literature) is not the only quality metric. It has also been noted by a number of scholars that the importance of corporate disclosure has often been inappropriately linked with the quantity disclosed (see, [43,48–50]).

2.2. Defining and Measuring Reporting Quality

The benefits of having a meaningful and measurable concept of “quality” are important to a wide range of disciplines, including computer science, social science, education, and accounting disclosure. The information might be described as “quality” if it is fit for the purpose intended. As we saw in the section above, the purpose intended for financial reporting and the accompanying non-financial reporting is primarily focused on meeting the needs of shareholders and financial market participants. We have also discussed how appropriate and useful information for these stakeholders cannot be assumed to be so for other stakeholders. However, the UK corporate governance code and the disclosure rules do state that the needs of these other stakeholders should be addressed to a degree, though perhaps not necessarily to a level that might be seen as sufficient or meaningful. In designing our ACD index, we have used both the Bribery Act and major non-governmental sources (UN, EITI, GRI) as guidance for what might be reasonable content for a company to address on this topic for it to be seen as meeting these broader information requirements in its annual report.

Another angle on quality in the information economics and accounting literature is the practical need for the provision of information to be collated at a reasonable cost, in a timely manner, and to be understandable. The IASB Conceptual Framework (2018, Section 2) puts these in a financial reporting context, and IASB (2022), a draft standard for sustainability financial disclosure, extends this to sustainability-related financial disclosures and, by implication, any other disclosure that would support such disclosure. Whilst the latter is beyond our sample period, it provides the clearest insight into the continuing mindset of corporate reporting.

Reporting quality has been examined by prior research across numerous dimensions, including the characteristics of information disclosed, the volume disclosed, the themes or topics covered, the type of information, and the language used [30] summarizes these. Most non-financial corporate reporting research approaches have used that draw on one or two of these dimensions to measure the “quality” of corporate sustainability, or sub-theme, reporting in most cases. To assess quality (e.g., the range of themes addressed, measures of disclosure, time period, and credibility of disclosure), we would require a very comprehensive (compound) descriptive model with the added complexity of needing to weight each factor for relative importance—yet another factor that may vary by user group. Hence, quality in the field of CSR reporting is no less a complex concept being multifaceted and subjective [43,45–47,51–53].

2.3. Credibility of Assessing Reporting Disclosure and Its Quality

The difficulty of measuring the extent of corporate disclosure is one of the most important limitations encountered in disclosure studies [54]. The volumetric approach, which counts words, sentences, or pages in the report, indicates the importance of the reported items/themes to readers and, therefore, can be used as a measure of reporting quality [31]. Additionally, the unweighted disclosure indices, which have been used to assess corporate disclosure quantity under the assumption that all disclosed items/themes are equally important, have also been criticized. As a proxy of reporting quality, these approaches focus only on how much information is provided. Additionally, meaning-based or interpretive approaches, such as weighted thematic content analysis, have also been used as a measure to evaluate the quality of disclosure [33,52]. Thus, this has led to generally quantitative evaluations of what is disclosed and how it is disclosed by analyzing the content of the corporate report in terms of specific criteria and then weighting/scoring the criteria according to their perceived relative importance (e.g., [32,46,55,56]). Despite these concerns,

weighted disclosure indices have been criticized as reflecting a bias towards a specific group of users [31], though the decision to use unweighted indices is no less a decision. Such studies apply content analysis to numeric but mostly non-numeric information [57]. By applying weighted thematic content analysis, these studies seek to evaluate the content of specific disclosed topics rather than simply count them [52]. Using content analysis, [50] examined corporate disclosure to assess the comparative positions and trends in corporate reporting (see, also, [30,44,47,58]).

It has often been considered that the amount of disclosure (i.e., number of disclosed items, pages, or words) is a sufficient measure of the quality of disclosure, despite the fact that many empirical studies have shown that the quality and quantity of disclosure are distinct from each other and that quality refers to the precision or accuracy of the disclosure (e.g., [18,29,30,32,59]). As a result, several studies have examined who is reporting, what is reported, how is reported, and how much is reported in the corporate social responsibility (CSR) reporting literature (see [30,42,60–63]). In addition, the narrative and graphical disclosures within UK annual reports (ARs) have offered a foundation for evaluating not just the quantity of disclosure but also the readability and reporting quality of these corporate documents [51,64]. Indeed, a report's breadth and visual format have established a framework for gauging the quality of CSR reporting [30].

Prior corporate non-financial reporting literature has focused on the number or type of disclosed items made in assessing the quality of CSR reports [33,38,44]. Many of these studies employ content analysis as a primary tool to analyze the content of these CSR reports (see, for example, [19,59,65–69]). This approach may include a number of words, sentences, phrases, pages, or items as well as assessing the readability or the proportional disclosure of good versus negative news [30]. To arrive at statistical conclusions on the quality of CSR reporting, these studies have often relied on content analysis to turn, usually, textual matter into quantitative metrics (e.g., [18,55,70,71]). A disclosure measure that seeks to measure reporting quality may provide a better result than a disclosure measure that just measures its quantity (see [19,30,31,47]).

Content analysis requires collecting relevant information by codifying and classifying both qualitative and quantitative information into pre-determined categories and sub-categories [27,30]. In our context, this is to identify trends and patterns in corporate reporting. Careful designing of the coding structure is paramount to avoid inaccurate results (i.e., the validity of inferences derived from data is determined by the integrity of the content analysis and the validity of the data collected, see [33]). Assessing reporting quality can also be incomplete if the scoring systems are based upon merely disclosure or non-disclosure (a 1/0 scale) since this would limit measuring and then assessing the themes covered, completeness, relevance, reliability, and other important features of corporate disclosure. Further, [57] asserts that the reliability of assessing reporting quality is dependent on shared meanings, which create the same referents independently of the coder (see [44]). Based on Krippendorff's [57] analysis, the reliability of measuring reporting quality is classified into three dimensions: (1) stability (the consistency exhibited over time by the same coder when analyzing the same content), (2) reproducibility (the degree to which different coders produce the same results when analyzing the same content), and (3) accuracy (whether the text is classified according to a standard or norm [57]). Finally, [53] emphasize that the scoring system is value loaded and depends on the prior knowledge of coders/assessors of corporate reporting. They also add that a training workshop of approximately 20 corporate reports (e.g., pilot study) is necessary to achieve accurate scores of reporting quality.

2.4. Measures of Assessing Reporting Quality

As the main objective of this research is to investigate the quantity and quality of corporate ACD, it is essential to review the common disclosure measures developed and used in the academic literature (e.g., [19,30,32,34,43,48,59,66,68,69,72]). As stated above, these measures are designed to scrutinize the non-financial, mostly textual, elements of

corporate reporting, usually analyzing and comparing the annual report of companies. Such assessment of reporting quality has primarily been conducted based on quantity or a checklist of themes/items or topics that seek to capture the volume and variety of corporate disclosure features. Much of the corporate disclosure literature has assessed corporate disclosure based on the volume of disclosure and the number of disclosed themes. There can be no quality without a level of quantity, but it is clear that a higher volume does not necessarily mean more meaningful content.

Studies have adopted the traditional approaches of content analysis (i.e., volumetric and interpretative) and scoring methods (i.e., unweighted and weighted disclosure index) (see, [27,30,31,34,35,66,68,73]) to the corporate reporting context. For instance, Michelson et al. (2015) assessed the quality of corporate disclosure using the quality model adopted by [35] to capture the quantity of information disclosed and the ‘richness’ of its content. This richness captures many quantitative and qualitative features in a specific type of disclosure. A further instance would be [19] assessing the quality of corporate disclosure using a scoring method with a minimum score of zero and a maximum of four, with zero for no disclosure and four being used for “truly extraordinary disclosures” (page 204). More recently, [31] developed a multidimensional quality model (MQM) to assess the quality of environmental disclosure and capture a broader set of assumed quality proxies (for example, high-level content, credibility, and communication of environmental disclosure).

We consider these metrics developed in the relatively well-researched reporting sub-category of environmental reporting and seek to apply them to ACD, a sub-category that has attracted much less research interest and a reporting segment where volume is much reduced compared to environmental issues. We categorize the different approaches to the assessment of corporate reporting into two groups: unidimensional measures and multidimensional measures. These are presented below in Section 3.3.

To conclude, previous academic literature has paid considerable attention to corporate sustainability and performance practices (e.g., [18,30,34,37,74,75]). Within sustainability reporting analysis, a few academic studies have addressed several ACD matters (e.g., [1,2,65,66,68,69,72,76]). These studies assessed both the quantity and quality of ACD practices using self-developed indexes and disclosure checklists based on sustainability reporting guidelines such as the Global Reporting Initiative (GRI) and Transparency International (TI) (see, [6,66,77], for example). Further research is needed to assess the response of companies to the pressure of regulation and international guidance mandating or encouraging them to disclose their anti-corruption practices. Hence, the current research aims to reduce this gap by addressing the research questions stated above. We develop a quality disclosure index and then, by applying metrics from the environmental accounting field to ACD reporting, seek to assess the merit of these metrics in this field firstly and, secondly, seek to use them to assess the impact of the UK Bribery Act 2010, on the quantity and quality of ACD practices of the large UK domiciled extractive companies.

3. Research Methodology

3.1. Research Sample

Our sample comprises the extractive firms listed in the UK FTSE 100 from 2003 to 2019. The FTSE 100 is one of the globe’s best-known stock market indices and includes the largest 100 firms with a main listing on the London Stock Exchange. The UK is a suitable country for such an analysis as it has relatively high levels of CSR reporting practices [73]. As stated above, the extractive industry is a suitable purposive sample as it is one of several industries where the potential for corruption is seen to be high and, therefore, would be an appropriate subject for companies to address. We collected annual reports for the companies below for the time in the sample period that they were in the FTSE 100, an index re-assessed every three months. The sample period covers a good number of years pre and post the introduction of the UK Bribery Act. This sample included 10 companies, detailed in the table below, though not all firms could be included for all years of the study due to changes of domicile and for periods when they were not in the FTSE 100 index. Glencore is

deemed to be a continuation of Xstrata, a predecessor company. The sample is presented in Table 1.

Table 1. Companies included in the study.

Company	Subsector	Founded	Years in Study	Market Cap (Oct 2020) (£Billion)	Key Countries of Operation
BP	Oil and Gas	1908	17 (2003–2019)	54.340 B	UK/70 countries worldwide
Anglo American	Metals and Mining	1917	17 (2003–2019)	33.962 B	South Africa/15 countries
Rio Tinto	Metals and Mining	1873	17 (2003–2019)	93.758 B	Australia/35 countries
Shell	Oil and Gas	1907	17 (2003–2019)	100.464 B	Netherlands/More than 70 countries
Antofagasta	Metals and Mining	1888	16 (2004–2019)	14.231 B	Chile and the United States
Evrast	Steel	1992	9 (2011–2019)	7.325 B	Russian Federation, US, Canada, Czech Republic, Kazakhstan
Fresnillo	Metals and Mining	2008	12 (2008–2019)	7.929 B	Mexico
BHP	Metals and Mining	1885	17 (2003–2019)	159.591 B	Australia/20 countries
Polymetal	Metals and Mining	1998	9 (2011–2019)	7.842 B	Russia, Kazakhstan, Armenia
Glencore	Metals and Mining	1974	17 (2003–2019)	33.297 B	Switzerland/19 countries

Notes: Market Cap Market Capitalisation; B Billion.

3.2. Research Method: Content Analysis of Extractive Firms' Annual Reports

This research investigates whether the unidimensional and multidimensional measures of reporting quality developed and used in the environmental reporting literature (e.g., [19,30,34,35,59]) are suitable for assessing the quality of ACD. Data were collected from corporate annual reports published by these ten UK extractive companies listed on the UK FTSE 100 for the period 2003 to 2019, a total count of 148 reports. The research sought to follow the approach of [57]. To recognize ACD content in the annual reports, 26 issues or items (detailed in Appendix A) were identified and organized into 6 categories. These were taken from items directly mentioned in the Bribery Act and/or recommended by TI, GRI, World Bank (WB), and Nation Combat Against Corruption (UNCAC).

The 'recording unit' for measuring the quantity of ACD was defined as the number of words. This recording unit includes the limitations of other recording units, such as sentences, lines, and pages, and considers both narrative and non-narrative disclosure, such as graphs, tables, and pictures [31,50]. Given the low quantity of ACD relative to the environmental content, words were chosen as fractions of pages, which is hard to measure and dependent on type size and requires decisions on whether the whole page is being considered or just the proportion of textual rather than a table or graphical content. Following earlier research and a pilot study, the following words and phrases were searched for in each of the 148 annual reports: 'corruption', 'bribery', 'UK Bribery Act', 'OECD', 'UNCAC', 'EITI', 'fraud', 'payment facilitation', 'code of conduct', 'dismiss', 'terminate', 'training', 'zero tolerance', 'corrupt', 'bribe', 'code of ethics', 'donation', 'donate', 'charity', 'charitable donation', 'political donation', 'political contribution'. Each occurrence was checked, and a decision was made as to whether the occasion was referring to ACD as opposed to another disclosure topic. The number of words in the ACD sentences/paragraphs/sections was collected and, as collected, were assessed for which of the 26 questions or issues that had been identified within ACD were being addressed. Once identified as ACD, the words in the relevant sentences were counted and assigned to one or more of the questions. Scoring for each of the disclosure metrics was then carried out. The collection mechanism was designed to avoid double counting of text that tackled more than one of the 26 issues whilst still recognizing that each of the issues had been addressed.

3.3. Metrics of Corporate Disclosure

The following metrics, see Table 2 and below, were chosen from a review by [30] of the literature on environmental reporting measures. Some measures were not appropriate or needed minor adjustments for ACD due to the relatively low volume of disclosure, the lack of pictures and graphs, and the lack of or ambiguity of external assurance of this content. The measures selected are detailed below. The table separates the unidimensional from the multidimensional measures, and each measure is discussed below.

Table 2. Measures of assessing disclosure quality and quantity.

Unidimensional (Quantity) Measures		Multidimensional (Quality) Measures		
Standardized Quantity Index (SQNI)	Scope Index (SCI)	Total Quality Index (TQLI)	Weighted Quality Index (ACHI)	Weighted Quality Index (SHI)
Standardized quantity (percentage of disclosure compared to minimum and maximum of the sample)	Scope index (unweighted themes): number of anti-corruption themes disclosed (percentage of disclosed themes to the maximum possible number of themes in the disclosure checklist)	Quantity, themes, and richness of disclosure	[34] weighted index (based on the richness of themes disclosed)	[19] weighted index (themes weighed based on the richness of disclosure content)
$SQNI_i = (\text{words}_i - \text{min}) / (\text{max} - \text{min})$	$SCI_i = (1/n_i) \sum d_j$	$TQLI_i = 1/2 (SQNI_i + RICH_i)$	$ACHI_i = \text{Total quality score/occurrence score}$	$SHI_i = 1/n_i \sum w_j d_j$

See the text below for details on the equations.

3.3.1. Standardized Quantity Index (SQNI)

This metric measures the ACD word count from an annual report, subtracts the lowest word count recorded in an annual report in the sample for that year, and then divides this by the range in word count (largest less least) again for that sample year. This metric is adjusted from page count due to the low level of ACD disclosure compared to environmental disclosure.

3.3.2. Scope Index (SCI)

This metric counts the number of questions answered in a particular annual report and compares this with the maximum possible number (all questions answered). In the previous research, these were referred to as themes rather than questions. Because of the low number of questions answered in many of the early years of the sample, in particular, we also computed a second SCI index scored by categories answered. The questions were grouped into six categories (see Appendix A), and each annual report was assessed based on the number of categories where at least one question had been answered out of a potential high score of all six. We refer to the question-based SCI as SCI-Q and the category SCI as SCI-C.

3.3.3. Total Quality Index (TQLI)

This index was developed by [35,36] and then empirically tested by [73]. This multidimensional metric combines the SQNI score above, which measures relative quantity, with a “richness” metric. As you see from the equation above, volume and “richness” are equally weighted. “Richness” is the unweighted average of width and depth. Width is taken as the number of questions addressed in an annual report divided by the maximum score of 26 questions. For depth, each question is scored between 0 for no content and 4 for exceptional disclosure. Then these scores are summed before being divided by the number of questions answered—giving an average question depth score for the report. 0 is recorded for no disclosure, 1 for a general description, 2 for a specific narrative, 3 for quantitative information, whether financial or non-financial, and 4 for truly outstanding depth of disclosure. Two authors independently undertook a sample to make sure there was reasonable objectivity in this difficult judgement.

3.3.4. Weighted Quality Index (ACHI)

This index assesses the quality of disclosure from the questions answered, ignoring the ones that are not covered in an annual report. Each question answer is scored 1 to 3, with 3 for quantitative disclosures, 2 for specific information but without numbers, and 1 for general narrative.

3.3.5. Weighted Quality Index (SHI)

The SHI statistic combines both width (taking account of all questions) and depth (scoring each addressed question between 0 and 4). Thus, with the reduced volumes of anti-corruption disclosure, SHI is, in effect, the richness calculation for TQLI. The scoring of 0 to 4 uses the same criteria per the TQLI index. One might argue that the SHI index is a more logical version of the ACHI because a high score can no longer be obtained from just answering one question very well but would need many questions answered reasonably.

3.3.6. Conclusions on Measures

Despite similar components, each of the above measures has its own calculative approach and may or may not add insight. We may find that the reduced level of disclosure as that of environmental reporting means their applicability is either enhanced or reduced when applied to the ACD context. We now apply these metrics to our sample set of annual reports.

4. Research Findings

This section first presents the descriptive statistics (Section 4.1) before addressing the first research question (Section 4.2) and then the second research question (Section 4.3).

4.1. Descriptive Statistics

Following through with the methodology detailed in Section 3.1 above, we generated a data set of word counts and questions answered by each company for each year. These were then used to produce the more sophisticated metrics applied in Sections 4.2 and 4.3 below. Table 3 shows the word count for each company for each year, with averages for each company at other times and across companies for each year. The word count is the rawest statement of volume. Table 4 progresses this a little by asking how many questions, out of the 26, were answered by each company for each year. A more granular examination of the data shows that companies do not necessarily answer the same questions every year, often with new questions being addressed and previously answered questions being dropped. There are examples of repeat sentences from one year's report to the next, but this was not that common. One might assume that companies read and learn from each other and may even feel compelled to match or beat each other on occasion (institutional isomorphism), but this did not seem evident on any scale or with any continuing trend. In Section 4.3, we will return to assess these statistics further.

Table 3. Descriptive statistics of the word count of sentences that address corruption content by the company by year.

Number of Words	Anglo American	BP	BHP	Glencore	RioTinto	Shell	Antofagasta	Fresnillo	Evraz	Polymetal	Average
2003	955	943	352	55	659	752					619
2004	725	1195	245	58	655	655	17				507
2005	438	782	318	58	307	230	360				356
2006	560	888	294	61	230	365	419				402
2007	763	227	188	64	575	428	256				357
2008	452	783	216	69	369	848	227	463			428

Table 3. Cont.

Number of Words	Anglo American	BP	BHP	Glencore	RioTinto	Shell	Antofagasta	Fresnillo	Evraz	Polymetal	Average
2009	914	827	318	73	558	247	331	184			432
2010	836	694	416	2089	808	356	552	954			838
2011	1831	2146	536	844	345	149	781	1123	219	686	866
2012	867	1696	1333	165	753	378	365	1241	632	1341	877
2013	1394	1312	2080	426	426	252	774	1997	1655	1618	1193
2014	944	1090	2617	356	387	232	1046	2285	2085	1148	1219
2015	2041	772	2471	398	220	359	752	1073	1420	1346	1085
2016	2138	771	1011	430	532	796	907	1200	2453	1349	1159
2017	1691	1159	1396	1071	802	1151	738	717	3166	930	1282
2018	1270	1166	1298	1712	674	1792	1117	1001	4729	1118	1588
2019	1730	835	1436	2885	361	1591	1620	1032	2210	912	1461
Average	1150	1017	972	636	509	622	641	1106	2063	1161	988

Table 4. Descriptive statistics of questions answered by the company by year.

Questions Answered (Max 26)	Anglo American	BHP	BP	Glencore	RioTinto	Shell	Antofagasta	Fresnillo	Evraz	Polymetal	Average
2003	4	3	4	2	4	4					3.5
2004	3	3	5	2	7	2	1				3.3
2005	3	4	7	2	5	3	2				3.7
2006	4	4	7	2	5	8	2				4.6
2007	4	3	4	2	6	11	2				4.6
2008	4	4	6	2	9	7	3	3			4.8
2009	6	4	6	2	8	4	3	5			4.8
2010	8	6	5	8	7	4	5	11			6.8
2011	13	9	15	6	5	3	13	13	3	11	9.1
2012	14	12	14	2	7	4	11	13	10	12	9.9
2013	14	13	16	2	6	4	13	13	8	12	10.1
2014	9	14	13	2	6	3	9	10	10	15	9.1
2015	13	12	9	2	2	5	12	4	4	14	7.7
2016	13	8	12	3	6	7	16	7	11	12	9.5
2017	15	12	17	13	7	13	17	5	13	14	12.6
2018	16	15	16	13	9	15	18	11	19	14	14.6
2019	14	17	11	16	4	12	17	7	16	14	12.8
Average	9.2	8.4	9.8	4.8	6.1	6.4	9.0	8.5	10.4	13.1	8.6

4.2. Research Question 1

This section presents the study findings related to the study's first research question: Can the deployment of reporting quality measures developed in the environmental reporting literature enhance our understanding and interpretation of corruption-reporting quality and behavior? The unidimensional metrics will be considered first in Section 4.2.1 and the multidimensional measure in Section 4.2.2, followed by a discussion in Section 4.2.3.

First, we consider the unidimensional measures, SQNI and SCI, and apply them to assess the anti-corruption disclosure over the 17-year period from 2003 to 2019.

4.2.1. Assessing ACD Using Unidimensional Metrics

Table 5 summarizes the findings for the entire period. Table 6 shows the mean, median, standard deviation, minimum and maximum values of SQNI and SCI question-based and SCI category-based for each company over the sample period.

Table 5. Mean values of the uni-dimensional measures of disclosure.

	Observations	SQNI	SCI-Q	SCI-C
Mean	148	39.6%	0.31	0.54
Stdev	148	32.8%	0.19	0.31
Min	148	0.0%	0.04	0.17
Max	148	100.0%	0.69	1.00

Note: SQNI = standardized quantity index; SCI is the scope index, the number of anti-corruption themes disclosed (percentage of disclosed themes to the maximum possible number of themes in the disclosure checklist). This is worked out first with a “theme” being defined more narrowly as a question (SCI-Question) and then more broadly as a category (SCI-Category).

Table 6. Descriptive statistics of uni-dimensional metrics for each extractive company across sample years.

Company	No of Years	SQNI				SCI—Questions Based				SCI—Category Based			
		Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev
Anglo American	17	14.7%	100.0%	61.5%	26.5%	0.12	0.62	0.36	0.19	0.17	1.00	0.65	0.35
BHP	17	3.5%	100.0%	40.9%	32.1%	0.12	0.65	0.32	0.19	0.17	1.00	0.44	0.31
BP	17	12.1%	100.0%	59.2%	38.6%	0.15	0.65	0.37	0.18	0.17	1.00	0.61	0.31
Glencore	17	0.0%	100.0%	17.7%	32.5%	0.08	0.62	0.19	0.18	0.17	1.00	0.39	0.28
RioTinto	17	0.0%	73.1%	26.1%	25.0%	0.08	0.35	0.23	0.07	0.17	0.67	0.41	0.19
Shell	17	0.0%	100.0%	29.2%	29.0%	0.08	0.62	0.25	0.16	0.17	1.00	0.39	0.28
Antofagasta	16	0.0%	49.9%	24.4%	14.5%	0.04	0.69	0.35	0.24	0.17	1.00	0.60	0.39
Fresnillo	12	0.0%	95.5%	42.5%	29.8%	0.12	0.69	0.41	0.20	0.17	1.00	0.63	0.26
Evraz	9	3.5%	100.0%	68.3%	33.6%	0.12	0.50	0.31	0.13	0.17	1.00	0.72	0.31
Polymetal	9	8.7%	76.8%	39.3%	25.0%	0.42	0.54	0.50	0.04	0.67	1.00	0.81	0.10

SQNI

Table 5 gives the mean value of SQNI for the entire sample, 39.6%, and the standard deviation of 32.8%, with minimum and maximum values of 0.0 and 1.0, respectively. Where 0.0 represents the company with the minimum number of words in ACD in a particular year, and 1.0 represents the company with the maximum. The calculation of SQNI on an annual basis means there will be a 0.0 and a 1.0 every year, with all other scores in between. The mean of 39.6% suggests that the average anti-corruption word count is somewhat nearer to the minimum disclosure for the year than the maximum. Table 6 shows that the company with the highest mean value of SQNI is Evraz, with 69%, followed by Anglo American with a score of 61.5%, and the lowest is Glencore, with 17.7%, closely followed by Antofagasta and Rio Tinto.

Figure 1 shows a remarkably volatile SQNI journey for each company over time. As we have discussed, SQNI is a relative measure, so one company will always score 100% and another 0%, even if the overall level of reporting is rising. Figure 1 also suggests that over

the last few years, more companies have bunched towards the bottom end of the graph, suggesting the highest performer in that year is more of an outlier than the lowest. Figure 2 confirms this with later year average scores being as low as 25%—the average reporter only includes a quarter of the words of the one with the highest word count.

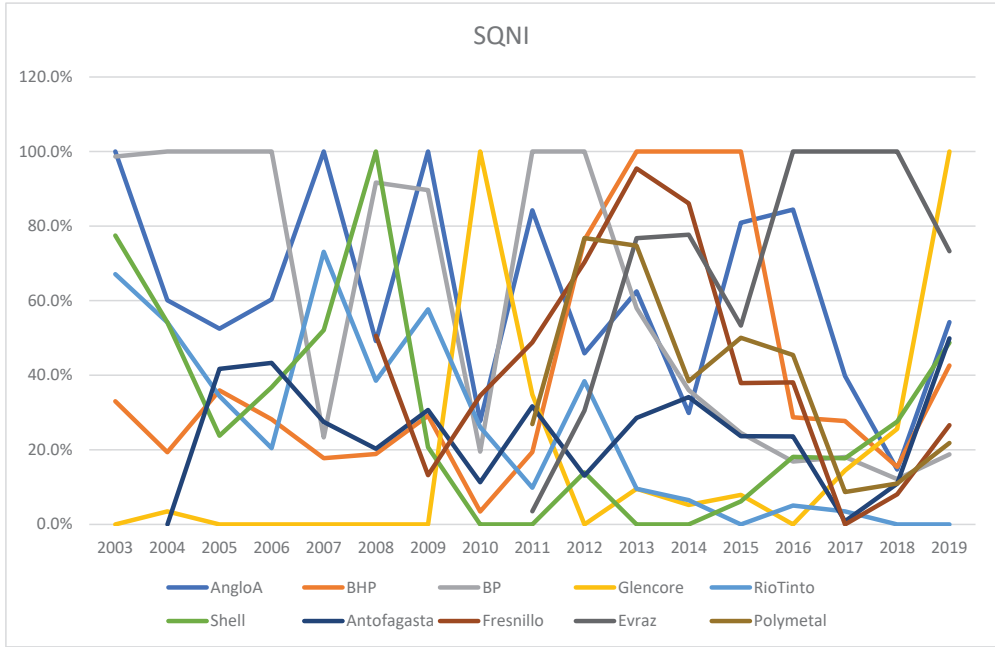


Figure 1. SQNI trend by each company over time.

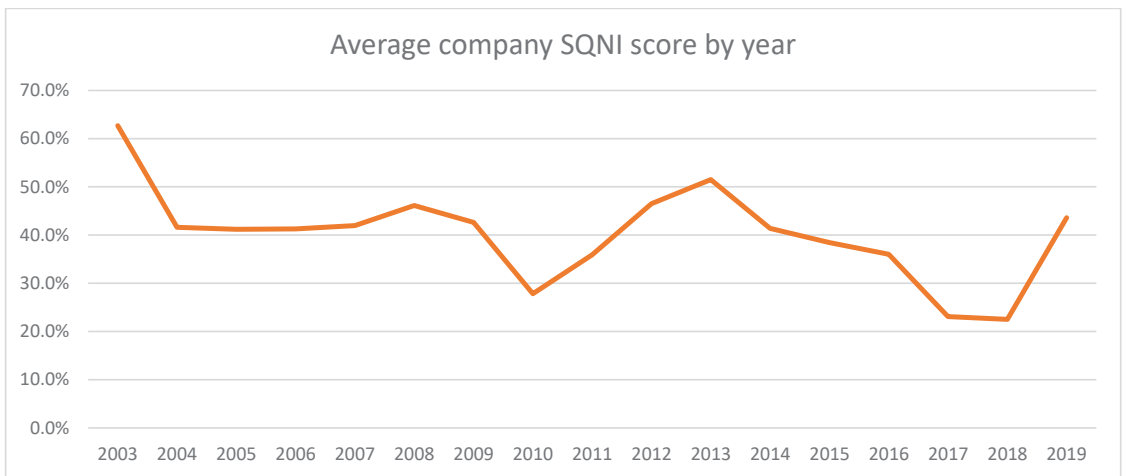


Figure 2. SQNI average trend over time.

Figure 2 confirms this, with the average SQNI score being below 0.5 in all but two years of the sample period.

SCI

You will recall that SCI measures the number of answers as a proportion of the total possible. This presents a picture not of relative disclosure, such as SQNI (the best company is 1, the worst company is 0), but of actual disclosure (1 is all questions or categories covered, 0 is no questions or categories covered). This metric is presented in two ways, firstly, the number of questions answered (a proportion of 26), and secondly, the number of categories where at least one question was addressed (a proportion of 6). Table 5 shows that the mean of SCI-question-based for the entire period is 0.31, while the highest score is 0.69 and the lowest is 0.04. For SCI-category-based, the highest score was 1, a company addressing all categories in an annual report, and the lowest at 0, no categories, and therefore, no questions addressed.

Table 6 also shows the question-based and category-based measures of the sample for the SCI metric. Answering one question would give a score of $1/26$ for SCI-Q, but a score of $1/6$ for SCI-C as one of the six categories would have been addressed; hence, SCI-C will always be higher. The minimum scores in Table 5 in both versions of the metric represent just one question or category being addressed; the maximum implies that, at best, 18 of the 26 questions were answered, though SCI-C tells us that on the best occasions, all categories were covered. The mean value of SCI-C suggests that, on average, just over half the categories were addressed, but SCI-Q shows that around a third of the questions were the mean proportion of questions tackled.

Table 6 shows that the company with the highest mean value of SCI-Q is Polymetal with 0.50, followed by Fresnillo with a score of 0.41, and the lowest is Glencore with 0.19, closely followed by Rio Tinto and Shell. SCI-C also has Polymetal as the highest reporter with a score of 0.81, with Evraz in second place with 0.72. Glencore and Shell tie on 0.39 for the lowest mean number of questions answered, followed by Rio Tinto. Polymetal and Evraz joined the FTSE100 part way through the sample period, which probably enhances their average, as the descriptive statistics show generally higher word count and questions answered in later years. There appears to be some consistency between SCI-Q and SCI-C in assessing the highest and lowest reporters.

Figures 3 and 4 both tell a visual story of rising questions and categories tackled with a visual jump for some companies in 2010/2011. However, this is not true of all companies, with Rio Tinto being close to the bottom of the graph at all times, whilst Glencore shows a dramatic improvement in reporting breadth in the last three years. The volatility of questions and categories tackled by each company shows that there is, it seems, a reconsideration of what to report in many years, with increased reporting sometimes followed by a reduction, which is perhaps a little surprising. One might have assumed that once a company had begun answering a question, then it would continue to do so. Figure 5 compares the average corporate score for each year for the two methods of calculation; both show a rising trend though not consistently.

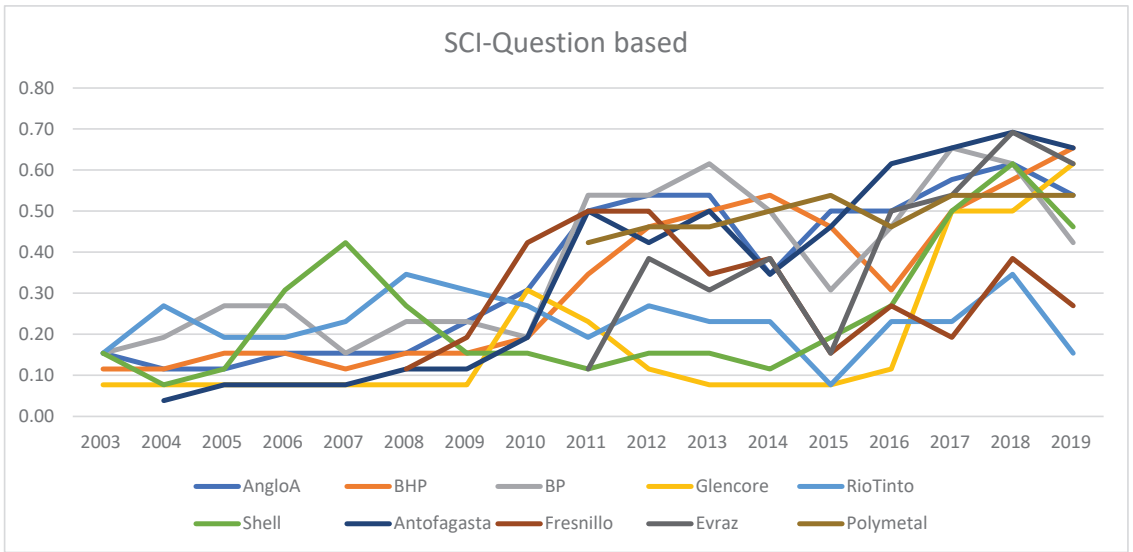


Figure 3. SCI-question-based by company for each sample year.

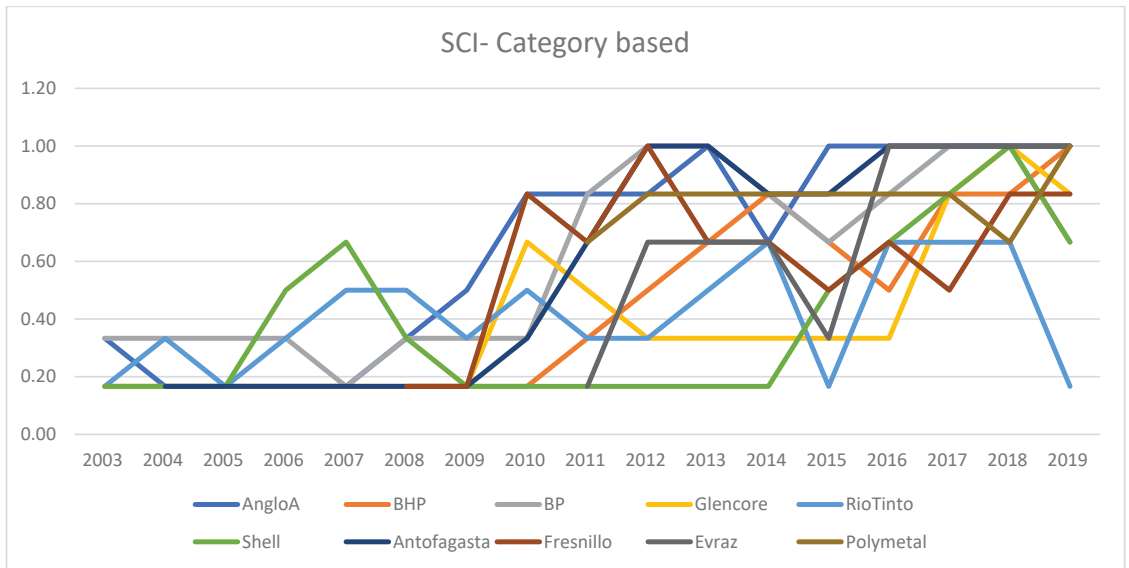


Figure 4. SCI-category-based by company for each sample year.

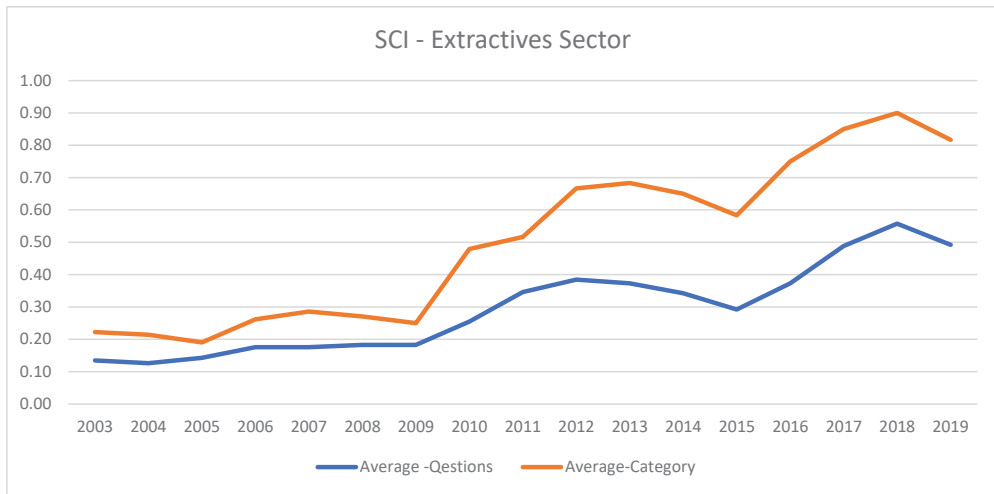


Figure 5. Average SCI-Q and SCI-C score by year.

4.2.2. Statistical Results of Multi-Dimensional Measures for UK Extractive Companies

The discussion now moves on to the more complex measures that seek to combine more than one dimension of “quality.” ACHI will be considered first, then SHI, and finally TQLI. Again, three tables are presented of the overall and detailed scores for these three metrics. Table 7 gives the overall statistics across the sample; Table 8 the overall statistics for the individual companies over the sample period; and Table 9 the year-by-year scores for the companies.

Table 7. Mean values of the multi-dimensional metrics of disclosure.

	Obs	TQLI	ACHI	SHI
Mean	148	0.496	1.92	0.60
Stdev	148	0.276	0.37	0.36
Min	148	0.058	1.00	0.08
Max	148	1.173	3.00	1.73

Note. TQLI: total quality index, ACHI: [34] Index, SHI: [32] Index.

Table 8. Descriptive statistics: Multi-dimensional metrics for the entire sample across years.

Company	No of Years	TQLI				ACHI				SHI			
		Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev
Anglo American	17	0.35	0.86	0.63	0.18	1.38	2.33	1.85	0.23	0.23	1.27	0.65	0.37
BHP	17	0.20	0.96	0.52	0.29	1.69	2.25	1.98	0.17	0.23	1.27	0.63	0.37
BP	17	0.25	1.02	0.70	0.22	1.69	2.53	2.11	0.26	0.27	1.73	0.81	0.41
Glencore	17	0.06	1.04	0.27	0.31	1.00	2.50	2.03	0.51	0.08	1.08	0.37	0.36
RioTinto	17	0.06	0.62	0.33	0.17	1.17	2.17	1.75	0.37	0.12	0.69	0.41	0.15
Shell	17	0.10	0.75	0.39	0.24	1.00	2.50	1.93	0.33	0.08	1.23	0.49	0.33
Antofagasta	16	0.06	0.85	0.42	0.20	1.31	3.00	2.04	0.54	0.08	1.19	0.59	0.37
Fresnillo	12	0.17	0.85	0.47	0.23	1.00	2.33	1.68	0.35	0.27	0.88	0.52	0.22
Evrast	9	0.13	1.17	0.73	0.35	1.38	2.25	1.85	0.30	0.23	1.35	0.77	0.42
Polymetal	9	0.54	0.81	0.67	0.10	1.67	2.07	1.88	0.15	0.77	1.19	0.94	0.14

Table 9. Summary of results of multi-dimensional metrics for the entire sample across years.

Dimensions	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
TLQI	Anglo American	0.63	0.44	0.38	0.46	0.65	0.38	0.67	0.35	0.84	0.69	0.83	0.48	0.83	0.86	0.78	0.71	0.81
	BHP	0.28	0.21	0.35	0.29	0.20	0.27	0.30	0.23	0.42	0.79	0.92	0.96	0.94	0.43	0.70	0.71	0.85
	BP	0.67	0.71	0.81	0.83	0.25	0.71	0.70	0.33	1.02	1.02	0.83	0.62	0.47	0.58	0.96	0.85	0.57
	Glencore	0.10	0.11	0.10	0.10	0.10	0.10	0.10	0.83	0.35	0.12	0.12	0.06	0.08	0.10	0.61	0.65	1.04
	RioTinto	0.49	0.50	0.36	0.29	0.62	0.44	0.62	0.42	0.24	0.44	0.18	0.17	0.06	0.16	0.19	0.35	0.15
	Shell	0.54	0.31	0.25	0.53	0.70	0.75	0.26	0.19	0.12	0.22	0.13	0.10	0.22	0.30	0.59	0.75	0.71
	Antofagasta		0.06	0.30	0.31	0.18	0.26	0.31	0.25	0.49	0.53	0.62	0.42	0.50	0.62	0.49	0.52	0.85
	Fresnillo						0.39	0.24	0.44	0.69	0.77	0.77	0.85	0.34	0.40	0.17	0.25	0.36
	Evraz									0.13	0.42	0.60	0.73	0.44	0.94	1.12	1.17	0.98
	Polymetal									0.56	0.81	0.76	0.79	0.71	0.63	0.54	0.59	0.61
	ACHI	Anglo American	1.75	2.33	2.00	2.00	2.00	1.75	1.50	1.38	1.69	1.71	1.86	2.00	1.69	1.77	2.00	2.06
BHP		2.00	2.00	2.00	2.00	2.00	2.25	2.00	2.20	1.89	1.75	1.69	1.71	1.92	1.88	2.23	2.20	1.94
BP		2.25	2.20	2.29	2.43	1.75	2.17	2.17	2.40	1.86	1.93	1.69	1.77	2.00	2.00	2.53	2.38	2.09
Glencore		2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.13	1.50	2.00	2.00	1.00	1.00	1.67	2.08	1.92	1.75
RioTinto		2.00	1.71	2.00	2.00	2.17	1.44	2.13	2.14	2.00	1.86	1.17	1.17	1.50	1.17	1.29	2.00	2.00
Shell		2.00	1.00	2.33	2.25	1.91	1.86	2.00	2.50	2.00	2.00	1.75	1.67	2.00	1.57	2.00	2.00	2.00
Antofagasta			3.00	2.50	2.50	2.50	2.67	2.67	2.00	1.31	2.18	1.92	1.44	1.67	1.63	1.47	1.33	1.82
Fresnillo							2.33	1.80	1.27	1.77	1.69	1.56	2.10	1.75	1.43	1.80	1.00	1.71
Evraz										2.00	1.40	1.38	1.80	2.25	1.77	2.13	1.94	2.00
Polymetal										2.00	1.83	1.67	2.07	1.71	1.75	1.86	2.00	2.00
SHI		Anglo American	0.27	0.27	0.23	0.31	0.31	0.27	0.35	0.42	0.85	0.92	1.04	0.65	0.85	0.88	1.15	1.27
	BHP	0.23	0.23	0.35	0.31	0.23	0.35	0.31	0.42	0.65	0.81	0.85	0.92	0.88	0.58	1.12	1.27	1.27
	BP	0.35	0.42	0.62	0.65	0.27	0.50	0.50	0.46	1.04	1.04	1.08	0.88	0.69	1.00	1.73	1.58	0.96
	Glencore	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.65	0.35	0.23	0.15	0.08	0.08	0.19	1.08	1.04	1.08
	RioTinto	0.31	0.46	0.38	0.38	0.50	0.50	0.65	0.58	0.38	0.50	0.27	0.27	0.12	0.27	0.35	0.69	0.31
	Shell	0.31	0.08	0.27	0.69	0.88	0.50	0.31	0.38	0.23	0.31	0.27	0.19	0.38	0.42	1.00	1.23	0.92
	Antofagasta		0.12	0.19	0.19	0.08	0.31	0.31	0.38	0.65	0.92	0.96	0.50	0.77	1.00	0.96	0.92	1.19
	Fresnillo						0.27	0.35	0.54	0.88	0.85	0.58	0.85	0.31	0.42	0.35	0.42	0.46
	Evraz									0.23	0.54	0.42	0.69	0.35	0.88	1.23	1.35	1.23
	Polymetal									0.85	0.85	0.77	1.19	0.92	0.81	1.00	1.08	1.00

Corporate Anti-Corruption Disclosure Findings (ACHI)

You will recall that ACHI measures the average depth of answers to the questions that the company has addressed in its report. The disclosure relating to a particular question is assessed as 3 to 1, with quantitative and detailed information again being rated more highly than qualitative and broad disclosure. Whilst this metric may tell us about the depth of the questions addressed, it will tell us nothing about the proportion of questions that were addressed. One question addressed well will lead to a metric of 3, whereas all 26 questions addressed with just broad statements would score 1, or 25 questions addressed at level 3 will only lead to 2.88. Hence this is similar to SHI but has a maximum question score of 3 rather than 4 and only reports on answered questions.

Table 8 shows Fresnillo with the lowest average score for ACHI and BP the highest at 2.11. This can be interpreted as BP generally answering questions that it chooses to

address with some depth, whereas Rio Tinto, on average, answers with less quantitative and less clear content. Table 9 shows a maximum of 3.0, which is Antofagasta in 2004, where one question was answered well. The mean score for a company's annual disclosure is 1.94, which we will see is significantly higher than the SHI average as the divisor here is just questions answered rather than total questions.

Figure 6 gives ACHI scores by the company over time. It is clear that there is no overall trend to greater depth or a company that consistently outperforms or underperforms compared to its peers. BP has the highest average of 2.11 whilst Fresnillo has the lowest average of 1.68. Table 9 shows no clear trend as the scores for each company are considered by year, and this is confirmed by Figure 7, which shows no rising trend and perhaps even a declining one over time. Figure 7 also shows the average number of questions answered by year, a clearly rising trend, yet ACHI does not reflect this.

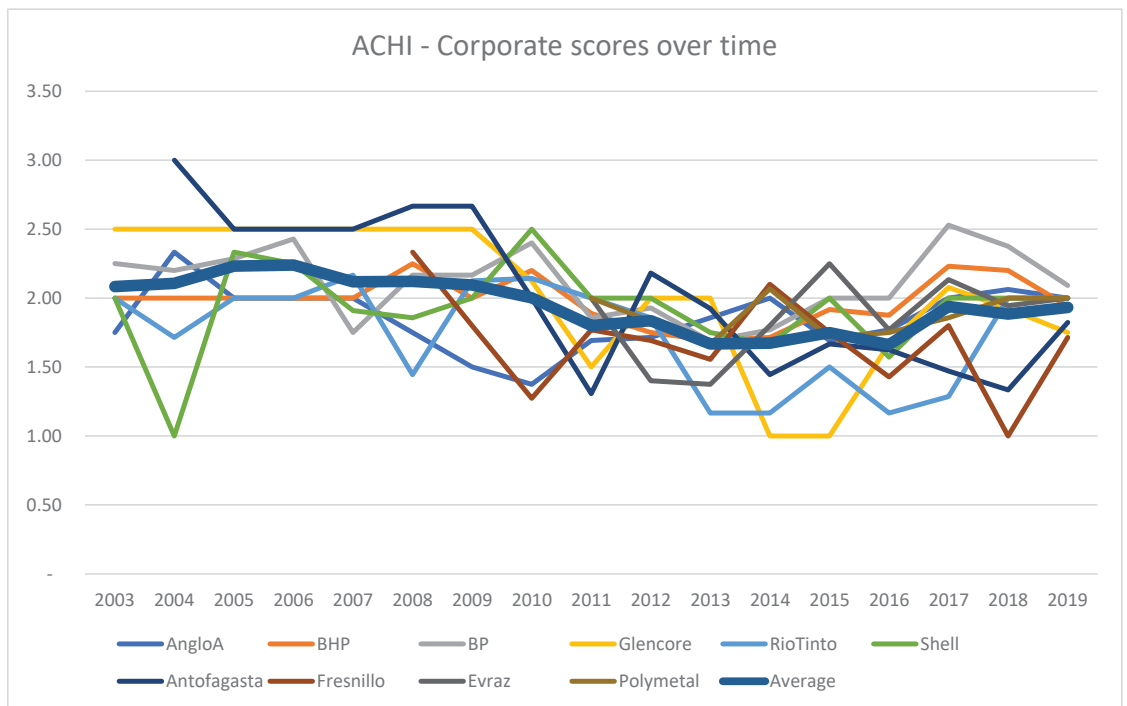


Figure 6. ACHI scores by company by year.

It may be interesting to note the differences in the results of ACHI from previous studies, even though they have focused on environmental issues and used different samples. As noted above, the mean value of ACHI for this entire sample is 1.94; this is higher than [34] mean value of ACHI among 198 US non-financial firms for the 1994 fiscal year, which was about 0.67. The authors suggest that on a scale of 0 to 3, where 3 represents quantitative disclosure of all significant environmental activities, on average, their sample firms disclosed only qualitative information at best. This study found that companies disclosed specific qualitative information, in line with [30], where the mean was about 2.8, higher than that of [34]. The level of these scores may be linked to the timing of the profile raising of the issues concerned, with anti-corruption disclosure calls from the UN (UN, 2003) and others having a series of legal and non-legal interventions from the early 2000s.

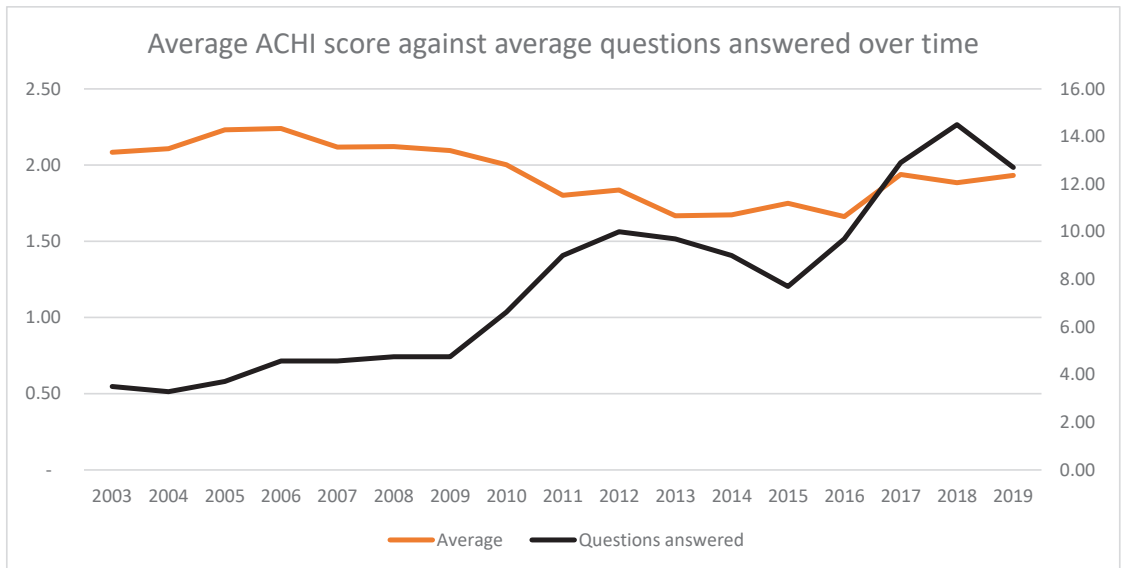


Figure 7. A comparison of the average ACHI score by year with the average number of questions answered by year.

Corporate Anti-Corruption Disclosure Findings (SHI)

SHI seeks to assess the depth and breadth of corporate response. Each question is assessed on a scale of 0–4, with 0 being no coverage and 4 being very high-level coverage. The SHI scores quantitative disclosure scores higher than qualitative. The sum of the scores across the questions is then divided by the total answered question count, meaning a minimum score of 0 would imply no questions have been answered, and a maximum score of 4 would mean every question answered had been answered well. From a total score of 2, it would be impossible to separate the company that had answered every question in a manner that was marked a 2 from a company that had only answered half the questions but had also scored a two on each of them.

Table 7 shows that the maximum score is 1.73 for SHI, with the mean being 0.60. Table 8 shows Glencore to be the lowest reporter of this metric over the sample period registering just 0.37, with Polymetal top on 0.94. Table 9 shows the scores by the company over time, and an overall rising trend is confirmed by Figure 8. However, as with previous measures, there are laggards as well as some years where companies decide to reduce their reporting of anti-corruption details. Nevertheless, Figure 9 shows a rising, if inconsistent, trend of the average score over time with 2010, the date of the UK corruption act, coinciding with a rise in disclosure, although there is a further greater rise in 2017.

In the study by [32] of environmental issues with a sample of 32 New Zealand companies for the fiscal year 2010–2011, their reported mean value of SHI was 0.681, which is broadly comparable with the average shown in this study (Table 7).

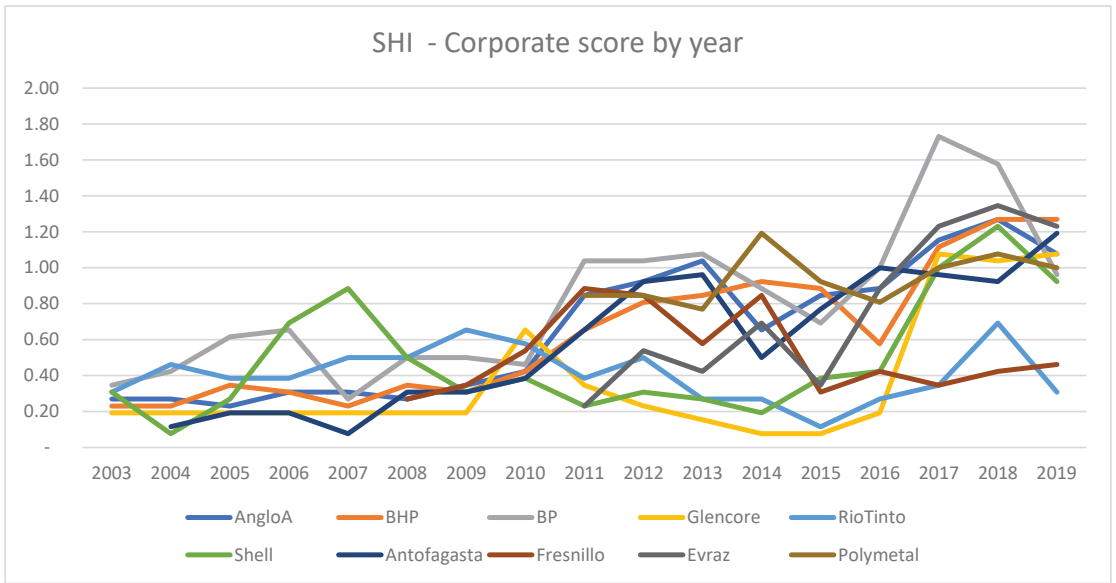


Figure 8. SHI company trends over time.

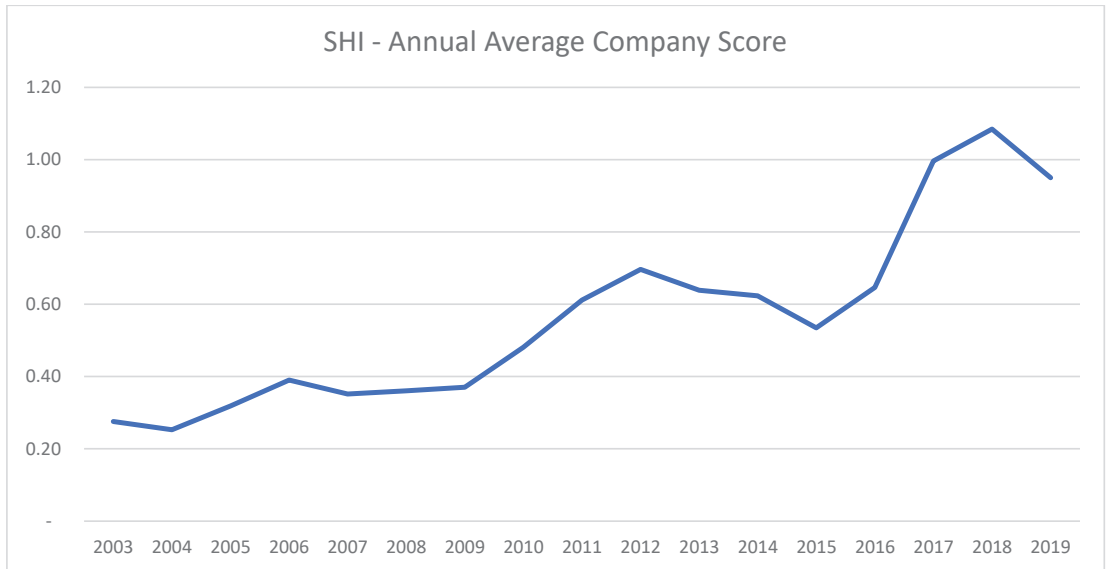


Figure 9. SHI average disclosure trend over time.

Corporate Anti-Corruption Disclosure Findings (TQLI)

TQLI is the most complicated of the metrics being examined in this paper. As explained before, the measure is an average of two components—the first part is the SQNI measure above (word count as a relative score across the sample companies by year), and the second is “richness,” which means width and depth. The SHI statistic combines both width (taking account of all questions) and depth (scoring each addressed question between 0 and 3), so with the reduced volumes of anti-corruption disclosure, SHI is chosen as a proxy for the original richness calculation.

The theoretical minimum score for TQLI is 0, and the maximum is 2 (the average of a 1 on SQNI and 3 on SHI). Table 7 shows the minimum score is just 0.06 (for Rio Tinto in 2015, see Table 9), while the highest score is 1.173 (for Evraz in 2018), while the mean is 0.496 (Table 7). Table 8 shows Glencore to have the lowest average TQLI metric through the sample period (0.273), followed by Rio Tinto; Evraz has the highest average, followed by BP. Figure 10 does not show any visual overall trend, and the presentation of the data in Figure 10 would appear to show a rising variation more than any rising average over time.

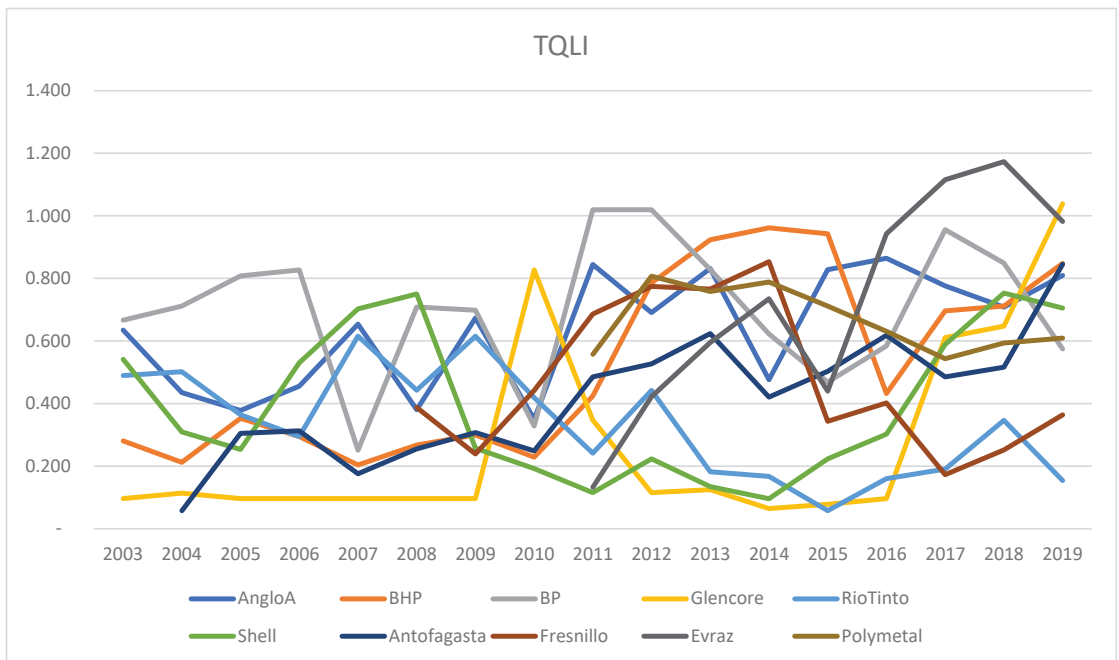


Figure 10. TQLI scores by company by year.

As we have seen, TQLI is made up of two components, with the quantity dimension (number of words) being relative across firms and representing 50% of the metric [59]. The overall TQLI with this revised approach is still reasonably similar to that of [35]. The SQNI calculation mitigates against showing any improvement of reporting over time as every year will have scores between 0 and 1 from the structure of the calculation. Figures 11 and 12 seek to address this through an alternative calculation of SQNI ranking across all years for all companies. Hence, the maximum score of 1 and minimum score of 0 occur only once throughout the sample period. This enables rising or falling scores over time to be represented in the TQLI calculation. The change this produces in Figure 11 is indeed a growth in the metric and the perceived reporting quality over the sample. Figure 12 shows this change in calculation results in SHI becoming a more consistent proportion of the overall TQLI score over time.

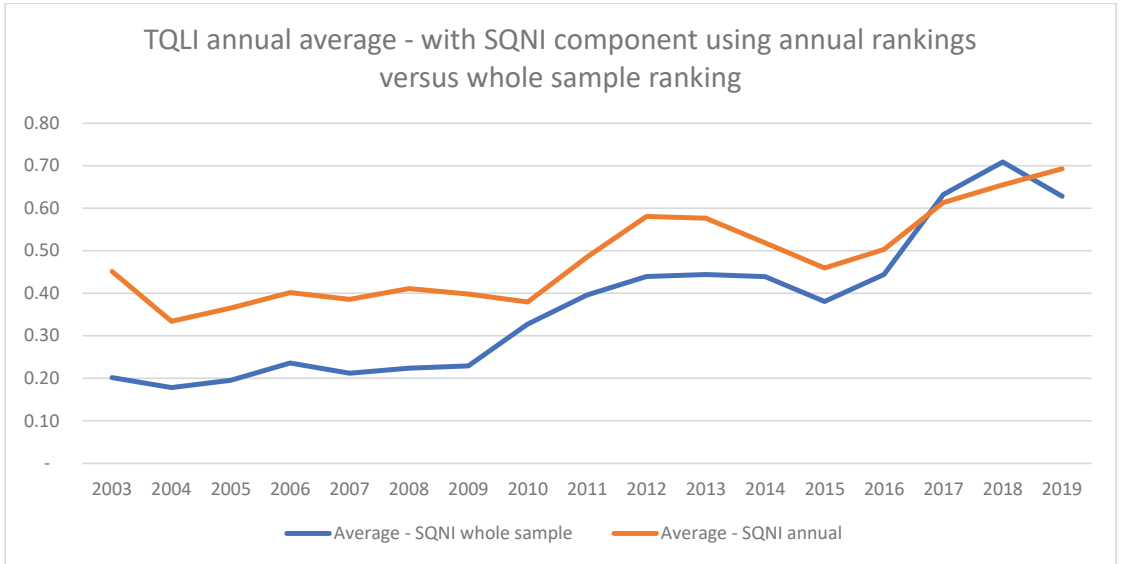


Figure 11. Average TQLI score by year using alternative SQNI component calculations.

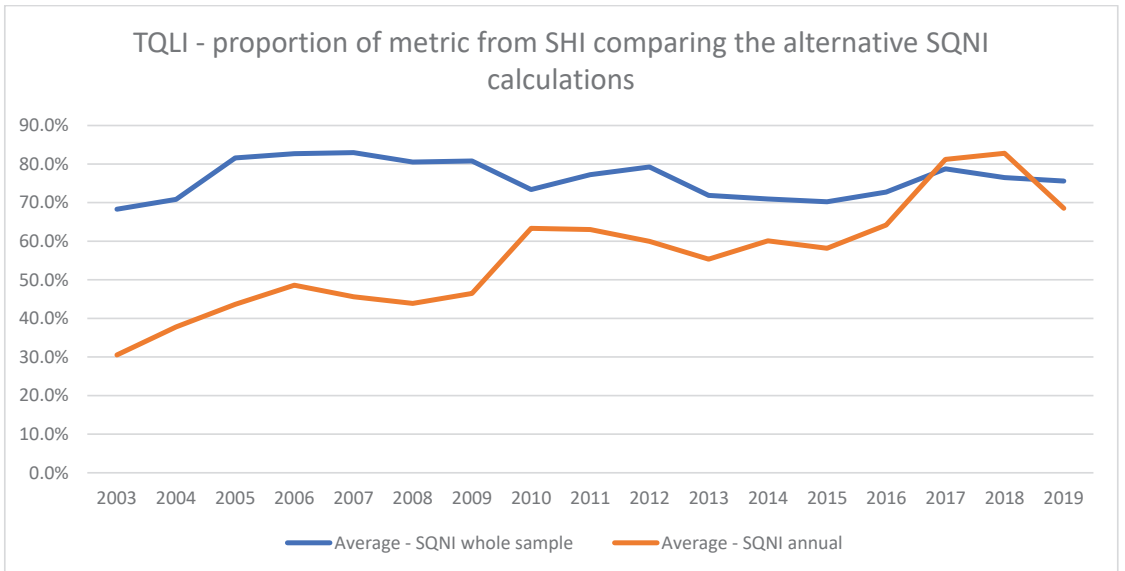


Figure 12. The proportion of TQLI derived from SHI with the alternate AQNI calculations.

4.2.3. Overview of Corporate Metric Results and Meaning

The discussion above has investigated the application of metrics used in the more expansive environmental disclosure field to the narrower, in reporting terms at least, of anti-corruption disclosure. The metrics differ from each other in a number of ways and hence, by design or default, seek to inform on slightly different issues or questions. SQNI, using the main calculation above, seeks relative disclosure by word count for each year without any clear concern for change over time. Other measures seek to inform on the number and/or depth of questions/categories answered and therefore can inform on not

just relative performance between companies over one year but over time too. TQLI seeks to combine SQNI with a depth of questions answered measure to give a broader assessment of quality across companies and over time.

In this section, the relative performance or ranking of the companies across the measures is considered, and this follows Helfaya and Whittington (2019, Table 7, page 537). Table 10 seeks to rank the best to worst disclosers according to each measure and, finally, a rough overall average score over the measures together. The three top performers for each column are highlighted in green, whilst the bottom three are shown in red. This shows a fairly consistent ranking for the companies at the bottom of the rankings whilst slightly more diversity at the top.

Table 10. Rank (Top 1, bottom 10) of companies by measure across the total sample period.

Total Period	SQNI	SCI-Q	SCI-Cat	SHI	ACHI	TQLI	Overall
Anglo American	2	4	3	4	7	4	4
BHP	5	6	7	5	4	5	5
BP	3	3	5	2	1	2	1
Glencore	10	10	9	10	3	10	9
RioTinto	8	9	8	9	9	9	9
Shell	7	8	9	8	5	8	8
Antofagasta	9	5	6	6	2	7	6
Fresnillo	4	7	4	7	10	6	7
Evraz	1	2	2	3	8	1	2
Polymetal	6	1	1	1	6	3	3

As mentioned throughout, some sample companies have not been part of the FTSE100 for the entire sample period. From 2011 all companies were part of the FTSE100, so Table 11 shows the same measures, but just for the final nine years of the sample period. If there is a rising trend or a discontinuity in disclosure following the 2010 Corruption Act, then it would be more reasonable to compare all companies across the same timeframes. The four companies at the base of the table are those with the restricted, later data; it is clear that Evraz and Polymetal, in particular, are now in the middle of the sample companies rather than towards the top. There would seem quite notable consistency with BP, Anglo American, and BP regularly at the top and Shell, Glencore, and Rio Tinto having the least disclosure, however, defined. Shell's ACHI score is the one major outlier to this last point; ACHI measures only the depth of questions answered with no concern for breadth, so one might conclude that Shell answers a few questions to some depth with few words (SQNI).

For each metric, the average scores across the sample companies were ranked by year from 1 (highest) to 17 (lowest). For example, 2003 has the highest rank for SQNI, 2018 is the lowest ranked, while SCI-Q ranks 2018 as the highest quality year, and 2003 is 16th out of our 17 sample years. The ranks were then compared across the metrics to see if one metric has significant power to explain or predict the level of another. The Spearman test was used for this as it requires fewer assumptions about the data and its structure. This is presented in Table 12. The two SCI variants were found to be highly correlated and also highly correlated with TQLI and SHI. The level of significance of each of these relationships is over 99%. It would be reasonable to assume that, in this context, little would be gained from working out more than one of these metrics. Intriguingly, ACHI, which assesses the depth of the questions answered, correlates negatively at 95% with all the above four metrics. This means that ACHI's interpretation of quality in anti-corruption reporting is opposite to that of the four nested metrics. Building on the previous discussion, it would seem that the increasing range of questions addressed comes at the cost of depth. SQNI has no significant positive or negative correlation with the other measures.

Table 11. Rank (Top 1, bottom 10) of companies by measure across 2011–2019.

2011–2019	SQNI	SCI-Q	SCI-Cat	SHI	ACHI	TQLI	Overall
Anglo American	3	2	1	2	5	2	2
BHP	2	5	7	4	2	3	3
BP	5	2	3	1	1	1	1
Glencore	8	9	8	9	7	9	9
RioTinto	10	10	10	10	10	10	10
Shell	9	8	9	8	3	8	8
Antofagasta	7	1	1	5	9	6	6
Fresnillo	4	7	6	7	8	7	7
Evrax	1	6	5	6	6	4	5
Polymetal	6	4	4	3	4	5	4

Table 12. Spearman correlations comparing environmental reporting measure consistency over the sample period.

	SQNI	SCI-Q	SCI-C	ACHI	SHI	TQLI (Revised)
SQNI	1.000					
SCI-Q	−0.283	1.000				
SCI-C	−0.316	0.966 **	1.000			
ACHI	0.130	−0.673 *	−0.706 *	1.000		
SHI	−0.348	0.983 **	0.961 **	−0.659 *	1.000	
TQLI	−0.039	0.907 **	0.895 **	−0.650 *	0.902 **	1.000

** significant at the 99% level for the two-tailed test, * significant at the 95% level for the two-tailed test.

4.3. Research Question 2

Our second research question considered the evaluation of the impact of the introduction of legislation, framed as: Does the use of these metrics provide consistent evidence that corporate ACD has responded to the introduction of the UK Bribery Act?

From the raw descriptive statistics tables (Tables 3 and 4), the average disclosure volume by companies for each year can be observed. The figure below shows this information graphically. Several observations can be made of this quantity graph. Firstly, the two metrics seem to closely follow each other, so more words are usually more questions answered rather than just longer answers. Secondly, there is a rising trend, but this is not consistent or uniform, as the company data in Tables 3 and 4 also demonstrates at the individual company level. Thirdly and looking more carefully, before 2010, the year of the Bribery Act, the graph seems fairly flat, but from 2010 onwards, there appears to be a jump that has continued as a somewhat inconsistent trend. This would suggest the Bribery Act may have had a positive response which companies continued to build on over the following years. Other initiatives from TI, GRI, etc., may also have impacted this positive trend.

We also considered the variation in mean values for significant differences splitting the sample into the years before the Bribery Act and the years after its introduction. Hence, the sample was split into two groups: 2003 to 2010, before the law was introduced, with 58 annual reports, 2011 and 2019, after the Bribery Act, with 90 annual reports. T-tests were conducted to compare the means of the corporate anti-corruption scores between the two groups. The results (Table 13) show a significant difference in the means of corporate anti-corruption disclosure scores at a 1% level for each of the measures except SQNI and ACHI. We have already noted that the design of SQNI means it does not provide a time trend.

Table 13. Two-sample *t*-test before and after the UK Bribery Act 2010.

Measure	Before/After	N	Mean	Std. Deviation	Significance	Equal Var?
SQNI	0	58	0.425	0.334		
	1	90	0.375	0.323	0.755	Yes
SCI-Q	0	58	0.174	0.088		
	1	90	0.405	0.174	0.000 ***	NO
SCI-C	0	58	0.275	0.169		
	1	90	0.712	0.262	0.000 ***	NO
SHI	0	58	0.354	0.164		
	1	90	0.753	0.369	0.000 ***	NO
ACHI	0	58	2.12	0.368		
	1	90	1.79	0.301	0.153	Yes
TQLI	0	58	0.390	0.214		
	1	90	0.565	0.289	0.008 ***	NO

*** Significance levels—1%.

Of the six metrics applied, four, SCI-Q, SCI-C, SHI, and TQLI, showed a high level of difference between findings before and after 2010. These four measures, all with a 1% significance, show a clear change and increase in how the measure assesses the quality of anti-corruption reporting after 2010. Interestingly not only are the means significantly higher for these four measures after 2010, but the variances are also significantly higher following 2010. ACHI measures the depth of reporting rather than the breadth, only assessing the depth of questions actually answered. From the tables and graphs above, particularly Figure 7, we have already found that the breadth of questions addressed within anti-corruption reporting is the reason for the rise in “quality” and that it seems the depth of content for questions addressed have either stayed the same or even declined.

5. Discussion and Conclusions

Overall, it seems that there are some differences in the findings of this study compared to previous studies. For example, the differences in ACHI results across previous studies, particularly studies that focused on environmental issues, are worth noting. This study found that the mean ACHI score for its sample is 1.94, which is higher than the mean ACHI score of 0.67 for 198 US non-financial firms in the 1994 fiscal year from [34] study. Authors [34] suggested that their sample firms only disclosed qualitative information at best, while this study found that companies, on occasion, provided specific qualitative information. The mean ACHI score of 1.94 in this study is more comparable to the mean ACHI value of 2.8 from the [30] study, which is higher than that of [34]. The differences in ACHI scores across studies may be due to the timing of profile-raising of the issues concerned. For instance, since the early 2000s, calls for anti-corruption disclosure from the UN and other entities have resulted in legal and non-legal interventions that may have led to higher levels of disclosure in this study compared to the study by [34]. Additionally, Ref. [32] study on environmental issues, which analyzed a sample of 32 New Zealand companies for the fiscal year 2010–2011, reported a mean SHI value of 0.681, which is comparable to the average ACHI score in this study (Table 7). There are many differences between environmental and corruption reporting, as well as the sample being from differing countries, sectors, and timeframes, so there is no reason to expect similar results to the previous studies. We have addressed two research questions.

The first considered the applicability of quality metrics used in the environmental accounting literature to ACD, where disclosure is of significantly lower volume. Table 12 shows a high correlation between four of these measures (SCI-Q, SCI-C, SHI, and TQLI), with SQNI giving a different interpretation of relative quality and ACHI being somewhat

closer to the results from the nested four metrics. SCI-C would require the least data collection and avoid the more subjective assessment of the quality of answers needed by TQLI and SHI. Thus, if a reader were concerned about ranking the companies' reporting, then SCI-C would seem the most efficient choice. Table 4 and Figure 4 also show inconsistency in corporate reporting, with companies deciding to reduce ACD in some years and increase it in others, so the corporate-ranking-focused reader could not rely on continuing levels of reporting from a company. If a reader were concerned with reporting across the sector, then the metric recommendation is a little different. Whilst Figure 5 (both SCI metrics), Figure 9 (SHI), and Figure 11 (TQLI) show a rising trend in ACD across the sector over time, SQNI (Figure 2) reveals a trend for more companies to be closer to the lowest volume reporter than the highest. Figure 7 (ACHI versus questions answered) suggests the potential declining depth of answers across the sector whilst the number of questions answered has clearly risen. Assessment of quality and relevant metrics can depend on the precise nature of the question asked and the purpose of the person or organization investigating the reporting. Even metrics that appear poor at one task might be able to provide additional insights when used carefully. It is hard to discern any general trend of companies following each other in a deliberate way. The number of questions answered in each of the 148 annual reports correlates negatively with the average depth of answers at a significant level (see Table 12), showing that perceiving a need to answer more questions seems linked to less detailed responses. This is effectively a component analysis of SHI, with the rising number of questions addressed in a report mitigated to a degree by their decline in depth.

The second research question addressed the impact on reporting of the introduction of the UK Bribery Act of 2010. Figure 13 shows a step change from 2010 with a generally rising trend in both word count and questions answered since that point. Table 13 shows the four metrics that were mutually supportive in tracking company trends across the sample period and also support reporting after the Act being significantly greater than before. Neither ACHI nor SQNI is significant, with SQNI suggesting that reporting has actually reduced. The findings from research question 1 give us confidence in SCI-Q, SCI-C, SHI, and TQLI, providing useful information on the level of company ACD reporting year by year, enabling us to conclude that the reporting of corruption issues has increased since the Act. However, as with question 1, the finding that this is primarily about the increased breadth of answers (more questions addressed) rather than deeper answers to each question might disappoint some annual readers. The Act, then, may have triggered an awareness of more areas to cover, but this seems to be matched with opportunism to reduce depth or reluctance to add yet more pages to the annual report or to, perhaps, "unbalance" the relative content across different issues. Moreover, whilst the timing of the change in reporting fits with the introduction of the Act, we need to be cautious in assuming the Act was the only driver of this change. Non-governmental organizations have also introduced and regularly revised calls for reporting over this timeframe, and pressures to respond to events might also drive corporate behavior. Table 11 shows that our four generally preferred metrics rank the best and worst reporters similarly in the post-Act period. It would be interesting to consider why the Act might lead to more of a response from some companies than others.

Without addressing the first research question, it would not have been possible to consider the impact of the Act on ACD assessed by these metrics. Through examining the two questions together, we can conclude that some metrics (SCI, SHI, and TQLI) are more useful in assessing questions of company reporting depth, breadth, and quality and that the same metrics are consistent in assessing the impact of an event, in this case, the introduction of the Bribery Act. The applicability of these findings to alternative and broader datasets is an important question for any study. The findings here are for the ACD of the ten major extractive companies listed on the UK stock exchange from 2003 to 2019. Further studies could address other sectors, specifically those where corruption is also perceived to be a major issue. Other governance settings would also be an interesting comparison. The vagueness of the ACD reporting requirement of the 2006 Companies

Act might not be matched by such a lack of clarity in other countries. Indeed, the style and history of corporate reporting might also lead to other findings [3]. ACD is not the only area of ESG reporting that might be examined in this way; modern slavery, gender pay gaps, and community engagement are just three areas where this approach could be applied, and it might then be clear whether the results here are robust across a broad range of low disclosure topics in corporate reporting that are, nevertheless, important to specific report readers and, more broadly, to those concerned with factors of reputational risk.

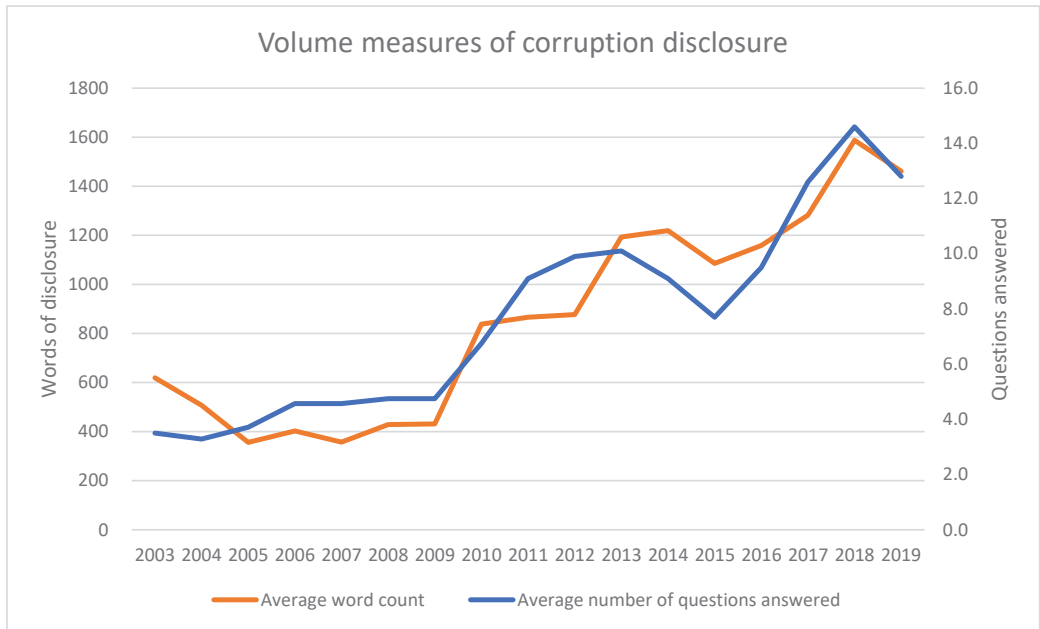


Figure 13. Volume of average company disclosure by year.

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Appendix A

Category	Explanation	Source
Category 1: Proportionate Procedure		
1.1. Commitment to anti-corruption	Explores whether companies publicly announced that anti-corruption is a fundamental strategy for the company.	UK Bribery Act 2010 Transparency International UNCAC

Category	Explanation	Source
1.2. Bribery and corruption; Bribery Act and other relevant legislation	Aims to ensure that companies are also committed to fighting corruption and responding to the regulations.	UK Bribery Act 2010 Transparency International
1.3. Prohibition of facilitation payments	Facilitation payments are bribes under section 1 of the Bribery Act as they provide an advantage, usually a small cash payment, to induce or reward a person, usually a public official, to give preferential treatment, or to refrain from or perform a task improperly.	UK Bribery Act 2010 Transparency International
1.4. Effective internal anti-corruption control system	Aims to explore whether the anti-corruption program that takes place is under control and is monitored by a strong internal control system to ensure its effectiveness.	UK Bribery Act 2010 Transparency International
1.5. Charitable donations	Charitable donations carry risks; they can be a conduit for corrupt payments. For example, a government official in negotiations with a business may disclose that they are on the board of a charitable organization and request a donation to be made to the charity, or a charity could be connected to a political party or a person with a decision-making function. Therefore, this item ensures that companies disclose their charitable donations.	UK Bribery Act 2010 Transparency International
1.6. Political donations	Expenditures, cash or in kind, made directly or indirectly to a political party or its local branches, elected officials, or political candidates. Therefore, such donations may lead to obtaining an improper business benefit, such as winning a public contract or securing changes to laws or regulations.	UK Bribery Act 2010 Transparency International
1.7. Prohibition of all forms of corruption, e.g., offering or receiving gifts, hospitality, or expenses	In the GRI Standards, 'corruption includes practices such as bribery, facilitation payments, fraud, extortion, collusion, and money laundering. It also includes an offer or receipt of any gift, loan, fee, reward, or other advantage to or from any person as an inducement to do something that is dishonest, illegal, or a breach of trust in the conduct of the enterprise's businesses.'	UK Bribery Act 2010 Transparency International GRI
1.8. Violations related to bribery and corruption	Requires companies to disclose any violations generated from corruption acts.	UK Bribery Act 2010 Transparency International
1.9. Disclosure of ethical codes of conduct	Aims to ensure that companies are compliant with applying ethical/conduct codes to ensure their adherence to the external codes.	Transparency International
1.10. Payments made to and received by governments based on EITI	Oil, gas, and mining companies, under the UK rules and as EITI members, are obligated to disclose any payments made or received by host countries. This ensures that such payment is not used for bribery.	EITI

Category	Explanation	Source
Category 2: Top-level Commitment		
2.1. Zero tolerance of corruption	Company publicly ensures anti-corruption based on a policy of zero tolerance for corruption. The company prohibits bribery and will not tolerate its directors, management, employees, or third parties related to the company being involved with bribery, whether by offering, promising, soliciting, demanding, giving, or accepting bribes or behaving corruptly while expecting a bribe or an advantage.	UK Bribery Act 2010 Transparency International
2.2. Board and management are overseeing the anti-bribery/anticorruption and program.	The board of directors or equivalent body is responsible for overseeing the company in which corruption/bribery is never acceptable and for ensuring that there is an effective design and implementation of a program to counter corruption.	UK Bribery Act 2010 Transparency International UNCAC WB OECD
2.3. Anti-corruption on the board agenda	Anti-corruption holds a place in the board's agenda, thus reflecting that the company is seriously taking action against corruption.	UK Bribery Act 2010
2.4. Consistent, relevant anti-bribery/anti-corruption laws in all relevant jurisdictions	Aims to ensure that companies are compliant with all relevant laws, including relevant anti-corruption laws. However, it is typical for a company to publicize its policy state to comply or be consistent with laws and regulations in all the countries in which the company and any subsidiaries operate.	UK Bribery Act 2010 Transparency International UNCAC WB OECD
2.5. Employees dismissed or disciplined for corruption	Aims to ensure that action is taken by companies by disclosing the total number of confirmed incidents in which employees were dismissed or disciplined for corruption.	GRI WB OECD UNCAC
Category 3: Risk Assessment		
3.1. The board or management oversees the risk assessment process	Aims to ensure that the board or management are responsible for oversight and implementation of the risk assessment process and should require regular reports. A risk assessment process provides the company with a systematic view of the corruption risks, which can help them design detailed policies and procedures.	UK Bribery Act 2010 <ul style="list-style-type: none"> • Transparency International • GRI
3.2. Corruption risk assessment	The risk assessment is established based on the risk of corruption and can help companies identify the scope of corruption risk.	UK Bribery Act 2010 Transparency International
3.3. Risk assessment process continues based on the assessment and prioritization of the risk of corruption		UK Bribery Act 2010 Transparency International GRI

Category	Explanation	Source
Category 4: Communication, including Training		
4.1. Training on anti-corruption for directors and employees	Can help directors and employees become more committed to the program and provide employees with the skills required to address any situations they may encounter.	UK Bribery Act 2010 Transparency International GRI WB OECD UNCAC
4.2. Percentage/number of employees trained	Aims to ensure that the company publishes information on the number/percentage of employees who are trained and have read the company's anti-bribery guidelines.	UK Bribery Act 2010 Transparency International GRI
4.3. Member anti-bribery/anti-corruption initiative	Aims to determine how many anti-corruption initiatives the companies obey and apply to their anti-corruption initiatives.	
Category 5: Due Diligence		
5.1. Anti-corruption and anti-bribery programs known to contractors, subcontractors, and suppliers	Aims to ensure that the company is vigorous and thorough in ensuring that its program is communicated to and endorsed by all its contractors and suppliers.	UK Bribery Act 2010 Transparency International
5.2. Company avoids and terminates contractors and suppliers suspected of paying bribes	Presents a clear picture that companies are strict in their action of fighting corruption by avoiding dealing with contractors and suppliers who take or offer bribes.	UK Bribery Act 2010 • Transparency International
5.3. Company monitors contractors and suppliers to ensure they have effective anti-corruption and anti-bribery programs	Proves that companies are dealing with contractors and suppliers who are obviously establishing programs to fight against corruption.	UK Bribery Act 2010 Transparency International
Category 6: Monitoring and Review		
6.1. External assurance of anti-corruption program effectiveness	Aims to obtain feedback from third parties to ensure the effectiveness and robustness of the program.	UK Bribery Act 2010 • Transparency International
6.2. Audit committee, oversight of internal controls, financial reporting processes, and related functions, including countering corruption/bribery.	Aims to ensure that the audit committee makes an independent assessment of the adequacy of the program and discloses its findings in the annual report to shareholders.	UK Bribery Act 2010 Transparency International

References

- Islam, M.A.; Dissanayake, T.; Dellaportas, S.; Haque, S. Anti-Bribery Disclosures: A Response to Networked Governance. *Account. Forum* **2018**, *42*, 3–16. [CrossRef]
- Blanc, R.; Cho, C.H.; Sopt, J.; Branco, M.C. Disclosure Responses to a Corruption Scandal: The Case of Siemens AG. *J. Bus. Ethics* **2019**, *156*, 545–561. [CrossRef]
- Aldaz Odriozola, M.; Álvarez Etxeberria, I. Determinants of Corporate Anti-Corruption Disclosure: The Case of the Emerging Economics. *Sustainability* **2021**, *13*, 3462. [CrossRef]
- Rose-Ackerman, S.; Palifka, B.J. *Corruption and Government: Causes, Consequences, and Reform*; Cambridge University Press: Cambridge, UK, 2016.
- Global Corruption Report 2009: Corruption and the Private Sector. Available online: <https://www.transparency.org/en/publications/global-corruption-report-2009> (accessed on 7 March 2023).
- Barkemeyer, R.; Preuss, L.; Lee, L. Corporate Reporting on Corruption: An International Comparison. *Account. Forum* **2015**, *39*, 349–365. [CrossRef]

7. Hess, D.; Dunfee, T.W. Fighting Corruption: A Principled Approach: The C Principles (Combating Corruption). *Cornell Int. Law J.* **2000**, *33*, 593.
8. Kolstad, I.; Wiig, A. Is Transparency the Key to Reducing Corruption in Resource-Rich Countries? *World Dev.* **2009**, *37*, 521–532. [CrossRef]
9. Hess, D. Catalyzing Corporate Commitment to Combating Corruption. *J. Bus. Ethics* **2009**, *88*, 781–790. [CrossRef]
10. Fiscal Monitor, April 2019: Curbing Corruption. Available online: <https://www.imf.org/en/Publications/FM/Issues/2019/09/27/Fiscal-Monitor-April-2019-Curbing-Corruption-46532> (accessed on 7 March 2023).
11. Le Billon, P. Natural Resources and Corruption in Post-War Transitions: Matters of Trust. *Third World Q.* **2014**, *35*, 770–786. [CrossRef]
12. Gray, S.J.; Hellman, N.; Ivanova, M.N. Extractive Industries Reporting: A Review of Accounting Challenges and the Research Literature. *Abacus* **2019**, *55*, 42–91. [CrossRef]
13. Robb, S.W.G.; Zarzeski, L.E.S.T. Nonfinancial Disclosures across Anglo-American Countries. *J. Int. Account. Audit. Tax.* **2001**, *10*, 71–83. [CrossRef]
14. Finance Act 1999 | ICAEW. Available online: <https://www.icaew.com/technical/tax/budgets-and-legislation/finance-acts/finance-act-1999> (accessed on 7 March 2023).
15. Improving Business Reporting—A Customer Focus: Meeting the Information Needs of Investors and Creditors: A Comprehensive Report. Available online: https://egrove.olemiss.edu/cgi/viewcontent.cgi?article=1105&context=aicpa_comm (accessed on 7 March 2023).
16. Lev, B.; Zarowin, P. The Boundaries of Financial Reporting and How to Extend Them. *J. Account. Res.* **1999**, *37*, 353–385. [CrossRef]
17. Cole, C.J.; Jones, C.L. The Usefulness of MD&A Disclosures in the Retail Industry. *J. Account. Audit. Financ.* **2004**, *19*, 361–388. [CrossRef]
18. Hasseldine, J.; Salama, A.I.; Toms, J.S. Quantity versus Quality: The Impact of Environmental Disclosures on the Reputations of UK Plcs. *Br. Account. Rev.* **2005**, *37*, 231–248. [CrossRef]
19. Hooks, J.; van Staden, C.J. Evaluating Environmental Disclosures: The Relationship between Quality and Extent Measures. *Br. Account. Rev.* **2011**, *43*, 200–213. [CrossRef]
20. Cahan, S.F.; De Villiers, C.; Jeter, D.C.; Naiker, V.; Van Staden, C.J. Are CSR Disclosures Value Relevant? Cross-Country Evidence. *Eur. Account. Rev.* **2016**, *25*, 579–611. [CrossRef]
21. Hussain, N.; Rigoni, U.; Orij, R.P. Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance. *J. Bus. Ethics* **2018**, *149*, 411–432. [CrossRef]
22. Tan, X.; Peng, M.; Yin, J.; Xiu, Z. Does Local Governments' Environmental Information Disclosure Promote Corporate Green Innovations? *Emerg. Mark. Financ. Trade* **2022**, *58*, 3164–3176. [CrossRef]
23. Roberts, J. The 'Subject' of Corruption. *Crit. Perspect. Account.* **2015**, *28*, 82–88. [CrossRef]
24. Kimbro, M.B. A Cross-Country Empirical Investigation of Corruption and Its Relationship to Economic, Cultural, and Monitoring Institutions: An Examination of the Role of Accounting and Financial Statements Quality. *J. Account. Audit. Financ.* **2002**, *17*, 325–350. [CrossRef]
25. Khumawala, S.; Ramchand, L. Country Level Corruption and Frequency of Issue in the U.S. Market. *J. Public Budg. Account. Financ. Manag.* **2005**, *17*, 341–364. [CrossRef]
26. Everett, J.; Neu, D.; Rahaman, A.S. Accounting and the Global Fight against Corruption. *Account. Organ. Soc.* **2007**, *32*, 513–542. [CrossRef]
27. Helfaya, A.; Bui, P. Exploring the Status Quo of Adopting the 17 UN SDGs in a Developing Country—Evidence from Vietnam. *Sustainability* **2022**, *14*, 15358. [CrossRef]
28. The Bribery Act 2010—Guidance. 2010. Available online: <https://www.justice.gov.uk/downloads/legislation/bribery-act-2010-guidance.pdf> (accessed on 7 March 2023).
29. Helfaya, A.; Moussa, T. Do Board's Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence. *Bus. Strategy Environ.* **2017**, *26*, 1061–1077. [CrossRef]
30. Helfaya, A.; Whittington, M. Does Designing Environmental Sustainability Disclosure Quality Measures Make a Difference? *Bus. Strategy Environ.* **2019**, *28*, 525–541. [CrossRef]
31. Helfaya, A.; Whittington, M.; Alawattage, C. Exploring the Quality of Corporate Environmental Reporting: Surveying Preparers' and Users' Perceptions. *Account. Audit. Account. J.* **2018**, *32*, 163–193. [CrossRef]
32. van Staden, C.J.; Hooks, J. A Comprehensive Comparison of Corporate Environmental Reporting and Responsiveness. *Br. Account. Rev.* **2007**, *39*, 197–210. [CrossRef]
33. Lee, K.-H. Does Size Matter? Evaluating Corporate Environmental Disclosure in the Australian Mining and Metal Industry: A Combined Approach of Quantity and Quality Measurement. *Bus. Strategy Environ.* **2017**, *26*, 209–223. [CrossRef]
34. Al-Tuwaijri, S.A.; Christensen, T.E.; Hughes, K.E. The Relations among Environmental Disclosure, Environmental Performance, and Economic Performance: A Simultaneous Equations Approach. *Account. Organ. Soc.* **2004**, *29*, 447–471. [CrossRef]
35. Beretta, S.E.; Bozzolan, S. Quality Versus Quantity: The Case of Forward-Looking Disclosure. *J. Account. Audit. Financ.* **2007**, *23*, 333–376. [CrossRef]
36. Urquiza, F.B.; Abad Navarro, M.C.; Trombetta, M. Disclosure Indices Design: Does It Make a Difference? *Rev. Contab.* **2009**, *12*, 253–277. [CrossRef]

37. Camilleri, M.A. Strategic Attributions of Corporate Social Responsibility and Environmental Management: The Business Case for Doing Well by Doing Good! *Sustain. Dev.* **2022**, *30*, 409–422. [[CrossRef](#)]
38. Haque, F.; Ntim, C.G. Environmental Policy, Sustainable Development, Governance Mechanisms and Environmental Performance. *Bus. Strategy Environ.* **2018**, *27*, 415–435. [[CrossRef](#)]
39. Pelger, C. The Return of Stewardship, Reliability and Prudence—A Commentary on the IASB’s New Conceptual Framework. *Account. Eur.* **2020**, *17*, 33–51. [[CrossRef](#)]
40. Zhang, Y.; Andrew, J. Financialisation and the Conceptual Framework: An Update. *Crit. Perspect. Account.* **2022**, *88*, 102322. [[CrossRef](#)]
41. Beattie, V.; McInnes, B.; Fearnley, S. A Methodology for Analysing and Evaluating Narratives in Annual Reports: A Comprehensive Descriptive Profile and Metrics for Disclosure Quality Attributes. *Account. Forum* **2004**, *28*, 205–236. [[CrossRef](#)]
42. Ben-Amar, W.; Belgacem, I. Do Socially Responsible Firms Provide More Readable Disclosures in Annual Reports? *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 1009–1018. [[CrossRef](#)]
43. D’Amico, E.; Coluccia, D.; Fontana, S.; Solimene, S. Factors Influencing Corporate Environmental Disclosure. *Bus. Strategy Environ.* **2016**, *25*, 178–192. [[CrossRef](#)]
44. Kalu, J.U.; Buang, A.; Aliagha, G.U. Determinants of Voluntary Carbon Disclosure in the Corporate Real Estate Sector of Malaysia. *J. Environ. Manag.* **2016**, *182*, 519–524. [[CrossRef](#)]
45. Lokuwaduge, C.S.D.S.; Heenetigala, K. Integrating Environmental, Social and Governance (ESG) Disclosure for a Sustainable Development: An Australian Study. *Bus. Strategy Environ.* **2017**, *26*, 438–450. [[CrossRef](#)]
46. Meng, X.H.; Zeng, S.X.; Shi, J.J.; Qi, G.Y.; Zhang, Z.B. The Relationship between Corporate Environmental Performance and Environmental Disclosure: An Empirical Study in China. *J. Environ. Manag.* **2014**, *145*, 357–367. [[CrossRef](#)]
47. Radu, C.; Francoeur, C. Does Innovation Drive Environmental Disclosure? A New Insight into Sustainable Development. *Bus. Strategy Environ.* **2017**, *26*, 893–911. [[CrossRef](#)]
48. Cho, C.H.; Roberts, R.W.; Patten, D.M. The Language of US Corporate Environmental Disclosure. *Account. Organ. Soc.* **2010**, *35*, 431–443. [[CrossRef](#)]
49. Gray, R.; Kouhy, R.; Lavers, S. Constructing a Research Database of Social and Environmental Reporting by UK Companies. *Account. Audit. Account. J.* **1995**, *8*, 78–101. [[CrossRef](#)]
50. Unerman, J. Methodological Issues—Reflections on Quantification in Corporate Social Reporting—Content Analysis. *Account. Audit. Account. J.* **2000**, *13*, 667–681. [[CrossRef](#)]
51. Beattie, V.; Jones, M.J. A Six-Country Comparison of the Use of Graphs in Annual Reports. *Int. J. Account.* **2001**, *36*, 195–222. [[CrossRef](#)]
52. Beck, A.C.; Campbell, D.; Shrivs, P.J. Content Analysis in Environmental Reporting Research: Enrichment and Rehearsal of the Method in a British–German Context. *Br. Account. Rev.* **2010**, *42*, 207–222. [[CrossRef](#)]
53. Hammond, K.; Miles, S. Assessing Quality Assessment of Corporate Social Reporting: UK Perspectives. *Account. Forum* **2004**, *28*, 61–79. [[CrossRef](#)]
54. Healy, P.M.; Palepu, K.G. Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *J. Account. Econ.* **2001**, *31*, 405–440. [[CrossRef](#)]
55. Cormier, D.; Magnan, M.; Van Velthoven, B. Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions? *Eur. Account. Rev.* **2005**, *14*, 3–39. [[CrossRef](#)]
56. Toms, J.S. Firm Resources, Quality Signals and The Determinants of Corporate Environmental Reputation: Some UK Evidence. *Br. Account. Rev.* **2002**, *34*, 257–282. [[CrossRef](#)]
57. Krippendorff, K. Reliability in Content Analysis: Some Common Misconceptions and Recommendations. *Hum. Comm. Res.* **2004**, *30*, 411–433. [[CrossRef](#)]
58. Moussa, T.; Kotb, A.; Helfaya, A. An Empirical Investigation of U.K. Environmental Targets Disclosure: The Role of Environmental Governance and Performance. *Eur. Account. Rev.* **2022**, *31*, 937–971. [[CrossRef](#)]
59. Salem, R.I.A.; Ezeani, E.; Gerged, A.M.; Usman, M.; Alqatamin, R.M. Does the Quality of Voluntary Disclosure Constrain Earnings Management in Emerging Economies? Evidence from Middle Eastern and North African Banks. *Int. J. Account. Inf. Manag.* **2020**, *29*, 91–126. [[CrossRef](#)]
60. Schaltegger, S.; Burritt, R. *Contemporary Environmental Accounting: Issues, Concepts and Practice*; Routledge: London, UK, 2017; ISBN 978-1-351-28252-9.
61. Lin, Y.-T.; Liu, N.-C.; Lin, J.-W. Firms’ Adoption of CSR Initiatives and Employees’ Organizational Commitment: Organizational CSR Climate and Employees’ CSR-Induced Attributions as Mediators. *J. Bus. Res.* **2022**, *140*, 626–637. [[CrossRef](#)]
62. Campbell, D. Intra- and Intersectoral Effects in Environmental Disclosures: Evidence for Legitimacy Theory? *Bus. Strategy Environ.* **2003**, *12*, 357–371. [[CrossRef](#)]
63. Aras, G.; Crowther, D. Corporate Sustainability Reporting: A Study in Disingenuity? *J. Bus Ethics* **2009**, *87*, 279–288. [[CrossRef](#)]
64. Beattie, V.; Jones, M.J. The Use and Abuse of Graphs in Annual Reports: Theoretical Framework and Empirical Study. *Account. Bus. Res.* **1992**, *22*, 291–303. [[CrossRef](#)]
65. Blanc, R.; Islam, M.A.; Patten, D.M.; Branco, M.C. Corporate Anti-Corruption Disclosure: An Examination of the Impact of Media Exposure and Country-Level Press Freedom. *Account. Audit. Account. J.* **2017**, *30*, 1746–1770. [[CrossRef](#)]

66. Islam, M.A.; Haque, S.; Dissanayake, T.; Leung, P.; Handley, K. Corporate Disclosure in Relation to Combating Corporate Bribery: A Case Study of Two Chinese Telecommunications Companies. *Aust. Account. Rev.* **2015**, *25*, 309–326. [[CrossRef](#)]
67. Islam, M.A.; Haque, S.; Gilchrist, D. NFOs and Their Anti-Corruption Disclosure Practices. *Public Money Manag.* **2017**, *37*, 443–450. [[CrossRef](#)]
68. Joseph, C.; Gunawan, J.; Sawani, Y.; Rahmat, M.; Avelind Noyem, J.; Darus, F. A Comparative Study of Anti-Corruption Practice Disclosure among Malaysian and Indonesian Corporate Social Responsibility (CSR) Best Practice Companies. *J. Clean. Prod.* **2016**, *112*, 2896–2906. [[CrossRef](#)]
69. Sari, T.K.; Cahaya, F.R.; Joseph, C. Coercive Pressures and Anti-Corruption Reporting: The Case of ASEAN Countries. *J. Bus Ethics* **2021**, *171*, 495–511. [[CrossRef](#)]
70. Brammer, S.; Pavelin, S. Factors Influencing the Quality of Corporate Environmental Disclosure. *Bus. Strategy Environ.* **2008**, *17*, 120–136. [[CrossRef](#)]
71. Hackston, D.; Milne, M.J. Some Determinants of Social and Environmental Disclosures in New Zealand Companies. *Account. Audit. Account. J.* **1996**, *9*, 77–108. [[CrossRef](#)]
72. Blanc, R.; Branco, M.C.; Patten, D.M. Cultural Secrecy and Anti-Corruption Disclosure in Large Multinational Companies. *Aust. Account. Rev.* **2019**, *29*, 438–448. [[CrossRef](#)]
73. Michelon, G.; Pilonato, S.; Ricceri, F. CSR Reporting Practices and the Quality of Disclosure: An Empirical Analysis. *Crit. Perspect. Account.* **2015**, *33*, 59–78. [[CrossRef](#)]
74. Alnabsha, A.; Abdou, H.A.; Ntim, C.G.; Elamer, A.A. Corporate Boards, Ownership Structures and Corporate Disclosures: Evidence from a Developing Country. *J. Appl. Account. Res.* **2018**, *19*, 20–41. [[CrossRef](#)]
75. Ebrahim, A.; Fattah, T.A. Corporate Governance and Initial Compliance with IFRS in Emerging Markets: The Case of Income Tax Accounting in Egypt. *J. Int. Account. Audit. Tax.* **2015**, *24*, 46–60. [[CrossRef](#)]
76. Healy, P.M.; Serafeim, G. An Analysis of Firms' Self-Reported Anticorruption Efforts. *Account. Rev.* **2016**, *91*, 489–511. [[CrossRef](#)]
77. D'onza, G.; Brotini, F.; Zarone, V. Disclosure on Measures to Prevent Corruption Risks: A Study of Italian Local Governments. *Int. J. Public Adm.* **2017**, *40*, 612–624. [[CrossRef](#)]

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Article

Corporate Sustainability by Combating Bribery: The Role of an Organisation Culture and Its Impact on the Organisation's Performance

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Abstract: There is an increasing trend in bribery practices among employees (corporate bribery), especially from emerging economies, where developed countries, including the USA, have enormous interests in various aspects of local and international trade. Therefore, this study aims to examine the influence of organisations' culture and outcome orientation, as well as the stability culture dimensions of Organisation Culture Profile (OCP), in order to combat corporate bribery practices, as an aspect of corporate sustainability practices, and their subsequent impact on both organisational financial and non-financial performance. The study surveyed mid-to-top level managers of a total of 201 organisations from Bangladesh. The survey data were used to develop a structural equation model (SEM) by utilising the AMOS (26th version) software, and thus tested the developed hypotheses on the study variables. The findings provide evidence of the positive influence of the two dimensions (outcome orientation and stability) of organisations' culture in combating bribery practices within organisations. The findings highlight the positive impact of combating bribery practices on both organisations' financial and non-financial performance. Our empirical findings contribute to the existing limited bribery-related corporate sustainability literature, with the goal of achieving suitable organisation culture in order to minimise unethical business practices, specifically bribery practices. The findings provide practical implications for practitioners and policymakers due to the discovery of the importance of having congenial corporate culture, in order to promote and enhance corporate sustainability practices by reducing the likelihood of poor practices by employees, i.e., taking or offering bribes to business partners.

Keywords: organisation culture; corporate sustainability; combating bribery; financial performance; non-financial performance; emerging economy

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1. Introduction

Organisations in the twenty-first century are under tremendous pressure from various stakeholders to operate and run organisations in a sustainable manner so that the interests of organisations' stakeholders are preserved without harming the interests of future stakeholders [1–3]. Although corporate sustainability is now being treated by many organisations, especially those from developed countries, as a strategic priority, its practice, especially from the ethical business practice perspective, is less likely to be observed by companies in developing and underdeveloped countries. More specifically, there is an increasing trend of unethical business practices, such as taking and/or offering bribes and small

felicitations for business operations by employees in developing and under-developed countries, such as Bangladesh, Sri Lanka and Pakistan [4–7]. According to the 2022 Corruption Perceptions Index (CPI), more than two thirds of 180 countries across the globe failed to prevent corruption, while Bangladesh has been ranked 147th out of the 180 countries [8]. More specifically, bribery is a common practice for businesses in Bangladesh, especially in utilities, tax payments and external trades [9]. Similarly, according to the 2022 TRACE Bribery Risk Matrix, which measures business bribery risk in 194 jurisdictions, Bangladesh has been ranked 153rd out of 194 countries across the world, with a high-risk score of 64 [10]. Consequently, overall sustainable business practices seem poor across the world, and in Bangladesh in particular. Although the existing sustainability literature has paid relatively more attention to the different aspects of sustainability practices, such as the environmental and economic aspects, less attention has been paid to the bribery aspect of sustainable business practices. Specifically, there is a limited understanding of what factors could minimise unethical business practices (bribery practices) and how they could do so, and could thus promote sustainable practices. Given the multifarious consequences of bribery practices, it is now important to identify and examine the factors preventing and minimising bribery practices in the corporate environment. Therefore, this study aims to examine the factor/s that may be useful in preventing bribery practices by employees in developing countries, and thus shed light on the aforementioned research gap.

It is evident that organisational culture has a substantial impact on business operations, practices, achieving business objectives and performance [11–13]. Organisational culture evolves and is established within an organisation or any component of an organisation over time, and guides and coordinates members' behaviour and holds the organisation together [6,14,15]. It shapes employees' behaviour within the organisation in performing their regular duties. Moreover, conducive organisational culture is directly linked to the morale of employees, which may be a driving force to combat bribery practices within organisations. Previous studies have examined the influence of organisational culture on organisational practices and state its importance for the successful implementation of a variety of organisational practices and changes [12,16]. However, how organisational culture is associated with corporate sustainability practices has been paid little attention in the sustainability literature [17]. Hence, this study addresses the research question: "Does organisational culture influence corporate sustainability practices, such as combating corporate bribery practices?". Accordingly, this study aims to examine the influence of organisational culture (outcome orientation and stability culture dimensions of (O'Reilly et al., 1991) [18] the Organisational Culture Profile (OCP) on combating bribery practices.

Provided that the achievement of an organisation's objectives is the key to its sustainability practices, as well as the growing interests of different stakeholders in developing insights into the impact of sustainability practices on organisational performance, it is important to develop insights into what is the impact of corporate sustainability practices on an organisation's performance. Although researchers have examined the impact of corporate sustainability practices on organisational performance [19], combating the bribery aspect of sustainability has been paid little attention. Accordingly, this study aims to further examine the impact of corporate sustainability, focusing on combating the bribery aspect and how this has an effect on organisational financial and non-financial performance. It is thus hoped to minimise the paucity of research on the antecedents of sustainability practices, and the relationship between sustainability practices and organisational performance [20].

The findings of this empirical study contribute to the existing limited bribery-related corporate sustainability literature, with the role of suitable corporate culture in minimising unethical business practices: minimising bribery practices and the impact of such practices on an organisation's financial and non-financial performance. The findings of this study contribute to the relevant literature in the following ways: first, it empirically exhibits the influence of an organisation's culture (outcome orientation and stability in particular) to combat bribery practices, and thus promote corporate sustainability practices, and thereby contribute to the limited literature in the field of interest. Second, this study

provides empirical evidence of the impact of corporate sustainability practices on both organisational financial and non-financial performance. Third, the findings of this study provide policymakers with empirical insights into the antecedents of combating bribery practices, which can be useful for promoting corporate sustainability practices and its subsequent impact on the organisation's financial and non-financial performance.

The remainder of this study is arranged as follows: Section 2 highlights the literature review and hypotheses of the study. Section 3 discusses the method of the study, including sample selection and data collection, variable measurements, and common method biases. In Section 4, the empirical results are reported along with the robustness and endogeneity check. Section 5 concludes the study.

2. Literature Review and Hypothesis Development

2.1. Corporate Culture and Its Dimensions

Corporate culture refers to “the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external and internal integration and that have worked well enough to be considered valid, and is therefore to be taught to new members as the correct way to perceive, think and feel in relation to these problems” [21] (p. 3). Researchers from different disciplines reveal different dimensions of corporate culture [3,14,22,23]. This study follows the way O'Reilly et al., 1991 [18], define corporate culture's dimensions. O'Reilly et al., 1991 [18], identify six different cultural dimensions, such as respect for people, outcome orientation, team orientation, innovation, attention to detail, and stability. The O'Reilly et al., 1991 [18], culture dimensions are popular to researchers from various disciplines [16,21,24–26]. This study focuses on two of the six dimensions of corporate culture, namely outcome orientation and stability culture, in order to examine their association with the bribery aspect of corporate sustainability practices. Outcome orientation culture refers to “the degree to which management focuses on results or outcomes rather than on the techniques, and the processes used to achieve them” [27] (p. 513) [28]. Stability culture is defined as “the degree to which organisational activities emphasise maintaining the status quo in contrast to growth” [27] (p. 513) [28].

2.2. Corporate Sustainability and Its Dimensions

The term “corporate sustainability” is complex to define, and thus a congruent definition of corporate sustainability is lacking [18,29,30]. Based on a review of the corporate sustainability literature, Montiel and Delgado-Ceballos, 2014 [31], define corporate sustainability as a tri-dimensional construct, which includes economic, social, and environmental aspects. This study follows one of the most recent definitions given by Valente, 2012 [32]. Valente, 2012, [32] (p. 586) defines corporate sustainability from the perspective of the “sustain-centric” orientation of the firm, “which is described as a step toward a proactive orientation to sustainability [. . .] to find ways to interconnect social, economic, and ecological systems, using coordinated approaches that harness the collective cognitive and operational capabilities of multiple local and global social, ecological, and economic stakeholders operating as a unified network or system”.

Researchers highlight various dimensions of corporate sustainability [33] practices. To address the aforementioned three constructs of corporate sustainability, Szekely and Knirsch, 2005 [13], list its 10 different dimensions, namely economic growth, shareholder value, prestige, corporate reputation, customer relationships, product quality, ethical business practices, sustainable job creation, value creation for all stakeholders, and attention to the need for the underserved stakeholders. Though this study agrees on the need to sustain all these different dimensions, it seems overwhelming for us to measure firms' corporate sustainability in respect to all dimensions [14]. Thus, our study pays attention to the ethical business practice dimension of corporate sustainability, i.e., the bribery aspect of corporate sustainability.

2.3. Corporate Bribery

Corporate sustainability practices are affected by numerous negative phenomena that interrupt the corporate sustainability performance and exacerbate the possibility of ensuring commitment to social good and firm reputation, which result in various drawbacks for the wider community [34]. However, the commitment to the social good may be useful for constraining corporate employees' greed. One of the challenges that the modern business environment experiences is corporate bribery.

Veselovská et al., 2020, [21] (p. 1972) define corporate bribery as "being symbiotic with broken ethical principles and criminal activities. Both present serious issues on their own; however, they represent a critical problem for organisations and their employees". A recent World Bank report published that USD 1 trillion annually accounts for 5% of the GDP, funded as bribery by individuals and firms [34,35]. Therefore, the risk of corporate bribery in the corporate sector is a critical issue that must be challenged. The CSR literature suggests that corporations that participate in corporate sustainability activities are less inclined to be involved in corporate corruption [36,37]. Thus, corporations must fight against bribery to ensure sustainable social and economic development [3]. When a firm engages in high-level CSR activities, it is expected to be ethically responsible and less likely to be involved in corruption risk, such as bribery [34]. Although the governments of many emerging countries, including Bangladesh, have undertaken several initiatives to enhance transparency and integrity in business operations, bribery issues, specifically with public services, are still continuing [38]. Corporate bribery practices by public service organisations impede their performances, damage the organisations' reputation and boost up the costs of transactions [3]. According to Abdullah et al., 2018 [39], there is an association between the quality of governance practices, such as employee attitude towards corporate ethics, and integrity is likely to reduce a firm's exposure to corporate bribery risk.

2.4. Association between Outcome-Orientated Organisation Culture and Combating the Bribery Aspect of Corporate Sustainability

Employees from outcome-oriented organisations pay attention to the results of actions and achievements [40], and expect rewards for their actions, efforts, and behaviour accordingly. Similarly, researchers posit that employees emphasize the different aspects and outcomes in their pursuit of corporate sustainability [41]. Accordingly, it is expected that employees are less likely to be involved in unfair business practices, such as taking bribes, and thus promote corporate sustainability if they are being treated fairly on the basis of their own individual performance. Researchers also highlight the importance of the existence of outcome orientation culture to promote corporate sustainability [16,41,42]. Hence, we assume that the existence of outcome-orientated culture in organisations will drive employees to abstain from taking and offering bribes from/to different stakeholders. Therefore, we hypothesise that:

H1: *There is a significant association between outcome orientation and combating the bribery aspect of corporate sustainability.*

2.5. Association between Organisation Stability Culture and Combating the Bribery Aspect of Corporate Sustainability

Employees in organisations where stability culture is being practiced value stability [43]. Such stability includes the stability/security of employment, and financial and leadership stability, being calm and low-conflict [25,43]. It is logical to assume that the existence of stability culture will promote employees not to involve in taking/offering illegal financial benefits in exchange for rendering and/or receiving services. This is because financial or job security reduces the risk of facing financial hardship in the future, which leads employees not to be reckless to generate illegal money for future safety. Accordingly, we assume that the existence of stability culture reduces the likelihood of participating in bribery practices, and thus enhances corporate sustainability practices. Therefore, we hypothesize that:

H2: *There is a significant association between stability culture and combating the bribery aspect of corporate sustainability.*

2.6. Association between Combating the Bribery Aspect of Corporate Sustainability and Organisational Financial and Non-Financial Performance

The existing literature on corporate sustainability examines the association between corporate sustainability and the organisation's financial performance, and finds the positive association between them in terms of return on equity (ROE), Tobin's Q, the return on assets (ROA), market share, gross profit margin, firm value, and stock returns [7,12,17,19,20,38,44,45]. For instance, Bhuiyan et al., 2020 [12], found that corporate sustainability practices, with respect to minimising illegal business activities, are positively associated with organisations' financial performance. Furthermore, a review of the literature highlights a positive association between corporate sustainability practices and an organisation's non-financial performance in terms of corporate reputation, innovation and differentiation [46,47], customer satisfaction [48], and employee commitment [49]. For instance, Bhuiyan et al., 2020 [12], found that corporate sustainability practices relating to the minimising illegal business activities are positively associated with the non-financial performance, such as product quality and customer retention rate. Accordingly, it is expected that combating bribery-related corporate sustainability practices might result in both higher financial and non-financial performance. Therefore, we hypothesize that:

H3: *Combating the bribery aspect of corporate sustainability has a significant association with organisational financial performance.*

H4: *Combating the bribery aspect of corporate sustainability has a significant association with organisational non-financial performance.*

A conceptual model of the study, along with the hypotheses developed above, has been demonstrated in Figure 1 below.

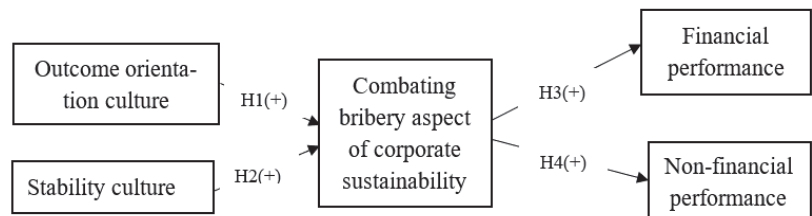


Figure 1. Conceptual model of the study variables.

3. Method

3.1. Sampling and Data Collection

This quantitative research surveyed a total of 460 organisations across various industries in Bangladesh identified in the Dun & Bradstreet dataset [50]. The list of organisations for the survey was prepared using the Dun & Bradstreet Hoovers database [6] on the basis of the organisations operating in Bangladesh, having more than or equal to fifty full-time employees, which resulted in a total of 460 organisations. A mail survey was administered to one middle- or higher-level executive from each of the 460 organisations. To administer the survey, this study followed (Dillman, 2011) [51] a tailored design method, and thus the sent survey instruments consisted of a cover letter, questionnaire, and self-addressed return envelope to the sampled organisations. Responses from a total of 201 organisations were received, which account for a response rate of 43.7%. Responses were received mostly from manufacturing organisations (140 organisations, which accounts for 69.65%), followed by service-oriented organisations (57 organisations, which account for 28.36%) (see Table 1). The majority of the organisations (176 organisations, or 87.6%) were domestic, while 25 organisations (12.43%) were multinational.

Table 1. A summary of response rates and respondents, and their organisation’s demographic statistics.

Panel A: Respondents’ organisation profile (n = 201)		
Industry type	No. of organisations	Percentage
Manufacturing	140	69.65
Service	57	28.36
Both	4	1.99
Total	201	100.00
Panel B: Respondents’ demographic statistics (n = 201)		
Designation	No. of employees	Percentage
Director/Chief Executive Officer	46	22.89
Chief Financial Officer	13	6.47
General Manager or similar titles	87	43.28
Senior Executive	20	9.95
Other	16	7.96
Details not disclosed	19	9.45
Service tenure at the current position (in yrs.)	No. of respondents	Percentage
1–5	109	54.20
6–10	68	33.83
11–15	15	7.50
Above 15	9	4.50
Gender	No. of respondents	Percentage
Male	196	97.50
Female	5	2.50
Total	201	100.00

3.2. Measurements

3.2.1. Corporate Culture

Outcome orientation and stability culture dimensions were measured with seven and three items, respectively, adapted from (O’Reilly et al., 1991) [18] the Organisational Culture Profile (see Appendix A). The confirmatory factor analysis (CFA) was conducted with ten items under two culture dimensions. The CFA results indicate a poor model fit to the dataset (CMIN/DF = 3.57; GFI = 0.888; AGFI = 0.818; CFI = 0.882; RMSEA = 0.113; SRMR = 0.066). After re-specifications of the model by connecting error terms based on modification indices, we found a final model with an acceptable level of the goodness of fit indices (the recommended threshold scores for the assessment of good SEM model fit to the data set are CMIN/DF < 5.0; GFI > 0.90; AGFI > 0.80; CFI > 0.90 [52]): CMIN/DF = 2.180; GFI = 0.936; AGFI = 0.887; CFI = 0.951; RMSEA = 0.077; SRMR = 0.048. The Cronbach alpha reliability scores (α) of the seven-item outcome orientation and three-item stability culture measures are 0.824 and 0.745, and thus exceeded the minimum cut-off of 0.70 [47].

3.2.2. Combating the Bribery Aspect of Corporate Sustainability

A six-item construct based on the OECD (2011) [6] seven principles relating to the combating bribery was used to measure the extent to which combating the bribery aspect of corporate sustainability was being practiced within the sampled organisations (see Appendix A). The respondents were asked to indicate the extent to which each item explained the current organisational practices on a five-point Likert scale, with the anchors of 1 ‘Not at all’ and 5 ‘To a great extent’. In order to validate this measure, we conducted CFA. The initial model CFA results (CMIN/DF = 2.331; GFI = 0.967; AGFI = 0.924; CFI = 0.977; RMSEA = 0.082; SRMR = 0.030) indicate a good model fit to the dataset. The Cronbach alpha score (α = 0.866) of the six-item measure exceeded the minimum cut-off of 0.70.

3.2.3. Organisation Performance

“Organisation performance” was measured from the perspective of both financial and non-financial aspects. A three-item construct for each of the financial and non-financial performance was adapted from Kaynak and Kara, 2004 [53]. The results of the initial

model CFA (CMIN/DF = 3.446; GFI = 0.956; AGFI = 0.886; CFI = 0.963; RMSEA = 0.111; SRMR = 0.037) indicated a poor model fit to the dataset. Re-specification of the model was then taken after deleting one item: “we have a lower employee turnover rate than our competitors” from the non-financial performance measure because its factor loading score (0.38) was less than the acceptable limit of 4.0 to be considered for the CFA analysis. The revised CFA model with the five items under both measures provided a good model fit to the dataset: CMIN/DF = 5.791; GFI = 0.957; AGFI = 0.841; CFI = 0.962; RMSEA = 0.155; SRMR = 0.031. The Cronbach alpha reliability scores (α) of the 3-item financial performance measure and the two-item non-financial performance measure were 0.892 and 0.71, respectively, and hence met the minimum cut-off score of 0.70.

3.3. Convergent and Discriminant Validity

In addition to the content validity of the measures of this study tested by the CFA, we tested the convergent and discriminant validity of the measures. The convergent validity of the measures was tested with respect to their path coefficients, standard errors (S.E.), and t -values [54]. The estimated factor loadings of all the measures are more than twice their respective S.E., and their t -values ($t > 2$) are significant at the level of 0.01 (see Appendix A for all measures), and composite reliability scores of all measures are more than 0.90, thereby supporting their convergent validity of the measures. The discriminant validity of the measures was tested by comparing the measures’ (Cronbach’s, 1951) [55] alpha reliability scores with their correlations, with the other scales of the study. The scales’ reliability scores are higher than their correlations with other scales (see Table 2), and thus provide evidence of the presence of the discriminant validity of the measures.

Table 2. Inter-construct correlation, descriptive statistics, and Cronbach alphas and composite reliability scores.

Variables	1	2	3	4	5
Inter-correlations					
1. Outcome orientation	1				
2. Stability	0.690 **	1			
3. Combating the bribery aspect of corporate sustainability	0.507 **	0.491 **	1		
4. Financial performance	−0.005	−0.035	0.173 *	1	
5. Non-financial performance	0.155 *	0.077	0.308 **	0.545 *	1
Descriptive statistics					
Mean	4.102	4.121	4.097	3.430	3.626
Standard deviation	0.548	0.641	0.664	0.809	0.731
Theoretical range	1–5	1–5	1–5	1–5	1–5
Minimum	2.140	2.00	2.17	1.00	2.00
Maximum	5.00	5.00	5.00	5.00	5.00
Cronbach alpha	0.824	0.745	0.866	0.892	0.710
Composite reliability	0.950	0.916	0.971	0.979	0.917

n = 201. ** and * correlation is significant at the 0.01 and 0.05 levels (2-tailed).

3.4. Common Method Bias Test

As suggested by Podsakoff et al., 2003 [50], this study followed numerous pre-survey techniques to minimise the likelihood of common method bias problems, including an extensive review of the literature to come up with established and validated scales to measure the variables of this study, drafting a questionnaire with a simple and easy language with the necessary clarification that helps minimise ambiguity, and mentioning that the respondent’s identity will be kept confidential. This entire process indicates that social desirability bias is less likely of an issue in this study [32].

In addition, this study employed a post-survey technique to check common method bias issues, if any were present. In this regard, we conducted Harman’s (1967) one (single)-factor test [40]. The exploratory factor analysis (EFA) (varimax rotation) was resulted in

four factors having eigenvalues of more than 1, and explained 61.02% of the total variance of 100%. While no factor (31.58% maximum) was explained by more than or equal to 50% of the total variance, thereby indicating that a common method bias is less likely an issue in this study.

4. Results and Discussion

4.1. Structural Equation Model

We developed structural equation modelling (SEM) by utilising the AMOS software, as suggested by Hair et al., 2010 [52]. We conducted CFA models first and then the SEM. We first developed a base model. The base model results are reported under “Model A” in Table 3. The base model’s goodness-of-fit indices indicated a poor model fit to the data set: CMIN/DF = 2.874; GFI = 0.819; AGFI = 0.772; CFI = 0.807.

Table 3. Summary of SEM results.

Description of Paths	Model A		Model B	
	Path Coefficient (Initial Model)	p-Value (Sig.)	Path Coefficient (Revised Model)	p-Value (Sig.)
Outcome orientation → Combating the bribery aspect of corporate sustainability	0.496	0.000 ***	0.490	0.000 ***
Outcome orientation → Financial performance	−0.228	0.024 **	−0.205	0.039 **
Outcome orientation → Non-financial performance	−0.106	0.318	0.023	0.822
Stability → Combating the bribery aspect of corporate sustainability	0.229	0.004 ***	0.224	0.003 ***
Stability → Financial performance	−0.040	0.623	−0.006	0.945
Stability → Non-Financial performance	−0.007	0.936	−0.050	0.571
Combating the bribery aspect of corporate sustainability → Financial performance	0.355	0.000 ***	0.262	0.007 ***
Combating the bribery aspect of corporate sustainability → Non-financial performance	0.456	0.000 ***	0.307	0.004 ***
Goodness of Fit Indices	CMIN/DF = 2.874		CMIN/DF = 2.467	
	CFI = 0.807		CFI = 0.853	
	GFI = 0.819		GFI = 0.874	
	AGFI = 0.772		AGFI = 0.803	

Note: p-values having *** and ** indicate statistically significant at 0.01 and 0.05 levels, respectively (2-tailed).

The initial model was revised by connecting error terms based on the highest possible modification indices recommended by Anderson and Gerbing, 1988 [54], and resulted in a good model fit to the dataset: (CMIN/DF = 2.467; GFI = 0.874; AGFI = 0.803; CFI = 0.953) (see Figure 2 and Model B in Table 3).

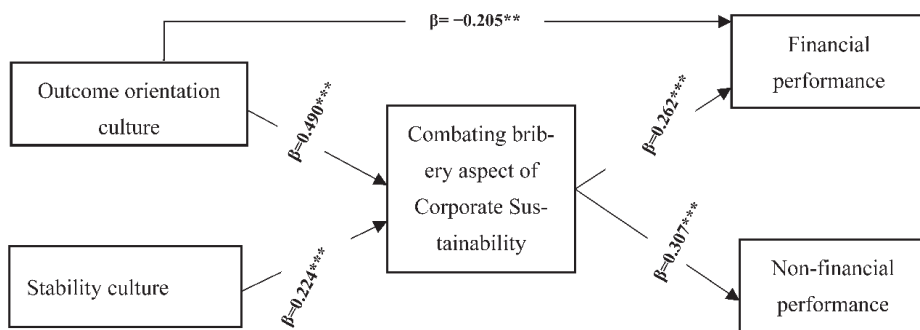


Figure 2. Results of the structural equation model among the study variables. Note: *** and ** indicate statistical significance at 0.01 and 0.05 levels, respectively (2-tailed).

4.1.1. Association between Outcome-Orientated Corporate Culture and the Bribery Combating Aspect of Corporate Sustainability

The SEM results reported in Figure 2 and Table 3 (Model B) reveal that the outcome-oriented culture is significantly and positively associated with the bribery combating aspect of corporate sustainability ($\beta = 0.490$; $p = 0.000$). Hence, hypothesis H1 is supported. The findings indicate that the culture of promoting competitiveness among employees, responding to their high expectations of performance, as well as providing them rewards based on their individual performance may refrain them to take bribes from and/or offer bribes to business partners. Hence, organisations that want to combat bribery practices, and thus promote corporate sustainability practices, are suggested to pay attention to develop an outcome-oriented culture by developing a culture of respecting employees' high expectations of performance, providing them rewards based on performance, and motivating them to be action-oriented. Our findings are in line with what other researchers discourse about the role of organisational outcome orientation culture on corporate sustainability practices [41,42]. Researchers [48,56] argue that the existence of outcome orientation culture is likely to promote employee sustainability practices. Our empirical findings contribute to the existing sustainability literature, with insights into the role of suitable organisation culture towards enhancing sustainability practices.

4.1.2. Association between Organisation Stability Culture and the Bribery Combating Aspect of Corporate Sustainability

The SEM results reported in Figure 2 and Table 3 (Model B) highlighted that organisational stability culture is significantly and positively associated with the bribery combating aspect of corporate sustainability ($\beta = 0.224$; $p = 0.003$). Hence, hypothesis H2 is supported. Furthermore, the associations between the stability culture and organisational financial ($\beta = -0.006$; $p = 0.945$) and non-financial performance ($\beta = -0.050$; $p = 0.571$) are statistically insignificant. The findings indicate that organisational stability culture has a positive influence on combating bribery practices in organisations. More specifically, if organisations provide employment security, bribery and small facilitation payment seems to be less likely to occur in organisations. This is because job security may lead employees not to be worried too much about the future, and thus there may have less tendency to make money illegally and abruptly by using organisational identity. Accordingly, organisations are advised to build a stability culture by providing employees with job security, and thus enhance corporate sustainability practices by reducing illegal and unethical practices, including taking and offering bribes. These findings contribute to the very limited corporate sustainability literature with the role of stability culture towards promoting corporate sustainability practices. Thus, the findings could be useful for organisational decision makers and policymakers, to devise suitable polices to combat bribery practices.

4.1.3. Association between the Bribery Combating Aspect of Corporate Sustainability and Organisational Financial and Non-Financial Performance

As reported in Figure 2 and Table 3 (Model B) and summarised in Table 4 Panel B, the bribery combating aspect of corporate sustainability practices is significantly and positively associated with financial performance ($\beta = 0.262$; $p = 0.007$) and non-financial performance ($\beta = 0.307$; $p = 0.004$). Hence, both hypotheses H3 and H4, are supported. The findings indicate that the bribery combating aspect of corporate sustainability practices drives organisations towards achieving their short-term financial goals, such as profit, sales, and ROI goals, as well as long-term strategic (non-financial goals) goals, such as the goal of ensuring high-quality product and service offering and the goal of achieving a higher customer retention rate than competitors. These findings conform with what previous studies found (see [2,8–10,41,52]). For example, Bhuiyan et al., 2020 [12], found a positive association of corporate sustainability practices (minimising the illegal activities aspect of sustainability practices) with organisations' financial performance. While others [46,47,57] found a positive association between corporate sustainability practices and organisation non-financial performance, such as reputation, innovation and differentiation, customer

satisfaction, and employee commitment. Therefore, the findings of the study may be useful for attracting the attention of policymakers and organisational decision makers in order to minimise the likelihood of bribery practices, and thus enhance organisational performance.

Table 4. Summary of SEM results with control the organisation size (number of employees) as the control variable.

Description of Paths	Path Coefficient (Revised Model)	p-Value (Sig.)
Outcome orientation → Combating the bribery aspect of corporate sustainability	0.504	0.000 ***
Outcome orientation → Financial performance	−0.221	0.025 **
Outcome orientation → Non-financial performance	0.012	0.902
Stability → Combating the bribery aspect of corporate sustainability	0.200	0.007 ***
Stability → Financial performance	0.006	0.946
Stability → Non-Financial performance	−0.050	0.560
Combating the bribery aspect of corporate sustainability → Financial performance	0.265	0.006 ***
Combating the bribery aspect of corporate sustainability → Non-financial performance	0.307	0.004 ***
Organisation size → Financial performance	0.060	0.408
Organisation size → Non-financial performance	0.102	0.189
		CMIN/DF = 2.347
Goodness of Fit Indices		CFI = 0.852
		GFI = 0.874
		AGFI = 0.803

Note: p-values having *** and ** indicate statistical significance at 0.01 and 0.05 levels, respectively (2-tailed).

4.2. Robustness and Endogeneity Check of the Base SEM Results

This study revised the base SEM model by including organisation size (in terms of the number of full-time employees) in the model as a control variable to check the robustness of the results of the base SEM model, as reported in Table 3 (Model B). The results of the new model (see Table 4 and Figure 3) indicate that the organisation size does not exhibit a significant association with any of the performance indicators: financial and non-financial performance. The new SEM model also provided results similar to what we found from the base SEM model reported in Table 3 (Model B), thus indicating the robustness of the findings of the base SEM model. Accordingly, we can conclude that endogeneity is less likely to occur in our study (Table 3, Model B).

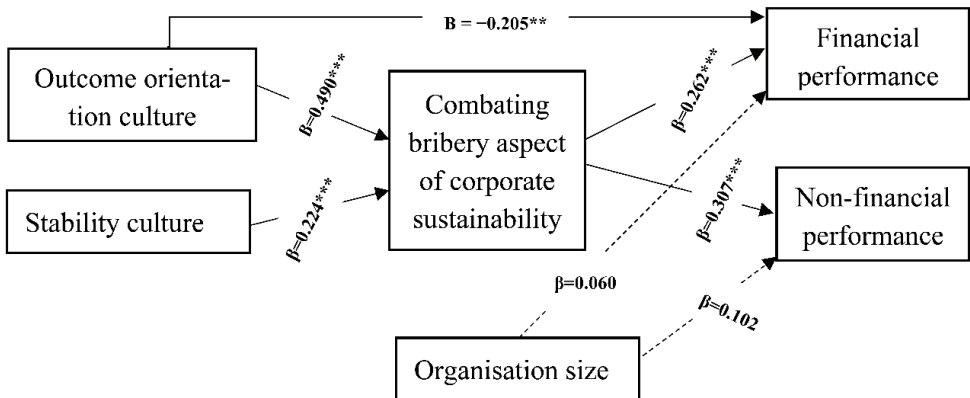


Figure 3. Results of the structural equation model among the study variables with the control variable (organisation size). Note: *** and ** indicate statistical significance at 0.01 and 0.05 levels, respectively (2-tailed).

5. Concluding Remarks

This study aimed at examining the influence of corporate culture on combating bribery practices, an aspect of corporate sustainability, and its subsequent impact on organisational performance. This survey-based quantitative study was based on the responses from a total of 201 mid-to-high level managers employed in Bangladeshi organisations. The survey data were analysed for SEM by employing the AMOS software. The findings highlight the importance of corporate culture: outcome orientation and stability cultures on combating bribery practices within organisations. The findings also provide evidence of positive associations between the combating bribery aspect of corporate sustainability practices and organisational financial and non-financial performance.

The evidence of corporate-level bribery practices provides interesting findings relating to its practical implications and the ability of the corporations to enhance their CSR engagement. This paper offers several policy implications. The regulators from emerging countries may move to mandatory CSR disclosure and investment from voluntary CSR practices by corporations. Given the social responsibility motivation of CSR, this study opens an arena of CSR as a medium of anti-corporate bribery behaviour. This study has an impact on substantial policy implications for emerging markets, such as encouraging corporations, stakeholders, ethical consumers, socially sensible investors, creditors and regulatory bodies to reciprocally cooperate for the benefits of CSR commitments, as a tool to restrict the risk of corporate-level bribery. The positive impact of CSR commitments may support resolving agency conflict between corporations, shareholders and society [37].

Similar to the other survey-based studies, this study is under the general limitation of survey-based research [58]. First, the determination of the causal relationships among variables is hard and treated as a common issue in the survey-based study [31]. Hence, future quantitative studies based on archival and/or panel data (longitudinal data) may improve generalisability of the findings within the field of this study [31,59,60]. Second, the study collected data from a respondent from each of the sampled organisations, which may raise the issue of representation of the company to which the respondent belongs. Accordingly, future studies based on the responses from multiple respondents from the same organisation may improve the accuracy of the findings of the study.

6. Implications

The findings of this empirical study contribute theoretically to the existing limited corporate sustainability literature, with insights into the role of suitable organisation culture, such as outcome orientation and stability culture on minimising bribery practices within the corporate environment. The findings also contribute theoretically to the corporate sustainability literature, with insights into the impact of sustainability practices towards enhancing the organisation financial and non-financial performance.

The findings of this study provide corporate practitioners and policymakers with practical implications of the importance of having a congenial corporate culture to promote and enhance corporate sustainability practices by reducing the likelihood of employees' ill practices, such as taking or offering bribes from/to organisations' business partners. This proposal of combating firm-level corporate bribery represents a comprehensive and innovative approach to the risk mitigation of the bribery impact on both financial and non-financial performance. Therefore, regulators and organisational policy implementors can create force on organisations to engage in high-level socially responsible activities to prohibit bribery and corruption. The understanding of such engagement is commendable and leads a clear path for other economies and corporations to move forward in corporate sustainability, and implement outcome orientation and stability within corporate culture towards limiting corporate-level bribery through sustainable and accountable business practices.

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Appendix A Questionnaire Items and CFA Statistics

The items retained after confirmatory factor analysis are shown below. The parameter 1 (one) was assigned as fixed on one item of each construct/scale in AMOS, which had the highest unstandardised estimate, and hence no *t*-value, as well as the value of S. E. is shown in the model.

Constructs and Items	Factor Loading	<i>t</i> -Value	S.E.	Cronbach Alpha
1. Organisational Culture				0.824
1.1 Outcome Orientation				
Being competitive	0.561 ***	n/a	n/a	
Being achievement-oriented	0.575 ***	6.294	0.165	
Having high expectations for performance	0.500 ***	6.576	0.117	
Being result-oriented	0.681 ***	7.053	0.161	
Being analytical	0.656 ***	6.902	0.177	
Being action-oriented	0.534 ***	5.997	0.162	
Being rule-oriented	0.751 ***	7.474	0.178	
1.2 Stability				0.745
Security of employment	0.545 **	n/a	n/a	
Stability	0.708 ***	9.267	0.143	
Predictability	0.688 ***	6.957	0.199	
Goodness of Fit: CMIN/DF = 2.180; GFI = 0.936; AGFI = 0.887; CFI = 0.951; RMSEA = 0.077; SRMR = 0.048				
2. Combating Bribery Aspect of Corporate Sustainability				0.866
Our company:				
-does not offer, give or accept undue financial, non-monetary or other advantage to/from public officials or the employees of business partners.	0.666 ***	n/a	n/a	
-has developed/adopted adequate internal controls, ethics and compliance programs or measures for preventing and detecting bribery.	0.807 ***	9.631	0.124	
-prohibits or discourages the use of small facilitation payments.	0.735 ***	8.947	0.106	
-accurately records small facilitation payments, if occurred, in books and financial records.	0.786 ***	9.441	0.101	
-takes adequate measures to minimise the likelihood of bribery.	0.748 ***	9.080	0.123	
-promotes employee awareness of and compliance with company policies and management control mechanisms against bribery.	0.611 ***	7.642	0.120	
Goodness of Fit: CMIN/DF = 2.331; GFI = 0.967; AGFI = 0.924; CFI = 0.977; RMSEA = 0.082; SRMR = 0.030				
3. Organisational Performance				0.892
3.1 Financial performance				
Profit goals have been achieved.	0.851 ***	n/a	n/a	
Sales goals have been achieved.	0.853 ***	14.345	0.070	
Return on investment (ROI) goals have been achieved.	0.865 ***	14.583	0.073	

Constructs and Items	Factor Loading	t-Value	S.E.	Cronbach Alpha
3.2 Non-financial performance				0.710
Our products/services are of a higher quality than those of our competitors.	0.635 ***	n/a	n/a	
We have a higher customer retention rate than our competitors.	0.866 ***	6.632	0.204	
Goodness of Fit: CMIN/DF = 5.791; GFI = 0.957; AGFI = 0.841; CFI = 0.962; RMSEA = 0.155; SRMR = 0.031				
Note: *** and ** indicate statistical significance at 0.01 and 0.05 levels, respectively (2-tailed)				

References

1. Majumdar, A.; Shaw, M.; Sinha, S.K. COVID-19 debunks the myth of socially sustainable supply chain: A case of the clothing industry in South Asian countries. *Sustain. Prod. Consum.* **2020**, *24*, 150–155. [CrossRef]
2. Orazalin, N. Do board sustainability committees contribute to corporate environmental and social performance? The mediating role of corporate social responsibility strategy. *Bus. Strategy Environ.* **2020**, *29*, 140–153. [CrossRef]
3. Wu, L.; Jin, S. Corporate Social Responsibility and Sustainability: From a Corporate Governance Perspective. *Sustainability* **2022**, *14*, 15457. [CrossRef]
4. Emran, M.S.; Islam, A.; Shilpi, F. Distributional Effects of Corruption When Enforcement is Biased: Theory and Evidence from Bribery in Schools in Bangladesh. *Economica* **2020**, *87*, 985–1015. [CrossRef]
5. Kashif, M.; Zarkada, A.; Ramayah, T. The impact of attitude, subjective norms, and perceived behavioural control on managers' intentions to behave ethically. *Total Qual. Manag. Bus. Excell.* **2018**, *29*, 481–501. [CrossRef]
6. OECD: Organization for Economic Cooperation and Development. *OECD Guidelines for Multinational Enterprises*; OECD Publishing: Paris, France, 2011. [CrossRef]
7. Yasser, Q.R.; Al Mamun, A.; Ahmed, I. Corporate social responsibility and gender diversity: Insights from Asia Pacific. *Corp. Soc. Responsib. Environ. Manag.* **2017**, *24*, 210–221. [CrossRef]
8. Transparency International Corruption Perception Index. Available online: <https://www.transparency.org/en/cpi/2022> (accessed on 9 March 2023).
9. TBS Report. It's Corruption that Bites Business Harder: CPD. 2023. Available online: <https://www.tbsnews.net/economy/corruption-remains-most-problematic-factor-doing-business-cpd-575938> (accessed on 9 March 2023).
10. TRACE Bribery Risk Matrix. Available online: <https://www.traceinternational.org/trace-matrix> (accessed on 9 March 2023).
11. Barakat, F.S.; Pérez MV, L.; Ariza, L.R. Corporate social responsibility disclosure (CSR) determinants of listed companies in Palestine (PXE) and Jordan (ASE). *Rev. Manag. Sci.* **2015**, *9*, 681–702. [CrossRef]
12. Bhuiyan, F.; Baird, K.; Munir, R. The association between organisational culture, CSR practices and organisational performance in an emerging economy. *Meditari Account. Res.* **2020**, *28*, 977–1011. [CrossRef]
13. Szekeley, F.; Knirsch, M. Responsible leadership and corporate social responsibility: Metrics for sustainable performance. *Eur. Manag. J.* **2005**, *23*, 628–647. [CrossRef]
14. Glaser, S.R.; Zamanou, S.; Hacker, K. Measuring and interpreting organizational culture. *Manag. Commun. Q.* **1987**, *1*, 173–198. [CrossRef]
15. Gordon, G.G.; DiTomo, N. Predicting corporate performance from organizational culture. *J. Manag. Stud.* **1992**, *29*, 783–798. [CrossRef]
16. Windsor, C.A.; Ashkanasy, N.M. Auditor independence decision making: The role of organizational culture perceptions. *Behav. Res. Account.* **1996**, *8*, 80–97.
17. Lourenço, I.C.; Branco, M.C.; Curto, J.D.; Eugénio, T. How does the market value corporate sustainability performance? *J. Bus. Ethics* **2012**, *108*, 417–428. [CrossRef]
18. O'Reilly, C.A.; Chatman, J.A.; Caldwell, D.F. People and Organizational Culture: A Profile Comparison Approach to Assessing Person-Organization Fit. *Acad. Manag. J.* **1991**, *34*, 487–516. [CrossRef]
19. Almaqtari, F.; Elsheikh, T.; Tawfik, O.I.; Youssef, M.A.E.A. Exploring the Impact of Sustainability, Board Characteristics, and Firm-Specifics on Firm Value: A Comparative Study of the United Kingdom and Turkey. *Sustainability* **2022**, *14*, 16395. [CrossRef]
20. Maletic, M.; Maletic, D.; Dahlgaard, J.; Dahlgaard-Park, S.M.; Gomišček, B. Do corporate sustainability practices enhance organizational economic performance? *Int. J. Qual. Serv. Sci.* **2015**, *7*, 184–200.
21. Veselovská, L.; Závadský, J.; Závadská, Z. Mitigating bribery risks to strengthen the corporate social responsibility in accordance with the ISO 37001. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1972–1988. [CrossRef]
22. Jung, T.; Scott, T.; Davies, H.T.; Bower, P.; Whalley, D.; McNally, R.; Mannion, R. *Instruments for the Exploration of Organisational Culture—Compendium of Instruments*; School of Management, University of St Andrews: St Andrews, UK, 2007.
23. Wijethilake, C.; Upadhaya, B.; Lama, T. The role of organisational culture in organisational change towards sustainability: Evidence from the garment manufacturing industry. *Prod. Plan. Control.* **2021**, *34*, 275–294. [CrossRef]
24. Baird, K.; Hu, K.J.; Reeve, R. The relationships between organizational culture, total quality management practices and operational performance. *Int. J. Oper. Prod. Manag.* **2011**, *31*, 789–814. [CrossRef]
25. Shanak HS, H.; Said, R.M.; Abdullah, A.; Daud, Z.M.; Abu-Alhaija, A.S. Corporate Organizational Culture and Corporate Social Responsibility Activities: An Empirical Evidence from Jordan and Palestine. *Int. J. Bus. Econ.* **2020**, *2*, 90–104.
26. Xenikou, A.; Furnham, A. A correlational and factor analytic study of four questionnaire measures of organizational culture. *Hum. Relat.* **1996**, *49*, 349–371. [CrossRef]
27. Robbins, S.P.; Judge, T.A.; Vohra, N. *Organizational Behavior*, 15th ed.; Prentice Hall: Hoboken, NJ, USA, 2013.
28. Schein, E.H. Coming to a new awareness of organizational culture. *Sloan Manag. Rev.* **1984**, *25*, 3–16.
29. Hart, S.; Dowell, G. A natural-resource-based view of the firm: Fifteen years after. *J. Manag.* **2011**, *37*, 1464–1479.
30. Hart, S.L.; Milstein, M.B. Creating sustainable value. *Acad. Manag. Exec.* **2003**, *17*, 56–67. [CrossRef]
31. Montiel, I.; Delgado-Ceballos, J. Defining and measuring corporate sustainability: Are we there yet? *Organ. Environ.* **2014**, *27*, 113–139. [CrossRef]
32. Valente, M. Theorizing firm adoption of sustaincentrism. *Organ. Stud.* **2012**, *33*, 563–591. [CrossRef]

33. Watson, L. Corporate social responsibility research in accounting. *J. Account. Lit.* **2015**, *34*, 1–16.
34. Luft, J.; Shields, M.D. Subjectivity in developing and validating causal explanations in positivist accounting research. *Account. Organ. Soc.* **2014**, *39*, 550–558. [[CrossRef](#)]
35. Healy, P.; Serafeim, G. An analysis of firms' self-reported anticorruption efforts. *Account. Rev.* **2016**, *91*, 489–511. [[CrossRef](#)]
36. Gao, F.; Liscic, L.L.; Zhang, I.X. Commitment to social good and insider trading. *J. Account. Econ.* **2014**, *57*, 149–175. [[CrossRef](#)]
37. Krishnamurti, C.; Shams, S.; Velayutham, E. Corporate social responsibility and corruption risk: A global perspective. *J. Contemp. Account. Econ.* **2018**, *14*, 1–21. [[CrossRef](#)]
38. Eccles, R.G.; Ioannou, I.; Serafeim, G. The impact of corporate sustainability on organizational processes and performance. *Manag. Sci.* **2014**, *60*, 2835–2857. [[CrossRef](#)]
39. Abdullah, W.M.T.W.; Ahmad, N.N.; Ariff, A.M. Combating corruption for sustainable public services in Malaysia: Smart governance matrix and corruption risk assessment. *J. Sustain. Sci. Manag.* **2018**, *4*, 1–14.
40. Rettab, B.; Brik, A.B.; Mellahi, K. A study of management perceptions of the impact of corporate social responsibility on organisational performance in emerging economies: The case of Dubai. *J. Bus. Ethics* **2009**, *89*, 371–390. [[CrossRef](#)]
41. MacIntosh, E.W.; Doherty, A. The influence of organizational culture on job satisfaction and intention to leave. *Sport Manag. Rev.* **2010**, *13*, 106–117. [[CrossRef](#)]
42. Su, S.; Baird, K.; Blair, B. Employee organizational commitment: The influence of cultural and organizational factors in the Australian manufacturing industry. *Int. J. Hum. Resour. Manag.* **2009**, *20*, 2494–2516. [[CrossRef](#)]
43. Baird, K.; Harrison, G.; Reeve, R. The culture of Australian organizations and its relation with strategy. *Int. J. Bus. Stud. A Publ. Fac. Bus. Adm. Ed. Cowan Univ.* **2007**, *15*, 15–41.
44. Artiach, T.; Lee, D.; Nelson, D.; Walker, J. The determinants of corporate sustainability performance. *Account. Financ.* **2010**, *50*, 31–51. [[CrossRef](#)]
45. One Source Information Services. D&B Hoovers Database. 2016. Available online: <https://app.avenion.com/> (accessed on 20 October 2017).
46. Boubakary, D.; Moskolai, D.D. The influence of the implementation of CSR on business strategy: An empirical approach based on Cameroonian enterprise. *Arab. Econ. Bus. J.* **2016**, *11*, 162–171. [[CrossRef](#)]
47. Chakravarthy, J.; DeHaan, E.; Rajgopal, S. Reputation repair after a serious restatement. *Account. Rev.* **2014**, *89*, 1329–1363. [[CrossRef](#)]
48. Senge, P.M.; Carstedt, G. Innovating our way to the next industrial revolution. *MIT Sloan Manag. Rev.* **2001**, *42*, 24–38.
49. Sarros, J.C.; Gray, J.; Densten, I.L. Leadership and its Impact on Organizational Culture. *Int. J. Bus. Stud.* **2002**, *10*, 1–26.
50. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.; Podsakoff, N.P. Common method biases in behavioural research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **2003**, *88*, 879–903. [[CrossRef](#)]
51. Dillman, D.A. *Tailored Design Method: Encyclopaedia of Survey Research Methods*; Sage Publications, Inc.: Thousand Oaks, CA, USA, 2011.
52. Hair, J.F.; Anderson, R.E.; Babin, B.J.; Black, W.C. *Multivariate Data Analysis: A Global Perspective*; Pearson Prentice Hall: Upper Saddle River, NJ, USA, 2010; Volume 7.
53. Kılıç, M.; Gurler, H.E.; Kaya, A.; Lee, C.W. The Impact of Sustainability Performance on Financial Performance: Does Firm Size Matter? Evidence from Turkey and South Korea. *Sustainability* **2022**, *14*, 16695. [[CrossRef](#)]
54. Anderson, J.C.; Gerbing, D.W. Structural equation modeling in practice: A review and recommended two-step approach. *Psychol. Bull.* **1988**, *103*, 411–423. [[CrossRef](#)]
55. Cronbach, L.J. Coefficient alpha and the internal structure of tests. *Psychometrika* **1951**, *16*, 297–334. [[CrossRef](#)]
56. Linnenluecke, M.K.; Griffiths, A. Corporate sustainability and organizational culture. *J. World Bus.* **2010**, *45*, 357–366. [[CrossRef](#)]
57. Saeidi, S.P.; Sofian, S.; Saeidi, P.; Saeidi, S.P.; Saeidi, S.A. How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *J. Bus. Res.* **2015**, *68*, 341–350. [[CrossRef](#)]
58. Singleton, R.A.; Straits, B.C. *Approaches to Social Research*, 6th ed.; Oxford University Press: New York, NY, USA, 2018.
59. Gippel, J.; Smith, T.; Zhu, Y. Endogeneity in accounting and finance research: Natural experiments as a state-of-the-art solution. *Abacus* **2015**, *51*, 143–168. [[CrossRef](#)]
60. Wu, A.; Chow, C.W.; McKinnon, J.L.; Harrison, G.L. Organizational Culture: Association with Commitment, job Satisfaction, propensity to Remain, and information sharing in Taiwan. *Int. J. Bus. Stud.* **2003**, *11*, 25–44.

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Article

Asymmetric Effects of the Defense Burden on Environmental Degradation: Evidence from NATO Countries

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Abstract: Rapid industrialization tends to occur at the expense of natural resources. Thus, countries are inclined to control natural resources for their development objectives, which may create conflicts when countries allocate scarce resources to national defense. As a major military block, NATO poses a potential threat to environmental degradation, as it comprises large industrialized arms manufacturers and military spenders. Therefore, the aim of this study is to investigate the asymmetric effects of the defense burden on environmental degradation, which has rarely been studied in the empirical literature. Panel ARDL and NARDL methodologies were used to analyze the period 1965–2018 for the 15 oldest members of NATO. The findings of the panel ARDL analysis do not indicate any significant effect of the defense burden (ME) on carbon dioxide emissions (CO₂) in the long term. On the other hand, panel NARDL analysis indicates that the effect of the defense burden on carbon emissions is asymmetric; a 1% negative change in ME leads to a 0.08% drop in CO₂ emissions in the long term. In line with these findings, the results of panel causality tests verify the validity of the treadmill of destruction theory.

Keywords: environmental degradation; defense burden; panel ARDL; panel NARDL; panel causality

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1. Introduction

Carbon emissions are the result of the use of fossil fuels to generate the energy required for production. They lead to the greenhouse effect, causing radiation that would be returned to space to remain in the atmosphere. Increasing carbon emissions since the industrial revolution, together with other greenhouse gases such as methane (CH₄), (HFCs), and sulfur hexafluoride (SF₆), have been the main cause of hydrofluorocarbons climate change and environmental crises. Considering that climate change occurs with the interaction of three important parameters—economy, energy, and environment—the best way to prevent climate change and to minimize its negative effects is to reduce anthropogenic greenhouse gas emissions [1].

To mitigate the adverse impacts of greenhouse gas emissions, global initiatives have been undertaken by industrialized countries such as the Montreal Protocol, the United Nations Framework Convention on Climate Change (UNCC), the Kyoto Protocol, the European Union (EU) Green Deal, and the Paris Agreement. The Montreal Protocol, which required 196 countries to stop the production of substances that damage the ozone layer, is considered to have been the most successful multilateral agreement on the environment [2]. The Kyoto Protocol, signed within the framework of the UNCC, foresees developed countries reducing their gas emissions by 5% compared to levels in 1990, and to reduce their emission values for an average of five years [3]. The Paris Agreement is the only globally legally binding monitoring agreement and, unlike the Kyoto Protocol, it lays a burden

for not only developed countries, but the rest of the world as well. The effect of the Paris Agreement was immediately apparent in Europe. It stipulates conserving the universal mean temperature to 2 °C above pre-industrial standards to restrain climate change [4]. With the EU Green Deal, EU countries aim to reduce carbon emissions by 55% by 2030 and to transform the European economy in order to become a “carbon-free continent” by 2050 [5]. Similarly, China is seeking to reach its highest carbon emission by 2030 and to achieve carbon neutrality by 2060 [6]. As calculated by the Intergovernmental Panel on Climate Change, 76% of the gases causing climate change are CO₂, 16% are methane and 6.2% are nitrous oxide gases; therefore, respectively [7]. Therefore, as an essential element of greenhouse effect, analyzing the effects of the defense burden and energy use on CO₂ emissions would contribute to the literature on climate change.

The effects of climate change and the desire to leave a more livable world to future generations have led to the idea that countries cannot exist only with economic growth, but also must be involved in a multi-faceted transformation process [8]. Calculations that global material use will increase from 89 gigatons to 167 gigatons between 2017 and 2060 and that gas emissions causing global warming will increase accordingly have caused a change in perspectives on the concept of sustainability. Brutland’s motto of “producing more with less” has evolved into a different growth concept with the internalization of externalities; in this way, responsibility is placed on countries that growth in use of resources and production be realized without harming the environment. Thus, having first been introduced in 1987 in the report of the World Commission on Environment and Development titled “Our Common Future”, sustainability has been defined by the Global Sustainability Development Report (2019) and become a more grounded concept [9].

To achieve development objectives, countries aim to achieve greater industrialization. With the unprecedented pace of industrialization in recent decades, pressures on natural resources have emerged that are being widely discussed by environmental scientists and policy makers. In order to control natural resources, countries tend to spend on their military operations. Those military operations bear potential risks to the environment due to their excessive depletion of natural resources. Furthermore, those environmental risks do not necessarily emerge in warfare. For instance, construction of military bases might occur at the expense of the destruction of forest areas, gasoline consumption may result in air pollution due to the deployment of military personnel by vehicles, and ammunition and personnel waste are associated with environmental pollution. These are some potential cases of militarization resulting in environment degradation. According to the Stockholm International Peace and Research Institute (SIPRI), worldwide military expenditures have reached their greatest historical level and accounted for 2.4% of the world’s GDP in 2020. The top fifteen military spenders accounted for 81% of global military spending, at USD 1603 billion, in 2020. The leading country in military spending is the United States of America (USA) at USD 778 billion, followed by China, India, the Russian Federation, and the United Kingdom (UK) [10].

In 1949, after World War II, the North Atlantic Treaty Organization (NATO) was established to ensure the territorial integrity of member states and solve political and military disputes between them. In addition to its general mission regarding the security issues of member states, NATO has also taken various actions to address sustainability issues since the end of 1960s. In this respect, the earliest attempt was the 1969 establishment of the Committee on the Challenges of Modern Society (CCMS), which was designed to initiate and support studies and fellowships to deal with all forms of pollution and disposal of hazardous wastes. Nonetheless, essential actions have been accelerated by the turn of the new millennium, with the rapidly growing interest in climate change and environmental concerns, as demonstrated by UN initiatives. In 2006, CCMS evolved as the Science for Peace and Security Plan to execute initiatives dealing with environmental security challenges. Among the most notable initiatives was the introduction of the Smart Energy Initiative, which calls for energy efficiency and innovative technologies to maintain the operations of the alliance. In addition, the concept of “Green Defense Framework” was

ratified by the member states at the Wales Summit in 2014 [11]. In 2021, militarization and the environmental crisis were an “important issue” within the framework of the Climate Change and Security Action Plan [12]. In addition, this situation is also considered in Brussels Summit of NATO in 2021. In the final declaration of the Summit, heads of states and governments committed to reduce greenhouse emissions to zero by 2050 [13]. However, the current position of NATO regarding environmental issues is mainly built upon awareness, information sharing, education and training activities of troops, and helping member states in the light of their own regulations and measures.

On the other hand, studies of defense economics have mainly addressed the macroeconomic effects of militarization, either theoretically or empirically, despite the presence of recent growing interest in environmental concerns. This article aims to empirically analyze the relationship between militarization and environmental degradation in terms of the treadmill of destruction theory, both symmetrically and asymmetrically, for the 15 oldest NATO countries over the period 1965–2018. The treadmill of destruction theory suggests that countries with more labor-intensive and cutting-edge technologies demand more natural resources. There are two basic motivations worth highlighting for this study. The first motivation is directly related to the purpose of this study. This paper aims to fill gaps in the literature in various aspects. First of all, it is a preliminary attempt to empirically address the asymmetric effects of militarization on environmental degradation, giving special focus to NATO. In other words, it differs from all studies in the literature, as it deals with the relationship between defense expenditures and the environmental degradation for NATO member countries from an asymmetrical point of view, which allows the observation of both sudden changes in military expenditures on environmental degradation and asymmetric long-term cointegration. In fact, NATO deserves special attention, since it accounted for 55% of global military expenditure in 2020 [10]. It should also be noted that six countries (the list of the countries by expenditure level is as follows: United States of America (USA), United Kingdom (UK), Germany, France, Italy, and Canada) of the top fifteen military spenders are members of NATO. Furthermore, four member states of NATO (the USA, Germany, Canada, and Turkey) were among the top fifteen CO₂-emitting countries in the world in 2020 [14]. Since NATO, which has focused on many security issues since the Cold War period, has recently focused on environmental degradation as creating a possible global security problem, this study, as among a few militarization and environmental studies, focuses on the subject in regard to NATO. In addition, our empirical investigation is limited to fifteen member states of NATO. Most of the countries in the sample are regarded as the founders of the alliance. Accordingly, these 15 countries are the top military spenders and top carbon emitters. Although NATO is an alliance between the member states, some members have engaged in arms races with each other. Greece and Turkey are members that have a significant defense burden due to historical and ongoing geopolitical conflicts with each other.

The second motivation for this paper lies on the methodology used throughout, which is relatively a novel approach and thought to fill a gap in the empirical literature. Except for Ullah et al. [15], the majority of empirical studies have examined the effect of militarization on environmental degradation in a linear context. Our study aims to detect asymmetric effects for a relatively broader group of countries that are considered as contenders in terms of arms races and are top emitters globally. To the best of our knowledge, this goal has not been specifically addressed in the empirical literature thus far. This study also aims to contribute a new dimension to the literature by integrating the effects of changes in the defense burden into a long-term relationship within the scope of the treadmill of destruction theory. Within the context of time-series analysis, an autoregressive distributed lag (ARDL) approach to cointegration presents some advantages. First of all, ARDL generates efficient results with small sample sizes. Secondly, the variables can be integrated by different orders. Finally, the inclusion of an error correction model integrates short-term dynamics into the long-term equilibrium model [16]. In addition to these advantages, NARDL methodology allows for examining the asymmetric interplay by decoupling the variables into positive

and negative components when generating the effects of changes. The selection of the sample period is mainly dictated by the availability of data on carbon dioxide emissions and primary energy use, which were gathered from British Petroleum's (BP) Statistical Review Database. It should also be noted that the sample period was selected to be long as possible in order to efficiently analyze the time-series characteristics of the data with respect to the availability of data for those countries.

In line with the aforementioned arguments, the layout of the present paper is as follows. The Section 2 presents the theoretical arguments on the nexus of militarization and the environment. The Section 3 is devoted to a literature review, in which we present theoretical and empirical studies, giving special focus to militarization and the environment. In the Section 4, we present our model and empirical strategies, and discuss the data issues. In accordance with the modeling and our empirical strategy, we present the findings of our estimations in the Section 5. Finally, in the Section 7, we terminate our paper with concluding remarks and policy recommendations.

2. Theoretical Arguments

This study is driven by the impulse to understand how energy use in defense production is harmful to the environment by determining the links between environmental degradation, defense expenditures, and energy consumption. Countries are bound by climate change-related reports and agreements, and the awareness of citizens of carbon emissions and environmental pollution has forced countries to be more environmentally-friendly in energy production and use. Although there has been a decrease in energy production and consumption due to the COVID-19 pandemic over the last three years, the CO₂ concentration in our atmosphere has increased from 280 to 415 ppm over the last thirty years, and CO₂ emissions due to energy consumption increased by 4.8% in 2021 [14].

The unprecedented pace of rapid industrialization since the Industrial Revolution has led countries to endeavor to dominate energy resources. In this context, the 20th century has witnessed power struggles in the international security system to ensure energy supplies. Jorgenson [17] links this fact with the concept of "military coercive power", which has two main strands. The first strand mainly addresses the ability and desire of countries to allocate budgetary resources to militarization. Even though the share of the public budget used military expenses tends to increase in wartime, during peacetime, countries may upgrade defense systems and military structures. The augmentation of these systems and structures not only requires more budgetary allocations, but also require more energy resources [18]. For instance, the US Department of Defense (Pentagon) is the world's largest consumer of petroleum-based energy, and its overall emissions of waste, fossil fuels, and other greenhouse gases are more than the sum of Sweden, Denmark, and Portugal [19]. According to the European Defense Agency, the defense institutions of the EU member states make significant use of energy within the Union and are seeking sustainable energy models, as the majority of those countries are overwhelmingly net importers [20]. Despite the introduction of cutting-edge technologies in the arms industry, the demand for energy is continuously growing. Although sustainable renewable energy models are being widely discussed in all countries, especially in the UN and NATO, there is no way for countries to realize these models in the short term except for their own military bases and personnel. According to the United Nations Environment Program, a military mission within the UN structure usually takes between six months and a year, while it takes up to five years to cover the costs of relatively expensive renewable energy elements [21]. Thus, short-term analyses do not work efficiently for planning energy and military elements. In addition, Jorgenson argues that another strand of military coerciveness stems from the level of military technology, which is captured by military spending per soldier [17]. Higher military spending per soldier is an indication of military technology, which is associated with research and development activities and procurement of military defense products despite the larger ecological footprint [17,22–24].

Indeed, militarization is among the most important anthropogenic factors causing environmental degradation [25] due to the destruction of forest areas to construct military bases, the adverse impacts on ecosystems associated with military demonstrations, and ammunition and personnel waste, along with pollution stemming from the deployment and shipment of military personnel and assets. These examples illustrate the sociology-based “treadmill of destruction” theory and great portion of the studies in this field draw attention to the high-intensity and causal relationship between militarization and environmental degradation, e.g., [26–32]. According to this theory, the dynamics of militarization in themselves can harm nature, and countries that want to become stronger damage the environment in many different ways by spending more on their militaries and defense [27]. Larger bases and production areas also require more natural resources, causing more damage to ecosystems [29]. In the struggle to be stronger, there is no need to harm the environment. An asymmetric study on warfare conducted on 126 countries between 2000 and 2010 predicted that extensive carbon emissions and environmental degradation is associated with higher militarization [32]. The destruction caused by militarization can occur not only through war, personnel, and armaments, but also through economic effects caused by production, international trade, and/or institutions; see [31,33]. The economic effects, especially those triggered by war, form depending on capital-intensive technology and cause multiple and joint negative effects on the environment, such as diminution of natural resources, augmentation of waste, and the release of toxic substances [26]. While the direct environmental effects of militarization such as bombing and destruction manifest themselves in the short term, effects such as the reduction in forests, pollution of soil and water, decreases in production, and waves of migration manifest themselves in the long term. Since climate change is a long-term phenomenon, its relationship with militarization should be evaluated in the long term.

3. Relevant Literature

Even though there is an extensive body of literature in the area of defense economics addressing the economic effects of military expenditure, studies that examine the effects of military expenditure on environmental sustainability are relatively scarce, despite recently growing interest. In this context, we present the findings of some prominent empirical studies that focus on the nexus of militarization and environmental sustainability. However, the findings of these empirical studies vary due their selection of methodology, sample period, and units. Accordingly, the bulk of these studies were inspired by earlier pioneering attempts [17,27–29,34,35] that argued for the impact of militarization on environmental and sociological grounds.

Earlier empirical efforts aimed to reveal the impacts of militarization on environmental degradation within the context of political economy by accounting for sociological aspects as well. In this context, Jorgenson [17], Jorgenson and Clark [34], and Jorgenson et al. [35] argued for the role of militarization in expanding the ecological footprints of nations within the context of the treadmill of production and the treadmill of destruction theories. Jorgenson [17] analyzed the effects of international power on the ecological footprint of nations by dividing international power into economic power, coerciveness, and dependence on exports. The results of standard cross-sectional regressions revealed that military technological power and dependence on exports have detrimental effects on a nation’s ecological footprint, whereas capital intensity has both direct and indirect effects driven by military power, urban population, domestic income inequality, and secondary education. Jorgenson and Clark [34] analyzed the effect of militarization on ecological footprint by incorporating the panel data set of 53 developed and less-developed countries over the period 1975–2000. Utilizing a random-effects estimator, the results indicate that the per capita ecological footprint of a nation is highly dependent on per capita GDP and military expenditure per soldier. Hence, these findings firmly confirm the treadmill of production and treadmill of destruction theories. Likewise, Jorgenson et al. [35] examined whether the treadmill of destruction theory was valid for 72 countries between 1970 and 2000. The conventional

panel data estimates (fixed effects estimator) suggest that militarization has directly positive effects on environmental degradation. By incorporating an annual panel dataset covering 68 countries over the period 1970–2000, Clark et al. [36] validated the treadmill of destruction theory and detected a positive interplay between defense expenditures and energy consumption. They also identified the link between militarization, energy use, and environmental damage from the fuel consumption of military elements. In line with our arguments in this present study, Reis et al. [37] adopted a different method, touching on the relationship between militarization and carbon footprint. Based on systematic literature review and case study researches, the authors find that European Union defense industry plays a crucial role on circular economy.

Some studies examine this relationship in terms of individual countries by employing various time-series methods. To this end, in a relatively earlier attempt, Reuveny et al. [38] drew attention to the destructive effects of militarization and energy use in the USA between 1980 and 2000. Their findings tended to support the treadmill of destruction theory, so that deforestation was associated with increases in conflicts and mass production. For the USA, Bildirici [39] analyzed the effects of militarization on carbon dioxide emissions by employing a bounds test approach to cointegration over the period 1960–2013. The findings showed that, together with economic growth and disposal of energy, militarization has an intensifying effect on CO₂ emissions. In addition, the findings of causality tests verified the presence of unidirectional causality from CO₂ emissions to militarization, as well as bidirectional causality. By employing the same methodologies, Bildirici [40] derived similar findings for the USA economy between 1984 and 2015. Solarin et al. [41] discussed the role of energy consumption and military expenditures on CO₂ emissions for the USA and highlighted the crucial role of militarization in environmental degradation. Ahmed et al. [42] uncovered a long-term interplay between energy consumption, military expenditure, and environmental degradation in Pakistan between 1971 and 2016 by employing novel cointegration tests and bootstrap causality tests. In addition to militarization, Gokmenoglu et al. [43] also investigated the role of financial development on environmental degradation and ecological footprint in Turkey, which is among the leading military spenders in NATO. Incorporating annual data spanning from 1960 to 2014, they employed the FMOLS estimator to find the magnitude and direction of the long-term coefficients. Overall, the findings support the treadmill of destruction theory for Turkey.

Ullah et al. [15] investigated the asymmetric effects of militarization on economic development and environmental degradation for Pakistan and India, which are competing in arms and industrialization, and have extensive disputes over the Kashmir issue. By employing the NARDL model for the period 1985–2018, the authors uncovered the presence of an asymmetric relationship between militarization and environmental degradation for both countries. In this case, a 1% decrease in militarization tended to alleviate carbon emissions by 0.225% in Pakistan, whereas carbon emissions tended to diminish by 0.337% in India for the same decrease. Using a novel empirical approach, Wang et al. [44] scrutinized the influence of militarization on crude oil dependency and CO₂ emissions for 11 crude oil net importing countries between 1990 and 2019. The results of Fourier ARDL (FARDL) methodology underlined that, as the largest crude oil consumers, only China and India exhibit a cointegration relationship between crude oil dependence, CO₂ emissions, and militarization. Strikingly, among the developed countries, only Italy displayed a cointegration relationship between dependency on crude oil, CO₂ emissions, and militarization due to its geography, energy shortage, and high crude oil dependency. For the rest of the sample, Wang et al. [44] found no cointegration relationships. Finally, in a recent paper, Erdogan et al. [45] examined the effect of militarization on environmental sustainability for Mediterranean countries over the period 1965–2019. By conducting global vector autoregression (VAR) analysis, the authors confirmed the validity of the treadmill of destruction theory. Accordingly, an unanticipated positive change in global military expenditure tends to increase carbon emissions.

It should also be noted that there has been recent growing interest among scholars in conducting empirical analyses due to recent advances in panel data analysis. In this context, Ben Afia and Harbi [46] investigated the impacts of militarization on air pollution for 121 countries, covering the period between 1980 and 2011. By conducting instrumental variables analysis, the authors found that militarization had positive direct and indirect effects on per capita emissions for all countries. Bildirici [47] analyzed the interconnectedness of CO₂ emissions and militarization for the G7 countries by incorporating annual panel data over the period 1985–2015. In order to reveal the long-term relationship between CO₂ emissions, militarization, GDP per capita, and energy consumption, panel autoregressive distributed lag (ARDL) methodology was utilized. The findings demonstrate the long-term interplay between the aforementioned variables.

Furthermore, the findings of panel causality tests confirmed the existence of unidirectional causalities running from militarization and energy consumption to CO₂ emissions. Bradford and Stoner [48] aimed to determine the energy use and environmental effects of militarization by using CO₂ emission levels, per capita national income, city population, and military expenditures in a panel data analysis for 62 countries between 1975 and 2014, and 162 countries between 1960 and 2014. Working with a fairly large and comprehensive dataset, the authors found that countries with high military expenditures also have high carbon emissions, and that militarization has harmful environmental consequences. In a similar vein, Ben Afia and Harbi [49] examined the direct and indirect effects of militarization through the income channel for 120 countries, spanning from 1980 to 2015. Their findings suggest that military outlays tend to have positive direct and indirect effects on per capita emissions overall. Using a generalized method of moments (GMM) and structural VAR (SVAR) model, Domguia and Poumie [50] scrutinized the relationship between CO₂ and methane gases and defense expenditures for 54 African countries between 1980 and 2016. The findings exhibited the presence of positive interplay between environmental damage, militarization, and energy use. Zandi et al. [51] conducted fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS) analysis for six Asian countries between 1995 and 2017, uncovering a positive and strong relationship between military expenditures, energy use, and CO₂ emissions. Finally, for South Asian countries between 1984 and 2019, Qayyum et al. [52] demonstrated the devastating effects of defense expenditures and energy use on the environment by using panel ARDL and causality tests. Dudzevičūtė et al. [53] employed Spearman correlation as well as ALM for Baltic countries, and found a positive relationship between military expenditure and energy use. However, all the studies mentioned in this section excluded the asymmetric relationships when evaluating direct effects. The development of nonlinear methods has provided a remarkable opportunity to reveal networks of relations, such as the damage to the environment from sudden military expenditures, or environmental sustainability during arms races. Therefore, this study aims to make a contribution to this field using the NARDL method.

4. Data Issues, Model Structure, and Estimation Strategy

4.1. Data Issues

This study utilizes the balanced panel data of fifteen member states of NATO (See Table A1 in the appendix for the list of the countries in the sample), spanning the period 1965–2018. The lack of available data for the new member states that joined the alliance in the late 1990s and early 2000s forced us to limit our empirical analysis to older member states of the alliance. We incorporated the annual balanced panel data for carbon dioxide emissions (CO₂), the defense burden in the percentage of military expenditure to GDP ratio (ME), and primary energy use (EN). We collected the data for the defense burden from the World Development Indicators (WDI) database of the World Bank [54], whereas the data for carbon dioxide emissions (kilotons) and primary energy use (kg of oil equivalent per capita) were compiled from the Statistical Review of World Energy database of British

Petroleum (BP) [55]. Empirical analysis was carried out using GAUSS 10 and Stata 16 software. Table 1 presents the definitions and data sources of the variables.

Table 1. List of variables and data sources.

Variables	Abbreviation	Source
Carbon dioxide emissions (kilotons) **	CO ₂	BP, Statistical Review of World Energy
Primary energy use (kg of oil equivalent per capita)	EN	BP, Statistical Review of World Energy
Defense burden (military expenditure to GDP ratio, %)	ME	World Bank, WDI

Note: ** dependent variable.

Table 2 displays descriptive statistics. The standard deviation for CO₂ and EN are relatively higher due to larger differences between maximum and minimum values. The minimum values for CO₂, ME, and EN were observed in Luxembourg, while the maximum values for these variables by far were observed in the USA. It should also be noted that the variables were converted into natural logarithmic form to reduce the likelihood of skewness in the original data set in order to obtain more reliable statistical results.

Table 2. Descriptive statistics.

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
CO ₂	810	576.020	1210.372	8.025	5892.213
ME	810	2.576	1.383	0.420	9.417
EN	810	9.775	19.830	0.104	96.967

4.2. Model Structure and Estimation Strategy

In line with the aforementioned empirical studies that deal with the treadmill of destruction theory, we construct our baseline model in implicit functional form as follows:

$$\text{CO}_2 = f(\text{ME}, \text{EN}) \quad (1)$$

where CO₂ is carbon dioxide emissions, which are the proxy for the environmental degradation. The right-hand-side variable ME represents the defense burden, which is measured as the ratio of military expenditures to GDP, while EN is the proxy for primary energy use. Accordingly, the baseline specification is constructed in the following equation:

$$\text{CO}_{2it} = \beta_0 + \beta_1 \text{ME}_{it} + \beta_2 \text{EN}_{it} + u_{it} \quad (2)$$

where the indices *i* and *t* denote cross-sectional units and time periods, respectively. β_0 is the drift parameter, while β_1 and β_2 are the parameters to be estimated. u_{it} denotes the conventional idiosyncratic disturbance term, which follows the i. i. d. process. In line with the theoretical arguments that support the treadmill of destruction theory, we postulate that the defense burden (ME_{it}) and energy use (EN_{it}) are positively associated with carbon dioxide emissions (CO_{2it}). In other words, the hypothesis could be postulated as in the following:

- H₀: ME_{it} and EN_{it} positively and asymmetrically influence CO_{2it} .
- H₁: ME_{it} and EN_{it} do not have significant and asymmetric influence on CO_{2it} .

In this respect, we will estimate the relationship given in Equation (2) using linear and nonlinear panel ARDL methods. In this empirical investigation, we specifically focus on the symmetric and asymmetric effects of the defense burden on environmental degradation. By adding the positive and negative partial sums of the defense burden to the linear ARDL model, we can detect the potential effects on carbon emissions of changes in the defense burden. By performing long-term analysis in the ARDL model, the variables can be integrated at different orders. As pioneered by Shin et al. [56], asymmetric relationships among the variables can be examined within the scope of the ARDL model, which was

introduced by Pesaran et al. [57]. Thus, we assume the presence of symmetric effects using the following error correction model:

$$\begin{aligned} \Delta CO_{2it} = & \alpha_i + \gamma_{1i}CO_{2i,t-1} + \gamma_{2i}ME_{i,t-1} + \gamma_{3i}EN_{i,t-1} + \sum_{j=1}^k \delta_{1ij}\Delta CO_{2it-j} + \sum_{j=0}^k \delta_{2ij}\Delta ME_{it-j} \\ & + \sum_{j=1}^k \delta_{3ij}\Delta EN_{it-j} + \pi_{1i}\overline{\Delta CO}_{2t} + \pi_{2i}\overline{CO}_{2t-1} + \pi_{3i}\overline{ME}_{t-1} + \pi_{4i}\overline{EN}_{t-1} + \pi_{5i}\overline{\Delta ME}_t \\ & + \pi_{6i}\overline{\Delta EN}_t + \sum_{\lambda=2}^p \pi_{7i\lambda}\overline{\Delta CO}_{2t-\lambda} + \sum_{\lambda=1}^p \pi_{8i\lambda}\overline{\Delta ME}_{t-\lambda} + \sum_{\lambda=1}^p \pi_{9i\lambda}\overline{\Delta EN}_{t-\lambda} + u_{it} \end{aligned} \tag{3}$$

As argued by Ullah et al. [14], the main advantage of this setup emanates from the combination of the short-term and long-term effects into single equation [15]. In accordance with Eberhardt and Presbitero [58], the short-term effects are captured by the term Δ , which denotes the first differences of the relevant variable, whereas the bar notation denotes the cross-sectional means of relevant variables in Equation (3). The long-term dynamics are captured by the normalization of the estimates of γ_{2i} and γ_{3i} on γ_{1i} . Following Eberhardt and Presbitero [58] and Ullah et al. [15], to determine whether the defense burden has asymmetric effects on CO₂ emissions, we decoupled the defense burden into positive and negative partial sums using the following equations:

$$ME_{it}^+ = \sum_{j=1}^t \Delta ME_{ij}^+ = \sum_{j=1}^t \max(\Delta ME_{ij}, 0) \tag{4}$$

$$ME_{it}^- = \sum_{j=1}^t \Delta ME_{ij}^- = \sum_{j=1}^t \min(\Delta ME_{ij}, 0) \tag{5}$$

where ME_{it}^+ represents the positive partial sums of the defense burden and ME_{it}^- represents the negative partial sums of the defense burden. In this respect, by using Equations (4) and (5), an asymmetric error correction representation of Equation (3) is given as follows:

$$\begin{aligned} \Delta CO_{2it} = & \alpha_i + \omega_{1i}CO_{2i,t-1} + \omega_{2i}ME_{i,t-1}^+ + \omega_{3i}ME_{i,t-1}^- + \omega_{4i}EN_{i,t-1} \\ & + \sum_{j=1}^k \gamma_{1ij}\Delta CO_{2it-j} + \sum_{j=0}^k \gamma_{2ij}\Delta ME_{it-j}^+ + \sum_{j=0}^k \gamma_{3ij}\Delta ME_{it-j}^- + \sum_{j=1}^k \gamma_{4ij}\Delta EN_{it-j} + \tau_{1i}\overline{\Delta CO}_{2t} + \tau_{2i}\overline{CO}_{2t-1} \\ & + \tau_{3i}\overline{ME}_{t-1}^+ + \tau_{4i}\overline{ME}_{t-1}^- + \tau_{5i}\overline{EN}_{t-1} + \tau_{6i}\overline{\Delta ME}_t^+ \\ & + \tau_{7i}\overline{\Delta ME}_t^- + \tau_{8i}\overline{\Delta EN}_t + \sum_{\lambda=2}^p \tau_{9i\lambda}\overline{\Delta CO}_{2t-\lambda} + \sum_{\lambda=1}^p \tau_{10i\lambda}\overline{\Delta ME}_{t-\lambda}^+ + \sum_{\lambda=1}^p \tau_{11i\lambda}\overline{\Delta ME}_{t-\lambda}^- + \sum_{\lambda=1}^p \tau_{12i\lambda}\overline{\Delta EN}_{t-\lambda} + u_{it} \end{aligned} \tag{6}$$

where ω_{2i} , ω_{3i} , and ω_{4i} denote the long-term coefficients, the positive and negative partial sums of the defense burden, and energy use, respectively. In a similar vein, γ_{2ij} , γ_{3ij} , and γ_{4ij} denote the short-term coefficients, the positive and negative partial sums of the defense burden, and energy use, respectively. The existence of the long-term relationship is dependent only if ω_1 has a negative value. In order to determine whether asymmetric effects of the defense burden on environmental degradation exist, we test the null hypothesis $\omega_{2i} = \omega_{3i}$. Rejection of the null hypothesis indicates that the effects of the defense burden on environmental degradation tend to be asymmetric in the long term. Likewise, rejection of the null hypothesis $\gamma_{2ij} = \gamma_{3ij}$ indicates the presence of asymmetric effects of the defense burden on environmental degradation in the short term. For heterogeneous dynamic panel data models, Chudick and Pesaran [59] proposed the dynamic common correlated effects estimator (DCCE), through which we estimated the error correction models shown in Equations (3) and (6). The major superiority of the DCCE estimator lies in the fact that it generates efficient estimates not only in the presence of cross-sectional dependency (CD) and endogeneity, but also in the presence of heterogeneity among the slope coefficients. Furthermore, the consistency of the DCCE estimator stems from the inclusion of the lags of the cross-sectional means of each variable [60].

For investigation of the causal interplay between the variables, both symmetrically and asymmetrically, we employed the panel causality test developed by Dumitrescu and Hurlin [61], in which the CD and heterogeneity of the coefficients for each unit are also considered. The following equation represents the general form of the panel causality test.

$$Y_{it} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} Y_{it-k} + \sum_{k=1}^K \beta_i^{(k)} X_{it-k} + \varepsilon_{it} \quad (7)$$

Along with the estimation of causality between the variables both symmetrically and asymmetrically, the next session will be mainly devoted to the estimation of our NARDL model, represented by Equation (6).

5. Estimation Results

Through the aforementioned baseline specifications, our empirical analysis consists of four steps. We commence the empirical treatment by checking for slope homogeneity and CD; the relevant results are displayed in Table 3, where the upper part shows the results of homogeneity tests and the lower part shows the results of CD tests. As developed by Pesaran and Yamagata [62], the homogeneity tests firmly indicate the presence of heterogeneity by rejecting the null hypothesis of the homogeneity of the slope coefficients at a 1% significance level. In order to clarify whether cross-correlations among the variables exist, we performed CD and CD_{LM} tests, as introduced by Pesaran [63]. The results of CD tests clearly revealed the existence of cross-correlations among the variables by rejecting the null hypothesis of CD independency at a 1% significance level.

Table 3. Slope homogeneity and CD tests.

A-Homogeneity Tests	
$\tilde{\Delta}$ Test	$\tilde{\Delta}_{adj}$ Test
50.936 (0.000) ***	52.934 (0.000) ***
B-CD Tests	
CD Test	CD _{LM} Test
66.020 (0.000) ***	297.546 (0.000) ***

Notes: significance codes: *** $p < 0.01$. Source: authors' estimations based on World Bank and British Petroleum (BP) data.

Before proceeding to the symmetric and asymmetric panel ARDL analysis, we performed unit root tests to account for heterogeneity and CD, as pioneered by Pesaran [64]. Table 4 reports the results of the CADF and CIPS tests. The results firmly attest that the series are integrated at different orders. The series of CO₂ and ME become stationary by first differencing, whereas the series of EN is stationary at level, i.e., I (0). Thus, as argued by Pesaran et al. [57], it is feasible to utilize ARDL methodology in linear and nonlinear structures.

Table 5 provides the results of panel ARDL and panel NARDL estimates. The coefficient of the error correction term (EC) is negative in each estimate, indicating that there is a cointegration relationship between carbon dioxide emissions and other variables. According to the short-term symmetric panel ARDL estimation results, ΔEN and ΔME are positively associated with CO₂. However, in the long term, there is no significant interplay between the defense burden and CO₂ emissions, whereas primary energy use has a positive effect on CO₂ emissions. A 1% increase in EN exacerbates CO₂ emissions by 0.361. The right panel of Table 4 exhibits the estimation results of the panel NARDL model, in which we decoupled ME into positive and negative components to capture the effects of changes on carbon dioxide emissions. We also performed Wald tests so that the coefficients of ME⁺ and ME⁻ were identical to each other to determine the presence of an asymmetric relationship between the defense burden and CO₂ emissions. The long-term Wald test statistic (WLR) confirms the asymmetry in the defense burden by rejecting the

null hypothesis, in which the coefficients of ME^+ and ME^- are identical. In this respect, the short-term estimation results demonstrate that positive changes in the defense burden (ΔME^+) do not have a significant effect on carbon dioxide emissions. According to WSR, there is no asymmetric relation in the short term. However, negative changes in the defense burden tend to diminish carbon dioxide emissions. Hence, a 1% fall in ΔME^- leads to a decrease in CO_2 by 0.06%. In line with the symmetric ARDL analysis, the results of the NARDL model verify the distorting effect of rising energy use on environmental quality. A 1% increase in ΔEN tends to increase CO_2 by 0.962%. In a similar vein, the long-term asymmetric analysis confirmed the validity the ameliorative effects of a decreasing defense burden on environmental quality. Accordingly, a 1% fall in ME tends to alleviate CO_2 by 0.08%. On the other hand, the estimation results points out the positive effect of energy use on CO_2 emissions. In this respect, 1% rise in EN causes CO_2 to increase by 0.486%.

Table 4. Panel unit root tests.

	CADF Test			CIPS Test		
	I (0)	I (1)	Decision	I (0)	I (1)	Decision
CO_2	−2.498 (0.238)	−5.563 (0.000)***	I (1)	−2.609	−6.312***	I (1)
ME	−2.401 (0.392)	−4.887 (0.000)***	I (1)	−2.659	−6.163***	I (1)
EN	−2.738 (0.037)**	−4.879 (0.000)***	I (0)	−2.854**	−6.268***	I (0)

Note: significance codes: *** $p < 0.01$ and ** $p < 0.05$. Critical values at 1%, 5%, and 10% significance levels for both tests are −2.93, −2.76, and −2.66, respectively. Source: authors' estimations based on World Bank and British Petroleum (BP) data.

Table 5. Panel ARDL and panel NARDL results.

Variable	Dependent Variable: CO_2			
	ARDL		NARDL	
	Coefficient	p -Value	Coefficient	p -Value
Short term				
ΔME^+			0.0888	0.207
$\Delta ME^+ (-1)$			0.0590	0.343
ΔME^-			0.0413	0.258
$\Delta ME^- (-1)$			0.0601	0.090*
ΔEN	0.9217	0.000***	0.9622	0.000***
$\Delta EN (-1)$	−0.0491	0.567		
ΔME	0.0481	0.065*		
$\Delta ME (-1)$	0.0322	0.258		
Long term				
ME^+			0.0197	0.647
ME^-			−0.0876	0.001***
EN	0.3617	0.000***	0.4867	0.000***
ME	−0.0355	0.125		
Diagnostic tests				
$EC (-1)$	−0.3746	0.000***	−0.4854	0.000***
Kao cointegration test	−3.8003	0.001***	−4.1560	0.000***
WLR			11.34	0.0009***
WSR			0.30	0.5859

Note: significance codes: *** $p < 0.01$ and * $p < 0.1$. WLR indicates long-term asymmetry test. WSR indicates short-term asymmetry test. Source: authors' estimations based on World Bank and British Petroleum (BP) data.

We finish the empirical analysis by investigating the causal interplay among the variables. The left panel of Table 6 shows the results of the symmetric causality tests, whereas the right panel shows the results of the asymmetric causality tests. The results of the symmetric causality tests demonstrate that unidirectional causality exists from ME to CO_2 and EN to CO_2 , clearly rejecting the null hypotheses at 10% and 5% significance

levels, respectively. To address the asymmetric effects of the defense burden, we examine the causal relationships between the positive and negative components of ME and each variable. In line with the results of the panel NARDL analysis, unidirectional causality is present from ME^- to CO_2 . To this end, the null hypothesis of ME^- does not cause CO_2 is rejected at a 10% significance level. Finally, it should also be noted that there is no evidence of causality from CO_2 and EN to positive or negative changes in ME.

Table 6. Symmetric and asymmetric panel causality tests.

Symmetric Causality				Asymmetric Causality			
Direction	$W_{\text{bar-Stat.}}$	$Z_{\text{bar-Stat.}}$	Prob.	Direction	$W_{\text{bar-Stat.}}$	$Z_{\text{bar-Stat.}}$	Prob.
ME → CO_2	3.408	6.596	0.063 ***	$ME^+ \rightarrow CO_2$	2.893	5.186	0.148
EN → CO_2	3.967	8.126	0.020 **	$ME^- \rightarrow CO_2$	3.715	7.435	0.067 ***
$CO_2 \rightarrow ME$	2.411	3.866	0.167	$CO_2 \rightarrow ME^+$	1.565	1.548	0.547
$CO_2 \rightarrow EN$	1.729	1.996	0.512	$CO_2 \rightarrow ME^-$	1.429	1.177	0.471
ME → EN	1.204	0.559	0.823	$ME^+ \rightarrow EN$	1.092	0.252	0.924
EN → ME	2.140	3.122	0.350	$ME^- \rightarrow EN$	1.497	1.361	0.652
				EN → ME^+	1.413	1.131	0.724
				EN → ME^-	0.894	−0.287	0.896

Note: significance codes: *** $p < 0.01$ and ** $p < 0.05$. Source: authors' calculations based on World Bank and British Petroleum (BP) data.

6. Discussion

Overall, our findings tend to support the findings of other empirical studies that address this issue for a panel of countries over various time spans [34,35,45–47,50–52]. Furthermore, our findings are in conformity with empirical studies validating the treadmill of destruction theory in the context of individual countries [15,39–41,43]. Thus, in line with the majority of the empirical literature, our findings reveal the validity of the so-called “treadmill of destruction” theory. Aligning with principle of the theory that countries with more labor-intensive and cutting-edge technologies demand more natural resources, our findings show that reductions in military outlays tend to diminish pressure on the environment. Since its establishment, NATO has taken various actions to mitigate pressure on the environment and natural resources due to the potential threat of climate change. The earliest example of this was the establishment of CCMS to initiate and support studies and fellowships to deal with all forms of pollution and the disposal of hazardous waste. These essential actions have been accelerated by the turn of the new millennium, with rapidly growing interest in the climate change and environmental concerns and the initiatives of the UN.

In 2006, CCMS introduced the Science for Peace and Security Plan to execute initiatives dealing with environmental security challenges. Among the most notable examples of this is the Smart Energy Initiative, which promoted energy efficiency and innovative technologies to maintain the operations of the alliance. In addition, the “Green Defense Framework” was ratified by the member states at the Wales Summit in 2014. Since all members of the alliance are involved in both the United Nations Framework Convention on Climate Change and the Paris Agreement, the member states are eager to achieve the target of limiting global warming to 2 or 1.5 degrees Celsius above pre-industrial levels [11,12]. Thus, within NATO, there is a growing tendency to implement innovative and eco-friendly technologies to reduce carbon dioxide and other greenhouse gas emissions through the individual efforts of member states. The majority of members tend to replace obsolete technology with eco-innovative technologies, and tend to reduce the military outlays for the purchase of emissions-producing arms products. Another factor that potentially supports our findings is the restrictions and regulations on carbon emissions within member countries. The countries in the sample are considered to be either high income or upper-middle income. Furthermore, the majority of the sample consists of EU members, for whom regulations on carbon and other greenhouse emissions are relatively strict for producers and suppliers

compared to the rest of the world. Therefore, arms producers are also influenced by regulations that potentially compel the use of eco-innovative technologies.

7. Conclusions

Climate change is a major challenge for the global economy. Rapid industrialization has caused the exploitation and disposal of natural resources to grow at an unprecedented pace compared to the early industrialization period. The flagrant waste of resources is a major potential risk for sustainable development. However, focusing only on sustainable development would not be an appropriate approach either, since peace and security for countries is also essential. In this respect, it becomes inevitable that countries to allocate some of their resources to the defense sector. Furthermore, tensions between and within countries drive them to arms races, resulting in the allocation of scarce resources to inefficient areas. This situation is known as the famous phenomenon of “butter versus guns” in the field of defense economics. The arms races and increase in military outlays mean not only the transfer of scarce resources to the arms industry, but also increases in energy consumption and the use of natural resources for the production and use of defense products. While the direct environmental effects of militarization such as bombing and destruction manifest themselves in the short term, effects such as the reduction in forests, pollution of soil and water, decreases in production, and waves of migration manifest themselves in the long term. Thus, the association between militarization and environmental degradation should be assessed in the long term.

In light of this information, this particular study deals the asymmetric effects of the defense burden on environmental degradation for fifteen countries within NATO, which is a major power in the global context in terms human resources, logistics, and technology. In line with the majority of empirical studies in the literature, our findings support the treadmill of destruction theory. Accordingly, a negative change in the defense burden has a retarding effect on carbon dioxide emissions in the long term. Furthermore, a unidirectional causal relationship exists between negative changes in the defense burden and carbon dioxide emissions.

The treadmill of destruction theory is tested by novel methods and confirmed asymmetrically; this creates the opportunity to better comprehension the link between militarization, environment, and sustainable development. Although it is widely accepted that countries with more labor-intensive and advanced technologies demand more natural resources, the findings for the countries investigated within the scope of this study show that as military expenditure decreases, pressure on the environment also decreases. Allocating significant budgetary resources to defense expenditure in extraordinary times as wars, coups, or natural catastrophe increases air pollution, as well as environmental waste. These findings draw attention to the high level of defense expenditure in the long-term and reveal that resources become scarcer as a result of shifting existing productive resources to inefficient fields such as defense. This resource transfer process both reduces efficiency and creates problems in terms of sustainability.

In connection with these findings, studies carried on the nexus of environment and militarization in the last ten years has been partially successful. It could be argued that initiatives aimed at reducing carbon emissions and other greenhouse emissions have been effective in recent decades. Furthermore, most of NATO countries are parties to vital agreements on environmental sustainability and the reduction in the adverse impacts of climate change and greenhouse gas emissions. Thus, they are also regarded as pioneers in these terrains. The fact that some of the countries included in the sample are important arms producers and exporters at the global scale might affect not only production technology, but also the military outlays that are made over old conventional arms products. Nevertheless, the existence of standards regarding the environment and energy consumption in the EU member states of NATO might potentially affect this situation.

The subject discussed in our study helps shed light on current practices and to develop policy recommendations for defense expenditure within the framework of a sustainable

development model in the future. Ensuring the usage of environmentally-friendly policies on defense technologies that avoid the consumption of fossil fuels may have a mitigating effect on environmental pollution. Through these policies, foreign dependency can also be decreased, paving the way for countries to be more active and effective politically. Awareness that increased defense expenditure in extraordinary times can increase air pollution and environmental waste can also aid in effective planning before these situations occur. Furthermore, the implementation of green growth policies can reduce the possible negative impacts of economic growth in terms of environmental pollution. NATO's future agenda includes ensuring the security and territorial integrity of member states, as well as taking action against climate change. It is inevitable that, using obsolete and less-sensitive technologies to environment, make defense activities gradually less effective. Therefore, using non-innovative and environmentally-friendly technologies also put pressure on scarce natural resources that are at risk of depletion. Thus, investments in renewable energy resources should also be given priority in how NATO members allocate resources for common defense. Actions taken within the "Green Defense Framework" developed at the Wales Summit in 2014 can also contribute to the creation of new employment opportunities and alleviate the concerns of countries regarding their economic growth while ensuring sustainability. In addition, while these actions are carried out, NATO should focus attention on minimizing conflicts of interest among members, enacting joint decision-making mechanisms, and developing relations in a peaceful framework.

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Appendix A

Table A1. List of countries.

List of Countries *	Date of Membership
Belgium	1949
Canada	1949
Denmark	1949
France	1949
Germany	1955
Greece	1952
Italy	1949
Luxembourg	1949
Netherlands	1949
Norway	1949
Portugal	1949
Spain	1982
Turkey	1952
United Kingdom	1949
United States of America	1949

Note: * countries are shown in alphabetical order.

References

- Panwar, N.L.; Kaushik, S.C.; Kothari, S. Role of Renewable Energy Sources in Environmental Protection: A Review. *Renew. Sust. Energ. Rev.* **2011**, *15*, 1513–1524. [CrossRef]
- United Nations Environment Program (UNEP). *Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer*; UNEP: Nairobi, Kenya, 2016.
- Newell, P. *The Kyoto Protocol and Beyond: The World after 2012*; United Nations Human Development Reports; Occasional Paper, No. 2007/37; United Nations Development Programme: New York, NY, USA, 2007.
- United Nations. Paris Agreement. Available online: <https://www.un.org/en/climatechange/paris-agreement> (accessed on 20 May 2022).
- Perea-Moreno, A.J. Renewable Energy and Energy Saving Worldwide Research Trends. *Sustainability* **2021**, *13*, 13261. [CrossRef]
- Qiu, S.; Lei, T.; Wu, J.; Bi, S. Energy Demand and Supply Planning of China through 2060. *Energy* **2021**, *234*, 121193. [CrossRef]
- Intergovernmental Panel on Climate Change (IPCC). AR5 Climate Change: Mitigation of Climate Change 2014. Available online: <https://www.ipcc.ch/report/ar5/wg3/> (accessed on 20 May 2022).
- United Nations. Global Sustainable Development Report 2019. Available online: <https://sustainabledevelopment.un.org/globalsdreport/2019> (accessed on 20 May 2022).
- World Commission on Environment and Development. Report of World Commission on Environment and Development: Our Common Future 1987. Available online: <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf> (accessed on 14 April 2022).
- Stockholm International Peace and Research Institute. SIPRI Yearbook 2021: Armaments, Disarmament and International Security 2021. Available online: <https://www.sipri.org/yearbook/2021> (accessed on 14 April 2022).
- North Atlantic Treaty Organization (NATO). Handbook on Long Term Defense Planning 2021. Available online: <https://apps.dtic.mil/sti/citations/ADA414193> (accessed on 14 April 2022).
- North Atlantic Treaty Organization (NATO). NATO Climate Change and Security Action Plan 2021. Available online: https://www.nato.int/cps/en/natohq/official_texts_185174.htm (accessed on 14 April 2022).
- North Atlantic Treaty Organization (NATO). Brussels Submit Communiqué 2021. Available online: https://www.nato.int/cps/en/natohq/news_185000.htm (accessed on 17 December 2022).
- International Energy Agency (IEA). Global Energy Review 2021: CO Emissions 2022. Available online: <https://www.iea.org/reports/global-energy-review-2021/CO-emissions> (accessed on 14 April 2022).
- Ullah, S.; Andlib, Z.; Majid, M.T.; Sohail, S.; Chishti, M.Z. Asymmetric Effects of Militarization on Economic Growth and Environmental Degradation: Fresh evidence from Pakistan and India. *Environ. Sci. Pollut. Res.* **2021**, *28*, 9484–9497. [CrossRef] [PubMed]
- Shahbaz, M.; Shabbir, M.S.; Butt, M.S. Does military spending explode external debt in Pakistan? *Defence Peace Econ.* **2016**, *27*, 718–741. [CrossRef]
- Jorgenson, A.K. Unpacking International Power and the Ecological Footprints of Nations: A Quantitative Cross-National Study. *Soc. Perspect.* **2005**, *48*, 383–402. [CrossRef]
- Roberts, J.T.; Grimes, P.E.; Manale, J.L. Social Roots of Global Environmental Change: A World System Analysis of Carbon Dioxide Emissions. *J. World-Syst. Res.* **2003**, *9*, 277–315. [CrossRef]
- Crawford, N.C. Pentagon Fuel Use, Climate Change and the Cost of War. Brown University Watson Institute Cost of War Working Paper. 2019. Available online: <https://watson.brown.edu/costsofwar/files/cow/imce/papers/Pentagon%20Fuel%20Use%2C%20Climate%20Change%20and%20the%20Costs%20of%20War%20Revised%20November%202019%20Crawford.pdf> (accessed on 14 April 2022).
- European Defense Agency (EDA). Defense Energy Data 2016 & 2017. 2017. Available online: <https://eda.europa.eu/docs/default-source/eda-factsheets/2019-06-07-factsheet-energy-defense> (accessed on 4 May 2022).
- United Nations Environment Program (UNEP). Greening the Blue Helmets. 2012. Available online: <http://staging.unep.org/disastersandconflicts/Introduction/EnvironmentalCooperationforPeacebuilding/GreeningtheBlueHelmetsReport/tabid/101797/Default.aspx> (accessed on 5 May 2022).
- Hveem, H. Militarization of Nature: Conflict and Control over Strategic Resources and Some Implications for Peace Policies. *J. Peace Res.* **1979**, *16*, 1–26. [CrossRef]
- Kick, E.L.; Byron, L.; Davis, D.K.; Thomas, J.B. A Cross-National Analysis of Militarization and Well-Being Relationships in Developing Countries. *Soc. Sci. Res.* **1998**, *27*, 351–370. [CrossRef]
- Jorgenson, A.K. Consumption and Environmental Degradation: A Cross-National Analysis of the Ecological Footprint. *Soc. Probl.* **2003**, *50*, 374–394. [CrossRef]
- Gould, K.A. The Ecological Costs of Militarization. *Peace Rev.* **2007**, *19*, 331–334. [CrossRef]
- Gould, K.A.; Pellow, D.N.; Schnaiberg, A. Interrogating the Treadmill of Production: Everything You Wanted to Know About the Treadmill, But Were Afraid to Ask. *Organ. Environ.* **2004**, *17*, 296–316. [CrossRef]
- Hooks, G.; Smith, C.L. The Treadmill of Destruction: National Sacrifice Areas and Native Americans. *Am. Sociol. Rev.* **2004**, *69*, 558–575. [CrossRef]
- Hooks, G. Treadmills of Production and Destruction: Threats to the Environment Posed by Militarism. *Organ. Environ.* **2005**, *18*, 19–37. [CrossRef]

29. Clark, B.; Jorgenson, A.K. The Treadmill of Destruction and the Environmental Impacts of Militaries. *Sociol. Compass* **2012**, *6*, 557–569. [CrossRef]
30. Givens, J.E. Global Climate Change Negotiations, the Treadmill of Destruction, and World Society. *Int. J. Sociol.* **2014**, *44*, 7–36. [CrossRef]
31. Islam, S.; Hossain, I. The Global Treadmill of Production and the Environment. In *Social Justice in the Globalization of Production*; Islam, S., Hossain, I., Eds.; Palgrave Macmillan: London, UK, 2015; pp. 144–158. ISBN 978-1-137-43401-2.
32. Smith, C.L.; Lengefeld, M.R. The Environmental Consequences of Asymmetric War: A Panel Study of Militarism and Carbon Emissions, 2000–2010. *Armed Forces Soc.* **2020**, *46*, 214–237. [CrossRef]
33. Schnaiberg, A. *The Environment: From Surplus to Scarcity*; Oxford University Press: New York, NY, USA, 1980; ISBN 978-0195026115.
34. Jorgenson, A.K.; Clark, B. The Economy, Military, and Ecologically Unequal Exchange Relationships in Comparative Perspective: A Panel Study of the Ecological Footprints of Nations, 1975–2000. *Soc. Probl.* **2009**, *56*, 621–646. [CrossRef]
35. Jorgenson, A.K.; Clark, B.; Kentor, J. Militarization and the Environment: A Panel Study of Carbon Dioxide Emissions and the Ecological Footprints of Nations, 1970–2000. *Glob. Environ. Polit.* **2010**, *10*, 7–29. [CrossRef]
36. Clark, B.; Jorgenson, A.K.; Kentor, J. Militarization and Energy Consumption: A Test of Treadmill of Destruction Theory in Comparative Perspective. *Int. J. Sociol.* **2010**, *40*, 23–43. [CrossRef]
37. Reis, J.; Rosado, D.P.; Cohen, Y.; Pousa, C.; Cavalieri, A. Green Defense Industries in the European Union: The Case of the Battle Dress Uniform for Circular Economy. *Sustainability* **2022**, *14*, 13018. [CrossRef]
38. Reuveny, R.; Mihallache-O’Keef, A.S.; Li, Q. The Effect of Warfare on the Environment. *J. Peace Res.* **2010**, *47*, 749–761. [CrossRef]
39. Bildirici, M.E. The Causal Link among Militarization, Economic Growth, CO Emission, and Energy Consumption. *Environ. Sci. Pollut. Res.* **2017**, *24*, 4625–4636. [CrossRef] [PubMed]
40. Bildirici, M.E. The Effects of Militarization on Biofuel Consumption and CO Emission. *J. Clean. Prod.* **2017**, *152*, 420–428. [CrossRef]
41. Solarin, A.A.; Al-Mulali, U.; Ozturk, I. Determinants of Pollution and the Role of the Military Sector: Evidence from a Maximum Likelihood Approach with Two Structural Breaks in the USA. *Environ. Sci. Pollut. Res.* **2018**, *25*, 30949–30961. [CrossRef]
42. Ahmed, Z.; Zafar, M.W.; Mansoor, S. Analyzing the Linkage between Military Spending, Economic Growth and Ecological Footprint in Pakistan: Evidence from Cointegration and Bootstrap Causality. *Environ. Sci. Pollut. Res.* **2020**, *27*, 41551–41567. [CrossRef]
43. Gokmenoglu, K.K.; Taspinar, N.; Rahman, M.M. Military Expenditure, Financial Development and Environmental Degradation in Turkey: A Comparison of CO Emissions and Ecological Footprint. *Int. J. Finance Econ.* **2021**, *26*, 986–997. [CrossRef]
44. Wang, K.H.; Su, C.W.; Lobont, O.R.; Umar, M. Whether Crude Oil Dependence and CO₂ Emissions Influence Military Expenditure in Net Oil Importing Countries? *Energy Policy* **2021**, *153*, 112281. [CrossRef]
45. Erdogan, S.; Gedikli, A.; Cevik, E.I.; Oncu, M.A. Does Military Expenditure Impact Environmental Sustainability in Developed Mediterranean Countries? *Environ. Sci. Pollut. Res.* **2022**, *29*, 31612–31630. [CrossRef]
46. Ben Afia, N.; Harbi, S. The Relationship between Military Expenditure, Military Personnel, Economic Growth, and the Environment. *Int. J. Econ. Manag. Eng.* **2016**, *10*, 1059–1064.
47. Bildirici, M.E. CO Emissions and Militarization in G7 Countries: Panel Cointegration and Trivariate Causality Approaches. *Environ. Dev. Econ.* **2017**, *22*, 771–791. [CrossRef]
48. Bradford, J.H.; Stoner, A.M. The Treadmill of Destruction in Comparative Perspective: A Panel study of Military Spending and Carbon Emissions, 1960–2014. *J. World-Syst. Res.* **2017**, *23*, 298–325. [CrossRef]
49. Ben Afia, N.; Harbi, S. The Relationship between CO Emissions and Military Effort. *J. Econ. Res.* **2018**, *2018*, 342225. [CrossRef]
50. Domguia, N.E.; Poumie, B. Economic Growth, Military Spending and Environmental Degradation in Africa. Munich Personal REPEC Working Paper No. 97455. 2019. Available online: https://mpra.ub.uni-muenchen.de/97455/1/MPPRA_paper_97455.pdf (accessed on 14 May 2022).
51. Zandi, G.; Haseeb, M.; Abidin, I.S.Z. The Impact of Democracy, Corruption and Military Expenditure on Environmental Degradation: Evidence from Top Six ASEAN Countries. *Humanit. Soc. Sci. Rev.* **2019**, *7*, 333–340. [CrossRef]
52. Qayyum, U.; Anjum, S.; Sabir, S. Armed Conflict, Militarization and Ecological Footprint: Empirical Evidence from South Asia. *J. Clean. Prod.* **2020**, *281*, 125299. [CrossRef]
53. Dudzevičūtė, G.; Bekesien, S.; Meidute-Kavaliauskiene, I.; Ševčenko-Kozlovsk, G. An Assessment of the Relationship between Defence Expenditure and Sustainable Development in Baltic Countries. *Sustainability* **2021**, *13*, 6916. [CrossRef]
54. World Bank. World Development Indicators Database. Available online: <https://www.databank.worldbank.org> (accessed on 20 September 2021).
55. British Petroleum. Statistical Review of World Energy Database. Available online: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html> (accessed on 20 September 2021).
56. Shin, Y.; Yu, B.; Greenwood-Nimmo, M. Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. In *Festschrift in Honor of Peter Schmidt*; Sickles, R., Horrace, W., Eds.; Springer: New York, NY, USA, 2014; pp. 281–314. ISBN 978-1-4899-8008-3.
57. Pesaran, M.H.; Shin, Y.; Smith, R.J. Bounds Testing Approaches to the Analysis of Level Relationships. *J. Appl. Econ.* **2001**, *16*, 289–326. [CrossRef]
58. Eberhardt, M.; Presbitero, A.F. Public Debt and Growth: Heterogeneity and Non-Linearity. *J. Int. Econ.* **2015**, *97*, 45–58. [CrossRef]

59. Chudick, A.; Pesaran, M.H. Common Correlated Effects Estimation of Heterogeneous Dynamic Panel Data Models with Weakly Exogenous Regressors. *J. Econom.* **2015**, *188*, 393–420. [[CrossRef](#)]
60. Ditzén, J. Estimating Dynamic Common-Correlated Effects in Stata. *Stata J.* **2018**, *18*, 585–617. [[CrossRef](#)]
61. Dumitrescu, E.I.; Hurlin, C. Testing for Granger Non-Causality in Heterogeneous Panels. *Econ. Model.* **2012**, *29*, 1450–1460. [[CrossRef](#)]
62. Pesaran, M.H.; Yamagata, T. Testing Slope Heterogeneity in Large Panels. *J. Econom.* **2008**, *142*, 50–93. [[CrossRef](#)]
63. Pesaran, M.H. General Diagnostic Tests for Cross Section Dependence in Panels. IZA Discussion Paper, No. 1240. 2004. Available online: <https://docs.iza.org/dp1240.pdf> (accessed on 20 September 2021).
64. Pesaran, M.H. A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence. *J. Appl. Econ.* **2007**, *22*, 265–312. [[CrossRef](#)]

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Article

A Comprehensive Model for Developing SME Net Zero Capability Incorporating Grey Literature

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Abstract: SMEs collectively account for a significant proportion of greenhouse gas emissions and so there is a need for urgent action to be taken by SMEs in the journey to achieve net zero. In this article, we provide a comprehensive conceptual framework for SMEs to draw from in the journey towards net zero by synthesizing the academic and grey literature. By bringing together key strands of the literature, we derive a conceptual model that provides a clear pathway for SMEs to embark on their net zero journeys. The framework we invent involves understanding the position of the SME in the value chain, understanding the pressures from stakeholders, undertaking greenhouse gas accounting to measure current levels of carbon emissions, undertaking internal changes towards the net zero agenda, undertaking external facing changes towards the net zero agenda, uncoupling, community participation, and updating business activities regularly. This model acts as a progressive decision-making and continuous improvement framework that will be an asset to SMEs as they undertake net zero activities. Overall, the paper contributes to the sustainability literature by being the first to synthesize the academic and grey literature to develop a comprehensive conceptual framework for SMEs to attain net zero.

Keywords: net zero; SMEs; sustainability; climate change; enterprises; grey literature; greenhouse gases; emissions

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1. Introduction

To keep the rise in global average temperatures within certain limits, science implies that there is a finite budget of carbon dioxide that is allowed into the atmosphere, alongside other greenhouse gases [1]. It is for this reason that around 197 countries have agreed to limit global warming to below 2 °C and to make efforts to limit global warming to 1.5 °C under the Paris Agreement. They include China, the countries of the European Union and the United States, the world's three largest greenhouse gas emitters [1]. Meeting the 1.5 °C goal with a fifty per cent probability translates into a remaining carbon budget of 400–800 GtCO₂. Staying within this carbon budget requires CO₂ emissions to peak before 2030 and fall to net zero by around 2050 [1,2].

Beyond this, any further carbon release must be balanced by removal into sinks [3]. This is because of the monotonic, positive and near-linear relationship between cumulative net anthropogenic CO₂ emissions and CO₂-induced surface warming [1,4]. The consequence of this result is that CO₂-induced warming halts when net anthropogenic CO₂ emissions halt (i.e., CO₂ emissions reach net zero) [5]. Thus, to turn net zero into a useful frame of reference for various decision makers, the global carbon constraint needs to be translated into individual decarbonisation pathways for nations.

The term “net zero” (or ‘carbon neutrality’) is used to refer to a state where, in broad terms, the level of CO₂ and equivalent emissions released into the atmosphere is balanced by that being removed or securely stored. In other words, net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount

removed from the atmosphere [6,7]. The UK definition of a small to medium enterprise (SME) is generally any organisation that has fewer than 250 employees and a turnover of less than €50 million or a balance sheet total of less than €43 million [8].

The UK aims to decarbonise all sectors of its economy and reduce CO₂ emissions to net zero by 2050 [9,10]. Achieving net zero by 2050 will require a transformation of business across the UK. To this end, SMEs must play a vital role in sustainability because of their significance to the UK economy. Accounting for 99 per cent of all UK businesses, SMEs are crucial to whether the UK meets this 2050 net zero target. SMEs are the backbone of the UK economy, generating 52 per cent of annual UK GDP [8]. SMEs also account for three-fifths of employment and half of the total turnover of the UK's private sector.

SMEs collectively account for around half (43–53%) of greenhouse gas emissions by UK businesses [10]. When households and the public sector are added to the mix, SMEs account for around a third (29–36%) of total UK emissions [10]. The most greenhouse gas (GHG)-intensive industries in the UK are energy supply, agriculture, water supply, mining, transport, and manufacturing (ONS,2019). Greenhouse gases are gases in the earth's atmosphere that trap heat in the atmosphere. The seven direct greenhouse gases under the Kyoto Protocol include; (1) Carbon dioxide (CO₂), (2) Methane (CH₄), (3) Nitrous oxide (N₂O), (4) Hydrofluorocarbons (HFCs), (5) Perfluorocarbons (PFCs), (6) Sulphur hexafluoride (SF₆), and (7) Nitrogen trifluoride (NF₃), [9]. CO₂ (the biggest contributor to climate change) accounts for about 79% of all U.S. greenhouse emissions, Methane accounts for 11%, Nitrous Oxide accounts for 7%, and Fluorinated Gases account for 3% [11].

SMEs have a huge task and opportunity to help the UK meet its net zero 2050 target and understanding how their current activities contribute to carbon emissions and what needs to be done to meet the net zero target is vital if the UK is to achieve net zero by 2050. The UK is a principal actor in the net zero discussion because the industrial revolution started in the UK and soon spread to the rest of the world, including the United States [12]. As industrialisation spread, CO₂ emissions naturally increased [13]. In this regard, it is not possible to ignore the aggregate impact of SMEs on CO₂ emissions. SMEs can not only reduce their emissions; they can also have an important indirect influence on the climate agenda through their influence on other actors, including suppliers, customers, and other organisations [14].

In this article, we contribute to the extant literature by providing a comprehensive conceptual framework for SMEs to draw from in their net zero transitions. We do this by synthesizing commonalities across SME operations primarily in the UK, but also often drawing from other relevant contexts and kneading together the academic literature and non-academic perspectives from the grey literature. The research objectives for this paper are given below:

- Research objective 1: To determine what the barriers that prevent SMEs from engaging in net zero activities are based on the academic and grey literature.
- Research objective 2: To determine what the drivers for SMEs to engage in net zero activities are based on the academic and grey literature.
- Research objective 3: To derive a conceptual framework to help SMEs achieve net zero capability based on the academic and grey literature.

Our motivation for this paper is to bring the grey literature into the academic literature on SME net zero activities. Grey literature can broaden the scope of literary analysis to include more recent and relevant studies, thereby providing a more complete assessment of available evidence [15–17]. Grey literature is a field in library and information science that deals with the production, distribution, and access to multiple document types produced on all levels of government, academics, business, and organization in electronic and print formats not controlled by commercial publishing i.e., where publishing is not the primary activity of the producing body [18,19].

Grey literature is produced at all levels of academia, business, government, and industry in print and electronic formats not controlled by commercial publishers [20]. Grey literature can include academic papers, conference papers and abstracts, discussion papers,

government reports, committee reports, newsletters, conference proceedings, program evaluation reports, standards/best practice documents, technical specifications and standards, and working papers [21]. Grey literature is troublesome to search and locate because there are no central sources, such as libraries or databases, where it is collected or housed. It thus requires considerable time and effort to locate [15–17].

Despite the difficulty in locating grey literature, purely empirical research-based reviews and papers have been criticized for their inability to provide meaningful conclusions about complex interventions and a national or regional context for differences in implementation [20,22]. It is for this reason that reviewing grey literature is preferred in the case of complexity in intervention and outcomes as is the case concerning SMEs and their net zero activities. Often, variations in outcomes cannot be explained by only reviewing empirical academic research-based studies because the actual mechanisms occurring within the intervention and useful ideas about the implementation of interventions are habitually not described [22,23]. In addition, there could be a lack of consensus, low volume and quality of evidence, complex outcomes and interventions, and important contexts for implementing interventions [20]. Such factors may be critical to support policy and program decisions regarding how SMEs can help to achieve net zero [22,24].

This paper is unique because it proposes an implementation framework for SMEs to implement their net zero strategies based on the academic and grey literature. Since this domain is not well researched within academia, this study develops an understanding of the multi-criteria relationships for SME decision making when implementing net zero activities. The rest of the paper proceeds as follows: we review the extant academic literature and then explain our materials and methods before discussing key themes that highlight the barriers and drivers for SMEs who wish to engage with the net zero agenda. We then build and explain our framework based on the academic and grey literature and then conclude.

2. Literature Review

The extant literature suggests that SMEs play a crucial and pivotal role in the reduction of carbon emissions and in addressing climate change [6,25–27]. For example, research argues that because SMEs account for 13% of global energy usage, there is a need for SMEs to take a proactive approach to contribute to reducing global carbon emissions [28].

However, many SMEs are still dominated by a very narrow world view which is primarily framed around economic growth as opposed to the contribution of their economic activities to climate change and global carbon emissions [2,26,29]. Within this context, the achievement of net zero capabilities is also being applied in a community where critical values around environmental protection are personal [6,28,30,31]. This makes the process challenging as the focus now shifts to SME behaviours and characteristics alongside external influences [32,33]. It follows that SMEs can generate net zero capability by implementing a range of strategies that reduce greenhouse gas (GHG) emissions and contribute to sustainable development. We conduct a thematic review of some examples of these strategies next.

2.1. Measuring and Managing Carbon Emissions

One element which can be used by SMEs to answer the economic problem and to change their views on the climate issue is proper measuring and managing of carbon emissions to ensure that adequate importance is given to reducing emissions. Firstly, the measuring of carbon emissions helps SMEs realise what their GHG footprint is. This does, however, come with its challenges as active monitoring will be required so that SMEs can balance between carbon emissions and the amount they offset [29]. Thus, the key aspect at this point is SMEs need to undertake an audit of their current climate footprint which will act as a benchmark for the carbon offset. Any such benchmark must take into account all emissions associated with traditional business operations including energy consumption, transportation, and waste [28].

Secondly, the process of change is not without its challenges and in the context of climate change and global footprints, many SMEs might need to go through a process of digital transformation [34,35]. This process of transformation includes adopting new technologies and systems that enable better tracking and reporting. In developing a process of measurement and management, SMEs can also measure their GHG emissions using tools such as the GHG Protocol, and then set targets for reducing them. After GHG emissions have been measured, they can then be managed using insights gained during the measurement phase. Overall, SMEs can benefit from cost savings, increased competitiveness, and improved reputation by measuring and managing their carbon emissions [2].

2.2. Adopting Renewable Energy Sources

SMEs can reduce their carbon footprint by using renewable energy sources such as solar, wind, or hydropower. To reduce their global GHG footprint, there is also an onus on SMEs to adopt renewable energy sources because SMEs account for 13% of global energy usage [28]. Technologies which can harness solar, wind and geothermal power offer significant advantages in reducing GHG footprints compared to traditional fossil fuels [36–38]. This reduction in footprint can also lead to other benefits; for example, the installation of solar panels or wind turbines on roofs or premises can act as a catalyst to generate electricity cleanly and efficiently, lowering operating costs and reducing reliance on grid power [6,33,39].

This approach towards renewable energy can also act as a marketing platform and can focus on environmentally conscious customers. While the benefits of adopting a net zero strategy are many, there are still considerable challenges which organisations need to consider when employing renewable energy, mainly upfront costs. These upfront costs may be a challenge for some SMEs. Investigating financial possibilities, such as grants and loans, that assist the development of renewable energy sources is one way to surmount this problem [30,40]. Joining community solar programmes or renewable energy cooperatives, which offer access to renewable energy sources without the need for substantial capital commitments, is a more creative solution to this problem for SMEs [6,41]. Renewable energy is becoming increasingly cost competitive and can provide a stable source of energy for SMEs [26,33,42].

2.3. Improving Energy Efficiency

SMEs can also reduce their energy consumption and emissions by improving the energy efficiency of their buildings and equipment. This can include measures such as upgrading insulation, installing energy-efficient lighting and appliances, and optimizing heating and cooling systems [2]. Research also suggests that there are many ways for SMEs to improve efficiency to minimise carbon footprints [28,33]. For many SMEs, the focus on improving energy efficiency is a key business strategy with targets set by the central government [31,43]. With minimal up-front costs, the implementation of such a strategy is a low-risk approach to a fundamental problem [44]. The benefits of such an approach allow SMEs to decrease their energy usage, operational expenses, and carbon footprint without having the huge upfront costs of installing renewable technology.

SMEs can improve their energy efficiency through a variety of mechanisms and methods. One example is conducting an energy audit, which is useful for identifying areas of waste and expense. This may entail locating inefficient lighting systems, obsolete heating and cooling systems, and other energy-intensive equipment [45]. The other approach is more holistic and companywide, involving education and support for all stakeholders. This requires educating people about energy-saving practises and changing their behaviour to improve efficiency. Simple actions such as turning off lights and appliances when not in use and encouraging employees to take public transportation, ride their bikes, or carpool can help reduce energy consumption and carbon emissions [46].

2.4. Implementing Circular Economy Principles

Another popular approach to reducing waste and maximising efficiency is the utilisation of circular economy approaches and strategies [47]. The principles of the circular economy provide a framework for long-term economic development by reducing waste and optimising resource utilization. SMEs are critical players in the global economy, but due to limited resources and knowledge, they frequently face unique challenges in adopting circular economy principles. Thus, a cheap and efficient approach to reducing environmental impact and achieving net zero capability is useful [44].

These principles, from an organisational perspective, also provide significant benefits to SMEs, including the reduction of material and production costs while promoting resource efficiency and sustainability by implementing closed-loop supply chains and designing products for circularity [37]. This is, in the view of the researchers, a critical approach to embracing sharing and collaborative consumption models; SMEs can reduce capital expenditures while also encouraging social responsibility and community engagement [48]. Overall, SMEs can adopt circular economy principles, such as reducing waste and reusing materials, to minimize their environmental impact.

2.5. Collaborating with Other Businesses and Organizations

Finally, there is scope to reduce carbon emissions and accomplish net zero through collaboration with other businesses and organisations [27,33,37]. In many cases, SMEs lack the resources, knowledge, and expertise to implement sustainability measures on their own. SMEs can work with suppliers, customers, industry groups, and local governments to share knowledge, resources, and best practices for achieving net zero emissions. SMEs can also accelerate their sustainability journey by collaborating with other businesses and organisations to share resources, knowledge, and best practices. Supply chain engagement, joint ventures, partnerships, and knowledge-sharing networks are all examples of collaboration [48]. These collaborations can assist SMEs in identifying and implementing opportunities to reduce carbon emissions, implement renewable energy solutions, and reduce waste [46]. Furthermore, collaboration can assist SMEs in gaining access to funding, technology, and other resources that they might not have otherwise.

By working together, SMEs can share knowledge, resources, and expertise to achieve common sustainability goals and reduce their environmental impact. Collaboration with other businesses and organisations can provide significant benefits to SMEs while also reducing their environmental impact [47]. SMEs can reduce costs, increase efficiency, and gain access to new markets and customers by collaborating. Furthermore, SMEs can improve their reputation and attract environmentally conscious customers and partners by demonstrating a commitment to sustainability and social responsibility through collaboration.

3. Materials and Methods

In addition to the literature we have already reviewed, the search terms ‘Net Zero’ and ‘SMEs’ were used jointly to search the titles and abstracts in three research databases, namely—Scopus, Business Source Complete (EBSCO) and Google Scholar. Scopus was chosen for its expansive multidisciplinary coverage, while Business Source Complete (EBSCO) and Google Scholar were used as supplementary databases for the opportunity to offer a cross-mapping or triangulation check on Scopus. We found a total of 24 articles that were directly relevant to our net zero SME review. The largest proportion were from Scopus (documents: $n = 13$, secondary documents: $n = 3$, patents $n = 1$), followed by Google Scholar ($n = 7$), and then Business Source Complete (EBSCO) ($n = 3$). Figure 1 gives a diagrammatical representation of the documents from Scopus and reveals that interest in SMEs’ contribution to net zero has increased in recent years.

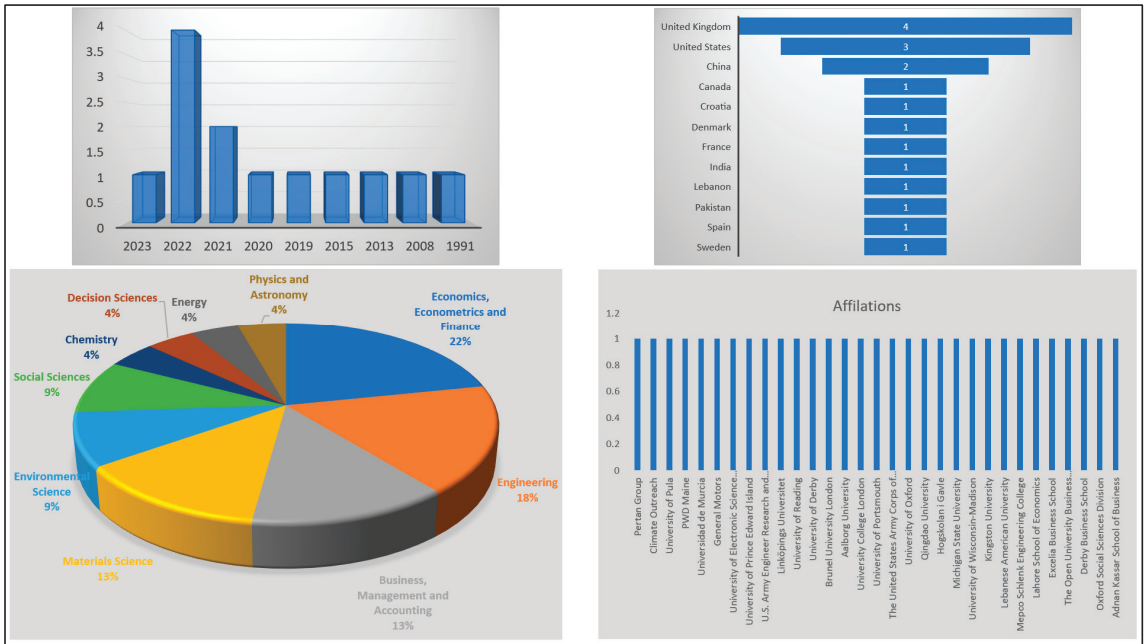


Figure 1. Scopus documents by year, country or territory, subject area and author affiliation (Source: Authors’ analysis).

The UK has been the largest contributor to this research area and the subject area and affiliations of contributors have been varied. After the elimination of duplicates from all three databases, these articles were then supplemented with other grey literature comprising recent publications by the Bank of Scotland [10], the largest professional body for environmental practitioners in the United Kingdom and worldwide, the Institute of Environmental Management and Assessment [42], the Carbon Trust [2], and the World Economic Forum [27]. Other key academic and grey literature that we included in our thematic literature review in Section 2 after this process was completed is shown in Table 1.

Table 1. Some other key grey and non-grey literature incorporated (Source: Authors’ analysis).

Authors	Title	Year	Source Title	Document Type
Carbon Trust [2]	The Journey to Net Zero for SMEs	2022	Carbon Trust	Publication
Blundel, R., Hampton, S. [6]	How can SMEs contribute to net zero?: An evidence review (no. 51), state of the art reviews	2021		Article/Report
Luong et al. [7]	Northern Ireland SMEs and the Net Zero target amidst the COVID-19 pandemic	2021	ERC Research Report	Research Report
Bank of Scotland (BOS) [10]	From Now to Net Zero: a practical guide for SMEs	2020	Bank of Scotland	Research Report
OECD [26]	No Net Zero without SMEs: Exploring the Key Issues for Greening SMEs and Green Entrepreneurship	2021	OECD SME and Entrepreneurship Papers	Article/Report

Table 1. Cont.

Authors	Title	Year	Source Title	Document Type
World Economic Forum (WEF) [27]	The “No-Excuse” Framework to Accelerate the Path to Net-Zero Manufacturing and Value Chains	2023	WEF	White Paper
Hampton et al. [28]	Transforming small and medium-sized enterprises to address the climate emergency: The case for values-based engagement	2022	Corporate Social Responsibility and Environmental Management	Article
Kesidou, E., Ri, A. [30]	Drivers and Performance Outcomes of Net Zero Practices from UK SMEs”, Research Paper 95, Enterprise Research Centre	2021	Enterprise Research Centre	Article/Report
Wilkinson-Dix, Jack. [31]	How can policy better support SMEs in the pathway to Net Zero?	2022	policycommons.net	Article/Report
Institute of Environmental Management and Assessment (IEMA) [42]	Pathways to Net Zero: Using the IEMA Green House Gas (GHG) Management Hierarchy	2020	IEMA	Publication
Afolabi et al. [49]	Exploration of small and medium entities’ actions on sustainability practices and their implications for a greener economy	2022	Journal of Applied Accounting Research	Article
Groot et al. [50]	Business models of SMEs as a mechanism for scaling climate smart technologies: The case of Punjab, India	2019	Journal of Cleaner Production	Article
Johansson et al. [51]	Impact evaluation of an energy efficiency network policy programme for industrial SMEs in Sweden	2022	Resources, Environment and Sustainability	Article
Kenington et al. [52]	Encouraging energy efficiency in United Kingdom independent retail? The case of the butcher, fishmonger and cycle-shop	2020	Energy Research and Social Science	Article
Mirza et al. [53]	The impact of green lending on banking performance: Evidence from SME credit portfolios in the BRIC	2023	Economic Analysis and Policy	Article
Paterson et al. [54]	Towards a conceptual framework of enterprise support for pro-environmental small and medium-sized enterprises: A contextualised review of diverse knowledge domains	2022	Local Economy	Review
Afolabi et al. [55]	Attitudes and Perspectives of SMEs’ Sustainability Reporting Toward Transition to the Net Zero Carbon Emissions	2023	Emerald	Research Paper
Fenton et al. [56]	Exploring SMEs attitudes to Net Zero & social media: Action Case research as a force for good	2022	British Academy of Management	Conference Paper
Liesen et al. [57]	Energy master planning toward net zero energy installation—Portsmouth Naval Shipyard	2015	ASHRAE Transactions	Conference Paper/Book

The Bank of Scotland commissioned Yonder to understand the perspectives of SMEs on sustainability issues and the challenges they face on their road to Net zero [10]. The research combined expert insight from industry and academia as well as the viewpoint of the SMEs themselves. It covered a survey of more than 1000 SME business leaders across the UK; in-depth interviews with 10 sustainability experts; six focus groups with SME business leaders and follow-up conversations with individual business leaders. The research gives a comprehensive picture of where SMEs are on their journey, and of their views and concerns about what Net zero means for their businesses, and so was useful in helping us to develop a conceptual framework that is based on the experiences of SMEs themselves. The IEMA [42] publication updates IEMA's widely used Green House Gas Management Hierarchy, with additional guidance considerations and planning diagrams that are useful for SMEs. The focus of this IEMA [42] publication is on optimum carbon reductions. The publication recognises that the climate emergency now requires an escalation of action across all fronts and offers practical solutions for SMEs, and is thus useful for our conceptual framework.

In the same manner, the Carbon Trust is an expert partner for businesses, governments and organisations around the world—helping them decarbonise and accelerate to net zero. The Carbon Trust provides solutions to the climate crisis by supporting organisations globally as they accelerate towards net zero. From target setting, net zero pathways, assurance and footprinting, to policy advice, strategy setting and programme delivery, the organisation seeks smarter ways to turn intent into impact, where sustainability and economic realities go hand in hand. The Carbon Trust [2] publication we employ aims to guide SMEs and relevant stakeholders on how SMEs can best undertake the journey to net zero. Finally, the World Economic Forum (WEF) was established in 1971 as a not-for-profit foundation and is headquartered in Geneva, Switzerland. It is independent, impartial and not tied to any special interests. The WEF strives in all its efforts to demonstrate entrepreneurship in the global public interest while upholding the highest standards of governance. The WEF [27] white paper we incorporate seeks to provide detailed information to businesses on how they can operationalize their commitments and address their carbon emission challenges throughout their operations and supply chains. These four publications, the grey literature we uncovered, and pertinent academic literature were the principal methods of deriving our conceptual framework.

4. Results

The UK was the first major economy to pass a net zero emissions law via legislation in 2019 [58]. This target commits the UK to a legally binding target of net zero emissions by 2050. Although this is an ambitious target, a climate emergency is driving several other economically advanced countries to commit to deep reductions in net emissions. For example, Sweden and Scotland have committed to net zero by 2045, and Denmark, France, and New Zealand by 2050. A majority of the academic and grey literature we uncovered emanated from the UK because of its ambitious agenda and the net zero emissions law.

To put the situation in the UK in context, CO₂ emissions in the UK increased by 6.3% to 341.5 million tonnes (Mt), and total greenhouse gas emissions by 4.7% to 424.5 million tonnes of carbon dioxide equivalent (MtCO₂e) between 2020 and 2021 [38]. Although total greenhouse gas emissions in the UK are 47.3% lower than they were in 1990 [38], they are nowhere near net zero. To combat this, government environmental regulations could restrict the use of GHG-intensive technologies [59]. Environmental taxes, such as the Emission Trading System (ETS) could also increase the cost of operating pollution-intensive processes and technologies. However, 99% of the EU27's non-financial businesses are SMEs, the majority of which are not covered by ETS, the core policy tool used in the EU for reducing greenhouse gas emissions in Europe [60].

A UK Emissions Trading Scheme (UK ETS) replaced the UK's participation in the EU ETS on 1 January 2021, but data on SMEs who participate in this scheme are not

available [61]. In the same vein, the government could stimulate green innovation through policies that provide incentives in the form of subsidies and grants that shift investments towards green R&D [62]. These kinds of incentives are highly relevant to SMEs because even though large corporations play a pivotal role in making green innovations more acceptable, SMEs are more prone to generate and implement radical green innovations [63].

A UK government study found that SMEs could save up to 25% of their energy consumption through cost-effective efficiency measures including upgrading building fabric, replacing lighting, heating and cooling equipment, and other process machinery; and implementing energy management systems [6]. SMEs can recoup their investment in implementing these measures through energy savings within a few years [64]. Moreover, the same study estimated that 37% of the savings could be achieved with zero capital investment [65], including turning down thermostats and switching off electronic equipment. Carbon emissions from electricity use can also be reduced by shifting the time of day at which energy-intensive processes are carried out.

Cleaner production technologies can modify the production process and stimulate the adoption of carbon-reducing practices, but net zero practices vary in their effects on environmental and business performance. For example, research from Germany indicates that only those net zero practices that increase production efficiency significantly can boost business performance [66]. SMEs can update their practices by considering best practices in green purchasing and procurement, sustainable supply network management, green transportation and logistics (including for employees), and green packaging and storage [30,67]. In the same vein, investing in net zero business training allows businesses to adopt a systematic approach to increasing the environmental awareness of employees. This also helps businesses to appraise, structure, and enhance the knowledge and capabilities of employees on environmental matters [68].

There is extensive literature addressing the reasons why it is difficult to improve the environmental performance of SMEs, and the dominant framing for this is as barriers and drivers [6,30]. The barriers and drivers approach provides a suitable and organised way of investigating the challenges linked with reducing the environmental impact of SMEs. It has also influenced the design of policy interventions in the UK and internationally [30,49]. We present the dominant barriers and drivers in Table 2.

Table 2. Barriers and drivers for SME net zero activities (Source: Authors' analysis).

Barriers	Drivers
(1) The costs of transitioning to cleaner technology/access to capital.	(1) Pro-environmental values.
(2) Uncertainty about the business environment.	(2) Legislation and government targets.
(3) Uncertainty about the usefulness of greener technologies.	(3) Some net zero activities could be cost saving.
(4) Lack of specialist knowledge about greener technologies.	(4) Some net zero activities may provide a competitive advantage.
(5) Scarcity of time and other resource constraints.	(5) Some net zero activities could open new market opportunities.
(6) Unclear energy management responsibilities.	(6) Pressure from customers and other stakeholders.
(7) Split incentives and priorities for SMEs.	(7) Corporate reputation.
(8) Lack of control over certain aspects of SME operations (for example domestic and international supply chains and short-term tenancy agreements).	(8) Government grants or subsidies
(9) Limitations in absorptive capacity.	(9) Risk mitigation.
(10) Limitations in organisational learning.	(10) Staff morale.
(11) Lack of trusted brokers/intermediaries.	(11) Voluntary agreements and self-regulation.
(12) Lack of awareness about greener technology products and the net zero agenda.	(12) Conditions for access to some sources of finance.
(13) Disinformation.	(13) High operational costs due to rising energy and related bills.

However, the concept of barriers and drivers in this context has been criticised, arguing that they fundamentally misunderstand organisational behaviour by assuming they are

‘rational’ economic actors. Understanding organisational behaviour as the outcome of a much wider set of socio-technical factors offers a more useful approach, which can more effectively inform policy [50].

4.1. Barriers to SME Net Zero Activities

Different studies describe a variety of barriers to the adoption of energy efficiency measures by SMEs. These barriers usually vary by industry/sector, size of SME, geographies, market behaviour and amount of legislative support [51–53]. For example, a lack of legislative support in certain sectors typically reduces the probability of the adoption of cleaner technology in those sectors. The take-up of measures by SMEs to adopt net zero measures could be low due to such barriers [69].

The literature seems to agree that the most significant barriers are the costs of transitioning to cleaner technology, access to capital, uncertainty about the business environment and usefulness of greener technologies, lack of specialist knowledge about greener technologies, scarcity of time and resource constraints, unclear energy management responsibilities, split incentives and priorities, and a lack of control over some aspects of SME operations (for example domestic and international supply chains and short-term tenancy agreements) [7,31,50,52]. These barriers generally do not incentivise SME owners to make long-term investments that could contribute to reaching net zero.

SMEs might also often be hampered by a lack of strategic alignment between their goals and that of the net zero agenda [6]. This might be especially true for manufacturing sector SMEs that typically report other priorities not aligned towards the net zero agenda, less time to implement sustainability measures, and a lack of information about energy efficiency measures [51]. Some authors also stress that trading opportunities may not be present for green-minded SMEs and so there may be low financial rewards for adopting cleaner technologies [33,70].

Related to this line of thought, SMEs may also suffer from having internal and external stakeholders that may not benefit from the net zero agenda [54]. This is because greener technology innovations may not be suitable for some risk-exposed SMEs and their stakeholders [50]. Other SMEs report that the cost of meeting regulations or standards and the uncertain demand for low-carbon products or services are major obstacles to committing to net zero practices [7]. Other researchers also highlight barriers on the supply side (e.g., financial costs), and the demand side of cleaner technologies (e.g., conflict with traditional methods). These studies identify low awareness of climate change, limited understanding of what works in different contexts and difficulties in proving the added value of CSA technologies as factors constraining the adoption of clean technologies [50]. Furthermore, false claims on climate change undermine the existence or impacts of climate change, the unambiguous human influence on climate change, and the need for corresponding urgent action. Such disinformation erodes trust in climate science and its perpetrators increasingly use ‘distract and delay’ tactics to delay much needed action.

While government support is seen as a driver of net zero activities, there are barriers to the adoption of low-carbon technologies even when there is government support, as has been seen in the case of European Regional Development Fund (ERDF)-funded projects. These are mostly due to the short project timeframes of most government projects, the involvement of partners with limited experience in net zero projects, lack of learning and knowledge exchange between projects, lack of coordination with other government SME decarbonisation policies, and the possible ‘crowding-out’ of private activity [31].

The time horizon for net zero itself could be a potential hurdle as SMEs may be particularly concerned about the payback time for investment in decarbonisation and other sustainability initiatives. The year 2045 appears so far in the future for many that it seems out of reach for many SMEs who could find it both impractical and unrealistic [10]. As one might expect, the COVID-19 pandemic was also a major obstacle to clean technology

adoption reported by SMEs in Northern Ireland and the rest of the UK [7], although some researchers report that even in the context of the COVID-19 pandemic, there was a strong, statistically significant relationship between both technological and organisational net zero practices and business performance, proxied by employment growth [30].

4.2. Drivers for SMEs Net Zero Activities

The principal reasons for SMEs to take part in net zero activities have been framed as drivers [6,30]. There are two categories of drivers, namely external and internal. External drivers are those forces outside the SME that encourage it to engage in net zero activities while internal drivers are forces within the SME that stimulate it to engage in net zero activities. External drivers entail government policies that encourage SMEs to reduce carbon emissions, voluntary regulations imposed by SMEs themselves, conditions for access to external finance, the desire to improve corporate reputation, and pressure from customers, whereas internal drivers include the motivation of businesses to improve their image, generating comparative advantage, environmental concerns and to reduce costs [6,35].

Government policies, either employing coercion or persuasion, can induce SMEs to adopt net zero practices. For example, mandatory social and environmental regulations (MSER) have been found to have an impact on firm innovation in China [71]. However, such policies need to be implemented coherently across different sectors and a mix of policies seems to be more effective [30,31]. Voluntary agreements by SMEs across the supply chain could induce businesses to commit to net zero [52,55]. In the same manner, voluntary GHG reporting might be relevant for SMEs, because it can be effective in monitoring how SMEs reduce their GHG emissions [60]. Such net zero strategies that focus on re-organising distribution processes across the supply chain can also reduce carbon emissions [72,73].

Some external funding from banks is only available to SMEs that engage in capital-intensive net zero practices. In the UK, for example, the now-privatised Green Investment Bank played a key role in financing renewable energy projects, as did the government's creation of the First Infrastructure Bank [30,53]. SMEs may invest in net zero practices to legitimise their business activities and gain approval from various national and international stakeholders. SMEs may also undertake net zero activities to enhance their image and reputation and these activities could be a result of customer feedback/demand or the desire to attract customers who prefer to patronise businesses that engage in net zero activities [26,56].

There is research that shows that environmental corporate social responsibility is positively associated with green innovation performance and also that shared vision capability mediates environmental corporate social responsibility, a green innovation performance link [74]. Interestingly, numerous SMEs, particularly those in the manufacturing of apparel and restaurant sectors, exhibit energy efficiency and differentiation in being environmentally friendly or sustainable [31]. Thus, being engaged in net zero activities may be a source of competitive advantage for SMEs. SMEs might simply want to 'do the right thing' and run their businesses responsibly and ethically, which benefits the planet [28,31]. Finally, the increasing costs of energy for heating, running machinery, and transportation could drive SMEs to adopt net zero practices.

4.3. Conceptual Framework for SME Net Zero Implementation Activities

The academic literature reviewed discussed the drivers and barriers to achieving net zero activities within SMEs. The academic literature reviewed has thoroughly investigated 'why' SMEs should be involved in NetZero implementation, and 'what' SMEs will need to overcome to achieve success in being carbon free. However, the academic literature has not incorporated the grey literature in providing a comprehensive guide on 'how' SMEs can achieve net zero. We reviewed the academic and grey literature on this topic and identified four frameworks that have been proposed for net zero implementation in the grey literature

that should be incorporated into the academic literature. The key stages involved in these grey literature frameworks are provided in Table 3.

Table 3. Key frameworks for the implementation of net zero strategies in the grey literature (Source: Authors’ analysis).

Framework Used	Key Stages in the Framework
Bank of Scotland: From Now to Net Zero: a practical guide for SMEs [10]	<ol style="list-style-type: none"> 1. Starting the process 2. Short wins and engaging employees 3. Measure, Mobilise, and Monitor 4. Future processes 5. Best practice cases
Institute of Environmental Management and Assessment (IEMA): Pathways to Net Zero: Using the IEMA Green House Gas (GHG) Management Hierarchy [42]	<ol style="list-style-type: none"> 1. Eliminate 2. Reduce 3. Substitute 4. Compensate
Carbon Trust: The Journey to Net Zero for SMEs [2]	<ol style="list-style-type: none"> 1. Make commitments 2. Calculate emissions 3. Renewable energy tariffs 4. Carbon reduction planning
World Economic Forum: The “No-Excuse” Framework to Accelerate the Path to Net-Zero Manufacturing and Value Chains [27]	<ol style="list-style-type: none"> 1. Develop a net zero strategy 2. Create internal changes 3. Drive external improvements through collaboration 4. Develop a net zero culture

5. Discussion and Development of Net Zero Implementation Framework

The analysis of the limited academic literature and grey literature on net zero implementation identified the drivers for SMEs to embark on this journey. The drivers as discussed previously in the paper focused on aspects of cost reduction through green energy procurement, the market demand for zero emissions, brand image, and the requirement to meet government regulations around net zero. Although the analysis identified that it will be beneficial for SMEs to implement net zero capability, the papers have also identified challenges that impede this capability. The challenges identified through the literature analysis have focused on the reduction of short-term profits when implementing sustainable practices, lack of support from the supply chain and government for implementation, and lack of training. An important aspect to consider for SMEs is their position in the supply/value chain and the influence of the consumer/customer to overcome the challenges. The position of the SME in the value chain and the position of power will also determine whether the SME can access funding, support, and skills training.

Although several frameworks have been proposed in the grey literature, this paper is unique because it proposes an implementation framework for SMEs to implement their net zero strategies based on the academic and grey literature. Based on our analysis of the key stages in the existing frameworks as shown in Table 3, we propose that some crucial elements from the academic and grey literature on SMEs and net zero activities can be incorporated into a holistic conceptual framework to help SMEs attain net zero and present these elements and the framework in Figure 2.

Figure 2 depicts the conceptual framework for SMEs to achieve net zero capability. It provides a clear pathway for SMEs to embark on their net zero journeys and acts as a progressive decision-making framework as well as a continuous improvement framework. The framework comprises eight stages: (1) Understanding the position of the SME in the value chain; (2) Understanding the pressures from stakeholders; (3) Undertaking greenhouse gas accounting to measure current levels of carbon emissions; (4) Undertaking internal changes towards the net zero agenda; (5) Undertaking external facing changes towards the net zero agenda; (6) Uncoupling, Reduction and Substitution; (7) Us over Me; and (8) Updating regularly. Next, we explain each of these stages.

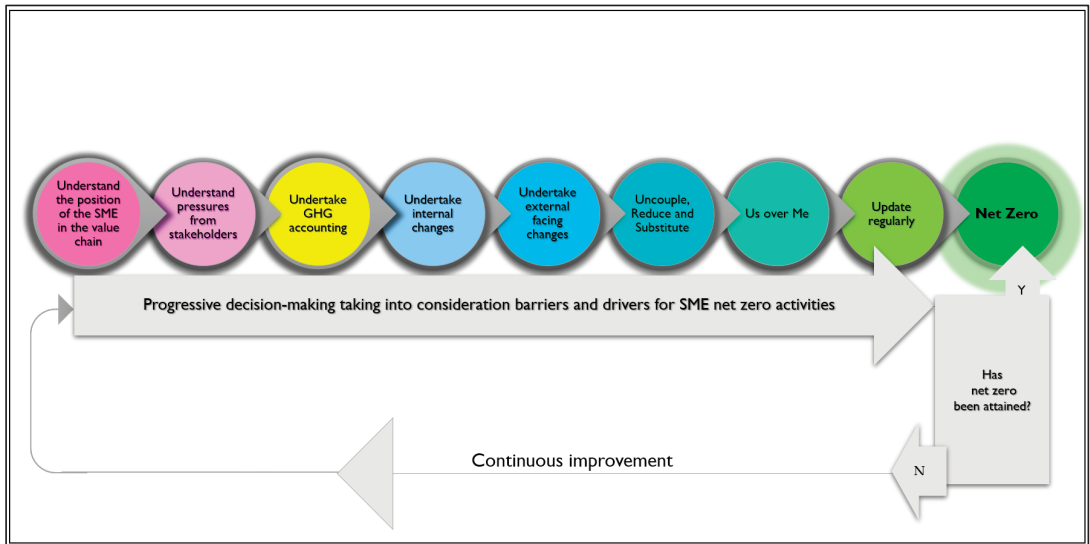


Figure 2. Framework for SMEs to achieve net zero capability (Source: Authors' analysis).

Stage 1: Understand the position of the SME in the value chain. The position in the value chain determines the level of engagement with the focal firm in the value chain that sets the performance targets for other entities in the chain [10,27]. This is essential because the activities and decisions of other entities within the value chain could affect the SME. The position of the SME in the value chain also determines the baseline business and operating model for the SME and the various strategies that it can engage in. For example, an SME that is high in the value chain will have more flexibility to adopt net zero activities and such an SME could more readily influence other entities. Conversely, if the SME occupies a low position in the value chain and can only stay profitable by engaging with firms higher up the value chain that are substantial carbon emitters, it will be hard to engage meaningfully with the net zero agenda [27,75].

Stage 2: Understand pressures from stakeholders. The position of the SME in the value chain not only sets the proximity of the SME to the focal firm, but also the proximity to the customer and other stakeholders. These stakeholders exert different types and levels of pressure on the SME and the SME needs to be aware of it. The typical transaction relationships (business to business or business to consumer) in which the firm typically engages must also be understood. If consumers are not sensitive to increases in price due to engagement in net zero practices, this can be a driver for the SME to engage in such practices [30,31].

Stage 3: Undertake greenhouse gas accounting to measure current levels of carbon emissions. SMEs need to create or invest in platforms that can monitor their GHG emissions and inform them about their emission levels [2,10,27,42]. This is a shared thread that runs across all of the grey literature. The importance of this has also been reported in the academic literature [33,55]. This can help SMEs to set targets that they can use to benchmark their carbon reduction efforts. SMEs at this stage can also start to decide on short-term outcomes that will be a step towards longer-term net zero capabilities. By engaging in this process, SMEs could also identify what activities they engage in that contribute most to GHG emissions.

Stage 4: Undertake internal changes towards the net zero agenda. After the previous stages have been achieved, SMEs can engage in changes within their businesses to reduce their GHG emissions. These do not have to be large changes. Little steps such as engaging in the training of employees so they are more conscious of the carbon footprint of the busi-

ness, conducting energy-intensive activities at certain hours, and using more information communication devices to reduce travel and the need for paper can help [2,27,33]. It is easier to make changes within the organisation before trying to make changes outside the organisation, the issue we turn to next.

Stage 5: Undertake external facing changes towards the net zero agenda. Altering how SMEs engage with the external environment is an essential requirement for SMEs if the net zero target is to be reached by 2045 or 2050 in the case of some countries [10,42]. This however will depend on the previous stages; for example, pressures from value and supply chain entities as well as the financial health of the SME could impact the SMEs' ability to procure energy from renewable sources because these could be more expensive [2,27]. Thus, activities at this stage will largely depend on Stage 1 and Stage 2 evaluations. At this stage, the scope of decisions will also be heavily influenced by the barriers and drivers to implementing net zero activities that we have shown in Table 2 [30,31].

Stage 6: Uncouple, Reduce and Substitute. Some SMEs might need to disengage from certain activities or even leave some markets altogether to help achieve net zero [27,42]. The literature is clear that to achieve net zero, certain practices will need to be eliminated, others reduced, and others substituted with cleaner technologies [2,10,42,60]. These can easily be identified from Stage 3. It must be noted that there could be unavoidable residual emissions that can only be offset via greenhouse gas removal (GGR) offsets from either nature-based projects such as reforestation and soil management, or through engineered methods including carbon capture and storage [2,42]. Offsetting can be used to make an organisation or product carbon neutral, where the sum of greenhouse gas emissions produced is compensated for by carbon offsets, also called carbon credits [2,6].

Stage 7: Us over Me. SMEs can drive external improvements through collaboration and help to build communities of climate-conscious SMEs [27,57]. Such communities have the potential to magnify the activities of individual SMEs and the combined efforts of such communities will be more effective at contributing to the net zero agenda. SMEs could also seek valuable partnerships and embed themselves in supply and value chains that are more environmentally friendly or seek to contribute to the greater climate good. There are many ways in which SMEs can help themselves and each other through vital collaboration in building not just sustainable companies, but sustainable supply chains and business communities [10,28].

Stage 8: Update regularly. Continuous improvement and innovation processes will be required to achieve the net zero agenda. SMEs will need to consistently be on the lookout for cleaner and more efficient technologies and practices. They will also need to find out ways to embed such technologies and practices into their business activities. However, engaging in communities and with stakeholders that are concerned with the net zero agenda (as discussed in Stage 7) can help in this regard.

SMEs start from Stage 1 and progressively make decisions until they reach Stage 8. If they have not achieved net zero at this point, they can return to Stage 1 and continuously improve their performance. This process should be repeated as many times as possible until net zero is eventually attained by the SME. Continuous improvement can also be implemented until the SME is carbon negative. This occurs when an entity reduces its carbon footprint to less than neutral so that the entity has a net effect of removing carbon dioxide from the atmosphere rather than adding it. Based on the discussion so far, we have inferred a model which we summarized in Figure 2 to emphasize several dimensions. The combined framework from the academic and grey literature indicates that for SMEs to effectively contribute to the net zero agenda, a holistic and long-term approach that incorporates the eight stages we have identified should be encouraged. It also suggests that SMEs should engage in progressive decision making as well as continuous improvement using our framework to actualise net zero.

6. Conclusions

The journey to net zero is urgent, but complex, and there are both challenges and huge opportunities for SMEs [10]. SMEs collectively account for a significant proportion of greenhouse gas emissions and so there is a need for urgent action to be taken by SMEs in the journey to achieve net zero. Lip service must not be paid in this context, but action needs to be taken. All hands must be actively on deck because, for example, research shows that Vietnamese listed firms have been found to engage in “green talks” in their corporate reporting rather than “green actions” in their daily practices [76]. The framework we have derived from the academic and grey literature is a helpful tool for SMEs as they plan and undertake activities to contribute to the net zero agenda.

Like all other research, this paper has some limitations, yet it provides vital opportunities for future research. First, like other studies that derive conceptual frameworks from the existing literature, we might have missed some useful literature. However, our incorporation of the grey literature takes into consideration the latest industry perspectives concerning our research questions. Future studies can aim to incorporate the literature we might have missed into our model. Secondly, most of the literature we have reviewed is from the context of the UK and so our framework should be applied with caution in different contexts. However, we were careful to try to incorporate as much of the literature as possible and not only the literature from the UK. The paper has also identified specific variables such as the position of the SME in the value chain, the power position, and the pursuance of net zero capability within short- and long-term timescales. There is therefore scope for the various aspects in this scope to be tested empirically in the future to ascertain the relationship between the variables examined as SMEs generate net zero capability.

A key theme across the entire academic and grey literature we have reviewed is the need for SMEs to understand their carbon footprint, otherwise known as greenhouse gas (GHG) accounting, and then seek to reduce it via several methods. SMEs need to actively engage in activities in the framework we have elucidated to limit global warming to 1.5 °C. Furthermore, achieving net zero implies that value chain emissions across the entire supply chain be reduced. When this has been done, any remaining emissions that remain uneliminated could be offset via greenhouse gas removal (GGR) offsets. To strengthen SMEs’ role as change agents for net zero, policymakers should reconsider this framework we have developed and ensure flexible and targeted incentives to support SMEs. SMEs should also be helped in the acquisition of green assets, knowledge and skills, which they can in turn share with their customers and communities.

From a scientific perspective, the novelty of our study is the use of academic and grey literature. Previous literature on SMEs and net zero have focussed on the academic perspective and have employed empirical measures taken to justify such perspectives. By introducing the grey literature, this paper explicates the academic and grey literature dimensions of SMEs and net zero to synergise multiple actors and develop a conceptual framework to contribute to the net zero agenda.

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References

- Fankhauser, S.; Smith, S.M.; Allen, M.; Axelsson, K.; Hale, T.; Hepburn, C.; Kendall, J.M.; Khosla, R.; Lezaun, J.; Mitchell-Larson, E. The Meaning of Net Zero and How to Get It Right. *Nat. Clim. Change* **2022**, *12*, 15–21. [CrossRef]
- CarbonTrust. The Journey to Net Zero for SMEs. Available online: <https://businesswales.gov.wales/news-and-blogs/news/journey-net-zero-smes> (accessed on 28 January 2023).
- Allen, M.R.; Frame, D.J.; Huntingford, C.; Jones, C.D.; Lowe, J.A.; Meinshausen, M.; Meinshausen, N. Warming Caused by Cumulative Carbon Emissions towards the Trillionth Tonne. *Nature* **2009**, *458*, 1163–1166. [CrossRef]
- Mathews, H.D.; Gillett, N.P.; Stott, P.A.; Zickfeld, K. The Proportionality of Global Warming to Cumulative Carbon Emissions. *Nature* **2009**, *459*, 829–832. [CrossRef] [PubMed]
- MacDougall, A.H.; Frölicher, T.L.; Jones, C.D.; Rogelj, J.; Matthews, H.D.; Zickfeld, K.; Arora, V.K.; Barrett, N.J.; Brovkin, V.; Burger, F.A. Is There Warming in the Pipeline? A Multi-Model Analysis of the Zero Emissions Commitment from CO₂. *Biogeosciences* **2020**, *17*, 2987–3016. [CrossRef]
- Blundel, R.; Hampton, S. How Can SMEs Contribute to Net Zero?: An Evidence Review. *State Art Rev. Ser.* **2021**, *51*, 1–10.
- Luong, H.M.; Hewitt-Dundas, N. *Northern Ireland SMEs and the Net Zero Target amidst the COVID-19 Pandemic*; ERC Research Report: Belfast, UK, May 2021.
- Small99. Small Business Carbon Emissions Statistics. Available online: <https://small99.co.uk/net-zero/small-business-carbon-stats/> (accessed on 27 October 2022).
- NAEI. National Atmospheric Emissions Inventory—Overview of Greenhouse Gases. Available online: <https://naei.beis.gov.uk/overview/ghg-overview> (accessed on 2 November 2022).
- BOS. From Now to Net Zero: A Practical Guide for SMEs. Available online: <https://business.bankofscotland.co.uk/assets/pdf/bos-smes-from-now-to-net-zero.pdf> (accessed on 22 January 2023).
- EPA. United States Environmental Protection Agency—Overview of Greenhouse Gases. Available online: <https://www.epa.gov/ghgemissions/overview-greenhouse-gases> (accessed on 2 November 2022).
- Cameron, R. A New View of European Industrialization. *Econ. Hist. Rev.* **1985**, *38*, 1–23. [CrossRef]
- Schipper, L.; Ting, M.; Khrushch, M.; Golove, W. The Evolution of Carbon Dioxide Emissions from Energy Use in Industrialized Countries: An End-Use Analysis. *Energy Policy* **1997**, *25*, 651–672. [CrossRef]
- Parag, Y.; Janda, K.B. More than Filler: Middle Actors and Socio-Technical Change in the Energy System from the “Middle-Out”. *Energy Res. Soc. Sci.* **2014**, *3*, 102–112. [CrossRef]
- Mahood, Q.; Van Eerd, D.; Irvin, E. Searching for Grey Literature for Systematic Reviews: Challenges and Benefits. *Res. Synth. Methods* **2014**, *5*, 221–234. [CrossRef]
- Pappas, C.; Williams, I. Grey Literature: Its Emerging Importance. *J. Hosp. Librariansh.* **2011**, *11*, 228–234. [CrossRef]
- Rothstein, H.R.; Hopewell, S. Grey Literature. *Handb. Res. Synth. Meta-Anal.* **2009**, *2*, 103–125.
- GreyNet. Grey Literature Network Service. Available online: <http://www.greynet.org/> (accessed on 20 January 2023).
- Schöpfel, J.; Farace, D.J. Grey Literature. In *Encyclopedia of Library and Information Sciences*; CRC Press: Boca Raton, FL, USA, 2010; pp. 2029–2039.
- Benziens, K.M.; Premji, S.; Hayden, K.A.; Serrett, K. State-of-the-evidence Reviews: Advantages and Challenges of Including Grey Literature. *Worldviews Evid. Based Nurs.* **2006**, *3*, 55–61. [CrossRef] [PubMed]
- Alberani, V.; Pietrangeli, P.D.C.; Mazza, A.M. The Use of Grey Literature in Health Sciences: A Preliminary Survey. *Bull. Med. Libr. Assoc.* **1990**, *78*, 358.
- Pawson, R.; Greenhalgh, T.; Harvey, G.; Walshe, K. Realist Review—A New Method of Systematic Review Designed for Complex Policy Interventions. *J. Health Serv. Res. Policy* **2005**, *10*, 21–34. [CrossRef]
- Berman, Y. INFUSE [Information Uses in Social Welfare]—Delineation of a Grey Document. *Eurosoc. Newsl.* **1992**, *59*, 39–43.
- Lavis, J.; Davies, H.; Oxman, A.; Denis, J.-L.; Golden-Biddle, K.; Ferlie, E. Towards Systematic Reviews That Inform Health Care Management and Policy-Making. *J. Health Serv. Res. Policy* **2005**, *10*, 35–48. [CrossRef]
- Reyes-Rodríguez, J.F.; Ulhøi, J.P.; Madsen, H. Corporate Environmental Sustainability in Danish SMEs: A Longitudinal Study of Motivators, Initiatives, and Strategic Effects. *Corp. Soc. Responsib. Environ. Manag.* **2016**, *23*, 193–212. [CrossRef]
- OECD. *No Net Zero Without SMEs: Exploring the Key Issues for Greening SMEs and Green Entrepreneurship*; OECD SME and Entrepreneurship Papers; OECD Publishing: Paris, France, 2021. [CrossRef]
- WEF. The “No-Excuse” Framework to Accelerate the Path to Net-Zero Manufacturing and Value Chains. Available online: https://www3.weforum.org/docs/WEF_Industry_Net_Zero_Accelerator_2023.pdf (accessed on 28 January 2023).
- Hampton, S.; Blundel, R.; Wahga, A.; Fawcett, T.; Shaw, C. Transforming Small and Medium-sized Enterprises to Address the Climate Emergency: The Case for Values-based Engagement. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 1424–1439. [CrossRef]
- Aykol, B.; Leonidou, L.C. Researching the Green Practices of Smaller Service Firms: A Theoretical, Methodological, and Empirical Assessment. *J. Small Bus. Manag.* **2015**, *53*, 1264–1288. [CrossRef]

30. Kesidou, E.; Ri, A. Drivers and Performance Outcomes of Net Zero Practices from UK SMEs. *Res. Pap.* **2021**, *95*. Available online: <https://www.enterpriseresearch.ac.uk/publications/drivers-and-performance-outcomes-of-net-zero-practices-evidence-from-uk-smes/> (accessed on 24 February 2023).
31. Wilkinson-Dix, J. How Can Policy Better Support SMEs in the Pathway to Net Zero? Climate Change Committee: London, UK, 2022.
32. Mole, K.; North, D.; Baldock, R. Which SMEs Seek External Support? Business Characteristics, Management Behaviour and External Influences in a Contingency Approach. *Environ. Plan. C Polit. Sp.* **2017**, *35*, 476–499. [[CrossRef](#)]
33. Zhao, F.; Fashola, O.I.; Olarewaju, T.I.; Onwumere, I. Smart City Research: A Holistic and State-of-the-Art Literature Review. *Cities* **2021**, *119*, 103406. [[CrossRef](#)]
34. Hussain, Z.; Jabbar, A.; Kong, K. Power, Dominance and Control: Implementing a New Business Intelligence System. *Digit. Transform. Soc.* **2023**, *ahead-of-print*. [[CrossRef](#)]
35. Kesidou, E.; Demirel, P. On the Drivers of Eco-Innovations: Empirical Evidence from the UK. *Res. Policy* **2012**, *41*, 862–870. [[CrossRef](#)]
36. Gherairi, S. Design and Implementation of an Intelligent Energy Management System for Smart Home Utilizing a Multi-Agent System. *Ain Shams Eng. J.* **2023**, *14*, 101897. [[CrossRef](#)]
37. Zakari, A.; Khan, L.; Tan, D.; Alvarado, R.; Dagar, V. Energy Efficiency and Sustainable Development Goals (SDGs). *Energy* **2022**, *239*, 122365. [[CrossRef](#)]
38. DBEIS. Department for Business, Energy and Industrial Strategy: 2021 UK Greenhouse Gas Emissions, Provisional Figures. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1064923/2021-provisional-emissions-statistics-report.pdf (accessed on 2 November 2022).
39. Li, T.; Long, J.; Du, W.; Qian, F.; Mahalec, V. Three Pathways towards Elimination of CO₂ Emissions from Industrial Plants That Use Hydrocarbon Fuels. *J. Clean. Prod.* **2023**, *391*, 136159. [[CrossRef](#)]
40. von Hellfeld, R.; Hastings, A.; Kam, J.; Rowe, R.; Clifton-Brown, J.; Donnison, I.; Shepherd, A. Expanding the Miscanthus Market in the UK: Growers in Profile and Experience, Benefits and Drawbacks of the Bioenergy Crop. *GCB Bioenergy* **2022**, *14*, 1205–1218. [[CrossRef](#)] [[PubMed](#)]
41. Trypolska, G.; Rosner, A. The Use of Solar Energy by Households and Energy Cooperatives in Post-War Ukraine: Lessons Learned from Austria. *Energies* **2022**, *15*, 7610. [[CrossRef](#)]
42. IEMA. Pathways to Net Zero: Using the IEMA GHG Management Hierarchy—November 2020. Available online: <https://www.iema.net/resources/reading-room/2020/11/26/pathways-to-net-zero-using-the-iema-ghg-management-hierarchy-november-2020> (accessed on 22 January 2023).
43. Zahoor, A.; Mehr, F.; Mao, G.; Yu, Y.; Sápi, A. The Carbon Neutrality Feasibility of Worldwide and in China’s Transportation Sector by E-Car and Renewable Energy Sources before 2060. *J. Energy Storage* **2023**, *61*, 106696. [[CrossRef](#)]
44. Broin, E.Ó.; Kelly, J.A.; Santos, G.S.; Grythe, H.; Svendby, T.; Solberg, S.; Kelleher, L.; Clinch, J.P. Hitting the Hotspots—Targeted Deployment of Air Source Heat Pump Technology to Deliver Clean Air Communities and Climate Progress: A Case Study of Ireland. *Atmos. Environ. X* **2022**, *13*, 100155. [[CrossRef](#)]
45. Sala, A.; Damalas, D.; Labanchi, L.; Martinsohn, J.; Moro, F.; Sabatella, R.; Notti, E. Energy Audit and Carbon Footprint in Trawl Fisheries. *Sci. Data* **2022**, *9*, 428. [[CrossRef](#)] [[PubMed](#)]
46. Bertoldi, P. Policies for Energy Conservation and Sufficiency: Review of Existing Policies and Recommendations for New and Effective Policies in OECD Countries. *Energy Build.* **2022**, *264*, 112075. [[CrossRef](#)]
47. Suárez-Eiroa, B.; Fernández, E.; Méndez-Martínez, G.; Soto-Oñate, D. Operational Principles of Circular Economy for Sustainable Development: Linking Theory and Practice. *J. Clean. Prod.* **2019**, *214*, 952–961. [[CrossRef](#)]
48. Ullah, S.; Khan, F.U.; Ahmad, N. Promoting Sustainability through Green Innovation Adoption: A Case of Manufacturing Industry. *Environ. Sci. Pollut. Res.* **2022**, *29*, 21119–21139. [[CrossRef](#)] [[PubMed](#)]
49. Afolabi, H.; Ram, R.; Hussainey, K.; Nandy, M.; Lodh, S. Exploration of Small and Medium Entities’ Actions on Sustainability Practices and Their Implications for a Greener Economy. *J. Appl. Account. Res.* **2022**, *ahead-of-print*. [[CrossRef](#)]
50. Groot, A.E.; Bolt, J.S.; Jat, H.S.; Jat, M.L.; Kumar, M.; Agarwal, T.; Blok, V. Business Models of SMEs as a Mechanism for Scaling Climate Smart Technologies: The Case of Punjab, India. *J. Clean. Prod.* **2019**, *210*, 1109–1119. [[CrossRef](#)]
51. Johansson, I.; Johnsson, S.; Thollander, P. Impact Evaluation of an Energy Efficiency Network Policy Program for Industrial SMEs in Sweden. *Resour. Environ. Sustain.* **2022**, *9*, 100065.
52. Kenington, D.; Chiu, L.F.; Janda, K.B.; Ruysssevelt, P. Encouraging Energy Efficiency in United Kingdom Independent Retail? The Case of the Butcher, Fishmonger and Cycle-Shop. *Energy Res. Soc. Sci.* **2020**, *62*, 101347. [[CrossRef](#)]
53. Mirza, N.; Afzal, A.; Umar, M.; Skare, M. The Impact of Green Lending on Banking Performance: Evidence from SME Credit Portfolios in the BRIC. *Econ. Anal. Policy* **2023**, *77*, 843–850. [[CrossRef](#)]
54. Paterson, F.; Baranova, P.; Gallotta, B. Towards a Conceptual Framework of Enterprise Support for Pro-Environmental Small and Medium-Sized Enterprises: A Contextualised Review of Diverse Knowledge Domains. *Local Econ.* **2022**, *37*, 142–168. [[CrossRef](#)]
55. Afolabi, H.; Ram, R.; Hussainey, K.; Nandy, M.; Lodh, S. Attitudes and Perspectives of SMEs’ Sustainability Reporting Toward Transition to the Net Zero Carbon Emissions. *J. Appl. Account. Res.* **2023**, *in press*.

56. Fenton, A.; Ahmed, W.; Hardey, M.M.; Koral, C. Exploring SMEs Attitudes to Net Zero & Social Media: Action Case Research as a Force for Good. In Proceedings of the British Academy of Management Conference, Manchester, UK, 31 August–2 September 2022.
57. Liesen, R.J.; Swanson, M.M.; Case, M.P.; Zhivov, A.; Latino, A.R.; Dreyer, D. *Energy Master Planning toward Net Zero Energy Installation: Portsmouth Naval Shipyard*; ASHRAE: Peachtree Corners, GA, USA, 2015.
58. GOV.UK. UK Becomes First Major Economy to Pass Net Zero Emissions Law. Available online: <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law> (accessed on 20 October 2022).
59. Johnstone, N.; Labonne, J. Environmental Policy, Management and R&D. *OECD Econ. Stud.* **2006**, *2006*, 2.
60. Marsh-Patrick, A. *Company GHG Emissions Reporting—A Study on Methods and Initiatives*.(ENV. G. 2/ETU/2009/0073); European Commission: Brussels, Belgium, 2010.
61. DBEIS. Department for Business, Energy and Industrial Strategy: Guidance Participating in the UK ETS. Available online: <https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets> (accessed on 4 November 2022).
62. Fabrizi, A.; Guarini, G.; Meliciani, V. Green Patents, Regulatory Policies and Research Network Policies. *Res. Policy* **2018**, *47*, 1018–1031. [[CrossRef](#)]
63. Hockerts, K.; Wüstenhagen, R. Greening Goliaths versus Emerging Davids—Theorizing about the Role of Incumbents and New Entrants in Sustainable Entrepreneurship. *J. Bus. Ventur.* **2010**, *25*, 481–492. [[CrossRef](#)]
64. Fresner, J.; Morea, F.; Krenn, C.; Uson, J.A.; Tomasi, F. Energy Efficiency in Small and Medium Enterprises: Lessons Learned from 280 Energy Audits across Europe. *J. Clean. Prod.* **2017**, *142*, 1650–1660. [[CrossRef](#)]
65. DECC. Department of Energy & Climate Change Annual Report and Accounts. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/447144/6.656_DECC_JG_Annual_Report_2014-15_AW_WEB.pdf (accessed on 27 January 2023).
66. Rexhäuser, S.; Rammer, C. Environmental Innovations and Firm Profitability: Unmasking the Porter Hypothesis. *Environ. Resour. Econ.* **2014**, *57*, 145–167. [[CrossRef](#)]
67. Laari, S.; Töyli, J.; Solakivi, T.; Ojala, L. Firm Performance and Customer-Driven Green Supply Chain Management. *J. Clean. Prod.* **2016**, *112*, 1960–1970. [[CrossRef](#)]
68. Pham, N.T.; Vo-Thanh, T.; Shahbaz, M.; Huynh, T.L.D.; Usman, M. Managing Environmental Challenges: Training as a Solution to Improve Employee Green Performance. *J. Environ. Manag.* **2020**, *269*, 110781. [[CrossRef](#)] [[PubMed](#)]
69. BBB. British Business Bank: Smaller Businesses and the Transition to Net Zero. Available online: https://www.british-business-bank.co.uk/wp-content/uploads/2021/10/J0026_Net_Zero_Report_AW.pdf (accessed on 5 November 2022).
70. Long, T.B.; Looijen, A.; Blok, V. Critical Success Factors for the Transition to Business Models for Sustainability in the Food and Beverage Industry in the Netherlands. *J. Clean. Prod.* **2018**, *175*, 82–95. [[CrossRef](#)]
71. Cao, Z.; Mu, Y. Social and Environmental Regulations and Corporate Innovation. *Sustainability* **2022**, *14*, 16275. [[CrossRef](#)]
72. Hsueh, L.; Bretschneider, S.; Stritch, J.M.; Darnall, N. Implementation of Sustainable Public Procurement in Local Governments: A Measurement Approach. *Int. J. Public Sect. Manag.* **2020**, *33*, 697–712. [[CrossRef](#)]
73. Sarkis, J.; Zhu, Q.; Lai, K. An Organizational Theoretic Review of Green Supply Chain Management Literature. *Int. J. Prod. Econ.* **2011**, *130*, 1–15. [[CrossRef](#)]
74. Ruan, R.; Chen, W.; Zhu, Z. Linking Environmental Corporate Social Responsibility with Green Innovation Performance: The Mediating Role of Shared Vision Capability and the Moderating Role of Resource Slack. *Sustainability* **2022**, *14*, 16943. [[CrossRef](#)]
75. Gereffi, G.; Fernandez-Stark, K. *Global Value Chain Analysis: A Primer*; Duke CGGC: Durham, NC, USA, 2016.
76. Helfaya, A.; Bui, P. Exploring the Status Quo of Adopting the 17 UN SDGs in a Developing Country—Evidence from Vietnam. *Sustainability* **2022**, *14*, 15358. [[CrossRef](#)]

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Article

Learning from Each Other: UK Global Businesses, SMEs, CSR and the Sustainable Development Goals (SDGs)

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Abstract: Situated within the context of ‘Transforming our World: the 2030 Agenda for Sustainable Development’ and the associated 17 Sustainable Development Goals (SDGs), this article explores some current understandings about corporate social responsibility (CSR) and related ethical and sustainable business policies and practices within UK-based global businesses. It also considers the potential lessons for small and medium enterprises (SMEs) based on the approaches of global companies. The research engaged senior CSR managers from UK global brand businesses to discuss their CSR perceptions and practices. To the surprise of researchers, the participants described how they were moving past ‘CSR’ to instead use the SDGs as their framework. The findings suggest that global companies are reframing CSR within the broader concept of sustainability, influenced by the SDGs, and are willing to offer advice to SMEs as part of a broader supply chain collaboration process. While there is emerging literature focusing on the practical implications of the SDGs for global business, there appears to have been less attention to the potential for knowledge sharing between global companies and SMEs linked to the SDGs. Our research asked participants about recommendations for SMEs and these are also discussed in this paper. Our intention is to make a particular contribution to the latter area of inquiry and demonstrate the relevance of the SDGs to business, regardless of size.

Keywords: SDGs; knowledge exchange; sustainable development; sustainability; CSR; global business; SMEs

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1. Introduction

This paper is based on the qualitative data generated by telephone interviews with senior CSR managers of UK-based global companies. The interviews were prompted by a business seminar around the theme of what corporate social responsibility (CSR) meant for Small and Medium Sized Enterprises (SMEs). Interviews were arranged using the online LinkedIn platform to ask managers about their current views on CSR and business practices related to this. We specifically wanted to explore how larger businesses were engaging SMEs within their supply chains on CSR. We were interested in, first, what senior managers in global companies are doing to achieve their CSR and related ethical and sustainability goals and, second, what SMEs might learn from this practice for their own engagement with issues of responsibility, ethics, and sustainability and other more general organizational concerns such as stakeholder relations, governance, accountability, and reporting.

During the interviews, it became apparent that senior managers in large global businesses are moving away from the language of CSR to embrace what they describe as the broader concept of sustainability. Global businesses use practices such as scientific targets, supply chain mapping, procurement, responsibility for products beyond the factory gate, and engagement with the Circular Economy and other multi-stakeholder initiatives in their efforts to apply the Sustainable Development Goals (SDGs) to business practice. In addition, the data collected from these interviews also suggested a change in approach for global business in that, rather than cost savings being the main justification for CSR,

interviewees talked, instead, of innovation and where CSR can add product or service value and competitive advantage. Such a shift in focus could drive significant innovation within organizations, such as the need for different skill sets for future sustainability managers, or that conversations about CSR, ethics, and sustainability should include an extended group of internal stakeholders such as accountants, facilities, operations, and the human resources management (HRM) function.

This article is structured in the following way. First, the literature review explores the changing concept of CSR—potentially influenced by frameworks such as the SDGs, ISO 26000 [1], the UN Global Compact, and the growing emphasis of Environment, Social, and Governance (ESG) investment criteria—and how this might reflect changes in social and technological understanding. In this discussion, the importance of individual values and sensemaking are highlighted. Second, the methodology section explains the decision to use telephone interviews as the main method of data collection along with the analytical approach. Third, the findings section provides an outline of respondents' comments regarding their assumptions about CSR and how their reframing of the concept as sustainability has affected practice. This section also considers the role of global business advice to SMEs regarding CSR engagement. Fourth, the discussion section concludes that if the construction of CSR is decided within the individual business, then the sensemaking of those individuals with a responsibility for directing the business response to CSR and sustainability is an important factor in understanding how these concepts are delivered in practice.

2. Literature Review

We begin by exploring the most recent ideas regarding what CSR is and how it is made sense of and enacted within business alongside related concepts such as business ethics and corporate sustainability. Our literature review also considers tools for CSR implementation and delivery including the use of ISO 26000 and other practical frameworks for analyzing CSR and sustainability in business. Given the growing importance of the SDGs for business and its stakeholders in relation to CSR, we include a succinct review of the literature on sustainable development, business, and the SDGs, noting how the SDGs have given renewed impetus for sustainable development in business, academic, and practitioner circles. As part of this process, there is an emerging academic literature on the relevance and application of the SDGs in business contexts [2–6]. Research on the perception of the SDGs in relation to CSR appears to be more limited to date [7,8]. Recent debates on CSR and environmental sustainability and their possible impacts for business have shifted to the role of individual actors [9]. The organizational level of analysis may be where CSR is expressed, however, it is individual business actors who are responsible for developing strategy, decision-making, and delivering CSR initiatives [10]. With this in mind, and with the objective of foregrounding individual managers' understanding of CSR and the influence this has on business practice, the literature around sensemaking and values [11,12] will also be discussed.

2.1. *The Changing Nature of CSR*

The concept of Corporate Social Responsibility (CSR) continues to evolve [13,14] and as such, presents a major challenge to business practice [15,16]. Hack et al. [17] carried out a critical review of CSR literature from the 1950s to the 2010s and concluded that CSR began as, and continues to be, an ambiguous and contested notion. Other commentators have described the concept of CSR as 'embryonic and contestable' [18] and, without any real, clear substance or definition, meaning very different things to different people with different purposes [19]. CSR literature continues to be highly fragmented with input from different disciplines and levels of analysis [10]. The ongoing evolution of the concept has made CSR, and how it is enacted by business in society, extremely problematic. This has given rise to more substantive critiques of CSR with some authors focusing on greenwashing linked to perceived gaps between CSR communications and actions [20]

and others who present more fundamental challenges to CSR by advocating notions of corporate social irresponsibility [21] or highlighting the structural and functional limits of CSR [22]. Nonetheless, CSR remains a prominent area of academic inquiry and seems likely to continue to have practical applications within many businesses and to resonate with key stakeholder audiences internally and externally for the foreseeable future [23].

One of the leading CSR academics for over more than four decades, Archie Carroll, insists that alternative concepts such as business ethics, corporate citizenship, stakeholder management, sustainability, and the more recent Creating Shared Value (CSV) 'are inter-related and overlapping terms that have been incorporated in CSR, which [remains] the benchmark . . . of the socially conscious business movement' [13] (p. 87). Carroll's Pyramid of CSR has been widely critiqued and reframed in diverse contexts by other researchers, which Carroll himself has welcomed: 'This is how theory and practice develops' [14] (p. 7). Although Frynas and Yamahaki do not consider Carroll's Pyramid to be one of the grand or middle-range theories of CSR [24], they nonetheless acknowledge that it is an established conceptual framework or typology for CSR sensemaking.

Several CSR-focused literature reviews e.g., [17,23,25,26] have examined the development of the CSR concept, not through what business does, but rather how it is discussed and defined in academic literature. In effect, those papers act as 'historical summaries' [27] reviewing secondary data which is itself often based on secondary data such as company reports. These papers e.g., [26] are all based on longitudinal literature reviews that look at the development of the CSR concept with a focus on developing a definition—the structure of the definition, the themes within the definition (e.g., [28])—rather than on the changing nature of the practice of CSR and what might be driving those changes. One exception is Kolk [26] who acknowledges that societal expectations about business behaviors have increased and that this has sometimes been linked to CSR debates.

Part of the plethora of approaches and focus on definitions may be a result of the nature of academia itself and the desire to be precise in meaning. However, the focus on definitions may also be a result of the various perspectives through which CSR is viewed; for example, are we looking for a normative definition [28] or new normative models [29]? Or are we looking from an international business perspective [26] or how CSR as a specialist topic has been framed in mainstream business journals as 'good for business' focusing on the financial bottom line [25]? Either way, fixating mainly on the definition itself is often a distraction from how CSR can help business develop responsible practices [28]. The different definitions reflect, sometimes inadvertently, the 'inevitable metamorphosis' [27] of CSR within the changing economic and cultural contexts within which business operates. There is also recent interest in business as an agent of social change reflecting transformation in external contexts [25]. Waddock [30] calls for a more challenging agenda of systemic business renewal where business transformation is about deep adaptation and change in businesses and the wider contexts within which they operate. Waddock argues that 'businesses are unlikely to transform until the surrounding ecosystem demands that they do so' [30] (p. 1). A hint of the potential for this kind of transformation arrived with the COVID-19 pandemic which has raised some fundamental questions about CSR thinking and action as Crane and Matten [31] suggest. Their future CSR research agenda advocates for: more inclusive approaches to understanding and involving stakeholders; more emphasis on global societal risk analysis; greater attention to the rights and needs of vulnerable workers in supply chains; and a reconceptualization of business as a vital part of global-local societal governance systems.

For the purposes of this article, the literature review by Sarkar and Searcy [28] is drawn upon where the authors start from the assumption that the concept of CSR continues to evolve over time and uncovers key terms as well as mapping the relationships between terms. The authors [28] identify six recurrent dimensions that underpin CSR as economic, social, ethical, stakeholders, sustainability, and voluntary, and propose the following definition that embraces these themes and resonates well with the ideas explored in this article:

‘CSR implies that firms must foremost assume their core economic responsibility and voluntarily go beyond legal minimums so that they are ethical in all their activities and that they take into account the impact of their actions on stakeholders in society, while simultaneously contributing to global sustainability’ [28] (p. 1433).

2.2. Tools for CSR Implementation and Delivery

In response to the complexity and challenges of CSR, businesses may look towards guiding frameworks and tools that can help them in moving forward or finding standard ways of reporting [32]. Baumgartner [32] argues that there is less within the academic literature on how firms manage CSR in comparison with other topics of interest, including links between CSR and firm performance, drivers, barriers, and the business case.

Several frameworks, tools, and instruments are discussed or proposed in the literature including ISO 26000, the Global Reporting Initiative (GRI), and the United Nations Global Compact (UNGC) [33], and the more recent B Corp Certification scheme which considers CSR activities and accomplishments [34,35].

Although these CSR-related tools are usually considered as separate frameworks, Zinecko et al. [33] found most of them to be generally complimentary with each other. However, there are criticisms of each in, for example, how useful they are to firms trying to develop a practical approach. For example, ISO 26000 is argued to take an explicitly moral perspective [36] with additional criticisms in areas such as corporate governance, perhaps due to its rootedness in a quality management approach [37]. The motivations for committing to a standard may not always be clear but there is evidence that its main usefulness is the ability of stakeholders to accept the standards the company is working towards. With this comes credibility and recognition for the efforts made by the business. There are several papers discussing the usefulness of ISO 26000 as a framework for addressing CSR including the work of Zinecko [33] and Moratis [36,37].

ISO 26000 has a familiarity in its approach to companies who already have certification to other CSR-related ISO standards, such as quality or environment. However, unlike ISO 9000 [38] or ISO 14001 [39] and related standards, ISO 26000 is not externally certificated and, reflecting the voluntary nature of CSR, is a guidance standard only. Commitment to ISO within a business is both time-consuming and costly and the lack of external accreditation must be a likely reason for its lack of uptake. However, ISO 26000 has advantages in being able to offer a standardized and widely accepted business definition of CSR within a standardized approach with which firms are familiar. In this, ISO 26000 provides both a definition and a tool [36]. In addition to promoting CSR as a ‘corporate derivative’ of sustainable development [33] (p. 499), the mission of ISO 26000 is to help contribute towards sustainable development.

2.3. Sustainable Development, Business, and the SDGs

Sustainable development is a notion that emerged from the work of the World Commission on Environment and Development (1983–1987) and the publication of *Our Common Future* [40,41], popularly known as the Brundtland Report. Although the report was mainly directed at governments through their various agencies and ministries, it also targeted private enterprises of all sizes, recognizing that they had the potential to make significant contributions to Brundtland’s global agenda for change towards sustainable development. Brundtland advocated sustainable development as a new approach to economic growth that would not exceed the planet’s future environmental or social capacities by considering the interrelationships between people, resources, environment, and development.

Attention to the role of business in sustainable development first gained prominence at and following the 1992 United Nations Conference on Environment and Development—the Earth Summit. The Business and Industry sector was one of nine major groups officially recognized in Agenda 21, the UN’s non-binding action plan for sustainable development post-Rio [41]. Over the following decade, both practitioners and academics began to publish extensively on practices and theories of business and sustainable development [42–45]. The

World Business Council on Sustainable Development was established in 1995 as a CEO-led organization of international member companies. Corporate environmental reporting also gained momentum during this period, particularly in Europe and North America. A 1999 study by KPMG [46] found that 24% of 1100 companies surveyed had published an environmental or Health, Safety, and Environmental (HSE) report in contrast with 1993 when only 13% had done so [47]. Although some companies such as the Co-operative Bank (2002), L'Oréal (2005), and Peugeot Citroen (2008) published sustainable development reports in the 2000s, many others used the language of corporate responsibility (e.g., BAE Systems, 2007; Coca Cola, 2005; O2, 2006), corporate citizenship (ExxonMobil, 2009), and sustainability (British American Tobacco, 2009; Shell, 2009) to describe their public reports to stakeholders. At the same time, in academic circles, there appeared to be a greater emphasis in research and publications on CSR, corporate responsibility, and sustainability in business and a less explicit focus on business and sustainable development per se [16,48–53].

The revival of sustainable development In business, academic, and practitioner contexts both conceptually and practically came in 2015 with the launch at the United Nations 'Transforming our World: the 2030 Agenda for Sustainable Development' and the associated 17 Sustainable Development Goals (SDGs) that aim to achieve a safer, more sustainable world by 2030. The SDGs include action on climate change, responsible consumption and production, industry innovation and infrastructure, and decent work and economic growth—key strategic and practical challenges facing business and society [54,55].

The SDGs succeeded the Millennium Development Goals (MDGs)—a 2000–2015 blueprint agreed to by all the world's countries and major international development institutions. Whereas the MDGs were closely associated with governmental aid programs and civil society organizations with less explicit business relevance, the SDGs 'offer a crystal ball for business . . . investments and new business opportunities and they represent a new toolbox for innovation and market development.' [56] (p. 22).

From a more strategic global business perspective, the SDGs and 2030 Agenda for Sustainable Development constitute an international partnership agreement between all members of the United Nations. The SDGs are globally and locally relevant, urgent, and legitimate, and they also offer businesses a formal inter-governmental, inclusive sustainability framework underpinned by SDG17 'Partnerships for the Goals'. The implementation of SDG17 includes the development of business-community partnerships and other forms of cross-sector collaboration where diverse forms of multi-stakeholder engagement and contributions are needed and valued [57–59].

Novozymes' Claus Stig Pedersen, Head of Corporate Sustainability and Public Affairs, describes the SDGs as a 'great gift to business', in that they 'represent a long-term political framework for business to contribute to sustainable development' and one which is 'in better sync with societal needs and long-term priorities' in comparison with MDGs. Pedersen also believes that private sector engagement with the SDGs 'could help secure the long-term license to operate' and consequently, business success [56] (p. 22).

For example, sustainability guru John Elkington [60] reports that delivering the SDGs in four sectors: energy and materials, food and agriculture, cities, and health and well-being 'could generate market opportunities of over \$12 trillion a year by 2030—and that's considered a conservative estimate' [60] (p. 30).

While Elkington [60] acknowledges that the SDGs are 'an impressive and comprehensive wish list in terms of what needs to be done-', he goes on to say that 'without a very different level of business involvement, the results are likely to be disappointing' [60] (p. 148). There are echoes here of Elkington's earlier recall [61] of his own triple bottom line sustainability framework which he argues has failed to transform business practice. In a related vein, a 2020 study by PricewaterhouseCoopers (PwC) and the UN Development Programme in China [62] found encouraging signs of high levels of business awareness (89%) and communication (69%) about the SDGs, but almost half of the Chinese companies surveyed had 'no clear idea about how to evaluate the SDGs' [62] (p. 9).

Notwithstanding such implementation challenges, one of the suppositions underpinning the SDGs is that a focus on economic growth and technology can help to end global poverty and business considers the role of government to be about creating ‘enabling environments’ for the private sector to deliver [63] (p. 374). The goals were designed with business engagement at the center and involved significant input from businesses from the start—not least in looking for alternative finance for sustainable development after public development budgets suffered from the 2007–8 global financial crises [3]. The fundamental assumption of the SDGs is that sustainable development will not happen without the private sector [2] and this, in turn, creates tangible business opportunities. The discussion in this paper focuses on how the SDGs affect the way in which business potentially frames and delivers CSR and within that, how the individual and collective values and sensemaking of those responsible for implementation are key; an area where there appears to be limited academic literature to date.

2.4. Sensemaking and Values

While ‘sensemaking’ can be a general phrase (see, for example, [64]), the definition used here is based on the process put forward by Karl Weick [65] whereby ‘people discover their own inventions’ [65] (p. 15) and construct their own reality [66] (p. 316), thereby creating and reinforcing their own world view. For example, Weick [65] explains that problems do not just arise but need to be recognized, actively constructed, and engaged with before a person will start to make sense of it. CSR is an example of what Weick [65] (p. 9) called a complex, ‘messy’ problem for individual managers as they manage the uncertainty of conflicting ideas. In such contexts, Weick claims that an individual will kickstart their sensemaking process by ignoring information that does not already agree with their existing values, beliefs, and attitudes. For example, information about climate change seen as frightening could be dismissed in order to reduce personal uncertainty and anxiety [67]. There is recent growing interest in the micro-level of how individuals within work draw on sensemaking concepts with respect to CSR [10,68,69]. This has reflected interest in wellbeing at work, as well as motivation to engage with CSR at work and how CSR might motivate individuals to engage with work [70]. However, despite this interest, there is still a gap in understanding how individuals make sense of CSR differently [10], with merit in looking to understand these processes better [69].

At the heart of the process of sensemaking [65] is the need to comprehend the social world and all the implications that has for self-identity. Self-identity is a reflection of how an individual views the social world, along with their own place within that. Values are central to identity [71] (p. 119) and motivation [72] (p. 121) and therefore are an essential part of sensemaking. Values, infused with ethical components and cues to action, produce different emotional reactions to information and thus influence how information about concepts such as CSR are received, understood, and engaged with. This process may threaten, challenge, or support the individual’s self-identity. This means, as Weick [65] (p. 133) expresses it: ‘we see what we believe’. This also implies that an individual’s beliefs about their own responsibilities will be anchored to the actions they will consider and the approaches they will sponsor [73]. Drawing on Rokeach [74], an individual’s expressed beliefs about a topic can be viewed as an expression of values [12,74]. An individual may be aware or unaware about their values but their values will be understood from what that person says or how they act. This means that, similar to sensemaking being a quest for ‘plausibility rather than accuracy’ [65] (p. 17), Rokeach [74] (p. 113) draws on Jastrow [75] (p. 284) to see individual consciousness as belief-seeking rather than fact-seeking. In the context of this current research, this implies an understanding of how individuals think about and act on CSR and sustainability is considered a reflection of their own individual values and how they make sense of the world around them.

3. Materials and Methods

To address the research problem, a methodology was needed that could generate rich exploratory data based on individual perception and experiences. However, generating such data can be time consuming and the target participants were senior, very busy, and difficult to engage. To overcome the obstacles to access, while facilitating the opportunity for discussion, one-on-one telephone interviews were set up with either the director or senior manager responsible for CSR within UK-based global businesses. There were 15 interviews in total, averaging 50 min each. The firms are all ‘household name’ companies in the UK and are from a variety of different business sectors, including retail, pharmaceuticals, engineering, textiles, hospitality, and legal services. The firms belong to what Pederson [29] refers to as the ‘high end on the CSR scale’: that is, they are leaders within their own industries and have received awards and public recognition for their approach to CSR. The respondents were identified through the researchers’ LinkedIn network and were invited to help with research in preparation for a regional Green Business Network (GBN) seminar on CSR in SMEs. At the start of the interviews, permission was given to record the calls and there was agreement that the data collected might be used for additional research. Respondents were assured of the anonymity of their input, although most were happy for GBN members to be told of their involvement.

The interviews were semi-structured in that there was an interview schedule, but this was not adhered to rigidly. Rather, the researcher was often prompted to ask additional questions, probe responses given, and give respondents the space to make sense of their own thoughts by talking freely without interruption. All participants were asked:

- What does CSR mean to you?
- What do you do that you consider CSR?
- What advice do you have for SMEs?

The use of telephone interviews rather than face-to-face was based largely on expediency and the availability of these senior managers. Literature about the merit of face-to-face versus telephone interviewing is mixed [76] but in this instance it was a conscious decision. If interviews generally can be defined as ‘negotiated accomplishments of both interviewers and respondents that are shaped by the contexts and situations in which they take place’ [77] (p. 663), then it is important to acknowledge the context (telephone) and the possible ramifications such as no sight of body language, possible technological hindrances, etc. However, advantages can also be noted such as wider geographical distribution of interviewees, reduced time and travel costs, and unobtrusive note taking. In short, ‘interacting from separate physical locations can be more convenient for both parties, letting each stay in a familiar and safe environment’ [78] (p. 265). Indeed, Unnithan [79] argues that telephone interviews were always a sound second method of qualitative data collection when face-to-face interviews were not available, and which during the COVID-19 pandemic, enabled qualitative research to continue.

The steps and techniques from data collection to coding followed a methodological approach, as follows: ‘Word Dictate’ was used to produce a transcript from each interview recording; the researcher then listened to each recording while correcting any errors in the transcript. Two copies of each transcript were printed off, one put aside for context, and one used to generate codes and data. Coding of the interview data was intuitively developed from the data [80]. For example, while the question ‘what does CSR mean to you’ produced a grouping of responses, other ideas (e.g., CSR as evolution, importance of the supply chain) within that code came from the themes identified in the data rather than pre-developed by the researcher. In this way, like Pederson [29], the data begins with an analysis of how managers in real life perceive CSR with codes cross-referenced between and within cases for consistency.

4. Findings

The research findings are discussed in the following sections which are based on the three research questions. Table 1 below provides a summary of the main findings.

4.1. What Does CSR Mean?

A strong theme in the data from all interviewees (identified here as R#) was that the definition of CSR had changed. It was felt that the term ‘CSR’ was helpful only in that it was recognizable to non-technical stakeholders. CSR was felt to be the ‘old way’ (R10) and about ‘community engagement and local suppliers’ (R3), ‘short term quick wins’ (R9), ‘reporting’ (R2), ‘philanthropy’ (R5), and ‘compliance and recycling’ (R4). One manager said that ‘CSR as a term moves in and out of fashion . . . but it’s not CSR now, it’s just about normal business’ (R5). Another said that CSR ‘is all about trust, reputation, and communication and how it is coordinated. It’s about how you build partnerships and what those partnerships aim to achieve and how’ (R8). All interviewees talked about this change in ideas around CSR and some explicitly used the term ‘evolution’ (R2, R8, R9, R11).

Some examples cited by interviewees about the reasons for this change were resource constraints, social aspirations, artificial intelligence, and overall values. As R5 explained: ‘change comes through values. People get bored talking about money: we are doing this because we don’t want people in the supply chain to suffer. If I’m doing it for that, why should I think the person opposite me is any less human?’

In preference to the term ‘CSR’, several interviewees said that they preferred ‘sustainability’, arguing that it has ‘more credibility’ (R1) and a greater emphasis on ‘environmental risks and benchmarking’ (R3). Indeed, R3 explained how ideas about the three pillars of sustainability (that is, economic, environmental, and social—or, informally, people, planet, and profits (see, for example [61]) were being updated through practice into new business models. These moved business away from linear economic models like the Doughnut economic model [81] and toward Circular Economies (see, for example [82]). Nonetheless, a theme within the data was that the term ‘sustainability’ could also mean ‘different things to different people’ (R4) and involve both macro and micro issues for business. In this respect, agreeing on a working definition across groups of stakeholders was considered useful. Some respondents (e.g., R4) said that they referred to definitions of sustainability based on the Brundtland Report [40,41] which focused on the idea that development should meet the needs of both present and future generations. Other interviewees commented that there was a feeling in business that sustainability meant something ‘broader’ (R5) than CSR and was about business opportunities and adding value within a period of potential crises and change rather than focusing on reporting, compliance, and cost savings. In other words, CSR could be considered a normal part of what the business does, or, as (R8) put it, an expected ‘core value’ of the organization. (R1) explained that FTSE 100 trends show that all businesses are moving rapidly towards energy efficiency and that this was important for large businesses because of their need to plan at least 18 months ahead. Respondents who had previously viewed CSR in this narrower way appeared to have had to challenge their own assumptions about what CSR meant and the potential that the concept holds for their practice.

The ‘evolution’ from CSR to sustainability and the broadening of what is considered by large businesses as relevant was felt by respondents to also be reflected in stakeholders’ expectations. Indeed, much of the evolution of the CSR concept was driven by public-facing business with retailers such as M&S and John Lewis being particularly proactive. Although some felt that some stakeholders’ demands were unrealistic and merely over-reactive to social media stories, some respondents felt that business credentials were not asked for regularly or consistently enough. As R9 explained: ‘we have moved from can you tick a box, to have you got a policy, to show us your policy, to show us what you do and how we can work alongside you’. Interviewees felt that social media has raised awareness of sustainability issues and that this was also driving change within business. Social media heightened the importance of communicating with a wide range of stakeholders and

staying proactive with those communications to ensure that companies ‘wrote their own story before anyone else did’ (R7).

There was also acknowledgment that companies had a duty to work with others and be transparent about their behaviors. Recognition that sustainability was a ‘journey’ (R11) meant that businesses should not be afraid to admit they still had progress to make. The ‘Blue Planet Effect’ (e.g., R5, R10, R11) and the power of the BBC program [83,84] to engage audiences with the issue of ocean plastic waste was an example drawn on to support the view that social media had the power to rapidly drive change. Indeed, in contrast to the work of the Ellen MacArthur Foundation [85] which had been striving to develop and share a similar message for years, Blue Planet was felt to be energizing conversations that were leading to a more systems-based approach towards plastic waste (e.g., R10, R11).

Table 1. Summary of main research findings.

Original Research Questions	Main Findings
1. What does CSR mean to you?	Dated; old fashioned; tick box reporting; greenwash; compliance and recycling; Use the SDGs for greater transparency, to support new business models and energizes conversations.
2. What do you do that you consider to be CSR?	Use scientific targets from the SDGs for strategic alignment, delivery, collaboration, and communication; Engage supply chain with new business modules including the circular Economy and Donut Economics; Use of ISO 14001 tools to improve environmental management; Communicate with stakeholders.
3. What advice do you have for SMEs?	Understand the SDG targets can make the abstract (cf. CSR) concrete; contribute locally to global solutions; Tell your story; Understand where your business needs to take responsibility; Integrate sustainability as a core value relevant to your offer.

4.2. The Importance of the Supply Chain

The role of, and the need for collaboration within, the supply chain was a key theme in the interviews with some suggesting that that this was the most significant recent change in business thinking towards sustainability. There was a recognition that any company looking at environmental or social impact was likely to find up to 90% of that impact within the supply chain, with global procurement meaning that companies could ‘not expect to live in isolation’ (R3). Public expectations of business were never greater, with a need to deliver quality of life within the supply chain as well as profit (R15). It was suggested that sustainability should be, and increasingly was, part of every conversation with every customer and every buyer: ‘we ask what matters, what should matter, and what should be our agenda’ (R8) in order so that agendas reflected what stakeholders wanted (R9) and a risk-based approach could be taken that explored all aspects of responsibility both up and down stream (R7). Drivers for change were identified as the Rayna Plaza collapse [86] (e.g., R2, R11, R12) for the retail sector but more recently, the UK Modern Slavery Act (2015), where most companies had been found to be non-compliant even though meeting the requirements of the Act was the new threshold to enter public procurement. R5 explained that, in her conversations with her suppliers, she asked: ‘Are there any slaves in your supply chain? How do you know? How many slaves are ok? 10? 15? Is it ok if even one child is making what I buy? We are not talking about the money—but how many customers would leave us.’

The need to ‘not live in isolation’ (R3) was seen more positively as a recognition of the need to work in partnership throughout the supply chain to meet the sustainability

challenges all companies were facing. This meant seeing challenges as opportunities for innovation and adding value through collaboration. Two broad approaches were described in attempting greater collaboration. Firstly, companies looked at local external partnerships, for example, with the Environment Agency, planning departments, and local authorities to understand how they may impact or be impacted by change at a local level. For example, R2 described how continual dialog meant they knew that changes to road design were being discussed so that they were able to explore how to minimize flood risk to a local outlet. Local partnerships could also mean collaboration within the business, for example, with research and development departments or with marketing to change consumer expectations (R7). Secondly, the notion of the Circular Economy encouraged a systematic approach; a recognition that challenges could not be met alone and ‘eco-system thinking’ (R10) was needed in the supply chain. This was viewed as a new way to meet customers and to understand their expectations and what could be achieved. Indeed, small companies within the supply chain were thought to be potentially very agile, enabling a large company to deliver on its ideas through innovation (R12).

4.3. How Businesses Act on Sustainability

In response to being asked about the technical delivery of CSR, responses can be categorized within four main areas: the circular economy, scientific targets within the UN SDGs, ISO 14001/26000, and communication. This section will explore how each of these ideas were discussed by managers in the interviews.

4.3.1. The Circular Economy

The concept of the Circular Economy (CE) meant that businesses could justify taking a more strategic approach to materials rather than offering an immediate reaction to ‘hot’ (R4) media topics. This could enable longer-term thinking and provide opportunities for innovation and different approaches. For example, in terms of the call for dealing with plastic offcuts, the principles of CE meant acknowledging that ‘90% of our plastic waste is product sent out into the economy and asking what we can do to take responsibility for that’ (R4). Solutions that respondents said they were working with included changing the business to provide more service and less product, changing the product, and developing e-commerce and software applications for the supply chain to track the product beyond the factory gate. The CE challenge was thought to be about questioning the sustainability of the goods and services being provided, which, in turn, meant having different conversations. Rather than meetings with the health, safety, and environment manager to demonstrate compliance or measure recycling, more likely were conversations with marketing, design, and business development teams to eliminate waste rather than just reduce, and to use sustainability as an opportunity to get ahead of competitors.

4.3.2. Scientific Targets within the UN SDGs

The Sustainable Development Goals (SDGs) were also being used to define which aspects of responsibility were most important to the organization. One respondent felt that the SDGs helped to bring ‘new life and new understanding into a stale organization’ (R2) and to encourage managers to think about where the business could add value. It was acknowledged that the current business climate was ‘nervous’ (e.g., R2, R3) with concerns about Brexit and government debt, and there was a need for ‘courage’ in business (R2). Where business was struggling with ‘change, uncertainty, and complexity’ [87] from all directions, the SDGs were felt to be helpful in addressing the challenges that brought forward decision making. The SDGs could help these challenges in four principal ways: (i) assessing strategic alignment, (ii) partnership development, (iii) scientific targets, and (iv) communication.

- (i) Strategic alignment: Respondents felt that using the SDGs as a framework enabled employees at all levels of the business to think about potential positive and negative contributions and organizational activity against each of the 17 main goals. This

- encouraged a more strategic approach where opportunities to make the greatest difference could be identified and enabled greater ‘collective responsibility’ (R9) within the business as a way forward;
- (ii) Partnership development: After deciding where contributions could be best made, the SDGs were felt to encourage a collaborative approach where the business could think about how to deliver against the goals, what projects, what changes within the business and within the supply chain needed to happen, and who was needed as a partner to help achieve this. There were also opportunities to work with those communities that were most disadvantaged within the business’ supply chain to address the goals from ‘the bottom up’ (R6);
 - (iii) Scientific targets: Taking a risk-based approach, the SDGs enable the setting of measurable targets based on the best that science could provide. While there was a ‘trend to report the story rather than the numbers; numbers do not go away as they are respected management tools’ (R9). Scientific measurable targets were helping to facilitate a ‘fundamental shift in the system’ (R6) and ‘driving radical materials reduction’ (R11);
 - (iv) Communication: Specifically, within the SDG framework, communication encouraged a qualitative as well as quantitative approach to reporting. The language of the goals encouraged those in the business to use its power and influence to good effect, explaining why a project was important as well as how targets would be achieved. The SDGs could encourage a perspective towards ‘collective responsibility’ (R4) towards actions within the firm, ‘not just the public side, that’s just the tip of the iceberg’ (R9) but fundamentally about the ‘sharing of skills’ (R9) and ‘who we are as a business’ (R3).

4.4. ISO 14001 and ISO 26000

The two internationally respected standards referred to in connection with CSR were the environmental standard, ISO 14001, and the social responsibility standard, ISO 26000. These were only briefly discussed by respondents but were clearly important enough to be referred to without being prompted in the interviews (e.g., R3, R6, R7, R9). As a well-established and respected standard within the supply chain, ISO 14001 was a clear tool for continuous improvement and could provide clear guidance and measurement for addressing environmental issues as well as helping those in the business think about how the business operated. There was no reference made in the interviews to the updated 2015 standard although two ideas dominant within that revision were referred to, namely the need to influence the supply chain and to engage the whole organization in delivering environmental improvement. The latter concept was acknowledged as both essential and very difficult to achieve.

ISO 26000 was referred to less often than ISO 14001, but some hope was expressed that increasing interest in sustainability through the SDGs might lead to greater understanding of how ISO 26000 could increase acceptance of what business responsibility means. The lack of formal accreditation to ISO 26000 did seem to deter its use by reinforcing CSR as optional but, interestingly, one respondent (R7) said that whilst they were currently using the SDGs as a framework, they had committed to work towards ISO 26000 from 2019: R7 said this was largely because ISO 26000 enabled a clear definition of CSR and a common language to be used with stakeholders.

4.5. Communication Generally

Communication was highlighted by respondents as being a vital part of CSR. A potential negative side of which was ‘greenwashing’ (R3), where CSR was focused on marketing specific, sometimes spurious, benefits while failing to address deeper issues with the product or business (see [88] for example). Nevertheless, the ‘story is important’ (R9) for both internal and external stakeholders, with the language used and the values that language reflected a key ‘output’ (R7) of the business. Communication was shown to be

important in two ways: firstly, as part of media/social media interest in business behavior and increasing expectations from stakeholders to behave more responsibly and take a leadership role with global problems that transcended national interest. For example, as R4 explains, ‘sustainability is a hot topic in the media, so it is important that we can codify what we do’. Secondly, communication was important as part of an ongoing ‘conversation’ (R8) with stakeholders both internal and external to the business. In this, communication was about more than the story but included advice to customers, practical support, ways to track achievement, and empowering stakeholders to engage.

4.6. Assumptions about SMEs

The original purpose of these telephone interviews on which this paper is based was to understand more about what larger companies meant by CSR so that managers in SMEs could learn from that for their own practices. The ideas and assumptions that interviewees expressed about SMEs suggest that there is work to be done to achieve greater collaboration and for sustainability within the supply chain to be delivered.

Assumptions about SMEs varied more than any other aspect of the interviews. Some respondents saw SMEs as diverse and difficult to engage with, whilst others saw that SMEs were agile and had great potential to help larger companies deliver CSR. Other respondents focused on the perceived difficulty for SMEs to engage with sustainability and changing agendas, either due to cost or complexity of ideas. Other interviewees put forward that SMEs were often already doing CSR but didn’t recognize it as such, largely because they were so embedded in their local communities. There also sometimes seemed to be an assumption that SME equated to family-run businesses.

What all interviewees did seem to agree with was that CSR was the responsibility of all types of businesses and that a ‘level playing field’ (R3) was needed for SMEs to engage. This meant that there was a need for SMEs to be able to access affordable support and for government and support organizations at different social and political levels to have the funds to engage SMEs with compliance and to ‘work out what is needed’ (R5). R10 suggested that the main issue for SMEs was that CSR could be dismissed as an abstract term that was only about corporate business and so, was not relevant to them. The challenge, therefore, was to help SMEs understand what CSR meant to them, how it matters to their customers, and how what they are doing already links with the ‘jargon’ (R9) used more widely in the business world. One respondent suggested that the title for the upcoming GBN seminar for SMEs should be ‘what is CSR and what the hell does it have to do with me?—from the assumption that it means nothing’ (R3).

4.7. Advice to SMEs

When discussing with interviewees the advice they might have for SMEs, the main ideas put forward emphasized the need for all aspects of the supply chain to understand the big sustainability issues as well as how each business, large or small, had a part to play in delivering responsibility. The importance of senior leadership support, preferably from a ‘charismatic leader who can bring people with them’ (R5), was highlighted.

The most common theme was the need for SMEs to understand what their businesses are about and then to focus on one or two things that build responsibility in that activity (e.g., R2, R3, R4, R5, R8, R9). R9 offered this illustration:

‘... for example, a butchers shop needs to show the cow was happy before it was slaughtered, that their supplier was responsible and that all cows were tagged and farmed locally so that customers feel they are helping local people and can trust in the butcher’.

In other words, this meant that CSR should be a ‘core value’ (R9) and linked at a strategic level to the heart of the business and what it does. It was meaningless, for example, for a local solicitor to sponsor a golf day for charity when its core value is in legal knowledge; instead, the practice should look to share its skills with a local legal aid charity with pro bono work for the community (R2). There was an idea that SMEs should ‘be generous’ (R10) to enable other firms and groups to take value from what they did not

need now. This meant ‘strategic alignment’ (R8) to something that was important to the community and adding value to both the community and the business. In this, CSR needed to be ‘more than just philanthropy’ (R5): SMEs needed to choose an approach that was strategically relevant. Another way that SMEs could identify the key activities to focus on could be to look at what the business was already engaged with, using a CSR lens, and to get on ‘the front foot, to share what you do and how you are part of the remedy’ (R9).

Like their own large businesses, the interviewees suggested that CSR for SMEs was about citizenship, stakeholders, and the environment, the three pillars of sustainability, being ethical and responsible, and looking at what will really ‘make a difference’ (R4) rather than what is current in the press. CSR effort needed to be about what was important for the business itself and, in this, the supply chain, climate change, and continuity were key. It was suggested that SMEs should ensure that they have a supply chain strategy that identifies different risk assessment scenarios and several options that offer the greatest mitigation. R2 encouraged SMEs to understand the future of their industry sector, how it was changing, and how CSR would play a part in that. Fundamentally, SMEs should look to act responsibly in their own context.

5. Conclusions

In looking to understand how senior CSR leaders currently perceive and act on CSR, this paper has shown how the nature of CSR is still evolving for businesses. As outlined here, senior managers who were interviewed from ‘high end’ global businesses view CSR as being superseded by broader ideas about sustainability and sustainable development. Respondents cited social media and TV programs, particularly the UK BBC Blue Planet series, to illustrate the pressures on them to respond to changing agendas within wider society. The SDGs framework was considered useful in helping business to engage with CSR and sustainability at both a strategic and practical level. Delivering against these goals, respondents talked about the importance of the overall supply chain, communication with stakeholders, scientific targets, and new business models. When talking about SMEs, there seemed to be some assumptions made but also an acknowledgement that they were key players in delivering agile and innovative responses. There are clearly many opportunities to facilitate joint working between global companies and SMEs within the supply chain.

One of the key contributions of this paper is that it reveals a policy shift in UK global businesses from CSR to sustainability with responsible senior managers increasingly recognizing the SDGs as a valuable sustainability framework for their companies. It is also one of the first papers to explore the potential for knowledge sharing between global companies and SMEs linked to the SDGs from the business perspective. It is not yet known how successful businesses will be in delivering the SDGs or how successful the SDGs will be in delivering their goals [60]. What the findings in this paper show is that several high-profile global businesses have recognized opportunities within the SDGs to engage in what they portray as more meaningful action. Our findings add value to recent literature that explores the relationship between CSR and the SDGs in business practice [7,8,88,89]. In many respects, our research demonstrates that the SDGs offer global businesses (and SMEs) ‘a unique opportunity to use the SDGs as a framework for improving CSR engagement’ [88] (p. 42).

Based on respondents’ comments, the SDGs appear to offer a framework that is clearer and more inspiring than ISO 26000 and can capture the imagination of senior leaders to promote innovation and new business models. Based on these research findings, the argument is that businesses of all sizes can make use of scientific targets within the SDGs to contribute to sustainability and tell both a qualitative story and to measure business progress. The potential to use the SDGs as a framework and common language may help support innovation and communication between different forms of organizations within the supply chain. Such increased communication may further support approaches such as the circular economy with the opportunity to engage smaller businesses with the redesign of components, design for longevity, and repair and reuse. While the potential to further

explore the relevance of the SDGs to SMEs is an opportunity for further research, the findings from this study have been used with some success to design MBA-level teaching based on the SDGs as a framework for ethics, responsibility, and sustainability [90]. SMEs can use the SDGs to help them engage with CSR and sustainability by understanding their impact on environment and society, and what they can do to reduce that impact and contribute, instead, to the solutions. In this way, the SDGs bring responsibility to the heart of what the organization does rather than in what it ‘gives back’. Promoting SME engagement within a similar framework should enable the development of both CSR and new sustainable business and economic models and help to facilitate both partnership and innovation across the supply chain and wider stakeholder collaboration linked to the SDGs [57–59].

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References

1. ISO 26000; How to Contribute to Sustainable Development. ISO: Geneva, Switzerland. Available online: <https://iso26000.info/> (accessed on 8 December 2022).
2. Muff, K.; Kapalka, A.; Dyllick, T. The Gap Frame-Translating the SDGs into relevant national grand challenges for strategic business opportunities. *Int. J. Manag. Educ.* **2017**, *15*, 363–383. [CrossRef]
3. Scheyvens, R.; Banks, G.; Hughes, E. The private sector and the SDGs: The need to move beyond ‘business as usual’. *Sustain. Dev.* **2016**, *24*, 371–382. [CrossRef]
4. Cordova, M.F.; Celone, A. SDGs and Innovation in the Business Context Literature Review. *Sustainability* **2019**, *11*, 7043. [CrossRef]
5. Grainger-Brown, J.; Malekpour, S. Implementing the Sustainable Development Goals: A Review of Strategic Tools and Frameworks Available to Organisations. *Sustainability* **2019**, *11*, 1381. [CrossRef]
6. Rosati, F.; Faria, L. Addressing the SDGs in sustainability reports: The relationship with institutional factors. *J. Clean. Prod.* **2019**, *215*, 1312–1326. [CrossRef]
7. ElAlfy, A.; Palaschuk, N.; El-Bassiouny, D.; Wilson, J.; Weber, O. Scoping the Evolution of Corporate Social Responsibility (CSR) Research in the Sustainable Development Goals (SDGs) Era. *Sustainability* **2020**, *12*, 5544. [CrossRef]
8. López-Concepción, A.; Gil-Lacruz, A.I.; Saz-Gil, I. Stakeholder engagement, CSR development and SDGs compliance: A systematic review from 2015 to 2021. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 19–31. [CrossRef]
9. Wang, H.; Tong, L.; Takeuchi, R.; George, G. Corporate social responsibility: An overview and new research directions: Thematic issue on corporate social responsibility. *Acad. Manag. J.* **2016**, *59*, 534–544. [CrossRef]
10. Aguinis, H.; Glavas, A. On corporate social responsibility, sensemaking, and the search for meaningfulness through work. *J. Manag.* **2019**, *45*, 1057–1086. [CrossRef]
11. Sagiv, L.; Roccas, S.; Ciecuch, J.; Schwartz, S.H. Personal values in human life. *Nat. Hum. Behav.* **2017**, *1*, 630–639. [CrossRef]
12. Schaefer, A.; Williams, S.; Blundel, R. Individual values and SME environmental engagement. *Bus. Soc.* **2020**, *59*, 642–675. [CrossRef]
13. Carroll, A.B. Corporate social responsibility: The centerpiece of competing and complementary frameworks. *Organ. Dyn.* **2015**, *44*, 87–96. [CrossRef]
14. Carroll, A.B. Carroll’s pyramid of CSR: Taking another look. *Int. J. Corp. Soc. Responsib.* **2016**, *1*, 3. [CrossRef]
15. Lockett, A.; Moon, J.; Visser, W. Corporate social responsibility in management research: Focus, nature, salience and sources of influence. *J. Manag. Stud.* **2006**, *43*, 115–136. [CrossRef]
16. Visser, W. *The Age of Responsibility: CSR 2.0 and the New DNA of Business*; Wiley and Sons: Chichester, West Sussex, UK, 2011.
17. Hack, L.; Kenyon, A.J.A.; Wood, E.H. A Critical Corporate Social Responsibility (CSR) Timeline: How should it be understood now? *Int. J. Manag. Cases* **2014**, *16*, 46–55.
18. Windsor, D. Corporate social responsibility: Three key approaches. *J. Manag. Stud.* **2006**, *43*, 93–114. [CrossRef]
19. Isa, S.M. Corporate social responsibility: What can we learn from the stakeholders? *Procedia-Soc. Behav. Sci.* **2012**, *65*, 327–337. [CrossRef]
20. Greiner, M.; Kim, J. Corporate political activity and greenwashing: Can CPA clarify which firm communications on social and environmental events are genuine? *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1–10. [CrossRef]

21. Alcadipani, R.; de Oliveira Medeiros, C.R. When Corporations Cause Harm: A Critical View of Corporate Social Irresponsibility and Corporate Crimes. *J. Bus. Ethics* **2020**, *167*, 285–297. [CrossRef]
22. Banerjee, S.B. A critical perspective on corporate social responsibility: Towards a global governance framework. *Crit. Perspect. Int. Bus.* **2014**, *10*, 84–95. [CrossRef]
23. Latapí Agudelo, M.A.; Jóhannsdóttir, L.; Davídsdóttir, B. A literature review of the history and evolution of corporate social responsibility. *Int. J. Corp. Soc. Responsib.* **2019**, *4*, 1. [CrossRef]
24. Frynas, J.G.; Yamahaki, C. Corporate social responsibility: Review and roadmap of theoretical perspectives. *Bus. Ethics A Eur. Rev.* **2016**, *25*, 258–285. [CrossRef]
25. Kudlak, R.; Low, K.Y. Special issues dedicated to CSR and corporate sustainability: A review and commentary. *Long Range Plan.* **2015**, *48*, 215–227. [CrossRef]
26. Kolk, A. The social responsibility of international business: From ethics and the environment to CSR and sustainable development. *J. World Bus.* **2016**, *51*, 23–34. [CrossRef]
27. Crowther, D. The life and death of corporate social responsibility. In *Redefining Corporate Social Responsibility*; Seifi, S., Crowther, D., Eds.; Emerald: Bingley, UK, 2018; Chapter 6; pp. 87–100.
28. Sarkar, S.; Searcy, C. Zeitgeist or chameleon? A quantitative analysis of CSR definitions. *J. Clean. Prod.* **2016**, *135*, 1423–1435. [CrossRef]
29. Pedersen, E.R. Modelling CSR: How managers understand the responsibilities of business towards society. *J. Bus. Ethics* **2010**, *91*, 155–166. [CrossRef]
30. Waddock, S. Achieving sustainability requires systemic business transformation. *Glob. Sustain.* **2020**, *3*, E12. [CrossRef]
31. Crane, A.; Matten, D. COVID-19 and the Future of CSR Research. *J. Manag. Stud.* **2021**, *58*, 280–284. [CrossRef]
32. Baumgartner, R.J. Managing corporate sustainability and CSR: A conceptual framework combining values, strategies and instruments contributing to sustainable development. *Corp. Soc. Responsib. Environ. Manag.* **2014**, *21*, 258–271. [CrossRef]
33. Zinenko, A.; Rovira, M.R.; Montiel, I. The fit of the social responsibility standard ISO 26000 within other CSR instruments: Redundant or complementary? *Sustain. Account. Manag. Policy J.* **2015**, *6*, 498–526. [CrossRef]
34. Kim Certified corporate social responsibility? The current state of certified and decertified B Corps. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1760–1768. [CrossRef]
35. Wilburn, K.; Wilburn, R. Evaluating CSR accomplishments of founding certified B Corps. *J. Glob. Responsib.* **2015**, *6*, 262–280. [CrossRef]
36. Moratis, L. Out of the ordinary? Appraising ISO 26000's CSR definition. *Int. J. Law Manag.* **2016**, *58*, 26–47. [CrossRef]
37. Moratis, L. The credibility of corporate CSR claims: A taxonomy based on ISO 26000 and a research agenda. *Total Qual. Manag. Bus. Excell.* **2017**, *28*, 147–158. [CrossRef]
38. *ISO 9000; Quality Management Systems—Fundamentals and Vocabulary*. ISO: Geneva, Switzerland, 2015. Available online: <https://www.iso.org/standard/45481.html> (accessed on 8 December 2022).
39. *ISO 14001; ISO 14001 and Related Standards Environmental Management*. ISO: Geneva, Switzerland. Available online: <https://www.iso.org/iso-14001-environmental-management.html> (accessed on 8 December 2022).
40. Brundtland, G.H. Our common future—Call for action. *Environ. Conserv.* **1987**, *14*, 291–294. [CrossRef]
41. WCED. *Our Common Future*; Oxford University Press: Oxford, UK; World Commission on Environment and Development (WCED): New York, NY, USA, 1987.
42. Schmidheiny, S. *With the Business Council on Sustainable Development Changing Course: A Global Business Perspective on Development and Environment*; The MIT Press: London, UK, 1992.
43. Elkington, J. Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development. *Calif. Manag. Rev.* **1994**, *36*, 90–100. [CrossRef]
44. Murphy, D.F.; Bendell, J. *In the Company of Partners: Business, Environmental Groups and Sustainable Development Post-Rio*; Policy Press: Bristol, UK, 1997.
45. Starkey, R.; Welford, R. (Eds.) *The Earthscan Reader in Business and Sustainable Development*; Earthscan: London, UK, 2001.
46. KPMG. *International Survey of Environmental Reporting 1999*; KPMG: Amstelveen, The Netherlands, 1999.
47. Wheeler, D.; Elkington, J. The end of the corporate environmental report? Or the advent of cybernetic sustainability reporting and communication. *Bus. Strategy Environ.* **2001**, *10*, 1–14. [CrossRef]
48. Jamali, D.; Mirshak, R. Corporate Social Responsibility (CSR): Theory and Practice in a Developing Country Context. *J. Bus. Ethics* **2007**, *72*, 243–262. [CrossRef]
49. Montiel, I. Corporate Social Responsibility and Corporate Sustainability: Separate Pasts, Common Futures. *Organ. Environ.* **2008**, *21*, 245–269. [CrossRef]
50. Waddock, S. Building a New Institutional Infrastructure for Corporate Responsibility. *Acad. Manag. Perspect.* **2008**, *22*, 87–108. [CrossRef]
51. Bendell, J. *The Corporate Responsibility Movement*; Routledge: London, UK, 2009.
52. Werna, E.; Keivani, R.; Murphy, D. *Corporate Social Responsibility and Urban Development: Lessons from the South*; Palgrave Macmillan: London, UK, 2009.
53. Visser, W. *CSR 2.0: Transforming Corporate Sustainability and Responsibility*; Springer: Berlin, Germany, 2014.

54. *UN Global Compact Making Global Goals Local Business: A New Era for Responsible Business*; United Nations Global Compact: New York, NY, USA, 2016.
55. Haywood, L.K.; Boihang, M. Business and the SDGs: Examining the early disclosure of the SDGs in annual reports. *Dev. South Afr.* **2021**, *38*, 175–188. [[CrossRef](#)]
56. Pedersen, C.S. The UN Sustainable Development Goals (SDGs) are a great gift to business. In Proceedings of the Procedia CIRP 69, 25th CIRP Life Cycle Engineering (LCE) Conference, Copenhagen, Denmark, 30 April–2 May 2018; pp. 21–24.
57. Ordonez-Ponce, E.; Clarke, A.; MacDonald, A. Business Contributions to the Sustainable Development Goals through Community Sustainability Partnerships. *Sustain. Account. Manag. Policy J.* **2021**, *12*, 1239–1267. [[CrossRef](#)]
58. Stott, L.; Murphy, D.F. An Inclusive Approach to Partnerships for the SDGs: Using a Relationship Lens to Explore the Potential for Transformational Collaboration. *Sustainability* **2020**, *12*, 7905. [[CrossRef](#)]
59. Murphy, D.F.; Stott, L. (Eds.) *Partnerships for the Sustainable Development Goals (SDGs)*; MDPI Books: Basel, Switzerland, 2021.
60. Elkington, J. *Green Swans: The Coming Boom in Regenerative Capitalism*; Fast Company Books: New York, NY, USA, 2020.
61. Elkington, J. 25 years ago I coined the phrase ‘triple bottom line’. Here’s why I think it’s time to change it. *Harv. Bus. Rev.* **2018**, *25*, 2–5.
62. *PwC and UNDP Private Sector Awareness of the SDGs: A Survey Report on Business and Sustainability in China*; PricewaterhouseCoopers China and UNDP China: Beijing, China, 2020. Available online: <https://www.pwccn.com/en/consulting/private-sector-awareness-of-the-sustainable-development-goals-jul2020.pdf> (accessed on 28 November 2022).
63. Pingeot, L. *Corporate Influence in the Post-2015 Process*; Bischöfliches Hilfswerk Misereor: Aachen, Germany, 2014.
64. Brown, A.D.; Stacey, P.; Nandhakumar, J. Making sense of sensemaking narratives. *Hum. Relat.* **2008**, *61*, 1035–1062. [[CrossRef](#)]
65. Weick, K.E. *Sensemaking in Organizations*; Sage: London, UK, 1995.
66. Nijhof, A.; Jeurissen, R. Editorial: A sensemaking perspective on corporate social responsibility: Introduction to the special issue. *Bus. Ethics A Eur. Rev.* **2006**, *15*, 316–322. [[CrossRef](#)]
67. Smerek, R. Sensemaking and sensegiving: An exploratory study of the simultaneous “being and learning” of new college and university presidents. *J. Leadersh. Organ. Stud.* **2011**, *18*, 80–94. [[CrossRef](#)]
68. Nazir, O.; Islam, J.U. Effect of CSR activities on meaningfulness, compassion, and employee engagement: A sense-making theoretical approach. *Int. J. Hosp. Manag.* **2020**, *90*, 102630. [[CrossRef](#)]
69. Richter, U.H.; Arndt, F.F. Cognitive processes in the CSR decision-making process: A sensemaking perspective. *J. Bus. Ethics* **2018**, *148*, 587–602. [[CrossRef](#)]
70. Fairfield, K.D. The role of sensemaking and organizational identification in employee engagement for sustainability. *Organ. Manag. J.* **2019**, *16*, 278–297. [[CrossRef](#)]
71. Hitlin, S. Values as the core of personal identity: Drawing links between two theories of self. *Soc. Psychol. Q.* **2003**, *66*, 118–137. [[CrossRef](#)]
72. Schwartz, S. Value Priorities and Behaviour: Applying a Theory of Integrated Value Systems. The Ontario Symposium. 1996, Volume 8. Available online: <http://www.palermo.edu/cienciassociales/publicaciones/pdf/Psico2/2Psico%2007.pdf> (accessed on 25 November 2022).
73. Williams, S.; Schaefer, A.; Blundel, R. Understanding value conflict to engage SME managers with business greening. In *Perspectives on Philosophy of Management and Business Ethics, Ethical Economy*; Rendtorff, J.D., Ed.; Studies in Economic Ethics and Philosophy 51; Springer: Berlin/Heidelberg, Germany, 2017; Chapter 6; pp. 73–92. [[CrossRef](#)]
74. Rokeach, M. *Beliefs, Attitudes and Values: A Theory of Organization and Change*; Jossey-Bassey: San Francisco, CA, USA, 1968.
75. Jastrow, J. *Keeping Mentally Fit*; Greenberg: Atlanta, Georgia, 1928.
76. Oltmann, S. Qualitative interviews: A methodological discussion of the interviewer and respondent contexts. In *Forum: Qualitative Social Research*; Freie Universität Berlin: Berlin, Germany, 2016; Volume 17, pp. 1–16.
77. Fontana, A.; Frey, J.H. The interview: From structured questions to negotiated text. In *Handbook of Qualitative Research*; Denzin, N.K., Lincoln, Y.S., Eds.; Sage: Thousand Oaks, CA, USA, 2000; pp. 645–672.
78. Kazmer, M.M.; Xie, B. Qualitative interviewing in internet studies: Playing with the media, playing with the method. *Inf. Commun. Soc.* **2008**, *11*, 257–278. [[CrossRef](#)]
79. Unnithan, M. Dialling in: Reflections on Telephone Interviews in light of the COVID-19 Pandemic. *J. Leg. Res. Methodol.* **2021**, *1*, 50–83. [[CrossRef](#)]
80. Wiles, J.L.; Rosenberg, M.W.; Kearns, R.A. Narrative analysis as a strategy for understanding interview talk in geographic research. *Area* **2005**, *37*, 89–99. [[CrossRef](#)]
81. Raworth, K. Why it’s time for doughnut economics. *Progress. Rev.* **2017**, *24*, 216–222. [[CrossRef](#)]
82. Murray, A.; Skene, K.; Haynes, K. The circular economy: An interdisciplinary exploration of the concept and application in a global context. *J. Bus. Ethics* **2017**, *140*, 369–380. [[CrossRef](#)]
83. Dunn, M.E.; Mills, M.; Verissimo, D. Evaluating the impact of the documentary series Blue Planet II on viewers’ plastic consumption behaviors. *Conserv. Sci. Pract.* **2020**, *2*, e280. [[CrossRef](#)]
84. Males, J.; Van Aelst, P. Did the blue planet set the agenda for plastic pollution? An explorative study on the influence of a documentary on the public, media and political agendas. *Environ. Commun.* **2021**, *15*, 40–54. [[CrossRef](#)]
85. The Ellen MacArthur Foundation. Available online: <https://ellenmacarthurfoundation.org/> (accessed on 25 November 2022).

86. Boudreau, L.; Makioka, R.; Tanaka, M. The Impact of the Rana Plaza Collapse on Global Retailers. 2015. Available online: https://www.researchgate.net/publication/308675271_The_Impact_of_the_Rana_Plaza_Collapse_on_Global_Retailers (accessed on 25 November 2022).
87. Blowfield, M. *Business and Sustainability*; Oxford University Press: Oxford, UK, 2013.
88. Schönherr, N.; Findler, F.; Martinuzzi, A. Exploring the interface of CSR and the sustainable development goals. *Transnatl. Corp.* **2017**, *24*, 33–47. [[CrossRef](#)]
89. Fallah Shayan, N.; Mohabbati-Kalejahi, N.; Alavi, S.; Zahed, M.A. Sustainable development goals (SDGs) as a framework for corporate social responsibility (CSR). *Sustainability* **2022**, *14*, 1222. [[CrossRef](#)]
90. Williams, S.; Murphy, D.F. Applying authentic assessment to teaching the SDGs. In *Business Schools, Leadership and the Sustainable Development Goals: The Future of Responsible Management Education*; Moratis, L., Melissen, F., Eds.; Routledge Taylor & Francis: London, UK, 2022; Chapter 10; pp. 175–190. [[CrossRef](#)]

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Article

Exploring the Status Quo of Adopting the 17 UN SDGs in a Developing Country—Evidence from Vietnam

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Abstract: This paper develops the multiple-theoretical framework of legitimacy, stakeholders, and voluntary perspective to assess the adoption of Vietnamese listed firms to the 17 United Nations' Sustainable Development Goals (SDGs). The paper's primary objective is to use content analysis to discover the status quo of the SDGs practices of the largest 100 Vietnamese listed firms on the two biggest Vietnamese stock exchanges (Ho Chi Minh Stock Exchange—HOSE and Hanoi Stock Exchange—HNX). By drawing a unique framework, the paper contributes to the extant literature review of SDG-related research. Our research framework enables corporate decision-makers significantly access corporate SDG adoptions and the implementation process. With the direct pressure of stakeholders, high environmental sensitivity industries are keen on disclosing SDG-related information. Notwithstanding, the findings reveal that Vietnamese listed firms indicate “green talks” in their corporate reporting rather than “green actions”. Thus, our findings encourage firms to engage in SDGs through substantive sustainability strategies and need greater attention from governments, practitioners, and policymakers.

Keywords: 17 UN sustainable development goals; sustainability reporting; legitimacy theory; stakeholder theory; voluntary disclosure theory; Vietnam

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1. Introduction

To address sustainable development priorities, 193 nations met and signed on to the SDGs at the United Nations in New York in September 2015 [1]. These goals are established by a global partnership of governments, civil society, the private sector, and others to drive the world's transition toward the goals' achievements [2]. The plan for Sustainable Development includes 17 goals and 169 targets which set out a plan for all nations' sustainable development to achieve by 2030, as seen in Table 1. These 17 UN SDGs reflect the “state of the art” thinking of governments worldwide [3].

Vietnam joined the United Nations on 20 September 1977 to receive support for war reconstruction and humanitarian assistance [4]. In May 2017, Vietnam released its National Action Plan (NAP) to show the effort of the Government to implement the Vietnam SDGs (VN SDGs). It was promulgated as per Decision 633/QD-TTg dated 10 May 2017 of the Prime Minister, in which the global goals of Vietnam towards 2030 were set, including 115 specific targets, as presented in Table 2 [5]. For example, the following three extracts illustrate companies' initiatives to achieve SDGs:

FPT Corporation (FPT) provided a general statement regarding SDGs awareness in their recent Annual Reports:

“The Sustainable Development Goals call for global actions towards a sustainable future for all countries by 2030. As a leading technology corporation in Vietnam, FPT is ready to play its role in all 17 of these millennium goals.” [6]

While TNG Investment and Trading JSC (TNG) stated that:

“Aiming at sustainable development on all of the economic, social, and environmental aspects, TNG has developed and obtained some achievements in 2021, associated with the specific objectives of TNG as well as 17 UN sustainable development goals for the period of 2015–2030.” [7]

Similarly, Viet Nam Dairy Products Joint Stock Company (VNM) highlighted that:

“Achieving Sustainable Development Goals (SDGs) related to poverty, climate change, and food and nutritional security is a major challenge, given the significant impacts of climate change on all aspects of life. From now to 2030, there are only 12 years left to speed up. This requires urgent actions by countries along with cooperative partnerships between governments and stakeholders at all levels.” [8]

These quotes indicated that Vietnam companies had attempted to adopt and follow the 17 UN SDGs. However, it is not easy to incorporate the business model with SDGs, especially for companies in developing countries [9]. Besides, Pizzi et al. [10] and Silva [11] pinpointed that companies have struggled to reconcile their financial performance with Corporate Social Responsibility (CSR) practices, including SDG disclosures. That is why although SDGs are in their infant stages of implementation, there is an increasing number of studies examining different perspectives of SDGs toward sustainable corporate development to interpret the role of SDGs in sustainability reporting [12]. Nevertheless, several studies indicated that the relationship between SDGs and corporate reporting has barely been examined [13–15].

Regarding research methodologies, it is undeniable that content analysis is the most appropriate method to examine the extent and quality of corporate reporting [11,16–18]. However, in terms of theoretical framework, prior literature has applied a single theory to explain corporate engagement toward SDGs, such as legitimacy theory [19]; stakeholder theory [20,21]. Within one single theory, more is needed to discover the level of corporate engagement in SDGs and corporate reporting of sustainability-related information. This is because the 17 UN SDGs are considered a collection of 17 interlinked global goals striving for the prosperity of the CSR pillars (social, environmental, and governance), not focusing on a particular topic in corporate sustainability performance. Moreover, referring to the corporate reporting of SDGs, it is inexplicable to ignore “corporate motivation” in committing to voluntary disclosure. It is also important to investigate whether this engagement and adoption of SDGs are symbolic (i.e., *green talk*) or substantive (i.e., *green action*) [16,17]? So, there is a need to develop a multi-theoretical framework to explore the SDG disclosure levels in corporate sustainability reports [13,15,18]—especially in developing countries such as Vietnam.

Therefore, in line with several recently published research, such as Silva [11]; Van der Waal & Thijssens [16]; Emma & Jennifer [17]; Heras-Saizarbitoria et al. [18], and Ike et al. [13], the authors developed a multi-theoretical motivated framework for SDGs adoption, including legitimacy theory (legitimizing motivation), stakeholder theory (motivation of meeting stakeholders’ expectations) and voluntary disclosure theory (volunteering motivation) to bridge the literature gap by answering the following main research questions: (1) What is the current state of SDG disclosures among Vietnamese firms? (2) How do Vietnamese listed firms disseminate SDGs in their reports? (3) How do Vietnamese listed companies adopt a symbolic/substantive strategy in disclosing SDGs information? (4) Which SDGs are addressed mainly by listed Vietnamese firms, and which industries focus more on achieving these SDGs?

To answer these research questions, this paper employs the content analysis method to 893 corporate reports of the top100 firms listed on the two main Vietnamese Stock Exchanges, including the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX). Particularly, the sample consists of 692 annual reports in Vietnamese, 177 annual reports, and 24 standalone sustainability reports from 2015 to 2021. Based on the market capitalization, we selected 50 firms from HOSE and 50 from HNX with the highest market capitalization as they are most likely to disclose sustainability-related information,

including SDGs. Based on Helfaya & Whittington [22], the search sample contains thirteen industries categorized into three industrial dimensions: high environmental sensitive industries (HESI), medium environmental sensitive industries (MESI), and low environmental sensitive industries (LESI), as seen in Table 4. For consistency, all reports of the Top 100 listed firms were downloaded from a reliable website (Vietstock) and corporate websites.

Our findings indicate that 84% of total firms are partly engaging with the 17 SDGs (only focusing on some specific goals), particularly SDG1—Poverty, SDG8—Economic growth, and SDG13—Climate change. This suggests that there is a lack of “actual implementation” or substantive performance to achieve the global goals among Vietnamese listed firms. Additionally, firms operating in HESI intend to have *green talks* in their reporting statements rather than *green actions* to achieve these SDGs. Interestingly, supported by our multi-theoretical framework of legitimacy, stakeholders, and voluntary disclosure theories, we found that many companies in HESI tend to avoid disclosing SDG-related information to protect their legitimacy and avoid legal commitment and public discontent.

Consequently, within our unique multi-theoretical framework, our study can fully cover various aspects of SDGs and the “motivation” to achieve them. Accordingly, this research can be considered pioneering research on the adoption and implementation of the UN SDGs in the Vietnamese context with two highlights. Firstly, relying on our research findings, it is undoubtedly that SDGs have gained a great attention among Vietnamese listed firms. However, it is still challenging due to a need for consistent reporting mechanisms and substantive strategies related to their implementation plans as part of their business operating objectives. For that reason, our findings are crucial and can be used as a guideline for corporate decision-makers of Vietnamese listed firms to satisfy their stakeholders’ expectations. Secondly, our results are essential for the Vietnamese government, regulators, and policymakers to track the progress of Vietnamese listed firms toward SDG adoption and implementation, enabling them to better support companies in adopting and achieving these goals and fulfilling the UN Agenda of 2030 at the country level.

The remainder of this paper is structured as follows. Section 2 discusses the literature review. Section 3 describes research methodologies, including research sample, data collection, and research method. Section 4 discusses the research results, and Section 5 concludes the study.

Table 1. The Measurement of 17 UN Sustainable Development Goals (SDGs).

Goals	Measurement	Description
SDG1	No Poverty	End poverty in all its forms everywhere
SDG2	Zero Hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
SDG3	Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages
SDG4	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
SDG5	Gender Equality	Achieve gender equality and empower all women and girls
SDG6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
SDG7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all
SDG8	Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all
SDG9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

Table 1. Cont.

Goals	Measurement	Description
SDG10	Reduce Inequality	Reduce inequality within and among countries
SDG11	Sustainable Cities and Communities	Make cities and human settlement inclusive, safe, resilient, and sustainable
SDG12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns
SDG13	Climate Action	Take urgent action to combat climate change and its impacts
SDG14	Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
SDG15	Life on Land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
SDG16	Peace and Justice Strong Institution	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels
SDG17	Partnership to Achieve the Goal	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Table 2. The 17 UN SDGs and VN SDGs.

Sustainable Development Goals	Components		Targets	
	UN SDGs	VN SDGs	UN SDGs	VN SDGs
Goal 1. No Poverty	End poverty in all its forms everywhere	Similar	7 (1.1–1.5; 1.a–1.b)	4 (1.1–1.4)
Goal 2. Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Similar	8 (2.1–2.5; 2.a–2.c)	5 (2.1–2.5)
Goal 3. Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages	Ensure a healthy life and enhance welfare for all citizens in all age groups	13 (3.1–3.9; 3.a–3.d)	9 (3.1–3.9)
Goal 4. Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Similar	10 (4.1–4.7; 4.a–4.c)	8 (4.1–4.8)
Goal 5. Gender Equality	Achieve gender equality and empower all women and girls	Achieve gender equality; empower and create enabling opportunities for women and girls	9 (5.1–5.6; 5.a–5.c)	8 (5.1–5.8)
Goal 6. Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all	Similar	8 (6.1–6.6; 6.a–6.b)	6 (6.1–6.6)
Goal 7. Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all	Similar	5 (7.1–7.3; 7.a–7.b)	4 (7.1–7.4)
Goal 8. Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all	Similar	12 (8.1–8.10; 8.a–8.b)	10 (8.1–8.10)

Table 2. Cont.

Sustainable Development Goals	Components		Targets	
	UN SDGs	VN SDGs	UN SDGs	VN SDGs
Goal 9. Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	Develop a highly resilient infrastructure; promote inclusive and sustainable industrialization; and promote renovation	8 (9.1–9.5; 9.a–9.c)	5 (9.1–9.5)
Goal 10. Reduce Inequality	Reduce inequality within and among countries	Reduce social inequalities	10 (10.1–10.7; 10.a–10.c)	6 (10.1–10.6)
Goal 11. Sustainable Cities and Communities	Make cities and human settlement inclusive, safe, resilient, and sustainable	Promote sustainable, resilient urban and rural development; ensure safe living and working environments; ensure a reasonable distribution of population and workforce by region	10 (11.1–11.7; 11.a–11.c)	10 (11.1–11.10)
Goal 12. Responsible Consumption and Production	Ensure sustainable consumption and production patterns	Similar	11 (12.1–12.8; 12.a–12.c)	9 (12.1–12.9)
Goal 13. Climate Action	Take urgent action to combat climate change and its impacts	Respond in a timely and effective manner to climate change and natural disasters	5 (13.1–13.3; 13.a–13.b)	3 (13.1–13.3)
Goal 14. Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	Similar	10 (14.1–14.7; 14.a–14.c)	6 (14.1–14.6)
Goal 15. Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Sustainably protect and develop forests; conserve biodiversity; develop eco-system services; combat desertification; prevent the degradation of and rehabilitate soil resources	12 (15.1–15.9; 15.a–15.c)	8 (15.1–15.8)
Goal 16. Peace and Justice Strong Institution	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels	Similar	12 (16.1–16.10; 16.a–16.b)	9 (16.1–16.9)
Goal 17. Partnership to Achieve the Goal	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Similar	19 (17.1–17.19)	5 (17.1–17.5)
Total	17	10/17 VN SDGs are entirely similar to SDGs.	169	115

2. Literature Review

2.1. 17 UN Sustainable Development Goals (SDGs)

Before the SDGs officially came into force, the aim started as an idea of sustainable goals by the Norwegian Prime Minister to define the sustainable development as: “meeting the needs of the present without compromising the ability of future generations to meet their own needs” [23]. After several conferences/roundtable meetings of the 30-member UN General Assembly Open Working Group on SDGs (such as Rio+20; the 68th session of the General Assembly), the Post-2015 Development Agenda was finally processed since the Open Working Group (OWG) submitted their proposal with 8 SDGs and 169 targets, called “The Eight Millennium Development Goals (MDGs)” [24]. Officially, the SDGs were set up in 2015 by the United Nations General Assembly.

All countries, regardless of their wealth, are called to promote prosperity while protecting the planet, tackling climate change, and addressing social challenges [25]. These SDGs are critically linked and underpin each other. For example, SDG1—No poverty and SDG2—Zero hunger, meaning that if any country can achieve either SDG1 or SDG2, their citizens must have the capability to strive for better well-being (SDG3) or quality education (SDG4). According to the United Nations, at the macro-level (i.e., country level), countries should take the primary responsibility to follow up and review the progress made in implementing SDGs [26]. At the micro-level (i.e., firm-level), firms are expected to apply their innovations, creativity, and financial resources to achieve the SDGs, which would effectively address the three sustainability dimensions: economic, environmental, and social [2].

The implementation of 17 UN SDGs by countries is now firmly in place. According to Sustainable Development Report 2022 within 163 countries by Sachs [27], the world progressed on the SDG Index at an average rate of 0.5 points a year from 2015 to 2019, which is considered too slow to achieve the SDGs by 2030. Simultaneously, the progress of SDGs implementation varied significantly across countries and goals. Sachs [27] found that poorer countries with lower SDG Index scores progressed faster than more affluent countries. Due to the COVID-19 pandemic, global energy, and financial crises, SDG Index scores have declined slightly since early 2020.

Accordingly, SDG1—No poverty and SDG2—Zero hunger were highly affected. For example, over 140 million people could fall into extreme poverty (measured against the \$1.90 poverty line) in 2020 [28]. Additionally, countries heavily depend on the international trade system, and tourism would face a challenge to achieving SDG8—Decent work and economic growth. For instance, Taiwan, Hong Kong, Thailand, and New Zealand have been seriously affected by the COVID-19 pandemic—notably, a declining figure of around 110 arrivals for every additional person infected by the coronavirus [29]. In contrast to the pandemic’s negative effect, Finland, Denmark, and Sweden, are the top 3 countries that effectively adopted and achieved the SDGs as stated in the SDG Index and Dashboards, respectively [27].

2.2. Adoption and Achievement of the Sustainable Development Goals (SDGs) by Vietnam

The Vietnamese Prime Minister’s office approved the National Action Plan to implement the Global Agenda 2030 for sustainable development (SD). The Plan was categorised into six intervention dimensions [30], including:

- Guiding the development of legal frameworks and policies on sustainable consumption and production.
- Promoting sustainable production.
- Greening the supply system.
- Promoting the sustainable export market.
- Changing consumption practices and supporting sustainable lifestyles.
- Advancing 3R (reduce, reuse, recycle) practices.

Table 2 proves that the Vietnamese National Action Plan (NAP) has been implemented in the correct direction. Regarding the global level, according to the Sustainable Develop-

ment Report 2015, Vietnam has not been engaged in SDGs, except for some Organization for Economic Co-operation and Development (OECD) countries, such as Finland, Denmark, Sweden, and Norway. By 2016, Vietnam started to commit to the 17 UN SDGs; however, the ranking was much below the average, at the 88th. Since 2017, the ranking of Vietnam on the index has considerably improved, thanks to the implementation of NAP. For example, Vietnam was one of 163 countries assessed in the 2022 SDG Index. Vietnam was ranked in 55th place with an overall index score of 72.8 [27], the same score as in 2022 (as presented in Table 3). Yet, its ranking was the 51st, which suggests that the average score among all nations has increased. Since 2015, East and South Asia have progressed more on the SDGs than any other region adopting sustainable goals. Among Southeast Asia, Vietnam has been ranked the 2nd country with the highest score on the SDG Index, just below Thailand for both years 2021 and 2022.

Table 3. Vietnam’s Score on the SDG Index and Dashboard.

Year	Score	Ranking
2016	57.6	88
2017	67.9	68
2018	69.7	57
2019	71.1	54
2020	73.8	49
2021	72.8	51
2022	72.8	55

Besides Vietnam’s National Action Plan on Sustainable Consumption and Production (2021–2030), the Vietnamese Government has implemented several activities, such as various conferences, to ensure the country is on the right track for SDGs implementation. For example, the Conference “National Assembly of Vietnam and the Sustainable Development Goals” was organized by the National Assembly of Vietnam, the Inter-Parliamentary Union (IPU), and the United Nations in Vietnam in December 2018. The conference covered different SDG topics (e.g., gender equality, decent work and economic growth, peace, and justice) [31].

Although the Vietnamese Government has actively promoted the SDGs by developing a legal framework [32], there are limited tools to assess the adoption of SDGs at the micro-level, such as the corporate level. It is challenging to examine the process of adopting the SDGs for a particular firm operating across the sectors, even for listed firms on the stock exchange.

2.3. Theoretical Background and Research Questions

The critics of the first definition of SD by Brundtland’s Commission have opened a road for hundreds of alternative definitions from scholars and practitioners [33]. For example, one of the popular definitions of SD is defined by the National Strategy of Sustainable Development (2003): “Sustainable development is the society’s development that creates the possibility for achieving overall wellbeing for the present and the future generations through combining environmental, economic, and social aims of the society without exceeding the allowable limits of the effect on the environment” [34]. Within the widespread SD phenomenon, SDGs is defined as “a shared blueprint for peace and prosperity for people and the planet, now and into the future” [35]. Due to limited resources available on Earth (e.g., water) [36], the SDG framework guides human beings to strive for SD in the long run [37].

Regarding firm-level of SDG adoption, SDGs enable firms to select and prioritize corporate sustainability issues and align strategies toward specific and relevant CSR pillars [38]. Since its launch in 2015, many firms around the world have started to disclose the

SDGs or SDGs-related information in their annual report (AR), standalone sustainability report (SR), or integrated report (IR) to declare their committed effort to SD [39–41]. At the same time, literature on sustainability reporting started shifting towards corporate engagement in the SDGs. There are several topics have been examined, such as the potential role of corporate activities in supporting the SDGs [42,43], the factors that affect companies' engagement in sustainable practices [18,44,45], and the firms' motivation or opportunities toward achieving the SDGs [46]. However, the studies by Ike et al. [13]; Diaz-Sarachaga [15], and Bennich et al. [14] indicate that the correlation between the SDGs and corporate sustainability reporting has barely been investigated.

Among limited empirical studies on the exploration of SDG disclosure levels in corporate sustainability reporting, Yu et al. [47] assessed the adoption and implementation of corporate SDG disclosure by analyzing the content in the corporate reporting of 100 Chinese companies listed on the Shanghai Stock Exchange from 2016 to 2018. They found that Chinese companies primarily focused on specific SDGs (such as SDG9—Industry, innovation, and infrastructure development; SDG8—Decent work and economic growth and SDG16—Peace and justice strong institution). Noticeably, their findings reveal that most companies focused solely on presenting SDG disclosure information rather than genuinely performing sustainable actions to achieve these goals. In the same vein, Manes-Rossi & Nicolò [48] conducted a content analysis of the non-financial reports to analyze how SDGs reporting is evolving and what are the most addressed SDGs in the context of the European energy sector companies. They pointed out that the disclosure of SDGs is an indispensable part of corporate reporting, yet more symbolic than substantial changes appear. Therefore, it is necessary to conduct an in-depth analysis to assess the corporate SDG disclosures and how the SDGs information is disclosed in the sustainability-related report.

SDGs have been critically emphasized from the introduction until now. However, scholars have highlighted that not all SDGs are mentioned in corporate reporting [48], suggesting that there is a particular focus on those SDGs [47]. Several potential reasons behind this concentration of SDG disclosure by firms have been figured out. For example, Heras-Saizarbitoria et al. and Diaz-Sarachaga [15,18] found that focusing on specific SDGs makes it easier to incorporate SDGs into corporate practices (e.g., Goal 8—Decent work and economic growth, Goals 12—Responsible consumption and production, and 13—Climate action). In contrast, because of the focus of certain SDGs by firms, some goals with more macroeconomic impacts (e.g., Goal 1—No poverty, Goals 2—Zero hunger, and 17—Partnership) are less mentioned [39,49]. Simultaneously, Van der Waal & Thijssens [16] found that some companies are not motivated to engage in SDGs, which are weakly linked to their core business activities.

As for emerging markets with weak overall legal systems and strong shareholder protection [50], a question arises by Van der Waal & Thijssens [16]: Why should listed firms voluntarily engage with SDGs while being principally shareholder value-oriented? Let us take an example, Sekarlangit & Wardhani [51] analyzed the impact of the board of directors' characteristics and the existence of CSR committees on SDG disclosures in corporate reporting for five Southeast Asian countries—Indonesia, Malaysia, Singapore, Thailand, and Philippines. They found that CSR committees can encourage more intensive SDG disclosures. Simultaneously, the finding reveals that the higher commitment to the sustainability agenda, the higher level of SDG disclosures [38]. Interestingly, Scheyvens et al. [2] argued that the SDGs are the nation-states' agreements rather than individuals' or businesses' actions. Besides, CSR is tightly linked to success when implementing global goals by world countries [52]. Similarly, Van der Waal & Thijssens [16] mapped the undiscovered terrain of corporate SDG involvement from the sustainability reports of the largest 2000 stock-listed businesses worldwide. They found that corporate SDG involvement is still limited (23% of the total sample of 2000 firms), and listed companies voluntarily engage in SDGs if it creates value for the common good. Additionally, Khaled et al. [53] developed a critical framework by hand-mapping the SDGs and their targets with a firm's sustainability practices. They found that the SDGs relate to their ESG performance

and tangibly measure their progress towards achieving the SDGs. Consequently, we claim that SDG disclosures strongly relate to firms' industry sectors and the awareness of SD and CSR practices.

At the industry level, according to Van der Waal & Thijssens; Heras-Saizarbitoria et al.; Diaz-Sarachaga and Manes-Rossi & Nicolò [15,16,18,48], there is a lack of studies to explore how the SDGs are prioritized across different industries. Al-Tuwajri et al. and Young et al. [54,55] claimed that the quality of sustainability reporting is dependable on the industry risk characteristics. They found that sustainability reporting is more robust in high-risk compared to low-risk industries. Indeed, firms operating in environmentally sensitive sectors (e.g., energy, tourism, or chemicals) intend to have high awareness and interest in the commitment and achievement of SDGs [39,44,49]. In contrast, Nechita et al. [44] evaluated the disclosure of SDG information in corporate reports using both qualitative and quantitative approaches. They found that 63% of the analyzed reports did not mention the SDGs. Surprisingly, the presentation of the SDG information in their selected sample was not similar even in the same industry.

Critically implementing SDGs into business models is necessary [11,56]. Emma et al. [17] argued that despite the high engagement of European companies in symbolic disclosures, SDGs reporting still plays a substantive role among companies operating in controversial and environmentally sensitive industries. They claimed that firms had employed SDGs as "*a symbolic legitimacy approach*" to address or enhance legitimacy issues and respond to the expectation of stakeholders. This finding is consistent with the studies of Heras-Saizarbitoria et al. [18] and Silva [11]. They vehemently claimed that firms would instead show their compliance with stakeholders' pressures to gain legitimacy than implement actual corporate actions to commit to SDGs.

Nevertheless, empirical studies revealed that most firms follow a symbolic approach toward SDG disclosures rather than providing substantive SDG reporting [16]. For instance, Izzo et al. [49] rationalized that the requirements of the SDGs and specific KPIs or achievement of SDGs are still missing in corporate reporting. As a result, we believe that businesses should use SDG disclosure as "*a strategic tool*" to achieve business ethics and sustainable responsibility, instead of using it as a symbolic strategy to "deal" with stakeholders' pressure of non-financial disclosure, such as SDGs.

Therefore, the need to explore SDG disclosure levels in corporate sustainability reporting [13,15,18] and the current debate on the dichotomy of symbolic/substantive approach to SDG disclosures [16,17] calls for more in-depth empirical evidence in different industries. Simultaneously, the literature review evidenced that while there is an increasing appetite for demonstrating a corporate commitment to SDGs, limited research indicates how companies effectively integrate SDGs in their reporting practices in developing countries. As a result, following the calls for filling this research gap, this research developed a multi-theoretical framework, including a legitimacy perspective–legitimacy theory; a stakeholder expectation–stakeholder theory, and a voluntary approach–voluntary disclosure theory of digging deep into ARs/SRs published by Top 100 Vietnamese Listed Firms in both HOSE) and HNX through a longitudinal and cross-sectorial approach. In doing so, our research paper intends to answer the following research questions:

1. RQ1: What is the current state of SDG disclosures among Vietnamese firms?
2. RQ2: How do Vietnamese listed firms disseminate SDGs in their reports?
3. RQ3: How do Vietnamese listed companies adopt a symbolic/substantive strategy in disclosing SDGs information?
4. RQ4: Which SDGs are addressed by listed Vietnamese firms, and which industries focus more on achieving these SDGs?

Since most previous empirical studies on SDG-related topics draw on legitimacy theory [11,19,57–59], Calabrese et al. [38] indicated that there is a need for frameworks to fully understand how companies are engaging in achieving the SDGs. Thus, to answer the above research questions and provide a practical framework that assists companies in incorporating SDGs information into their non-financial reporting.

Firstly, in corporate social reporting, Guthrie et al. [60] pointed out that legitimacy theory posits that CSR disclosures are reactions to environmental factors to legitimize corporate actions. Additionally, O'Donovan [58] claimed that legitimacy theory posits that the survival and success of corporations correspond with society's expectations, suggesting that firms are required to act and perform in "socially acceptable behaviors" manner. Deegan [61] undertook a study examining the social and environmental disclosures of BHP Ltd. to ascertain the corporate social and environmental disclosures and pinpointed that legitimacy theory refers to a "social contract" between the corporate and the society in which they operate or "community license to operate". According to legitimacy theory, the corporate SDG disclosure is presented in the corporate reporting to show companies' efforts in achieving SDGs and conforming to the community's desire for non-financial information or managing the firms' legitimacy [11,57,62]. Additionally, legitimacy theory indicates that poorly sustainability-performing firms use sustainability disclosure as a legitimation tool to lead the community perceptions [63]. Therefore, under legitimacy theory, we assume that corporate SDG disclosure has been used as "a strategic tactic" to strengthen the firm legitimacy or even to alter society's expectation because of the managers' perceptions, which strongly influences the business model of a specific firm.

Regarding stakeholders' perspectives, stakeholder engagement is essential for implementing CSR strategies and achieving SDGs [45,64,65]. Stakeholder theory can be used to explain how corporations engage in SDG disclosures. Mainly, this theory posits that "managing for stakeholders" involves paying attention to the interests and well-being of primary stakeholders (including employees and managers, shareholders, financiers, customers, and suppliers) [66]. Therefore, instead of using symbolic strategies to disclose SDGs in sustainability reports, several firms have chosen to link SDGs to their stakeholders' expectations and then communicate their CSR strategy to the public. For example, Lopez [67] analyzed Spanish MNCs' (CSR) strategy and how they incorporate the SDGs into their reporting systems. The results revealed that firms communicated their operating performance in economic, social, and environmental aspects by linking SDGs' targets to various primary stakeholders of the corporation.

Although sustainability reporting is commonly used to describe the self-reporting of CSR-related activities [68], it is still optional in most countries [69]. Therefore, voluntary disclosure theory also offers another theoretical explanation for corporate SDG disclosures [70]. Initially, this theory was derived from game theory, meaning that a corporation's motivation in making or withholding disclosures depends upon shareholders' value [71]. In response to voluntary disclosure theory, Nishitani et al. [68] found a positive relationship between sustainability performance and its reporting. They claimed that companies are motivated to use sustainability-related reporting to aid improved decision-making by their shareholders. Furthermore, to address the stakeholders' expectations, companies voluntarily engage in and account for sustainability-related issues in their reporting systems [72–74].

Therefore, we claim that firms intend to mention SDG disclosures in their reporting in a voluntary basis; they use it as "a communication tool" to satisfy primary stakeholders' transparent demand for non-financial information to increase legitimacy or even manage the stakeholders' perception (regardless of the impact of industrial sectors). Figure 1 shows the research framework developed from a multi-theoretical foundation of legitimacy theory, stakeholder theory, and voluntary disclosure theory.

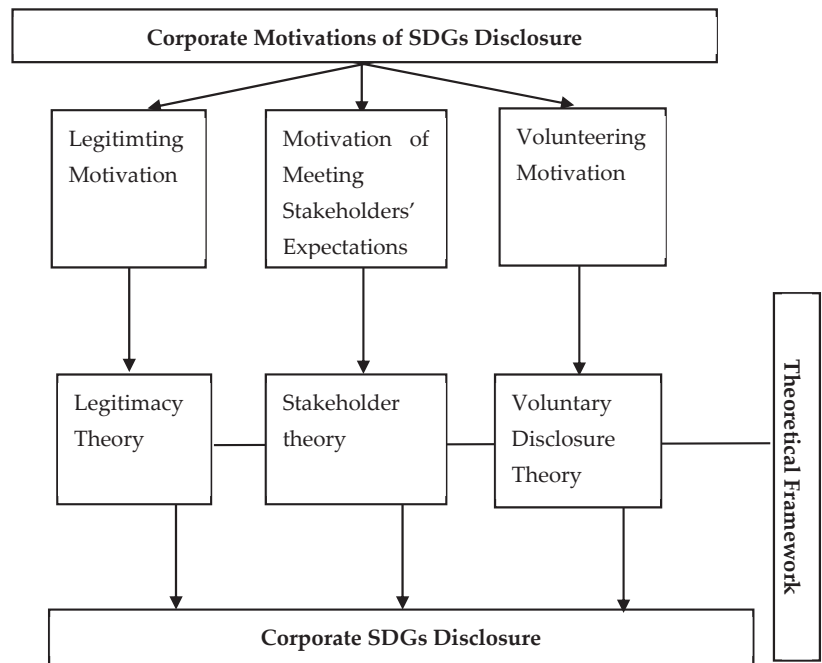


Figure 1. Research Theoretical Framework.

3. Research Methodology

3.1. Research Sample and Data Collection

Our initial sample consists of the top 100 firms listed on the two biggest Vietnamese Stock Exchanges, Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) from 2015 to 2021. Based on the market capitalization, we selected the top 50 firms from both HOSE and HNX. Vietnam is an emerging market, and therefore SDG disclosures or sustainability reporting is still optional. From the legitimacy perspective, big companies are more likely to incorporate the SDGs into their reporting systems than small ones [19] to gain a positive public image and reputation [22,57,75,76]. Therefore, we chose these firms with a strong belief that they have integrated the SDGs information into their corporate reporting. Simultaneously, within the big 100 firms, they can firmly represent the Vietnamese economic trend in disclosing SDGs-related information.

In sum, our sample includes 13 industrial sectors including accommodation and food services; agriculture production; construction and real estate; finance and insurance; food & beverage; health care; information and technology; manufacturing; mining, quarrying, and oil and gas extraction; natural gas distribution; transportation and warehousing; utilities; and wholesale trade in which the construction and real estate sector account represents 32% of total firms. All reports of the 100 selected firms were downloaded from corporate websites and Vietstock (for further details of the website, please access via this link: <https://en.vietstock.vn/> (accessed on 27 August 2022)). 96 Vietnamese firms have integrated sustainability reports (SRs) in their annual reports (ARs) as a separate section to disclose CSR or sustainability matters. Only four firms published their standalone SRs between 2015 and 2021, namely BVH, SSI, VCS, and VNM.

In line with our research objectives and prior literature review [13,15–18], this research analyzed the sample of 893 firm-year observations of Vietnamese ARs and SRs of the big 100 listed firms in HOSE and HNX for the period 2015–2021. Additionally, we relied on previous CSR disclosure literature to understand how different industries focus most on achieving these SDGs [22,70,77]. Notably, we categorized 13 industries into 3 groups based on their

levels of environmental sensitivity: 8 high environmental sensitivity industries (HESI: accommodation and food services; agriculture production; construction and real estate; food & beverage; manufacturing; mining, quarrying, and oil and gas extraction; natural gas distribution and utilities) with 67 companies; 4 medium environmental sensitivity industries (MESI: health care; information and technology; transportation and warehousing and wholesale trade) with 8 companies, and 1 low environmental sensitivity industry (LESI: finance and insurance) with 25 companies, as seen in Table 4.

Table 4. Sample Selection and Industry Composition.

(A) Sample Selection	Total Listed Firms	Based on Market Capitalization			Total
		Less Firms with the IPO Date after 2015			
Ho Chi Minh Stock Exchange (HOSE)	401				50
Hanoi Stock Exchange (HNX)	348				50
Total Final Sample	749				100
(B) Industry Composition					
Sectors	Number of Firms (%)	Total of Firm-Year Observations			Total
		Vietnamese AR	English AR	SR	
<i>1. High environmental sensitivity industries (HESI)</i>					
Accommodation and Food Services	1	7	0	0	7
Agriculture Production	2	14	7	0	21
Construction and Real Estate	32	220	46	0	266
Food & Beverage	3	20	7	7	34
Manufacturing	20	140	32	6	178
Mining, Quarrying, and Oil and Gas Extraction	5	35	6	0	41
Natural Gas Distribution	2	13	0	0	13
Utilities	2	14	0	0	14
<i>2. Medium environmental sensitivity industries (MESI)</i>					
Health Care	1	7	0	0	7
Information and Technology	1	7	7	0	14
Transportation and Warehousing	3	20	6	0	26
Wholesale Trade	3	20	0	0	20
<i>3. Low environmental sensitivity industries (LESI)</i>					
Finance and Insurance	25	175	66	11	252
Total	100	692	177	24	893

3.2. Research Method: Content Analysis

Krippendorff [78] discovered the method of “content analysis”, which is a “research technique for making replicable and valid inferences from data according to their context” [22,79]. This method has become “the most common method of analyzing the textual fabric of contemporary society” [78]. This method enables researchers to place and codify the text of narrative writing into different items/subjects based on selected criteria [22,57,79]. For SDG-related topics, many researchers have applied content analysis to AR and SR [18,38,41,48,62], as this method is considered an excellent instrument to measure relative levels and trends in reporting [60,80]. Therefore, relying on content analysis, this research examined 893 reports, including information of corporate SDG disclosures for the

period between 2015 and 2021, to address the proposed research questions. Each firm was considered a unit of analysis.

Following Schreier [81], we organized our data collection based on a systematic multi-process of three stages, including:

- Stage 1: Extraction and collection of SDGs information from the reports with the selection of illustrative quotations.
- Stage 2: Development of the categorization framework.
- Stage 3: Analysis and interpretation of data.

At first, we extracted the selected reports using available tools. Many searches were made using different keywords related to the term “Sustainable Development Goals” (such as “Sustainable Development Goals”, “SDGs”, “Goals”, “CSR”, “Sustainability”, “Aim”, “Objective”, etc.). All reports have been downloaded from both Vietstock and corporate websites. At this stage, we made an overview of the reports by identifying the main sections containing the information on the SDGs and generating the first insight into how companies present their adoption and achievement of the SDGs. The recording units of analysis cover specific linguistic information such as words, sentences, and lines, and consider both narrative and non-narrative disclosure (such as graphs, tables, figures, and pictures) [82]. At the same time, the illustrative quotation was selected for the English version of 177 ARs by choosing the statement, discussion, or images of corporate SDGs information, the corporate SDGs implementation processes, the corporate CSR-related activities (e.g., prevent climate change, save energy, protect the environment, do charitable works, protect human and labor rights, etc.).

Next, we developed the coding framework to capture the corporate disclosure of SDGs. The disclosure checklist including 17 UN SDGs was developed by Silva [11] and used to quantify the current state of SDG disclosures among Vietnamese-selected firms. Specifically, we reviewed every report to check how many times each of these 17 UN SDGs was disclosed/reported by the selected firms. Simultaneously, we generated a checklist of SDGs’ engagement by the 13 industrial sectors to highlight the SDGs concentration toward sectors. After that, we appraised the most recent reports of the sample by using three main criteria to assess how Vietnamese listed firms incorporate SDGs in their reports and examine whether these firms adopt a *symbolic or substantive* strategy in disclosing SDG information, such as (1) Any mention of SDGs in CEO and/or Chair’s message; (2) Any indication of potential risks and opportunities related to the SDGs; and (3) Any association of specific key performance indicators (KPI) to priority SDGs.

For the last stage, as in other works carrying out this type of analysis [18,41], the information obtained from the reports was then analyzed and interpreted.

4. Results and Discussion

4.1. Assessment of Vietnamese SDGs Adopters: Current Status of SDG Disclosures

Firstly, Table 5 records the descriptive statistical results of the adoption of the 17 UN SDGs of the selected sample. It suggests a notable difference in implementing SDGs among Vietnamese firms. For example, SDG1—Poverty and SDG8—Economy have been received great attention from Vietnamese firms (with a mean of 0.69 and 1.12, respectively). Therefore, it can be argued that firms operating in developing countries intend to incorporate the goal of solving poverty and contributing to economic growth rather than making a significant effort to focus on various aspects of SDGs, like climate change. Since the transition to a low-carbon economy is already underway [83]; thus, our finding outlines that there is a need for companies in the developing world to act seriously on fighting climate change.

Table 5. Descriptive Statistics.

SDGs Measure	No. Obs	Mean	Median	Std. Dev	Min	Max	Skewness	Kurtosis	Normality Test of Kolmogorov–Smirnov		
									Statistic	df	Sig.
Poverty	700	0.69	1.00	0.67	0.00	3.00	0.61	−0.11	−0.05	699	0.95
Hunger	700	0.52	0.00	0.63	0.00	2.00	0.81	−0.36	−0.18	699	0.86
Health	700	0.50	0.00	0.63	0.00	4.00	1.24	2.12	−0.11	699	0.90
Education	700	0.48	0.00	0.62	0.00	3.00	1.20	1.49	−0.18	699	0.85
Gender	700	0.17	0.00	0.43	0.00	2.00	2.66	6.58	−0.26	699	0.79
Water	700	0.38	0.00	0.55	0.00	3.00	1.22	1.08	−0.14	699	0.89
Energy	700	0.46	0.00	0.58	0.00	3.00	0.92	0.33	0.13	699	0.90
Economy	700	1.12	1.00	0.86	0.00	3.00	0.14	−0.94	0.00	699	1.00
Industry	700	0.18	0.00	0.39	0.00	2.00	1.76	1.34	−0.10	699	0.92
Inequality	700	0.15	0.00	0.36	0.00	1.00	1.93	1.73	0.20	699	0.83
Cities	700	0.22	0.00	0.52	0.00	3.00	2.79	8.84	−0.15	699	0.88
Production	700	0.25	0.00	0.48	0.00	2.00	1.64	1.74	0.24	699	0.81
Climate	700	0.33	0.00	0.52	0.00	2.00	1.30	0.71	−0.22	699	0.83
Ocean	700	0.18	0.00	0.39	0.00	2.00	1.91	2.29	−0.19	699	0.85
Land	700	0.17	0.00	0.39	0.00	2.00	2.09	3.28	−0.29	699	0.77
Justice	700	0.14	0.00	0.37	0.00	2.00	2.39	4.81	0.21	699	0.84
Partnership	700	0.33	1.00	0.49	0.00	2.00	0.93	−0.60	0.15	699	0.88

Table 6 reports the results of our mapping between selected firms and their engagement with the 17 UN SDGs and the descriptive statistics of disclosing SDGs from 2015 to 2021. Additionally, Table 6 presents the ranking of 100 firms according to the number of disclosing the 17 UN SDGs in their reports. For example, the 17 UN SDGs-related information mentioned in corporate reporting ranges from 0 (e.g., QCG; CTX; NDN; S99; POM; TKU; KLF and PVI) to 22 times (e.g., VIC), meaning that firms are inconsistent in following the SDG Disclosures. In other words, some firms have shown a “real” effort more than others, and even though some firms lack efforts in adopting the SDGs. Therefore, this highlights that firms have different perspectives to adopt SDGs.

Table 6. Descriptive Statistics by Firms.

No.	Firm's Stock Symbol	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17	Mean	Std. Dev	Range
1	QCG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	CTX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	NDN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	S99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	POM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	TKU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	KLF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	PVI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	LIG	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.06	0.24	1
10	PVL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.06	0.24	1
11	DNP	1	1	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0.41	0.51	1
12	PTI	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.39	1
13	CEO	2	2	2	2	0	0	1	2	0	0	2	1	0	0	0	0	0	0.82	0.95	2
14	HHS	2	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.35	0.79	2
15	SAM	3	0	1	3	0	3	3	3	0	0	0	0	0	0	0	0	0	0.94	1.39	3
16	HTP	0	0	0	0	0	3	0	3	0	3	0	0	0	0	0	0	0	0.53	1.18	3
17	PSI	1	0	0	0	0	1	1	3	0	0	0	0	0	0	1	1	2	0.59	0.87	3
18	IDJ	3	3	1	2	0	1	1	4	1	0	1	2	1	0	0	0	0	1.18	1.24	4

Table 6. Cont.

No.	Firm's Stock Symbol	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17	Mean	Std. Dev	Range
19	VC2	2	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0.35	1.06	4
20	STB	5	3	3	5	3	5	6	7	5	5	3	5	3	5	4	5	5	4.53	1.18	4
21	BII	4	4	0	1	0	4	4	5	0	0	0	0	4	0	0	0	0	1.53	2.03	5
22	MST	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0.29	1.21	5
23	VC7	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0.29	1.21	5
24	MBG	0	0	0	0	0	3	5	5	0	0	0	0	0	0	0	0	0	0.76	1.75	5
25	APS	5	0	5	1	0	0	1	5	0	0	0	0	1	1	1	3	3	1.53	1.91	5
26	KDH	4	0	0	0	0	4	6	6	0	3	0	1	5	0	0	0	0	1.71	2.37	6
27	SCR	4	4	0	1	0	4	4	6	0	0	0	1	3	0	0	0	5	1.88	2.18	6
28	HUT	4	2	1	2	0	0	0	6	0	0	0	1	1	0	0	0	0	1	1.7	6
29	SDT	6	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.71	1.99	6
30	VC3	0	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	1	0.47	1.46	6
31	VNM	9	9	9	9	8	8	9	12	6	6	7	7	9	6	6	6	6	7.76	1.71	6
32	LAS	5	4	1	1	0	4	4	6	0	0	0	0	4	4	4	0	0	2.18	2.21	6
33	VIT	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.35	1.46	6
34	PPC	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.35	1.46	6
35	AMV	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.35	1.46	6
36	PVT	6	6	6	6	6	0	6	6	0	6	0	0	0	0	0	6	6	3.53	3.04	6
37	DL1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.35	1.46	6
38	SRA	2	0	0	0	0	6	6	6	0	0	0	0	0	0	0	0	0	1.18	2.35	6
39	EIB	6	4	5	5	0	0	6	6	0	0	0	5	0	0	0	0	6	2.18	2.72	6
40	NVB	4	0	1	4	0	0	0	6	2	0	0	2	0	0	0	0	0	1.12	1.87	6
41	WSS	6	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0.71	1.99	6
42	ITA	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0.82	2.32	7
43	KBC	6	6	0	0	0	6	6	7	0	0	4	0	0	0	0	0	0	2.06	2.93	7
44	FIT	5	5	5	5	0	0	0	7	0	0	0	0	0	0	0	0	0	1.59	2.58	7
45	BCC	6	6	6	1	0	5	5	7	0	0	0	0	3	0	0	0	0	2.29	2.82	7
46	BTS	0	0	0	0	0	0	6	7	0	0	0	0	7	0	0	0	0	1.18	2.63	7
47	TNG	7	7	7	7	2	2	6	9	2	2	2	2	7	7	7	2	2	4.71	2.69	7
48	VCS	7	7	7	7	7	7	7	14	7	7	7	7	7	7	7	7	7	7.41	1.7	7
49	PLC	7	7	7	5	0	7	7	7	1	1	1	1	7	7	6	0	1	4.24	3.09	7
50	GMD	7	7	7	7	0	7	7	7	0	0	0	0	0	0	0	0	7	3.29	3.6	7
51	ACB	7	7	7	7	0	0	0	7	0	0	0	0	0	0	0	0	0	2.06	3.29	7
52	AGR	6	1	1	0	0	0	6	7	0	0	0	0	0	0	0	0	0	1.24	2.46	7
53	CTG	7	7	7	7	4	0	0	6	0	0	0	0	0	0	0	0	4	2.47	3.16	7
54	OGC	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0.41	1.7	7
55	VCB	7	7	7	7	0	0	0	6	0	1	0	0	6	1	1	1	2	2.71	3.08	7
56	IVS	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0.41	1.7	7
57	SHN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0.41	1.7	7
58	TVC	2	0	0	2	0	4	4	7	0	0	0	0	7	0	0	0	0	1.53	2.48	7
59	FLC	3	3	1	2	1	1	1	8	5	0	8	0	3	0	0	0	0	2.12	2.64	8
60	HOM	7	7	4	1	0	4	6	8	0	0	0	7	7	1	3	0	0	3.24	3.17	8
61	VGS	4	0	4	0	4	0	0	8	0	4	0	0	4	4	4	0	4	2.35	2.47	8
62	GAS	4	4	4	4	0	3	3	8	0	0	0	0	0	0	0	0	0	1.76	2.41	8
63	MBB	7	7	7	7	0	0	1	8	1	0	0	0	0	0	0	0	7	2.65	3.46	8
64	DIG	8	7	3	3	2	5	2	11	3	2	3	3	2	2	4	2	3	3.82	2.56	9
65	DXG	7	2	2	1	0	0	3	9	7	0	7	0	7	0	0	0	7	3.06	3.4	9
66	PDR	11	7	5	7	4	5	5	13	5	5	5	4	4	4	4	5	5	5.71	2.57	9
67	NTP	6	5	5	5	5	7	7	14	5	5	5	7	5	7	5	5	5	6.06	2.22	9
68	BVH	7	6	7	7	6	5	6	12	4	5	3	6	10	4	4	9	5	6.24	2.33	9
69	VNR	3	2	2	3	2	2	2	9	0	2	0	0	3	2	2	2	2	2.24	1.99	9
70	MSN	5	5	0	0	0	5	6	10	0	0	5	0	5	0	0	0	0	2.41	3.18	10
71	PVD	8	6	6	6	2	2	6	12	2	2	2	4	2	6	6	2	6	4.71	2.82	10
72	BVS	6	0	5	5	0	6	6	10	0	0	0	0	5	0	1	5	6	3.24	3.23	10
73	HT1	6	6	6	3	0	4	4	11	0	0	0	0	4	4	3	0	0	3	3.14	11
74	CII	0	0	0	0	5	0	6	0	12	0	0	0	0	0	0	0	0	2.06	4.16	12
75	HQC	11	7	1	7	7	5	12	11	7	0	4	7	4	0	0	0	0	4.88	4.21	12
76	DFM	6	6	6	6	0	6	6	12	0	0	0	0	6	6	0	0	4	3.76	3.6	12
77	PVC	12	6	0	6	0	0	6	6	0	0	0	0	6	6	0	0	0	2.82	3.75	12

Table 6. Cont.

No.	Firm's Stock Symbol	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17	Mean	Std. Dev	Range
78	PGS	7	7	7	5	0	5	7	12	0	4	0	7	0	7	7	0	7	4.82	3.59	12
79	NT2	10	10	10	7	0	9	9	12	3	3	3	3	7	7	10	0	4	6.29	3.8	12
80	VND	7	0	7	1	0	3	3	12	0	0	0	0	2	0	0	0	7	2.47	3.62	12
81	DLG	2	0	1	0	0	0	5	13	0	0	7	0	6	0	0	0	0	2	3.67	13
82	NLG	8	8	3	9	0	8	0	13	0	0	5	0	7	0	0	0	0	3.59	4.37	13
83	VCG	9	8	5	0	0	6	6	13	0	0	0	3	1	0	0	0	2	3.12	4.03	13
84	SHS	6	0	0	5	0	4	4	13	0	4	0	0	7	0	4	4	4	3.24	3.51	13
85	OCH	4	4	3	0	0	1	5	14	0	0	8	0	4	1	0	0	0	2.59	3.79	14
86	ASM	14	14	6	4	0	0	0	14	7	0	7	0	0	0	0	0	7	4.29	5.44	14
87	KDC	7	7	7	7	0	10	10	14	0	0	0	6	1	0	0	0	0	4.06	4.67	14
88	SBT	10	10	10	10	10	10	10	11	5	5	10	10	10	0	0	5	10	10	5.34	14
89	HPG	11	11	11	7	0	6	6	14	5	3	7	7	3	6	0	5	5	6.29	3.82	14
90	PVS	8	8	7	7	0	7	7	14	0	0	0	7	5	4	4	0	6	4.94	3.93	14
91	TVD	7	7	7	0	0	7	7	14	0	0	0	0	3	2	2	0	7	3.71	4.13	14
92	FPT	13	13	7	13	0	0	7	14	7	0	0	7	7	0	0	0	7	5.59	5.4	14
93	BID	14	7	9	7	13	7	7	13	0	5	0	5	7	0	0	5	7	6.24	4.49	14
94	HCM	7	7	7	7	0	0	0	14	0	0	0	0	0	0	0	7	7	3.29	4.37	14
95	HAG	15	10	10	7	10	7	7	14	7	1	0	7	0	0	3	0	13	6.53	5.12	15
96	REE	6	3	8	10	0	11	13	15	0	6	0	7	9	0	0	0	7	5.59	5.05	15
97	SSI	7	0	7	7	0	2	16	7	7	0	7	7	7	7	5	7	5.88	3.84	16	
98	TIG	8	8	7	1	0	1	1	21	1	1	1	3	1	0	0	0	1	3.24	5.34	21
99	HSG	14	14	13	13	6	6	6	21	6	6	7	14	0	0	0	6	6	8.12	5.85	21
100	VIC	7	7	22	21	7	5	7	17	7	3	21	7	0	0	0	3	6	8.24	7.4	22

Our mapping (as seen in Table 6) shows that firms do not follow all 17 UN SDGs. Only 8% of the selected firms reported sustainability information about these 17 SDGs for seven years (2015–2021), which suggests that some goals should be focused on by the States rather than corporations [53]. Firms also need to adopt “macro” goals, such as SDG10—Reduce inequality and SDG11—Sustainable cities and communities, since it is emphasized that “Organizations must acknowledge their impact on the achievement of sustainable development both outside and within the organization’s boundary” [84].

Likewise, it is indicated that there are three main patterns of Vietnamese firms’ SDGs adoptions (as presented in Table 6), including “*unfollow, partly follow, and fully follow.*” In more detail, for cases of ignoring the terms “Sustainable Development Goals” in their corporate reporting, we point out that there are two primary reasons. The first reason is because of the reporting format. Although no SDGs information is mentioned for some firms, they still disclose SDG-related information on their corporate websites. The second reason is that their business models are not focused on the SDGs, which is in line with previous studies [44,47]. Indeed, even in the same industries, the reporting of the SDGs information of the selected sample was different.

Our findings show that 84% of total firms are just partly engaging in the 17 SDGs (i.e., focusing only on some specific goals) across various sectors (e.g., poverty, economic growth, and climate change). This suggests a lack of “actual implementation” of SDGs among Vietnamese firms. Regarding the CSR session in the AR, there is a question: Do these firms “pretend” to satisfy the stakeholders’ expectations of social and environmental information or honestly act to progress their commitment toward the SDGs? This can be proved by matching these specific and focused goals by Vietnamese companies with the 3 pillars of CSR practices, such as SDG1—Poverty/Social; SDG8—Decent working environment and economic growth/Governance; SDG13—Climate change/Environment) [53,85].

A review of both ARs and SRs indicated that companies intend to primarily focus on improving poverty, economic growth, and climate change, as illustrated in the following quotations:

“Applications of the circular economy will help reduce the cost of business operation, increase competitiveness and lead to global development opportunities worth up to USD 4.5 trillion by 2030.” [8]

“Continuing the annual charity program of giving Tet gifts to the poor conducted from 2009, BIDV gave away 30,000 sets of Tet gifts, with the value of VND15 billion, together with local authorities to take care of the poor, helped the poor to have a warm Tet whenever spring comes.” [86]

“On August 5, 2021, KIDO Group donated 1532 bottles of cooking oil equivalent to VND 582,000,000 for the program “Emergency support for disadvantaged people in Ho Chi Minh City.” [87]

“In an effort to help people overcome the damages, at the end of October, PDR’s mission visited and donated gifts to people in the most affected communes of Quang Ninh and Le Thuy districts. The total value of donations by Phat Dat was VND 500 million.” [88]

“Continue to promote strengths, take more domestic market share which is aiming to the objective of 70–80% drilling market share in Vietnam; expand market share of drilling service and drilling related services in regional and global markets, create added value for clients by high quality services and competitive prices.” [89]

“... Gemadept has taken concrete steps both in decisions and actions to work towards the goal of responding to climate change, joining hands with the Vietnam Government in sustainable development, reflected in green and environmentally friendly port projects, shifting to renewable energy, reforestation projects.” [90]

Notably, 8% of the sampled firms were fully committed to SDGs (namely, STB, VNM, VCS, PDR, NTP, BVH, TNG, and PVD), and aware of the importance of sustainable development. Thus, our theoretical framework can explain these patterns of SDGs implementation among industries in an emerging market like Vietnam, particularly:

- **Unfollow:** firms lack all three motivations: legitimating motivation, motivation to meet stakeholders’ expectations, and volunteering motivation;
- **Partly follow:** firms indicate one/two motivation(s) toward adopting and achieving SDGs adoptions; or
- **Follow:** firms indicate their great motivation to achieve sustainable development.

4.2. Assessment of Vietnamese SDGs Adopters: Evaluation of Environmental Sensitive Industries Impact Level

This analysis of the SDG disclosures of the Top 100 Vietnamese listed firms reveals a general trend toward the content of Vietnamese corporate reports across the sectors. Table 7 presents our mapping between industries categorized by the level of sensitive environmental factors and the adoption of 17 UN SDGs from 2015 to 2021. Overall, there is an increasing trend in the number of SDGs disclosed in the corporate reporting, for example, HESI: 291 to 585 times; MESI: 20 to 41 times; LESI: 87 to 163 times. Unsurprisingly, Panel A—High environmental sensitivity industries (HESI) accounts for the highest number of mentions regarding SDGs in the selected firms’ corporate reporting compared to Panel B and Panel C year by year. This result is consistent with previous research findings [54,55], meaning that SDG-related information disclosed by corporations primarily depends on industry risk characteristics. However, with firms operating in the Low environmental sensitivity industries (LESI), Panel C revealed more SDG-related information in their reports compared to Panel B, with firms operating in the Medium environmental sensitivity industries (MESI). This result is consistent with the predictions derived from stakeholder theory that high-risk industries disclose more sustainability information to meet the stakeholders’ expectations of enhancing CSR practices.

Table 7. Adoption of SDGs by Environmental Sensitive Industries Impact Level.

Year	SDG1 Poverty	SDG2 Hunger	SDG3 Health	SDG4 Educa- tion	SDG5 Gender	SDG6 Water	SDG7 Energy	SDG8 Econ- omy	SDG9 Indus- try	SDG10 In- equal- ity	SDG11 Cities	SDG12 Produc- tion	SDG13 Cli- mate	SDG14 Oceans	SDG15 Land	SDG16 Justice	SDG17 Part- ner- ships	Total
Panel A: HESI																		
2015	31	26	20	22	3	13	17	58	7	2	15	13	15	9	8	1	31	291
2016	44	33	28	26	9	19	28	70	10	5	16	18	15	10	8	4	14	357
2017	41	36	32	29	11	30	34	72	12	7	19	18	20	10	8	6	19	404
2018	50	42	35	34	12	36	41	86	13	9	23	20	25	18	14	7	22	487
2019	53	45	38	34	12	36	39	86	14	14	23	22	28	19	17	8	21	509
2020	53	44	40	34	15	40	42	89	17	17	26	23	28	18	18	11	23	538
2021	59	49	47	40	13	40	48	96	19	18	24	27	32	20	18	10	25	585
Panel B: MESI																		
2015	2	2	2	2	0	1	2	4	1	0	0	1	1	0	0	0	2	20
2016	4	4	3	4	1	2	4	7	1	1	0	1	1	0	0	1	3	37
2017	4	4	3	4	1	2	4	6	1	1	0	1	1	0	0	1	3	36
2018	4	4	3	4	1	2	4	7	1	1	0	1	1	0	0	1	3	37
2019	4	4	3	4	1	2	4	7	1	1	0	1	1	0	0	1	3	37
2020	6	5	3	4	1	2	4	8	1	1	0	1	1	0	0	1	3	41
2021	6	5	3	4	1	2	4	8	1	1	0	1	1	0	0	1	3	41
Panel C: LESI																		
2015	14	7	11	11	3	2	2	16	2	1	0	2	5	1	1	1	8	87
2016	17	7	10	11	4	5	6	23	4	3	1	4	7	3	3	4	11	123
2017	17	8	12	12	4	5	6	26	4	4	0	5	8	3	2	7	10	133
2018	18	9	13	13	6	7	7	28	4	5	2	5	9	3	4	9	13	155
2019	18	9	13	14	6	7	8	26	4	5	2	5	10	3	4	9	13	156
2020	18	9	14	13	7	6	9	30	4	6	1	5	9	3	5	9	13	161
2021	19	9	15	14	5	5	11	31	4	5	0	4	10	4	6	8	13	163

Next, as presented in Table 8, sectors are deeply interpreted as the level of adopting the 17 UN SDGs. Although Table 7 reveals that firms belonging to high environmental sensitivity industries have an impact on the way of reporting the SDGs information. Some HESI firms have not made a solid effort to follow the SDGs agenda. For instance, two HESI sectors: natural gas distribution and utilities, have weakly followed and committed to the UN SDGs, apart from SDG8 Decent Work and Economic Growth; suggesting that even operating in high-risk industries, the level of adoption is different from sector to another because of the business core model rather than capturing “the trend” to adopt the SDGs implementation in their reporting practice. Interestingly, our result indicates that LESI firms are intensely keen to disseminate their sustainability initiatives in their corporate reporting, despite the absence of stakeholders’ pressure related to firms’ legitimacy and transparency motivations. This finding is consistent with previous studies by [82,91], as they have no product-related risks to hide. These findings can be explained by legitimacy theory and voluntary disclosure theory; unsustainable performers intend to disclose less sustainability-related information to conceal their actual performance for sustainable development and avoid damaging their legitimacy and reputation.

4.3. Assessment of Vietnamese SDGs Adopters: Substantive or Symbolic Approaches to Corporate Legitimacy

Table 9 describes how firms disclose information about their SDGs in their corporate reporting, whether it is substantive (*green-wishing*) or symbolic (*greenwashing*), by reviewing all selected firms’ reports with three main criteria (1) The awareness of the CEO/chairman toward SDGs; (2) The corporate awareness of risks and opportunities related to SDGs and (3) The corporate-specific KPIs associated with the SDGs. Table 9 is also used to indicate the trends of firms in committing to SDGs by comparing the answers “Yes” and “No” for two preceding years: 2015 (the year of global implementation of SDGs) and 2021 (the current year). Surprisingly, there is considerable inconsistency in adopting and disclosing SDGs information by the Top 100 Vietnamese firms. For instance, some firms have SDG-related information in the CEO/chairman. Yet, there is no information indicating the risks/opportunities or connection between their firms’ KPIs to the SDGs, suggesting that managers’ perception of SDGs is insignificant to disclose SDG information. Moreover, some firms (e.g., OCH, HAG, and KDH) show their effort in committing to the SDGs by indicating this fact in the CEO/Chairman letter in 2015. However, no information was mentioned in 2021. Accordingly, our findings suggest Vietnamese firms show a “*green talk*” not a “*green action*” in their ARs or standalone SRs rather than following substantive SDG strategies.

Table 8. Adoption of SDGs by Sectors.

No.	Sectors	SDG1 Poverty	SDG2 Hunger	SDG3 Health	SDG4 Education	SDG5 Gender	SDG6 Water	SDG7 Energy	SDG8 Economy	SDG9 Industry	SDG10 Inequality	SDG11 Cities	SDG12 Production	SDG13 Climate	SDG14 Oceans	SDG15 Land	SDG16 Justice	SDG17 Partnerships	Total
1	Accommodation and Food Services	4	4	3	0	0	1	5	14	0	0	8	0	4	1	0	0	0	44
2	Agriculture Production	15	10	10	7	10	7	7	14	7	1	0	7	0	0	3	0	13	111
3	Construction and Real Estate	118	81	70	84	21	75	82	222	36	20	80	40	58	6	8	9	37	1047
4	Food & Beverage	26	26	26	26	18	28	29	37	11	11	17	23	20	6	6	11	26	44
5	Manufacturing	90	84	76	57	24	63	74	163	25	30	28	49	57	52	33	25	33	963
6	Mining, Quarrying and Oil and Gas Extraction	42	34	27	24	2	23	33	53	3	3	3	12	17	25	24	2	20	347
7	Natural Gas Distribution	12	12	12	10	0	8	10	22	0	4	0	7	0	7	7	0	7	118
8	Utilities	10	10	10	7	0	9	9	18	3	3	3	3	7	7	10	0	4	113
9	Health Care	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6
10	Information and Technology	13	13	7	13	0	0	7	14	7	0	0	7	7	0	0	0	7	95
11	Transportation and Warehousing	13	13	13	13	6	7	13	19	0	6	0	0	0	0	0	6	13	122
12	Wholesale Trade and Finance and Insurance	4	2	0	0	0	6	6	8	0	0	0	0	0	0	0	0	0	26
13	Finance and Insurance	121	58	88	88	35	37	49	180	26	29	6	30	58	20	25	47	81	978
Average		36	27	26	25	9	20	25	59	9	8	11	14	18	10	9	8	36	

Note: Industry Sectors: **HESI**: High environmental sensitivity industries; **MESI**: Medium environmental sensitivity industries; **LESI**: Low environmental sensitivity industries. Rate of Mentioning SDGs in the Corporate Reporting: **Green**: 50% or above/ (>=30 times); **Yellow**: 25%–<50%/(=15–<30 times); **Red**: <25%/(<15 times).

Table 9. Sustainable Development Goal (SDG) Disclosures Criteria Check List.

No.	Stock Symbol	Criteria 1		Criteria 2		Criteria 3	
		Does the CEO and/or Chair's Message Talk about the SDGs?		Does the Reporting Identify Potential Risks and Opportunities Related to the SDGs?		Does the Reporting Associate Specific Key Performance Indicators (KPI) to Priority SDGs?	
		2015	2021	2015	2021	2015	2021
1	OCH	Yes	No	Yes	Yes	Yes	Yes
2	ASM	No	No	No	No	No	No
3	HAG	Yes	No	Yes	Yes	Yes	Yes
4	CII	No	No	No	No	No	No
5	DIG	Yes	No	No	Yes	Yes	Yes
6	DLG	No	No	No	No	No	No
7	DXG	Yes	Yes	No	Yes	Yes	No
8	FLC	No	N/A	No	N/A	Yes	N/A
9	HQC	No	Yes	No	Yes	No	Yes
10	ITA	Yes	Yes	No	No	No	Yes
11	KBC	Yes	No	Yes	Yes	Yes	Yes
12	KDH	No	Yes	No	Yes	No	Yes
13	NLG	Yes	No	No	No	Yes	Yes
14	PDR	No	Yes	No	No	Yes	Yes
15	QCG	No	No	No	No	No	No
16	REE	No	No	No	No	Yes	Yes
17	SAM	No	No	No	No	No	Yes
18	SCR	No	Yes	No	Yes	No	Yes
19	VCG	No	No	No	No	No	Yes
20	VIC	No	No	No	No	Yes	Yes
21	BII	No	No	No	No	No	No
22	CEO	No	No	No	Yes	No	No
23	CTX	No	No	No	No	No	No
24	HUT	No	Yes	No	Yes	No	Yes
25	IDJ	No	No	No	No	No	Yes
26	LIG	No	No	Yes	Yes	No	No
27	MST	N/A	No	N/A	No	N/A	No
28	NDN	No	No	No	No	No	No
29	PVL	No	No	No	No	No	No
30	S99	No	No	No	No	No	No
31	SDT	No	No	No	No	No	No
32	TIG	Yes	Yes	No	No	No	No
33	VC2	No	No	No	No	No	Yes
34	VC3	No	No	No	No	No	No
35	VC7	No	No	No	No	No	No
36	KDC	No	No	No	No	Yes	No
37	SBT	Yes	N/A	No	N/A	Yes	N/A
38	VNM	Yes	Yes	No	No	No	Yes
39	DPM	No	No	No	No	Yes	Yes
40	FIT	No	No	No	No	No	No
41	HPG	Yes	No	No	No	Yes	Yes
42	HSG	No	No	No	No	Yes	Yes
43	HT1	No	Yes	No	No	No	Yes
44	MSN	No	No	No	No	No	No
45	POM	No	No	No	No	No	No
46	BCC	No	No	No	No	No	No
47	BTS	No	No	No	No	No	No
48	DNP	Yes	No	No	No	No	No
49	HOM	No	No	No	Yes	Yes	Yes
50	HTP	No	No	No	No	No	No

Table 9. Cont.

No.	Stock Symbol	Criteria 1		Criteria 2		Criteria 3	
		Does the CEO and/or Chair's Message Talk about the SDGs?		Does the Reporting Identify Potential Risks and Opportunities Related to the SDGs?		Does the Reporting Associate Specific Key Performance Indicators (KPI) to Priority SDGs?	
		2015	2021	2015	2021	2015	2021
51	LAS	No	No	No	No	Yes	No
52	MBG	No	No	No	Yes	No	No
53	NTP	No	No	Yes	No	Yes	No
54	TKU	No	No	No	No	No	No
55	TNG	No	No	Yes	Yes	Yes	Yes
56	VCS	No	No	No	No	Yes	Yes
57	VGS	No	No	Yes	No	No	No
58	VIT	No	No	No	No	No	No
59	PVD	No	No	No	Yes	Yes	Yes
60	PLC	No	No	No	No	No	Yes
61	PVC	No	Yes	Yes	No	No	Yes
62	PVS	No	Yes	Yes	Yes	Yes	Yes
63	TVD	No	No	Yes	Yes	Yes	Yes
64	GAS	Yes	Yes	Yes	Yes	Yes	Yes
65	PGS	No	No	No	Yes	Yes	Yes
66	NT2	No	No	No	Yes	No	Yes
67	PPC	No	No	No	No	No	No
68	AMV	No	No	No	No	No	No
69	FPT	No	No	No	No	Yes	Yes
70	GMD	No	No	No	Yes	Yes	Yes
71	PVT	No	No	No	Yes	No	Yes
72	DL1	No	No	No	No	Yes	No
73	HHS	No	No	No	No	No	No
74	KLF	No	No	No	No	No	No
75	SRA	No	No	No	No	No	No
76	ACB	No	No	No	No	No	Yes
77	AGR	No	No	No	No	No	No
78	BID	Yes	No	No	No	Yes	Yes
79	BVH	Yes	Yes	Yes	Yes	Yes	Yes
80	CTG	No	No	No	No	No	Yes
81	EIB	Yes	No	No	No	Yes	Yes
82	HCM	Yes	Yes	No	No	Yes	Yes
83	MBB	Yes	Yes	No	Yes	Yes	Yes
84	OGC	No	No	No	Yes	No	Yes
85	SSI	Yes	Yes	Yes	Yes	Yes	Yes
86	STB	Yes	Yes	No	No	Yes	Yes
87	VCB	Yes	Yes	No	No	Yes	Yes
88	VND	Yes	No	No	No	Yes	Yes
89	APS	No	No	No	No	No	Yes
90	BVS	No	No	No	No	No	Yes
91	IVS	No	No	No	No	No	No
92	NVB	Yes	No	No	No	Yes	Yes
93	PSI	No	No	No	No	No	Yes
94	PTI	No	No	Yes	No	No	No
95	PVI	No	Yes	No	No	Yes	Yes
96	SHN	No	No	No	No	No	No
97	SHS	No	No	No	No	No	Yes
98	TVC	No	No	No	No	No	No
99	VNR	No	No	No	No	No	Yes
100	WSS	No	No	No	No	No	Yes

Note: N/A means both annual and sustainability reports are not available on the company websites or elsewhere.

Additionally, several companies attempt to indicate their effort to engage in SDGs without specific KPIs, as shown in the below quotes:

“BIDV has always tried to ensure equity environment and paid attention to material and spiritual lives of female staff, as well as created conditions for female staff to participate in professional operation, promotion and appointment (mostly at department leader positions)” [92]

“Construction and operation of real estate projects consume a large amount of energy. Therefore, to save energy, Khang Dien actively applies many solutions to save power and fuel.” [93]

“Baoviet always engages economic growth with environmental protection and social responsibility—three pillars on which a long-term success of Baoviet is built...” [94]

“...BVSC always encourages and mobilizes employees to use public transport, helping to reduce CO₂ into the environment.” [95]

Notwithstanding, 8% of total firms (as presented in Table 6) indicate that they wish to be green (*green wishing*) by indicating an effort to adopt all global goals. Furthermore, although during 2015–2021, some firms just partly followed the 17 UN SDGs, these firms have set and achieved specific key performance indicators (KPI).

For example, as seen in Figure 2, FPT sets some objectives to ensure the achievement of sustainable growth [96].

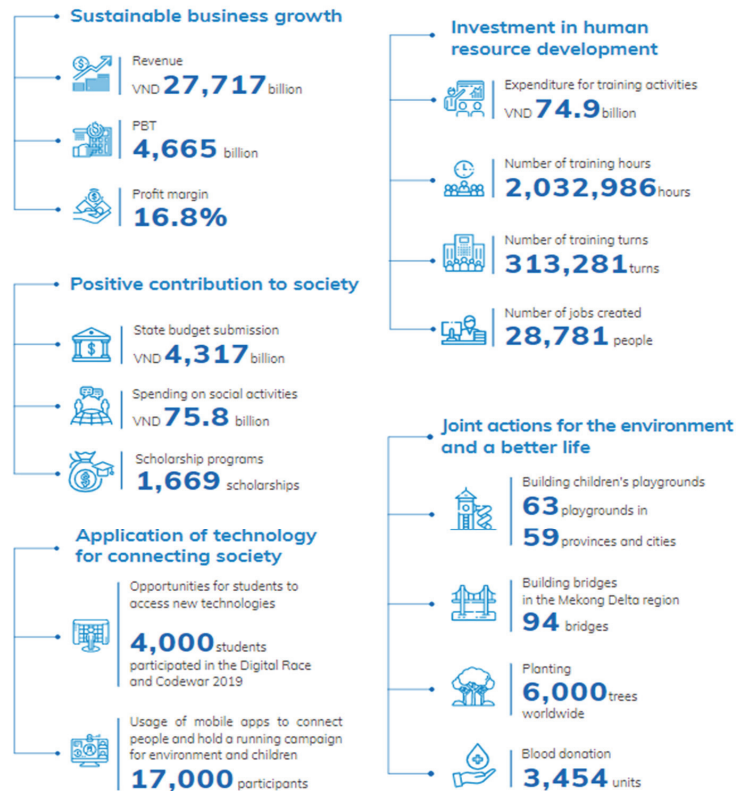


Figure 2. FPT Corporation’s KPI for SDGs.

Besides, Petrovietnam Transportation Corporation (PVT) indicated their SDG targets, as presented in Figure 3 which was extracted from the AR 2018 [97].

Implementation of sustainable economic objectives

Economic development	Indirect economic impact	Continuously training to improve professional knowledge skills for the personnel of PVTrans and its member companies, thereby contributing to strengthening employee's skills and knowledge in domestically shipping industry. 90% of input services of PVTrans are provided by domestic enterprises.
Social Development	Ensuring and securing income for employees	Ensuring income and life standard for employees. The average income of PVTrans employees is VND 18.9 million/person/month, attaining 109% of the 2018 plan. Initial salary of PVTrans employees is much higher than the local minimum wage in specific working areas. The minimum starting income is also over double higher than the state minimum wage set for Region I.
	Diversity and equality in work	The leaders of PVTrans commits to creating equal working conditions for all employees, regardless of ethnicity, gender, age or religion.
	Respect for human rights	The leaders of PVTrans commits to respecting human rights in labor use. Specific regulations are as follows: Child labor: Do not use child labor. Do not use goods and services from the suppliers who use child labor. Forced labor: Do not use and employ forced labor. Do not use goods and services from the suppliers who use forced labor. Rights of indigenous people: Do not violate the rights of indigenous people when conducting production and business activities outside the territory of Vietnam. In 2018, PVTrans and its member companies did not face to any complaints related to human rights.
Environmental Protection	Responsible fuel consumption Labor safety	PVTrans always has a plan on saving fuel costs. Safety in operating transport services: complying with labor regulations, ISO, safety training courses in labor

Figure 3. Petrovietnam Transportation Corporation's KPI for SDGs.

Additionally, for 2015, 21% of the sampled firms mentioned the SDGs in the CEO/Chairman letter, 15% showed their awareness of risks related to SDGs, and 41% linked their KPIs to SDGs. Compared to 2021, there is an increasing trend; however, there is a neglectable increase for the three criteria, 20%, 26%, and 56%, respectively. Although many firms link their business objectives to SDGs, as pointed out in Tables 5 and 6, these SDGs primarily indicate the firms' effort to legitimize the firms' images of sustainable development rather than achieving the UN SDGs. Additionally, our findings show a lack of corporate understanding of SDG risks and opportunities among the top 100 Vietnamese firms. Therefore, our results suggest that it is necessary for Vietnamese firms to significantly use SDG disclosures as 'a strategic tool' or *green wishing/substantive actions* to strengthen their legitimate image for striving for long-term SDGs. Instead of using it as *greenwashing actions* to "deal" with stakeholders' pressure of non-financial disclosures such as SDGs, which is in line with previous literature [16,17,49].

5. Conclusions

Throughout the analysis of the top 100 Vietnamese listed firms on the two biggest stock exchanges (HOSE and HNX), we provide a holistic picture of how firms operating in emerging markets like Vietnam adopt and follow the 17 UN SDGs. As pioneering research in the context of Vietnam, we reviewed the corporate reporting of SDGs in both ARs and SRs. Our findings indicate that 84% of total firms are partly engaging in the 17 UN SDGs, by focusing on some specific goals (SDG1—Poverty, SDG8—Economic growth, and SDG13—Climate change). This suggests that there is a lack of "actual implementation" for SDGs among Vietnamese listed firms.

At the industry level, we found that corporate SDG disclosures differ between corporations because of their business strategies rather than the nature of their industrial sectors.

Furthermore, the findings indicate that firms operating in high environmental sensitivity industries are keen on reporting SDG-related information compared to medium and low environmental sensitivity industries. Unsurprisingly, many companies operating in high-risk industries (e.g., natural gas distribution and utilities) avoid disclosing SDG-related information to protect their legitimacy. Likewise, our findings reveal a considerable inconsistency in adopting and disclosing the SDG information to the public, suggesting that Vietnamese firms should use SDG disclosure as *'a strategic tool'* to strengthen their legitimacy and truly satisfy stakeholders' social, environmental, and business ethic expectations.

Consequently, from a theoretical standpoint, this research can contribute to the academic literature on adopting and disclosing SDGs in developing countries. It represents one of the first studies to explore SDG adoption in a developing country's context by providing a unique multi-theoretical framework of legitimacy, stakeholders, and voluntary disclosure theories to analyze the motivation for adopting the 17 UN SDGs.

From a practical perspective, our findings can be used as a guideline for corporate decision-makers of Vietnamese publicly traded firms to identify the status of SDGs adoption and implementation and satisfy stakeholders' expectations. The findings also send a warning message to the board of directors/corporate decision-makers to adopt and embed the 17 UN SDGs into their business models and organizational culture. Simultaneously, this research also contributes to exploring the corporate adoption and implementation efforts to report SDGs toward fulfilling the UN Agenda of 2030 for developing countries. At the country level, our findings are essential for government, practitioners, and policymakers to support companies in adopting and achieving these UN SDGs as part of their business strategies and objectives by providing a consistent and binding framework for communicating the action plan and achievement level of these SDGs in ARs and/or standalone SRs.

Like other research, this paper has some limitations, yet it provides vital opportunities for future research. Firstly, the research sample only focuses on Vietnamese listed firms on the two biggest stock exchanges. Therefore, the discovery of the SDGs' adoption and implementation may only partially reflect the holistic view of all Vietnamese companies. Moreover, our findings point out a question mark for the case of adopting the 17 UN SDGs in a developing country, Vietnam (Do these firms "pretend" to satisfy the stakeholders' expectations of social and environmental information or honestly act to progress their commitment toward the SDGs?). Therefore, future research may consider a large sample size (e.g., by using cross-country corporate data) or adopt qualitative research methods using questionnaires and/or semi-structured interviews to assess the impact of managers' religious beliefs, personal characteristics, and attitudes towards corporate sustainable development in different countries adopted and implemented the 17 UN SDGs, see, for example, Helfaya & Easa [98]. Secondly, since this is the case of Vietnam, the results should be applied with caution in different contexts. Consequently, at a micro level, future research can consider adopting our research framework for multi-national companies operating in different industries to investigate the key determinants (e.g., firm's characteristics and corporate governance factors) that affect the process of adopting and implementing these 17 SDGs. At a macro level, future research could examine the institutional factors (e.g., legal systems, ownership structure, size of capital markets, cultural factors, political stability, environmental regulations, etc.) in both developing and developed countries to discover what aspects of emerging countries are different from other developed countries; and to examine the difference among countries in implementing and engaging SDGs. Thirdly, we primarily relied on content analysis to investigate the status quo of adopting and implementing the 17 UN SDGs in Vietnam. Accordingly, future research could employ a mixed methodology (e.g., quantitative and qualitative) to investigate the level of adopting and implementing the 17 UN SDGs and their determinants.

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References

- Mio, C.; Panfilo, S.; Blundo, B. Sustainable Development Goals and the Strategic Role of Business: A Systematic Literature Review. *Bus. Strategy Environ.* **2020**, *29*, 3220–3245. [CrossRef]
- Scheyvens, R.; Banks, G.; Hughes, E. The Private Sector and the SDGs: The Need to Move Beyond ‘Business as Usual. *Sustain. Dev.* **2016**, *24*, 371–382. [CrossRef]
- Bebington, J.; Unerman, J. Achieving the United Nations Sustainable Development Goals: An Enabling Role for Accounting Research. *Account. Audit. Account. J.* **2018**, *31*, 2–24. [CrossRef]
- UNSDG | UN in Action—Viet Nam. Available online: <https://sdgs.un.org/goals> (accessed on 25 July 2022).
- The National Action Plan for the Implementation of the 2030 Sustainable Development Agenda. Available online: <https://vietnam.un.org/index.php/en/4123-national-action-plan-implementation-2030-sustainable-development-agenda> (accessed on 24 July 2022).
- FPT Corporation Annual Report 2021. Available online: <https://bctn2021.fpt.com.vn/en> (accessed on 20 July 2022).
- TNG Investment and Trading JSC Annual Report 2021. Available online: https://tng.vn/userfiles/files/Quan%20H%E1%BA%B9%20c%E1%BB%95%20%C4%91%C3%B4ng/BAO%20Cao%20Thuong%20Nien%202021/20220429_TNG_AR2021_EN.pdf (accessed on 25 June 2022).
- Viet Nam Dairy Products Joint Stock Company Annual Report 2018. Available online: https://www.vinamilk.com.vn/static/uploads/bc_thuong_nien/1553157661-ea4e37fe1db29419325178dd843588da6e8234bb730198a6aa961d741128712e.pdf (accessed on 20 July 2022).
- Lauwo, S.G.; Azure, J.D.-C.; Hopper, T. Accountability and Governance in Implementing the Sustainable Development Goals in a Developing Country Context: Evidence from Tanzania. *Account. Audit. Account. J.* **2022**, *35*, 1431–1461. [CrossRef]
- Pizzi, S.; Caputo, A.; Corvino, A.; Venturilli, A. Management Research and the UN Sustainable Development Goals (SDGs): A Bibliometric Investigation and Systematic Review. *J. Clean. Prod.* **2020**, *276*, 124033. [CrossRef]
- Silva, S. Corporate Contributions to the Sustainable Development Goals: An Empirical Analysis Informed by Legitimacy Theory. *J. Clean. Prod.* **2021**, *292*, 125962. [CrossRef]
- Izzo, M.F.; dello Strologo, A.; Granà, F. Learning from the Best: New Challenges and Trends in IR Reporters’ Disclosure and the Role of SDGs. *Sustainability* **2020**, *12*, 5545. [CrossRef]
- Ike, M.; Donovan, J.D.; Topple, C.; Masli, E.K. The Process of Selecting and Prioritising Corporate Sustainability Issues: Insights for Achieving the Sustainable Development Goals. *J. Clean. Prod.* **2019**, *236*, 117661. [CrossRef]
- Bennich, T.; Weitz, N.; Carlsen, H. Deciphering the Scientific Literature on SDG Interactions: A Review and Reading Guide. *Sci. Total Environ.* **2020**, *728*, 138405. [CrossRef]
- Diaz-Sarachaga, J.M. Shortcomings in Reporting Contributions towards the Sustainable Development Goals. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1299–1312. [CrossRef]
- Van der Waal, J.W.H.; Thijsens, T. Corporate Involvement in Sustainable Development Goals: Exploring the Territory. *J. Clean. Prod.* **2020**, *252*, 119625. [CrossRef]
- Emma, G.-M.; Jennifer, M.-F. Is SDG Reporting Substantial or Symbolic? An Examination of Controversial and Environmentally Sensitive Industries. *J. Clean. Prod.* **2021**, *298*, 126781. [CrossRef]
- Heras-Saizarbitoria, I.; Urbietta, L.; Boiral, O. Organizations’ Engagement with Sustainable Development Goals: From cherry-picking to SDG-washing? *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 316–328. [CrossRef]
- Elalfy, A.; Weber, O.; Geobey, S. The Sustainable Development Goals (SDGs): A Rising Tide Lifts All Boats? Global Reporting Implications in a Post SDGs World. *J. Appl. Account. Res.* **2021**, *22*, 557–575. [CrossRef]
- Rosati, F.; Faria, L.G.D. Business Contribution to the Sustainable Development Agenda: Organizational Factors Related to Early Adoption of SDG Reporting. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *26*, 588–597. [CrossRef]
- Kayikci, Y.; Kazancoglu, Y.; Gozacan-Chase, N.; Lafci, C. Analyzing the Drivers of Smart Sustainable Circular Supply Chain for Sustainable Development Goals through Stakeholder Theory. *Bus. Strategy Environ.* **2022**, *31*, 3335–3353. [CrossRef]
- Helfaya, A.; Whittington, M. Does Designing Environmental Sustainability Disclosure Quality Measures Make a Difference? *Bus. Strategy Environ.* **2019**, *28*, 525–541. [CrossRef]

23. Brundtland, G.H. Our Common Future—Call for Action. *Environ. Conserv.* **1987**, *14*, 291–294. [[CrossRef](#)]
24. Mahida, D.P.; Sendhil, R.; Ramasundaram, P. Millennium to the Sustainable Development Goals: Changes and Pathways for India. *Bus. Strategy Dev.* **2021**, *4*, 136–147. [[CrossRef](#)]
25. Helgason, K.S. The 2030 Agenda for Sustainable Development: Recharging Multilateral Cooperation for the Post-2015 Era. *Glob. Policy* **2016**, *7*, 431–440. [[CrossRef](#)]
26. Persson, Å.; Weitz, N.; Nilsson, M. Follow-up and Review of the Sustainable Development Goals: Alignment vs. Internalization. *Rev. Eur. Comp. Int. Environ. Law* **2016**, *25*, 59–68. [[CrossRef](#)]
27. Sachs, J.; Lafortune, G.; Kroll, C.; Fuller, G.; Woelm, F. Sustainable Development Report 2022. Available online: <https://s3.amazonaws.com/sustainabledevelopment.report/2022/2022-sustainable-development-report.pdf> (accessed on 24 July 2022).
28. Swinnen, J.; McDermott, J. COVID-19 and Global Food Security. Available online: <https://ebrary.ifpri.org/digital/collection/p15738coll2/id/133762> (accessed on 26 July 2022).
29. Tran, B.-L.; Chen, C.-C.; Tseng, W.-C.; Liao, S.-Y. Tourism under the Early Phase of COVID-19 in Four APEC Economies: An Estimation with Special Focus on SARS Experiences. *Int. J. Environ. Res. Public Health* **2020**, *17*, 7543. [[CrossRef](#)] [[PubMed](#)]
30. Hengesbaugh, M.; Olsen, S.; Zusman, E. *Governing National Sustainable Consumption and Production Action Plans in the Philippines and Viet Nam: A Comparative Analysis*; Institute for Global Environmental Strategies; Institute for Global Environmental Strategies: Hayama, Japan, 2021.
31. Conference on National Assembly and Sustainable Development Goals. Available online: <https://vietnam.un.org/vi/node/8939> (accessed on 24 July 2022).
32. Nishitani, K.; Nguyen, T.B.H.; Trinh, T.Q.; Wu, Q.; Kokubu, K. Are Corporate Environmental Activities to Meet Sustainable Development Goals (SDGs) Simply Greenwashing? An Empirical Study of Environmental Management Control Systems in Vietnamese Companies from the Stakeholder Management Perspective. *J. Environ. Manag.* **2021**, *296*, 113364. [[CrossRef](#)] [[PubMed](#)]
33. Borowy, I. *Defining Sustainable Development for Our Common Future*; Routledge: London, UK, 2013; ISBN 9781135961220.
34. Ciegis, R.; Ramanauskiene, J.; Martinkus, B. The Concept of Sustainable Development and Its Use for Sustainability Scenarios. *Eng. Econ.* **2009**, *2*, 28–37.
35. Rusciano, V.; Civero, G.; Scarpato, D. Social and Ecological High Influential Factors in Community Gardens Innovation: An Empirical Survey in Italy. *Sustainability* **2020**, *12*, 4651. [[CrossRef](#)]
36. Chen, F.; Kusaka, H.; Bornstein, R.; Ching, J.; Grimmond, C.S.B.; Grossman-Clarke, S.; Loridan, T.; Manning, K.W.; Martilli, A.; Miao, S.; et al. The Integrated WRF/Urban Modelling System: Development, Evaluation, and Applications to Urban Environmental Problems. *Int. J. Climatol.* **2011**, *31*, 273–288. [[CrossRef](#)]
37. Griggs, D.; Stafford-Smith, M.; Gaffney, O.; Rockström, J.; Öhman, M.C.; Shyamsundar, P.; Steffen, W.; Glaser, G.; Kanie, N.; Noble, I. Sustainable Development Goals for People and Planet. *Nature* **2013**, *495*, 305–307. [[CrossRef](#)]
38. Calabrese, A.; Costa, R.; Gastaldi, M.; Levaldi Ghiron, N.; Villazon Montalvan, R.A. Implications for Sustainable Development Goals: A Framework to Assess Company Disclosure in Sustainability Reporting. *J. Clean. Prod.* **2021**, *319*, 128624. [[CrossRef](#)]
39. Curtó-Pagès, F.; Ortega-Rivera, E.; Castellón-Durán, M.; Jané-Llopis, E. Coming in from the Cold: A Longitudinal Analysis of SDG Reporting Practices by Spanish Listed Companies Since the Approval of the 2030 Agenda. *Sustainability* **2021**, *13*, 1178. [[CrossRef](#)]
40. Hummel, K.; Szekely, M. Disclosure on the Sustainable Development Goals—Evidence from Europe. *Account. Eur.* **2022**, *19*, 152–189. [[CrossRef](#)]
41. Al Lawati, H.; Hussainey, K. Does Sustainable Development Goals Disclosure Affect Corporate Financial Performance? *Sustainability* **2022**, *14*, 7815. [[CrossRef](#)]
42. Pedersen, C.S. The UN Sustainable Development Goals (SDGs) Are a Great Gift to Business! *Procedia CIRP* **2018**, *69*, 21–24. [[CrossRef](#)]
43. Küçükgül, E.; Cerin, P.; Liu, Y. Enhancing the Value of Corporate Sustainability: An Approach for Aligning Multiple SDGs Guides on Reporting. *J. Clean. Prod.* **2022**, *333*, 130005. [[CrossRef](#)]
44. Nechita, E.; Manea, C.L.; Nichita, E.-M.; Irimescu, A.-M.; Manea, D. Is Financial Information Influencing the Reporting on SDGs? Empirical Evidence from Central and Eastern European Chemical Companies. *Sustainability* **2020**, *12*, 9251. [[CrossRef](#)]
45. De Luca, F.; Iaia, L.; Mehmod, A.; Vrontis, D. Can Social Media Improve Stakeholder Engagement and Communication of Sustainable Development Goals? A Cross-Country Analysis. *Technol. Forecast. Soc. Chang.* **2022**, *177*, 121525. [[CrossRef](#)]
46. Šebestová, J.; Sroka, W. Sustainable Development Goals and SMEs Decisions: Czech Republic vs. Poland. *J. East. Eur. Cent. Asian Res. JEECAR* **2020**, *7*, 39–50. [[CrossRef](#)]
47. Yu, S.; Sial, M.S.; Tran, D.K.; Badulescu, A.; Thu, P.A.; Sehleanu, M. Adoption and Implementation of Sustainable Development Goals (SDGs) in China—Agenda 2030. *Sustainability* **2020**, *12*, 6288. [[CrossRef](#)]
48. Manes-Rossi, F.; Nicolo', G. Exploring Sustainable Development Goals Reporting Practices: From Symbolic to Substantive Approaches—Evidence from the Energy Sector. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 1799–1815. [[CrossRef](#)]
49. Izzo, M.F.; Ciaburri, M.; Tiscini, R. The Challenge of Sustainable Development Goal Reporting: The First Evidence from Italian Listed Companies. *Sustainability* **2020**, *12*, 3494. [[CrossRef](#)]
50. Klapper, L.F.; Love, I. Corporate Governance, Investor Protection, and Performance in Emerging Markets. *J. Corp. Financ.* **2004**, *10*, 703–728. [[CrossRef](#)]

51. Sekarlangit, L.D.; Wardhani, R. The Effect of the Characteristics and Activities of the Board of Directors on Sustainable Development Goal (SDG) Disclosures: Empirical Evidence from Southeast Asia. *Sustainability* **2021**, *13*, 8007. [[CrossRef](#)]
52. Lu, J.; Ren, L.; Lin, W.; He, Y.; Streimikis, J. Policies to Promote Corporate Social Responsibility (CSR) and Assessment of CSR Impacts. *Bus. Adm. Manag.* **2019**, *22*, 82–98. [[CrossRef](#)]
53. Khaled, R.; Ali, H.; Mohamed, E.K.A. The Sustainable Development Goals and Corporate Sustainability Performance: Mapping, Extent and Determinants. *J. Clean. Prod.* **2021**, *311*, 127599. [[CrossRef](#)]
54. Al-Tuwaijri, S.A.; Christensen, T.E.; Hughes, K.E. The Relations among Environmental Disclosure, Environmental Performance, and Economic Performance: A Simultaneous Equations Approach. *Account. Organ. Soc.* **2004**, *29*, 447–471. [[CrossRef](#)]
55. Young, S.; Marais, M. A Multi-Level Perspective of CSR Reporting: The Implications of National Institutions and Industry Risk Characteristics. *Corp. Gov. Int. Rev.* **2012**, *20*, 432–450. [[CrossRef](#)]
56. Rendtorff, J.D. Sustainable Development Goals and Progressive Business Models for Economic Transformation. *Local Econ. J. Local Econ. Policy Unit* **2019**, *34*, 510–524. [[CrossRef](#)]
57. Helfaya, A.; Moussa, T. Do Board's Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence. *Bus. Strategy Environ.* **2017**, *26*, 1061–1077. [[CrossRef](#)]
58. O'Donovan, G. Environmental Disclosures in the Annual Report. *Account. Audit. Account. J.* **2002**, *15*, 344–371. [[CrossRef](#)]
59. de Villiers, C.; van Staden, C.J. Can Less Environmental Disclosure Have a Legitimising Effect? Evidence from Africa. *Account. Organ. Soc.* **2006**, *31*, 763–781. [[CrossRef](#)]
60. Guthrie, J.; Parker, L.D. Corporate Social Reporting: A Rebuttal of Legitimacy Theory. *Account. Bus. Res.* **1989**, *19*, 343–352. [[CrossRef](#)]
61. Deegan, C. Introduction: The Legitimising Effect of Social and Environmental Disclosures—A Theoretical Foundation. *Account. Audit. Account. J.* **2002**, *15*, 282–311. [[CrossRef](#)]
62. Moussa, T.; Kotb, A.; Helfaya, A. An Empirical Investigation of U.K. Environmental Targets Disclosure: The Role of Environmental Governance and Performance. *Eur. Account. Rev.* **2022**, *31*, 937–971. [[CrossRef](#)]
63. Deegan, C.; Rankin, M.; Tobin, J. An Examination of the Corporate Social and Environmental Disclosures of BHP from 1983–1997. *Account. Audit. Account. J.* **2002**, *15*, 312–343. [[CrossRef](#)]
64. Campillo-Alhama, C.; Iguál-Antón, D. Corporate Social Responsibility Strategies in Spanish Electric Cooperatives. Analysis of Stakeholder Engagement. *Sustainability* **2021**, *13*, 6810. [[CrossRef](#)]
65. Jun, H.; Kim, M. From Stakeholder Communication to Engagement for the Sustainable Development Goals (SDGs): A Case Study of LG Electronics. *Sustainability* **2021**, *13*, 8624. [[CrossRef](#)]
66. Harrison, J.S.; Bosse, D.A.; Phillips, R.A. Managing for Stakeholders, Stakeholder Utility Functions, and Competitive Advantage. *Strateg. Manag. J.* **2010**, *31*, 58–74. [[CrossRef](#)]
67. Lopez, B. Connecting Business and Sustainable Development Goals in Spain. *Mark. Intell. Plan.* **2020**, *38*, 573–585. [[CrossRef](#)]
68. Nishitani, K.; Unerman, J.; Kokubu, K. Motivations for Voluntary Corporate Adoption of Integrated Reporting: A Novel Context for Comparing Voluntary Disclosure and Legitimacy Theory. *J. Clean. Prod.* **2021**, *322*, 129027. [[CrossRef](#)]
69. Kaya, I. The Mandatory Social and Environmental Reporting: Evidence from France. *Procedia Soc. Behav. Sci.* **2016**, *229*, 206–213. [[CrossRef](#)]
70. Clarkson, P.M.; Li, Y.; Richardson, G.D.; Vasvari, F.P. Revisiting the Relation between Environmental Performance and Environmental Disclosure: An Empirical Analysis. *Account. Organ. Soc.* **2008**, *33*, 303–327. [[CrossRef](#)]
71. Dye, R.A. An Evaluation of “Essays on Disclosure” and the Disclosure Literature in Accounting. *J. Account. Econ.* **2001**, *32*, 181–235. [[CrossRef](#)]
72. Prado-Lorenzo, J.-M.; Gallego-Alvarez, I.; Garcia-Sanchez, I.M. Stakeholder Engagement and Corporate Social Responsibility Reporting: The Ownership Structure Effect. *Corp. Soc. Responsib. Environ. Manag.* **2009**, *16*, 94–107. [[CrossRef](#)]
73. Amran, A.; Ooi, S.K.; Mydin, R.T.; Devi, S.S. The Impact of Business Strategies on Online Sustainability Disclosures. *Bus. Strategy Environ.* **2015**, *24*, 551–564. [[CrossRef](#)]
74. Gualandris, J.; Klassen, R.D.; Vachon, S.; Kalchschmidt, M. Sustainable Evaluation and Verification in Supply Chains: Aligning and Leveraging Accountability to Stakeholders. *J. Oper. Manag.* **2015**, *38*, 1–13. [[CrossRef](#)]
75. Friedman, M. *Capitalism and Freedom*; University of Chicago Press: Chicago, IL, USA, 1962.
76. Garriga, E.; Melé, D. Corporate Social Responsibility Theories: Mapping the Territory. *J. Bus. Ethics* **2004**, *53*, 51–71. [[CrossRef](#)]
77. Said, R.M.; Kim, L.L.; Senik, R.; Yusri, Y. Quantity and Quality of Environmental Disclosure by Environmental Sensitive Companies in Malaysia. *Int. Bus. Manag.* **2016**, *10*, 4342–4350.
78. Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*; Sage Publications: Thousand Oaks, CA, USA, 2018.
79. Cho, C.H. Legitimation Strategies Used in Response to Environmental Disaster: A French Case Study of Total SA's Erika and AZF Incidents. *Eur. Account. Rev.* **2009**, *18*, 33–62. [[CrossRef](#)]
80. Aribi, Z.A.; Alqatamin, R.M.; Arun, T. Gender Diversity on Boards and Forward-Looking Information Disclosure: Evidence from Jordan. *J. Account. Emerg. Econ.* **2018**, *8*, 205–222. [[CrossRef](#)]
81. Schreier, M. *Qualitative Content Analysis in Practice*; Sage Publications: Thousand Oaks, CA, USA, 2012.
82. Helfaya, A.; Whittington, M.; Alawattage, C. Exploring the Quality of Corporate Environmental Reporting. *Account. Audit. Account. J.* **2018**, *32*, 163–193. [[CrossRef](#)]
83. Fankhauser, S. A Practitioner's Guide to a Low-Carbon Economy: Lessons from the UK. *Clim. Policy* **2013**, *13*, 345–362. [[CrossRef](#)]

84. Adams, C.A. *Sustainable Development Goals Disclosure (SDGD) Recommendations: Feedback on the Consultation Responses*; ACCA: London, UK, 2020.
85. Cordova, M.F.; Celone, A. SDGs and Innovation in the Business Context Literature Review. *Sustainability* **2019**, *11*, 7043. [CrossRef]
86. JSC Bank for Investment and Development of Vietnam Annual Report 2018. Available online: https://www.bidv.com.vn/wps/wcm/connect/598743e9-7eac-4f41-8004-3625b4333b84/Annual+Report+2018_6mb.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-598743e9-7eac-4f41-8004-3625b4333b84-m1cCGF5 (accessed on 16 July 2022).
87. Kinh Bac City Development Share Holding Corporation Annual Report 2021. Available online: <https://www.kinhbaccity.vn/download/kbc-annual-report-2021.pdf> (accessed on 22 July 2022).
88. Phat Dat Real Estate Development Joint Stock Company Annual Report 2020. Available online: https://www.phatdat.com.vn/wp-content/uploads/2021/03/PDR_Annual-Report_Final-English.pdf (accessed on 29 July 2022).
89. PetroVietnam Drilling & Well Services Corporation Annual Report 2020. Available online: <https://www.pvdrilling.com.vn/en-US/annual-reports> (accessed on 21 August 2022).
90. Gemadept Corporation Annual Report 2021. Available online: <https://www.gemadept.com.vn/shareholders/annual-report/index.html> (accessed on 28 July 2022).
91. Dissanayake, D.; Tilt, C.; Qian, W. Factors Influencing Sustainability Reporting by Sri Lankan Companies. *Pac. Account. Rev.* **2019**, *31*, 84–109. [CrossRef]
92. JSC Bank for Investment and Development of Vietnam Annual Report 2017. Available online: https://www.bidv.com.vn/wps/wcm/connect/0ba73342-ee5c-4d96-8002-ddec3f74ec18/BIDV_BCTN+2017_12MB.Final+Eng.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-0ba73342-ee5c-4d96-8002-ddec3f74ec18-mBmdlkE (accessed on 23 July 2022).
93. Khang Dien House Trading and Investment JSC. Annual Report 2018. 2018. Available online: https://www.khangdien.com.vn/Data/Sites/1/media/co-dong/bao-cao-thuong-nien/english/20190405_kdh-ar-2018_english.pdf (accessed on 29 July 2022).
94. Bao Viet Holdings Annual Report 2020. Available online: https://baoviet.com.vn/BVH_IR2020-EN.pdf (accessed on 16 July 2022).
95. IDJ Vietnam Investment Joint Stock Company Annual Report 2021. Available online: https://static2.vietstock.vn/data/HNX/2021/BCTN/VN/IDJ_Baocaothuognien_2021.pdf (accessed on 20 August 2022).
96. FPT Corporation Annual Report 2019. Available online: <https://fpt.com.vn/-/media/project/fpt-corporation/fpt/ir/report/tabs/annual-report/years/2019/2019/file-1/bctn-2019.pdf> (accessed on 28 June 2022).
97. Petrovietnam Transportation Corporation Annual Report 2018. Available online: https://static2.vietstock.vn/vietstock/2019/7/12/20190712_PVT%20190712%20Annual%20report%202018.pdf (accessed on 25 August 2022).
98. Helfaya, A.; Easa, N.F. Islamic Religiosity and CSR Attitudes—The Case of Egyptian Managers. *Sustainability* **2022**, *14*, 11255. [CrossRef]

Article

Advancing SDG No 16 via Corporate Governance Disclosure: Evidence from Indonesian and Malaysian Fintech Companies' Websites

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Abstract: The aims of this paper are: (1) to examine the extent of corporate governance disclosure on the websites of Indonesian and Malaysian FinTech companies using the coercive isomorphism tenet, and (2) to determine whether variation in the extent of corporate governance disclosure is influenced by the country and type of FinTech services. The websites of 148 Indonesian and 159 Malaysian corporations were subjected to content analysis using a Modified Corporate Governance Disclosure Index (MoCGOvDi). The MoCGovDi was constructed using the ASEAN Corporate Governance Scorecard and previous research. The level of corporate governance disclosure is higher among Malaysian FinTech companies, possibly due to stronger coercive pressure by government regulation in Malaysia. Overall, the level of corporate governance disclosure is low in both countries (7 and 9 items out of 50 total items for Indonesia and Malaysia, respectively), which may delay the achievement of SDG No 16. Several implications are provided in this paper to advocate the corporate governance disclosure of FinTech companies in Indonesia and Malaysia to achieve SDG No 16.

Keywords: corporate governance; disclosure; FinTech; sustainability; coercive isomorphism

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1. Introduction

Sustainability is an important agenda at various levels, i.e., individuals, organizations, and nations. Organizations are doing their best to advance the 17 United Nations 2030 sustainable development goals (SDGs). One of the ways implemented by organizations is by carrying out good corporate governance practices. Corporate governance practice is highly associated with SDG No. 16, i.e., peaceful, just, and inclusive societies. In order to foster peaceful, just, and inclusive societies and to ensure sustainable development, SDG 16 outlines the crucial roles that governance and the rule of law play. This paper is developed based on Conway et al. [1], which incorporates the broader perspective of corporate governance that highlights the need to be accountable to stakeholders. This is possibly done through disclosure or reporting. Corporate governance reporting has received acceptance by scholars, with a variety of clarifications of the justification of such disclosure [1]. Corporate governance disclosure refers to how transparently an organization communicates to stakeholders its governance practices and strategies [2].

Based on the OECD general guidelines on corporate governance [3,4], corporate governance information would be communicated via platforms that are equal, timely, and accessible. Improved disclosure of corporate governance information would increase the monitoring capabilities of shareholders and the board of directors. Studies relating to corporate governance and websites found that websites are useful channels for communication with stakeholders. The research also found low levels of corporate governance practices disclosed on the company website, which might be because there is not enough oversight [1]. This indicates a lack of accountability which possibly hinders the realization

of SDG No. 16. Various companies, including FinTech companies, implement the corporate governance disclosure.

FinTech refers to companies that combine innovative technologies with financial services [5]. FinTech investments increased globally from less than USD 10 billion annually before 2013 to USD 215 billion in 2019 before declining to about USD 122 billion in 2020. The amount invested in FinTech by the first half of 2021 was already USD 98 billion [6].

FinTech is considered one of the most important breakthroughs in the financial sector. The FinTech evolution is accelerated by the auspicious rule and information technology. FinTech promises to disrupt and transform the financial sector by improving the superiority of fiscal provisions, reducing costs, and establishing a numerous diverged and steady financial environment [5,7]. With the rapid evolution of underlying advanced tools, for example, blockchain and artificial intelligence, and their widespread application in various financial-business contexts, FinTech has emerged as a crucial force in the transformation and innovation of the financial industry [8]. In addition, websites, just like blockchain, can be used to accelerate the SDG progress [9].

Interestingly, the FinTech market has the spirit of increasing financial inclusion by reaching out to people who have difficulty accessing conventional financial institutions. The problem of FinTech in Indonesia has had an impact not only on the economic aspects of society but has transformed into a form of disruptive innovation that changes the style of people's transactions [10]. FinTech delivers support to the business sphere in reducing inadequacies in their payment scheme through mobile payments, peer-to-peer (P2P) lending, robotic investment advice, blockchain technology, artificial intelligence, and machine learning [11].

FinTech companies are developing rapid evolution in recent years and have had a significant impact on society [12]. FinTech companies have already started to close the financial enclosure disparity by ways of providing facilities to the unbanked at the base (bottom) of the pyramid, made possible by new business models and information and communication technologies (ICT) [5,12]. Research on FinTech companies is pivotal because these emerging digital financial services rely on investors' funds to establish and expand their businesses. Therefore, providing effective and accountable information by FinTech companies is crucial for the achievement of SDG No 16 by carrying out effective corporate governance practices.

FinTech is the disruption in the financial industry that aims to ease access to the financial services provider and makes an effective and efficient service delivery. However, FinTech might carry some risks that are not negligible. According to KPMG [13], the FinTech industry carries three kinds of risks: risks to consumers and investors, risks to financial services firms, and risks to financial stability.

FinTech comes with risks that may harm consumers, such as the lack of consumer understanding of the nature of FinTech and its operation. The tech-savvy people might be easy to understand, but the non-tech-savvy and older people might find difficulties in understanding the services offered by FinTech. Moreover, consumers are vulnerable to losing their data and may not know how it is used. Therefore, data privacy, security, and protection are essential for consumers because when using the FinTech solution, consumers are requested to give up their data to the FinTech provider. The unauthorized use of technology poses a threat since it is possible to track people without their consent [14]. Issues of data privacy and data security regarding consumer information and protection negatively impact individuals as well as the soundness and stability of strong institutions (SDG 16) [15].

The other risks are that the boards and senior management of FinTech firms may not have sufficient awareness and understanding of FinTech and FinTech-related risks, and may, therefore, be unable to identify, measure, manage and control these risks effectively. Responsibilities and accountabilities for FinTech and risk management may also not be sufficiently clear. FinTech developments also have increased the competitive pressures on many financial services firms. Some will struggle to survive. Forbes [16] reported that in Fintech, 2022 is becoming the year of layoffs. Through LinkedIn research and speaking

directly with companies and industry insiders, Forbes identified nine FinTech businesses that have apparently shrunk their labor forces recently without any announcement or public reporting of their downsizing. Therefore, the implementation of good corporate governance is pivotal for the FinTech industry.

The SDG's 16 goal is "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels". To build strong institutions requires strong governance as well. The four principles of good governance are accountability, transparency, openness, and the rule of law. This study elaborates on how FinTech institutions present corporate governance disclosure. The FinTech industry was chosen because it is an industry that is experiencing rapid growth. The public responds positively to FinTech companies. The Fintech industry is considered a solution for demographic bonuses, a solution to reduce unemployment rates. The government immediately responded by preparing regulations and various policies to encourage the development of this FinTech industry. Therefore, it is important and interesting how the FinTech company's governance is, whether the FinTech company has also disclosed it on their website. There is limited research on the disclosure of governance in FinTech companies. Several studies on corporate disclosure were conducted in publicly listed companies using ASEAN CG Scorecard. Therefore, this study developed the Modified Corporate Governance Disclosure Index (MoCGOvDi) to better reflect FinTech companies' characteristics.

It is worth comparing the Indonesian and Malaysian contexts because the two nations have similarities and differences in their history and culture [17]. Besides geographical proximity, both countries are categorized as emerging economies and develop FinTech as a financial industry. Based on Singapore and Malaysia FinTech News Portal, Indonesia has 181 fintech companies, while based on Malaysia Fintech Portal, Malaysia has 201 fintech companies. However, after excluding unavailable, restricted, and duplicate websites, the authors found that Indonesia and Malaysia have 148 and 159 FinTech companies, respectively, which are included in this paper.

1.1. Corporate Governance in Malaysia

The corporate governance reformation in Malaysia has been strengthened throughout time. The 2016 Companies Act sets the regulatory framework for Malaysian corporations. Introduced in 2000, the Malaysian Code on Corporate Governance (MCCG) has been an important institutional foundation for corporate governance reform and has had a favorable impact on the corporate governance practices of corporations. The MCCG incorporates worldwide concepts and widely recognized practices of corporate governance that exceed the minimum requirements established by statute, regulation, or Bursa Malaysia Berhad (the stock exchange of Malaysia). The revision of MCCG took place in 2007, 2012, and 2017 to ensure its continued relevance and alignment with internationally recognized best practices and standards. The MCCG was modified in April 2021 to adopt a new strategy to encourage the internalization of corporate governance culture.

Bursa Malaysia Berhad's Corporate Governance Guide aims to enhance the adoption and implementation of corporate governance procedures by preparing listed issuers with useful assistance. The Guide was created to represent the latest ways of thinking and the "CARE" (C—Comprehend; A—Apply; Re—Report) principle that drives the MCCG. The Guide provides an understanding of good corporate governance practices and how such principles might be used and actualized in content instead of form to assist organizations in creating sustainable value [18].

1.2. Corporate Governance in Indonesia

In Indonesia, limited liability corporations are governed by Law No. 40 of 2007 on Limited Liability Companies (Company Law). The Company Law outlines the general responsibilities of a company's shareholders, boards of directors, boards of commissioners, employees, commercial partners, and the general public.

The Financial Services Authority (Otoritas Jasa Keuangan or OJK) additionally controls corporate governance for specific forms of organizations and companies. OJK regulations oversee corporate governance conditions for the financial sectors and public companies.

The Coordinating Ministry for Economic Affairs set up the National Committee on Governance (NGC) through the Decree of Coordinating Ministry for Economic Affairs No. KEP-49/M.EKON/11/TAHUN 2004. Subsequently, this ruling was revised by Coordinating Ministry for Economic Affairs Decree No. KEP-14/M.EKON/03/Year 2008. According to the NGC's stated mission, the Indonesian Code of Good Corporate Governance was formulated, promoted, and made easier to apply and enforce.

In 2006, the GCG Code was firstly issued. It was clearly stated that the GCG Code is not a lawful document and, intrinsically, corporations in Indonesia are not bound by it. The GCG Code is a methodology that gives corporate governance implementation guidelines for businesses [19].

1.3. FinTech Regulation in Indonesia and Malaysia

According to the Cambridge Centre for Alternative Finance (CCAF), Indonesia and Malaysia are among the leading ASEAN nations in terms of the number of FinTech enterprises [20]. Bank Indonesia (BI) is the Central Bank and is responsible for all aspects of financial stability and supervision. The Indonesian Financial Services Authority (OJK) regulates the financial services industry, which includes the registration, security, and licensing of FinTech companies [21].

In the case of Malaysia, there are two primary regulatory agencies. Bank Negara Malaysia (BNM), the country's central bank, oversees the nation's financial establishments, credit system, and fiscal plan. Securities Commission Malaysia (SC) is a statutory agency charged with regulating and systematizing the development of Malaysia's capital markets [21]. Table 1 summarizes the FinTech regulations in both countries.

Table 1. FinTech Regulation in Indonesia and Malaysia.

	Indonesia	Malaysia
P2P Lending/Marketplace Lending	OJK Regulation No.77/POJK.01/2016	SC Guidelines on Recognized Markets SC-GL/6-2015 (R1-2016)
Equity Crowdfunding	OJK Regulation No.37/POJK.04/2018	SC Guidelines on Recognized Markets SC-GL/6-2015(R3-2019)
Digital Payments	Article 1(6) of Law No.23 of 1999	Financial Services Act 2013 (FSA)
ICO/Cryptoassets	BI Regulation No.18/40/PBI/2016 and BAPPEBTI Regulation No.5 of 2019	SC Guidelines on Recognized Markets SC-GL/6-2015(R3-2019)
Insurance Technology	OJK Regulation No.69/POJK.05/2016	Financial Services Act 2013 (FSA)

Source: Authors' Compilation.

There is evidence from prior research that good corporate governance practices can promote company transparency by increasing voluntary disclosure levels [22]. Disclosure studies have been carried out extensively for big corporations and publicly traded firms, but studies using FinTech companies, which are often less regulated, are scarce [23]. FinTech companies are not often large publicly traded corporations; instead, they are mainly start-ups, which may explain why there is a limited study on their disclosure, which in turn, affect the achievement of SDG No. 16. FinTech clients are small enterprises and individuals who have little access to information other than what these companies supply on their websites. As a result, the website's information serves a vital purpose for stakeholders and society [23], which provides the motivation for this paper. Correspondingly, the research questions posited in this paper are:

RQ1—What is the extent of corporate governance disclosure in both Malaysian and Indonesian FinTech companies?

RQ2—Do the country and type of FinTech services affect the extent of corporate governance disclosure in both Malaysian and Indonesian FinTech companies?

In prior research, the industrial sector has been identified as a significant factor in determining whether a high or low level of information is disclosed [24]. Arguably, different practices exist in each country. The rationale for studying this variable is that organizations in the same industrial sector or service have similar information-disclosure policies. In this paper, each FinTech service represents a distinct FinTech Business sector.

This paper adds to the literature in several significant ways. First, the application of a Modified Corporate Governance Disclosure Index (MoCGovDi) is expected to expand the corpus of research on corporate governance in FinTech companies. The research's novelty is demonstrated by the index derived from the ASEAN Corporate Governance Scorecard and prior literature. Most studies examined corporate governance information disclosure using other guidelines such as AAOIFI and IFSB involving Islamic banks [25,26]; banks [27]; Guidance on Good Practices in Corporate Governance Disclosure' issue by the ISAR (International Standards of Accounting and Reporting) [28], companies and ASX corporate governance guidelines [1], banks using the Code of Corporate Governance for Public Companies in Nigeria, 2011 and the Code of Corporate Governance for Banks and Discount Houses 2014 [29]; Islamic financial institutions the corporate governance for licensed Islamic banks (GP1-i) issued by the Bank Negara Malaysia (BNM) in 2007, guiding principles on corporate governance for institutions offering only Islamic services (excluding Islamic insurance [Takaful] institutions and Islamic mutual funds) introduced by IFSB [30]. Consequently, the results may serve as a point of reference for future studies tracing any changes to corporate governance regulations.

Second, from the perspective of coercive isomorphism under the institutional theory, this study contributes to the insight into the corporate governance disclosures practice of FinTech companies in Indonesia and Malaysia, in which there is a dearth of investigation in this field, which is also related to SDG No. 16. According to the authors' knowledge, the specific governance-related information is among the first research on corporate governance in FinTech companies. The remaining sections of the paper are organized as follows. Section 2 is a discussion of the literature review and the study's theoretical framework. Section 3 covers the methodology, while Section 4 covers the results and discussions. Lastly, Section 5 concludes the paper.

2. Literature Review

2.1. Past Studies Relating to Corporate Governance Disclosure

Corporate governance has long been a source of concern for scholars. Several scandals have captured headlines in recent years, along with the Enron, Lehman Brothers, and Volkswagen scandals. This instance is frequently mentioned in studies on the necessity of effective corporate governance. In line with the study's findings, transparency, leadership, and organizational culture define strong corporate governance [31]. According to research relating to corporate governance, three clusters exist, first, corporate social responsibility and reporting; second, corporate governance strategies; and third, board composition [32].

If corporate governance is defined as a firm control system that involves a series of relationships between its stakeholders with the goal of boosting economic efficiency [32], [33]. In that case, corporate governance disclosure is described as a tool to reveal corporate governance information. The organization's openness to reveal management practices, financial reporting, and other vital information is an example of transparency that fosters trust among stakeholders. This phenomenon has lately increased studies on corporate governance disclosure. Accountability, honesty, and openness are all enhanced by corporate disclosures. The corporation shares essential information with all its stakeholders through Corporate Disclosures [33]. Corporate disclosure study was conducted using publicly available stock exchange data [34]. Several studies have been conducted to determine what

kinds of data are transparent. The scope of the study varies, involving organizations such as profit companies' businesses, non-profits, and state-owned enterprises, with national or worldwide regions of interest, or comparing nations.

Today's world is familiar with the financial technology business, which is in accordance with the century of technological growth. FinTech signifies the application of technology into financial services corporations' contributions to improve their procedure and supply to customers. This is achievable by unbundling such organizations' contributions and creating new markets for them. This industry is rapidly expanding and is popular among millennials. FinTech, a new business with a significant turnover, is also essential to practice good governance. Unfortunately, certain unfavorable cases hurt the population; thus, testing and in-depth investigations to determine the cause are required. There is still a scarcity of studies on the subject. Several studies on FinTech are related to the topic of business models. Six FinTech business models, including payments, wealth management, crowdfunding, loans, capital market, and insurance services, have been adopted by the expanding number of FinTech start-ups [35].

2.2. Past Studies Relating to Corporate Governance Disclosure on Websites

The study of information disclosure on the website is also becoming more popular. Most website observations are used to learn about financial statements, good governance, and corporate social responsibility for publicly traded firms [36,37], governments [38], and other institutions. Only Herrador-Alcaide and Hernández-Solís [23] studied FinTech companies and found that there are not any effects due to the type of service (Banking and data analytics, payments, capital markets technology, financial management) or the geographical area (Europe, North America, Worldwide, Asia-Pacific) on the disclosure of FinTech companies.

2.3. Past Studies Relating to Factors Affecting the Extent of Corporate Governance Disclosure

Joseph et al. [39] examined the level of integrity framework information disclosed on the websites of 51 Malaysian and 34 Indonesian local governments. The findings suggested that the disclosures of the 34 Indonesian local governments were superior to those of Malaysia's 51 city and municipal councils. On average, Indonesia published 29 out of 47 studied items on their websites, while Malaysia disclosed only four items. Another study using the sample of government websites conducted by Stewart et al. [38] examined corporate governance disclosures on the websites of 36 state government departments in Australia. It was revealed from the study that both the level of disclosure and the accessibility of the information disclosed vary considerably. In addition, the study identified a lack of agreement over the definition of governance and what it entailed, as well as the requirement for an extra organized way to share governance info with stakeholders. Gandía [37] investigated the corporate governance information provided online by 92 non-financial firms listed on the Spanish capital market. It was revealed that the level of disclosure depends on the extent to which businesses are observed by analysts, their age of listing, their media presence, and their involvement in the communications and information services industry. Mulyadi [40] studied the corporate governance disclosure practices of the 50 top-listed family-owned enterprises in Indonesia and the extent to which company websites supplement or replace annual reports that include corporate governance disclosures. The study found that Indonesia's disclosure policies were still inadequate, particularly those of family-owned businesses. Using 21 disclosure items from the United Nations Conference on Trade and Development's corporate governance disclosure benchmark that are required in Indonesia, the study discovered that only three firms publish corporate governance information in their annual reports and none on their websites. Using the sample of banks, Feldioreanu and Seria [27] studied the influence of culture, company size, and profitability on corporate governance disclosure practices using 34 banks in Romania and Malaysia. The study found that Romanian banks disclose less information regarding corporate governance than Malaysian banks. However, the quality of websites

for Romanian banks is higher. This study illustrates the likelihood of better-performing banks releasing more corporate governance information than fewer profitable financial institutions. Last but not least, Herrador-Alcaide and Hernández-Solís [23] carried out an investigation based on the analysis of information disclosed by firms on two FinTech top lists. Using data from 91 FinTech companies across Europe, Asia, and North America, the study concluded that neither the type of services nor the geographic location had any effect on the disclosure of FinTech companies.

2.4. Theoretical Framework

This paper uses the institutional theory to support the corporate governance disclosures by Indonesian and Malaysian FinTech companies. Corporate governance disclosure is an organizational practice that is shaped by the institutional environments in which the organizations operate [41,42]. Wijayati [42] argued that the institutional theory could explain the corporate governance disclosure practices in Indonesia and Malaysia due to the differences in corporate governance practices in both countries. According to Wijayati [42], a country with a specific institutional framework undergoes isomorphic processes that cause corporate governance practices to become increasingly uniform among enterprises.

According to DiMaggio and Powell [43], the situation that explains the standardization of organizational practices is isomorphism. Isomorphism could be classified into coercive, normative, and mimetic. The highly noticeable institutional pressure is coercive isomorphism. Based on DiMaggio and Powell [43], forces can be exercised by another corporation on which a corporation may be dependent, in addition to cultural beliefs inside the organization's operating environment. This paper uses the coercive isomorphism tenet to explain the extent of corporate governance disclosure in both Indonesian and Malaysian FinTech companies. This paper discusses the coercive pressures from the regulatory authority monitoring and regulating corporate governance practices.

Mimetic isomorphism constitutes the second institutional pressure. Mimetic isomorphism encourages copying the best practices of legitimate and successful organizations [43]. The copying behavior is likely to occur if the organizations have doubts about executing specific best practices that lead to mimicking behavior among members in the same organizational field.

Normative isomorphism is the third isomorphism. This pressure usually arises from professionals and occupational groups [39]. This is normally the sharing of norms, beliefs, and culture involving the organizational practices throughout the corporations.

3. Methodology

The data in this study were collected based on a content analysis of the disclosure of corporate governance information on the websites of Malaysian and Indonesian FinTech companies. Since websites offer the maximum openly accessible information that could be employed as a credible supply of data, the disclosures on the website were examined [39]. In addition, Malaysia and Indonesia are implementing voluntary disclosure of corporate governance information on their FinTech companies' websites.

Content analysis has been extensively carried out in disclosure studies, for example, Joseph et al. and Midin et al. [39,44]. One of the effective ways to quantify qualitative data is through content analysis, which enables us to analyze practices through disclosures [45]. The Modified Corporate Governance Disclosure Index (MoCGovDi) was developed based on several steps.

1. Step 1

Reference was made to the ASEAN Corporate Governance Scorecard (ACGS), which has two levels of scoring for corporate governance practice. The measurement of governance ratings is prepared based on the methodology applied in the ASEAN countries and multilateral institutions such as the OECD. The ACGS is a scorecard of the good corporate governance evaluation and ranking for public companies in ASEAN. This scorecard is a provincial effort from the ASEAN Capital Market Forum (ACMF) in cooperation with

the Asian Development Bank (ADB) since 2011 [46]. This paper refers to the first level of scoring, comprised of five categories (146 items) based on the principles of governance by the OECD. All the questions in the five parts are refined as disclosure items in the development of the Modified Corporate Governance Disclosure Index (MoCGovDi). Originally, the details in five parts of level 1 scoring are:

- Part A: Rights of Shareholders—21
- Part B: Equitable Treatment of Shareholders—15
- Part C: Role of Stakeholders—13
- Part D: Disclosure and Transparency—32
- Part E: Responsibilities of the Board—65

2. Step 2

Reference was made to past literature to ascertain the additional items to be incorporated into the MoCGovDi, i.e., (1) Feldioreanu & Seria; (2) Suwaidan et al. [47]; (3) Hassan [48]; (4) Shahar et al. [30]. The modification to the current standard measurement of corporate governance disclosure is important because this study aims to examine the actual disclosures available on websites. In addition, the study takes into consideration the disclosure items that are available for FinTech companies in both countries and, at the same time, determines whether the disclosure is in line with past literature, which is commonly performed in the disclosure index development, e.g., see Joseph et al. [49].

3. Step 3

Steps 1 and 2 are combined. The total number of items is equal to 157.

4. Step 4

Referring to items in Step 3, the content analysis on three websites from each country was conducted. The actual disclosed items were identified and added to the MoCGovDi. The 102 non-disclosed items were eliminated from the MoCGovDi. Five overlapping items were also deleted from the checklist.

5. Step 5

The MoCGovDi is sent for validation by academicians specializing in corporate governance.

6. Step 6

The final MoCGovDi consists of five categories and 50 items. Figure 1 summarizes the steps.

- Part A: Rights of Shareholders—3
- Part B: Equitable Treatment of Shareholders—2
- Part C: Role of Stakeholders—13
- Part D: Disclosure and Transparency—10
- Part E: Responsibilities of the Board—22

In this study, data was collected in each country by coders, who assigned scores of 1 for relevant disclosure and 0 for no disclosure, following Joseph et al. [39]. Nevertheless, the analysis of data for both countries was merged. In order to lessen bias and increase trustworthiness, the two coders in each country performed the content analysis. Between 26 June and 11 July 2022, coders collected and tabulated the disclosure information from the websites. The Statistical Package for Social Science (SPSS) was used to compute and analyze the frequency of sub-categorizations. The sample selection of this research was based on the websites <https://fintechnews.sg/fintech-startups-in-indonesia/> (accessed on 26 June 2022) for Indonesian FinTech companies and <https://fintechnews.my/list-fintech-startup-malaysia-fintech-companies-malaysia-directory/> (accessed on 3 July 2022) for Malaysian FinTech companies. To answer the first research question, descriptive tests were performed. The independent t-test and ANOVA were performed to answer the second research question.

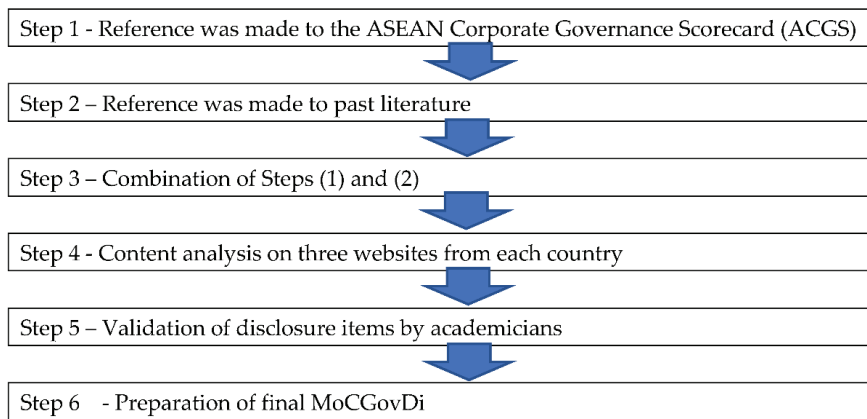


Figure 1. Steps in the Development of Modified Corporate Governance Disclosure Index (MoCGovDi).

4. Results and Discussion

The descriptive tests are carried out to answer the first research question. Table 2 shows that the total sample of Indonesian and Malaysian FinTech companies are 148 and 159, respectively. The mean of disclosure for Indonesian FinTech companies is 6.74, while the mean of disclosure for Malaysian FinTech companies is 8.5. It shows that Malaysian FinTech companies disclose more information than their Indonesian counterparts. However, Malaysian FinTech companies have greater dispersion of disclosure. It was indicated by a higher standard deviation score than Indonesia.

Table 2. Descriptive Statistics.

	N	Min	Max	Sum	Mean	Std. Dev
Indonesia	148	1	44	998	6.74	5.359
Malaysia	159	2	46	1351	8.50	9.177

The highest amount of disclosure items by Indonesian FinTech companies is 44 items, while the highest amount of disclosure items by Malaysian FinTech companies is 46 items. The company with the highest amount of disclosure is a payment FinTech, i.e., Cashlez. Cashlez disclosed many items due to its status as a listed company on the Indonesian Stock Exchange. Therefore, Cashlez is obliged to implement good corporate governance practices. Moreover, the same thing happens in the Malaysian FinTech industry. XOX Mobile, the company with the highest disclosure, is also listed in Bursa Malaysia. Some companies with a high amount of disclosure, such as Grabkios, Paypal, Samsungpay, TM One, and Rakuten Trade, are due to their websites being integrated with their parent companies. This clearly indicates that the parent company is responsible to coerce the requirements for subsidiary companies to implement the SDG 16 initiatives that include the disclosure of corporate governance information on websites.

In terms of the most disclosed items, the two items that are the most disclosed by FinTech companies in Indonesia and Malaysia are the items of the company's activity and company's policy and practices to address customers' welfare. Both items focused on customer services and overall information about the firm. It shows that as an emerging and growing industry, FinTech companies are more concerned about the business aspect than the governance aspect. Therefore, the lack of accountability due to low disclosure of corporate governance information might hamper the achievement of SDG No 16. This indicates that Fintech companies in both countries are not fully ready to contribute to

global governance through their external engagement with other stakeholders. Thus, more awareness of the importance of SDG 16 via corporate governance disclosure should be promoted, as SDG 16 permits firms to communicate their broader role in shaping societies and institutions.

The second research question in this study is: do the country and type of FinTech services affect the extent of corporate governance disclosure in both Malaysian and Indonesian FinTech companies? Previous studies have deemed that the country is a critical factor influencing the disclosure level [50,51]. The second research question is answered by the *t*-test. The *p*-value in the *t*-test takes $0.044 < 0.05$ (Sig. level). Thus, country has a significant effect on the corporate governance disclosure of FinTech companies. Therefore, the findings suggest a statistical association between the countries and the amount of corporate governance disclosure on the websites.

According to the result of the *t*-test in Table 3, this study found that Malaysian FinTech companies disclose more corporate governance information than their Indonesian counterparts. The possible reason for this difference might be due to Malaysian Code of Corporate Governance (MCCG) came earlier in 2000 than the Indonesian GCG Code in 2006. Therefore, MCCG is more embedded in Malaysian companies. Besides that, according to the coercive isomorphism tenet, it might imply that Malaysia's government uses its coercive powers to pressure businesses to disclose corporate governance information rather than Indonesia's government. This finding is incompatible with the study conducted by Joseph et al. [39] that indicated Indonesian local authorities or provinces exceeded Malaysia's city and municipal councils' disclosures. Thus, it is maintained that the push towards achieving SDG 16 via disclosure practices differs based on the functions of organizations. Undeniably, the close tie between local authority and community assists in advancing SDG 16 as compared to role of business organizations such as FinTech companies in maximizing profits. In addition, different priorities in certain sectors in different countries also potentially influence the variation in corporate governance disclosure that affects the realization of SDG 16.

Table 3. *T*-test for Country.

		Levene's Test		<i>t</i> -test for Equality of Means		
		F	Sig.	<i>t</i>	df	Sig. (2-Tailed)
CG Score	Equal variances assumed	11.846	0.001	−2.025	305	0.044
	Equal variances not assumed			−2.061	257.788	0.040

The results shown in Table 4 show that payment FinTech is the most prominent type of FinTech company in Indonesia and Malaysia (115 companies), followed by lending FinTech (42 companies). The mean of disclosure for payment and lending FinTech companies is also the largest among the sector, with scores of 8.6 and 8.3, respectively. However, payment FinTech companies have greater dispersion of disclosure than lending FinTech companies. It is indicated by the higher score of the standard deviation of payment FinTech companies. It is possible since payment and lending FinTech companies as the most popular type of FinTech. Both service types gained the most active users in Indonesia and Malaysia. Therefore, there might be enforcement by BI, BNM, OJK, and SC as the regulators of payment and lending FinTech companies to disclose more rather than their counterparts. It indicates that coercive isomorphism from relevant authorities such as BI, BNM, OJK, and SC might force both service types to comply more with the corporate governance code.

BNM and BI regulate digital payment and e-money. Meanwhile, SC and OJK regulate the other fintech sector such as crowdfunding, peer-to-peer lending, and the like. The regulators have introduced The Regulatory Sandbox to facilitate and encourage FinTech innovation. It is a formal regulatory program that allows FinTech firms to test their business model in actual business practice, subject to certain safeguards and oversight. The regulators need to be flexible to welcome new entrants and take a more business-friendly approach in

allowing financial innovation and sectorial growth. However, they also must be cautious in their licensing and approval processes, where only new operators with proper capability and resources will be selected to ensure adequate safeguards and system integrity are in place and to prevent over-crowding in the FinTech space in Indonesia and Malaysia.

Table 4. Descriptive Statistics.

Service Type of FinTech	N	Mean	Std. Dev	Min	Max
Wealthtech	30	7.73	4.638	1	22
Payment	115	8.62	10.589	1	46
Lending	42	8.33	3.580	3	19
Insurtech	24	5.38	3.033	1	12
Crowdfunding	17	5.88	3.604	3	18
Blockchain/Crypto	30	5.93	1.874	3	10
Total	258	7.67	7.601	1	46

The second research question has been tested using ANOVA. The relationship between each group of FinTech companies by service type and the extent of information disclosed is shown in Table 5. The p -value in the ANOVA = 0.236 > 0.05 (Sig. Level), indicating the means between groups are similar. Consequently, the type of FinTech service does not influence the total quantity of disclosure.

Table 5. ANOVA test for Service Type of FinTech.

	SS	df	MS	F	Sig.
Between Groups	393.030	5	78.606	1.371	0.236
Within Groups	14,453.622	252	57.356		
Total	14,846.651	257			

Based on the result of the ANOVA test, this study is in line with Herrador-Alcaide and Hernández-Solís [23], which found no significant relationship between service type and the amount of disclosure. Therefore, the type of FinTech service has no significant influence on corporate governance disclosure though the means of corporate governance disclosure are higher for payment and lending FinTech companies. This finding implies that the type of FinTech service is not a factor that determines the disclosure level of corporate governance information. As a result, it is impossible to distinguish between disclosures made by various FinTech subsectors on the websites. It shows that there might be a lack of pressure from regulators on specific FinTech companies. Even the two most popular and prominent types of FinTech companies, namely payment and lending FinTech companies, have no significant difference from other FinTech service types in disclosing corporate governance information.

5. Conclusions

This paper has achieved the intended objectives and has answered the research questions. The findings show that FinTech companies provide around 7 to 9 out of 50 disclosure items. This paper cannot figure out the existence of a homogeneous disclosure structure in Indonesian and Malaysian FinTech companies. On the other hand, this study identifies a similar disclosure practice among FinTech companies in any service type. FinTech companies also lack a habit of voluntarily disclosing corporate governance information. This disclosure is more inclined toward the promotion of the business. FinTech companies might focus more on the business rather than the governance aspect. Hence, the information is emphasized on services in FinTech and general information about the company. This low corporate governance disclosure will inhibit the distribution of pivotal information to shareholders. Therefore, this lack of disclosure will hinder the attainment of SDG No 16,

which campaigns for the provision of access to justice for all and for building effective and accountable institutions.

To conclude, there is a variation in the total volume of disclosure of FinTech companies in both countries. Malaysian FinTech companies disclose more information than their Indonesian counterparts. However, in terms of service type, there is no difference in the level of disclosure when taking into account the type of service provided.

The findings of this study have implications. To demonstrate their accountability to stakeholders, particularly their shareholders who provide the capital to run the business, it suggests that FinTech companies in Indonesia and Malaysia need to enhance their corporate governance disclosures on their websites. Since the corporate governance disclosures were low (around 7 to 9 out of 50 disclosure items), FinTech companies must enhance their accountability by communicating corporate governance information on their websites. Simultaneously, it will help realize SDG No 16 in achieving sustainable and accountable institutions.

This study also suggests that all service types of FinTech companies need to demonstrate their accountability by disclosing more corporate governance items. Especially, the two most popular and prominent fintech services, namely payment and lending FinTech companies. Since both service types gained the most active users and financial transactions, thus, the findings from this study can be used by FinTech companies to improve transparency and accountability by using websites to share corporate governance information. The findings also become valuable input for regulators to formulate a policy to increase compliance with the code of corporate governance for FinTech companies, which in turn will assist the achievement progress of SDG No 16.

Just like any other study, this study has its limitations. The content analysis technique at all time deal with the inevitable problem of bias [52]. However, as this study used more than one coder to assign scores, subjectivity could be reduced, and the accuracy of assigning scores increased. Because the study's focus was solely on website disclosures, the results should only be interpreted considering the time frame in which it was conducted, given that website content is constantly changing.

Future research could continue this study by using interviews to understand better the motivations behind disclosed and undisclosed corporate governance information. Future studies will also find it fascinating to provide information on factors affecting the level of disclosures in corporate governance information.

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References

1. Conway, S.L.; Wilmshurst, T.; Williams, B. Guidelines for corporate governance disclosure—Are Australian listed companies conforming? *J. Asia-Pac. Cent. Environ. Account.* **2012**, *18*, 5–24.
2. United Nations. *Corporate Governance Disclosure in Emerging Markets*; United Nations: Geneva, Switzerland, 2011.
3. OECD. *OECD Principles of Corporate Governance*; OECD Publications Service: Paris, France, 2004.

4. OECD. *G20/OECD Principles of Corporate Governance*; OECD Publications Service: Paris, France, 2015.
5. Moro-Visconti, R.; Rambaud, S.C.; Pascual, J.L. Sustainability in FinTechs: An Explanation through Business Model Scalability and Market Valuation. *Sustainability* **2020**, *12*, 10316. [CrossRef]
6. World Bank Group. *Fintech and the Future of Finance*; World Bank Group: Washington, DC, USA, 2022; Available online: <https://www.worldbank.org/en/publication/fintech-and-the-future-of-finance> (accessed on 18 October 2022).
7. Vergara, C.C.; Agudo, L.F. Fintech and Sustainability: Do They Affect Each Other? *Sustainability* **2021**, *13*, 7012. [CrossRef]
8. Yuan, K.; Xu, D. Legal Governance on Fintech Risks: Effects and Lessons from China. *Asian J. Law Soc.* **2020**, *7*, 275–304. [CrossRef]
9. Aysan, A.; Bergigui, F.; Disli, M. Using Blockchain-Enabled Solutions as SDG Accelerators in the International Development Space. *Sustainability* **2021**, *13*, 4025. [CrossRef]
10. Amboningtyas, D.; Seputro, A.; Anjar Wicaksono, A. Critical Review of Fintech Management. *J. Mantik* **2020**, *4*, 1321–1325.
11. Meiling, L.; Yahya, F.; Waqas, M.; Shaohua, Z.; Ali, S.A.; Hania, A. Boosting Sustainability in Healthcare Sector through Fintech: Analyzing the Moderating Role of Financial and ICT Development. *Inq. J. Health Care Organ. Provis. Financ.* **2021**, *58*, 1–11. [CrossRef]
12. Rosavina, M.; Rahadi, R.A.; Kitri, M.L.; Nuraeni, S.; Mayangsari, L. P2P lending adoption by SMEs in Indonesia. *Qual. Res. Financ. Mark.* **2019**, *11*, 260–279. [CrossRef]
13. KPMG International. *Regulation and Supervision of Fintech: Ever-Expanding Expectations*; KPMG International: Amstelveen, The Netherlands, 2019.
14. Dobrowolski, Z. Internet of Things and Other E-Solutions in Supply Chain Management May Generate Threats in the Energy Sector—The Quest for Preventive Measures. *Energies* **2021**, *14*, 5381. [CrossRef]
15. Foster, K.; Blakstad, S.; Bos, M.; Gazi, S.; Melkun, C.; Shapiro, B. Annex 1-6 Technical Paper 1.1: BigFintechs and Their Impacts on Sustainable Development. 2021. Available online: <https://www.undp.org/sites/g/files/zskgke326/files/2021-06/UNDP-UNCDF-TP-1-1-BigFintechs-and-Their-Impacts-on-Sustainable-Development-EN.pdf> (accessed on 23 August 2022).
16. Kauflin, J. In Fintech, 2022 Is Becoming the Year of Layoffs. 2022. Available online: <https://www.forbes.com/sites/jeffkauflin/2022/07/28/in-fintech-2022-is-becoming-the-year-of-layoffs/?sh=5390559220f3> (accessed on 12 October 2022).
17. Yuhertiana, I.; Zakaria, M.; Suhartini, D.; Sukiswo, H.W. Cooperative Resilience during the Pandemic: Indonesia and Malaysia Evidence. *Sustainability* **2022**, *14*, 5839. [CrossRef]
18. ECGI. Corporate Governance in Malaysia. 2020. Available online: <https://ecgi.global/content/corporate-governance-malaysia> (accessed on 23 August 2022).
19. ECGI. Corporate Governance in Indonesia. 2020. Available online: <https://ecgi.global/content/corporate-governance-indonesia> (accessed on 23 August 2022).
20. Diniyya, A.A.; Aulia, M.; Wahyudi, R. Financial Technology Regulation in Malaysia and Indonesia: A Comparative Study. *Ihtifaz J. Islam. Econ. Financ. Bank.* **2020**, *3*, 67–87. [CrossRef]
21. CCAF; ADBI; FintechSpace. *The Asean Fintech Ecosystem Benchmarking Study*; Cambridge Centre for Alternative Finance: Cambridge, UK, 2019.
22. Haniffa, R.; Cooke, T.E. Culture, Corporate Governance and Disclosure in Malaysian Corporations. *Abacus* **2002**, *38*, 317–349. [CrossRef]
23. Herrador-Alcaide, T.-C.; Hernández-Solís, M. Topics of Disclosure on the Websites: An Empirical Analysis for FinTech Companies. In *Modeling, Dynamics, Optimization and Bioeconomics III*; Springer International Publishing: New York, NY, USA, 2018; Volume 224, pp. 187–203. [CrossRef]
24. Fernández, A.G. La Divulgacion De Informacion Financiera en La Web Corporativa De Empresas Cotizadas: Un Estudio Evolutivo. 2009. Available online: http://www.aeca1.org/pub/on_line/comunicaciones_xvcongresoaecca/cd/98g.pdf (accessed on 23 August 2022).
25. Meutia, I.; Soediro, A. Disclosure of Governance Practice by Islamic Banks in Indonesia. *Int. J. Islam. Econ. Financ. Stud.* **2019**, *5*, 72–89. [CrossRef]
26. Sulaiman, M.; Majid, N.A.; Arifin, N.M. Corporate governance of Islamic financial institutions in Malaysia. *Asian J. Bus. Account.* **2015**, *8*, 65–93.
27. Feldioreanu, I.-A.; Seria, C. Corporate governance disclosure of banks in Romania and Malaysia and the quality of the web sites. *Account. Manag. Inf. Syst./Contab. si Inform. Gestiune* **2015**, *14*, 193–216.
28. Panchasara, B.M.; Bharadia, M.H.S. Corporate Governance Disclosure Practices and Firm Performance: Evidence from Indian Banks. *Paradigm* **2013**, *17*, 88–98. [CrossRef]
29. Herbert, W.E.; Agwor, T.C. Corporate governance disclosure and corporate performance of Nigerian banks. *J. Res. Emerg. Mark.* **2021**, *3*, 14–36. [CrossRef]
30. Shahar, N.A.; Nawawi, A.; Salin, A.S.A.P. *Shari'a* corporate governance disclosure of Malaysian IFIS. *J. Islam. Account. Bus. Res.* **2020**, *11*, 845–868. [CrossRef]
31. Napitupulu, S.; Primiana, I.; Nidar, S.R.; Effendy, N.; Puspitasari, D.M. The Effect of Management Capabilities in Implementing Good Corporate Governance: A Study from Indonesia Banking Sector. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 159–165. [CrossRef]
32. E-Vahdati, S.; Zulkifli, N.; Zakaria, Z. A Moderated Mediation Model for Board Diversity and Corporate Performance in ASEAN Countries. *Sustainability* **2018**, *10*, 556. [CrossRef]
33. Shrivastav, S.M.; Kalsie, A. The Relationship between Foreign Ownership and Firm Performance in India: An Empirical Analysis. *Artha Vijnana J. Gokhale Inst. Politi. Econ.* **2017**, *59*, 152. [CrossRef]
34. Le Minh, T.; Walker, G. Corporate Governance of Listed Companies in Vietnam. *Bond Law Rev.* **2008**, *20*, 5520. [CrossRef]

35. Giglio, F. Fintech: A Literature Review. *Int. Bus. Res.* **2022**, *15*, 1–80. Available online: <https://ideas.repec.org/a/ibn/ibrjnl/v15y2022i1p80.html> (accessed on 23 August 2022).
36. Basuony, M.A.K. Corporate governance: Does it matter for corporate social responsibility disclosure via website and social media by top listed UK companies? *Corp. Ownersh. Control* **2021**, *19*, 84–93. [[CrossRef](#)]
37. Gandía, J.L. Determinants of internet-based corporate governance disclosure by Spanish listed companies. *Online Inf. Rev.* **2008**, *32*, 791–817. [[CrossRef](#)]
38. Stewart, J.; Asha, F.; Shulman, A.; Ng, C.; Subramaniam, N. Governance Disclosure on the Internet: The Case of Australian State Government Departments. *Aust. J. Public Adm.* **2012**, *71*, 440–456. [[CrossRef](#)]
39. Joseph, C.; Gunawan, J.; Madi, N.; Janggu, T.; Rahmat, M.; Mohamed, N. Realising sustainable development goals via online integrity framework disclosure: Evidence from Malaysian and Indonesian local authorities. *J. Clean. Prod.* **2019**, *215*, 112–122. [[CrossRef](#)]
40. Mulyadi, M.S. Do corporate webs substitute annual reports for corporate governance disclosures in large Indonesian family corporations? *Int. J. Web Based Communities* **2017**, *13*, 311. [[CrossRef](#)]
41. Brammer, S.; Jackson, G.; Matten, D. Corporate Social Responsibility and institutional theory: New perspectives on private governance. *Socio-Econ. Rev.* **2011**, *10*, 3–28. [[CrossRef](#)]
42. Wijayati, N. Form over Substance: The Board Governance Practices in Indonesia. *Indones. J. Account. Res.* **2022**, *25*, 1–28. [[CrossRef](#)]
43. DiMaggio, P.J.; Powell, W.W. The Iron Cage Revisited: Institutional Isomorphism in Organizational Fields. *Am. Sociol. Rev.* **1983**, *48*, 147–160. [[CrossRef](#)]
44. Midin, M.; Joseph, C.; Mohamed, N. Promoting societal governance: Stakeholders’ engagement disclosure on Malaysian local authorities’ websites. *J. Clean. Prod.* **2017**, *142*, 1672–1683. [[CrossRef](#)]
45. Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*; Sage Publications: Beverly Hills, CA, USA, 1980.
46. Asian Development Bank. *ASEAN Corporate Governance Scorecard Country Reports and Assessments 2015: Joint Initiative of the ASEAN Capital Markets Forum and the Asian Development Bank*; Asian Development Bank Institute: Mandaluyong, Philippines, 2017.
47. Suwaidan, M.S.; Al-Khoury, A.F.; Areiqat, A.Y.; Cherrati, S.O. The Determinants of Corporate Governance Disclosure: The Case of Jordan. *Acad. Account. Financ. Stud. J.* **2021**, *25*, 1–12.
48. Hassan, M.K. A disclosure index to measure the extent of corporate governance reporting by UAE listed corporations. *J. Financ. Rep. Account.* **2012**, *10*, 4–33. [[CrossRef](#)]
49. Joseph, C.; Rahmat, M.; Yusuf, S.N.S.; Janang, J.T.; Madi, N. The ethical value disclosure index from the lens of SDG 16 and institutional theory. *Int. J. Ethic Syst.* **2022**. *ahead of print*. [[CrossRef](#)]
50. Gray, S.J.; Meek, G.K.; Roberts, C.B. International Capital Market Pressures and Voluntary Annual Report Disclosures by U.S. and U.K. Multinationals. *J. Int. Financ. Manag. Account.* **1995**, *6*, 43–68. [[CrossRef](#)]
51. Sultana, S. Corporate Governance Disclosures—A Comparative Analysis of Countries at Different Stages of Economic Development. Ph.D. Thesis, Curtin Graduate School of Business, Perth, Australia, 2015.
52. Gunawan, J. Corporate social disclosures in Indonesia: Stakeholders’ influence and motivation. *Soc. Responsib. J.* **2015**, *11*, 535–552. [[CrossRef](#)]

Article

Ownership Characteristics and Financial Performance: Evidence from Chinese Split-Share Structure Reform

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Abstract: This paper investigates the relationship between two characteristics of corporate governance (concentrated and state ownership) and firm financial performance by bringing new and extensive evidence from an emerging market. Further, this study examines the impact of the recent stock split reform in China on the corporate ownership characteristics–firm performance relationship. The final sample of this study is comprised of 234 firms with 2340 annual observation values. The study hypotheses are examined using regression analysis of panel data. We found that concentrated ownership is positively and significantly related to firm performance. However, state ownership has a significant negative impact on firm performance. Further, we observed that the stock split reform has a substantial and positive effect on the ownership–corporate financial performance relationship. In particular, the positive relationship between ownership concentration and firm performance has increased following the split-share structure reform. The negative relationship between state ownership and corporate financial performance has been mitigated following the split-share structure reform. We contribute to the existing literature on corporate governance by investigating the ownership–corporate financial performance relationship in a unique research setting based on the impact of an exogenous regulatory change, namely, the split-share structure reform in China. The study presents implications for regulators, investors, and researchers interested in examining developing markets such as China. Our results imply that the institutional reform of the Chinese stock market has benefitted investors through enhancing corporate financial performance. The findings suggest that the reform of the Chinese stock market has significantly shaped the impact of ownership structure on corporate financial performance in a valuable way for effective capital allocation. Thus, collectively, the split-share structure reform enhances the quality of corporate governance, which is pivotal to the growth of the country’s economy. This, in turn, has policy implications for other emerging economies.

Keywords: stock split reform; ownership characteristics; state ownership; concentrated ownership; financial performance; China

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1. Introduction

Corporate governance (CG) is a system of checks and measures that prevent the detrimental actions of directors and conflicts of interest between owners and managers [1,2]. CG is well established in developed markets such as the USA and Canada, but what about emerging economies with emerging structures? In these economies, there is no clear evidence that CG impacts corporate performance [3–6]. This is an important question that needs special examination, especially within the broad economic reforms that have been recently launched in some developing countries, such as the latest stock split reform in China in 2005 [7–9].

This latest reform brought about significant changes in ownership structures in China’s listed companies, especially by removing restrictions on non-tradable shares. Ownership

structures are crucial CG mechanisms [10–15], especially in settings with higher ownership concentrations and state ownership levels, such as the Asian markets in general and the Chinese market in particular [16]. In emerging markets, where (external) governance mechanisms and legal systems are not highly effective, as they are in developed markets, internal CG mechanisms, such as those related to ownership structure, become increasingly apparent as monitoring mechanisms [17–19].

Scholars worldwide have recently investigated the impact of ownership structures on firm performance [20]. However, the reported findings are mixed. In particular, a set of studies informed positive implications e.g., [21–23]. Other studies perceived ownership structures, especially state ownership, negatively e.g., [24–27]. The mixed results in the literature indicate the context-dependent nature of the CG–firm financial performance relationship and the importance of understanding this relationship in its institutional and contextual environment. In this regard, Nguyen et al. [28], for example, found that the positive impact of ownership concentration on company performance is more related to contexts with lower governance systems (such as Vietnam) than contexts with effective governance systems (such as Singapore). Despite the importance and the significant implications of the stock split reform in China, there is a limited empirical study with a recent broad set of data that examines its implications for the governance process. Thus, it is vital to investigate the impact of this reform on governance mechanisms to test the influences of regulatory interventions on the quality of corporate governance. It also provides a unique setting to contribute to the ongoing debate on the nexus of the ownership–firm financial performance relationship.

The Chinese market was chosen as the study context because it is currently one of the most important developing economies worldwide. In addition, economic reforms in China are underway where state-owned enterprises (SOEs) are being transformed into modern firms [29]. Notably, in 2005, the China Securities Regulatory Commission presented the split-share structure reform, allowing public companies' non-tradable shares to be tradable by eliminating restrictions on all shares [8]. As a result, China's economy has faced vast economic growth during the last years. During this economic transformation, state intervention was apparent, making this context worthy of a particular investigation.

The Chinese economy has unique characteristics that motivated us to conduct this study in this unique context. These include the higher levels of government interference and the lower levels of investors' legal protection compared to developed markets, such as the USA; the economic transformation without political changes, as is the case with most emerging markets [29–31]; the apparent links between corporate executives and the government [32]; the minimal managerial equity ownership [6]; the presence of a unique ownership structure in which shares are classified according to five distinct classes of owners: the state, legal persons, employees, domestic individuals, and foreign individuals or institutional holders; the higher levels of ownership concentrations, where a single or a few owners own the majority of shares, in contrast to the case of developed markets, such as the USA, that have lower levels of ownership concentration [29]; and finally, the non-tradable nature of state ownership [33]. Despite these peculiar features, the studies conducted in the Chinese context are limited and report mixed findings, such as Wu and Cui [34], on the positive side, and Filatotchev et al. [17] on the negative side.

We revealed that concentrated ownership is positively and significantly associated with corporate performance. However, state ownership has a significant negative effect on corporate performance. Further, we observed that the stock split reform has a substantial and positive effect on the ownership–firm financial performance relationship. Particularly, the positive association between ownership concentration and firm performance has increased following the split-share structure reform. The negative association between state ownership and firm financial performance has been mitigated following the split-share structure reform. This research contributes to the previous studies by bringing evidence from an emerging market where a few studies have been conducted e.g., [8,17,28,35]. It also extends the limited studies related to the impact of ownership characteristics on firm perfor-

mance in China, and the present inconclusive evidence reported in the literature in general see, e.g., [17,33,35–37]. Further, it extends the minimal studies concerned with the impact of stock market reforms on the governance (ownership) structures–firm performance relationship [8,38,39].

The study is organized as follows. Section 2 presents the contextual background of the study. Section 3 clarifies the theoretical lens of the study. Section 4 provides a literature review and hypotheses development. Section 5 clarifies the research methods. Section 6 presents data analyses and discusses the findings. Finally, Section 7 concludes the paper.

2. Background

The Chinese economy is one of the fastest-growing transitional economies globally [40]. As in most developing countries, China has embraced a comprehensive economic reform program since the early 1990s that liberalizes the economy and supports the private sector. The privatization program in China ushered in two stock exchanges: the Shanghai Stock Exchange, which opened in 1990, and the Shenzhen Stock Exchange, which opened in 1991. Since then, the Chinese market has attracted massive investments from China and overseas. The ensuing economic developments required the establishment of governance structures, especially ownership structures, to monitor corporate actions and performance. However, in contrast to developed countries, China’s CG process is determined by the political and institutional factors, where the state plays an essential part [41]. Hence, it is crucial to understand the institutional context where CG is applied before understanding the ownership structures–firm performance relationship.

Chinese companies were allowed to issue different types of shares to different kinds of owners. Domestic investors (including legal persons, the state, and individuals) can invest in shares of type A. SOEs own the majority of state and legal-person shares to retain voting control. State shares are owned by all country people and managed by the State Assets Management Bureau (SAMB) to nominate directors to the general shareholders meeting [6]. Legal shares are those owned by local organizations such as banks, insurance firms, and mutual funds. The management of those entities cannot change the present level of state ownership [6]. A-type shares are listed on Shanghai and Shenzhen stock exchanges and traded in Renminbi [29]. Foreign investors can invest in B- or H-type shares [33]. B-type shares are traded in USD (in Shanghai exchanges) or HKD (in Shenzhen exchanges). Finally, H-type shares are traded in USD in Hong Kong. Chinese companies can issue H-type shares in the Hong Kong Stock Exchange [29].

In 2001, local investors were allowed to invest in B-type shares, presenting more investment opportunities in the market. In the same year, the government sold out state-owned shares, raising the share of private firms in the market to 20% within the next two years, following their being sold [42]. By then, most A-type shares (owned by governmental institutions) were non-tradable; instead, they were traded on a contract basis that required the acceptance of regularity authority [43]. In contrast, tradable shares were owned by individuals and other private persons. This dual structure can be dated back to the earlier reform in 1978. Then, there were two types of ownership in China: SOEs (constituting most companies) and collectives run by municipalities and communities. However, this dual structure had severe economic impacts and increased the agency problem [44,45]. Thus, several reforms followed, but they were not successful enough to achieve real economic impacts [46].

One of the notable reforms was presented in 2005, noting that, as of February 2005, non-tradable shares represented approximately two-thirds of the whole outstanding shares [38]. In particular, on the 29 April 2005, the China Securities Regulatory Commission presented the split-share structure reform, allowing public companies’ non-tradable shares to be tradable by eliminating restrictions on all shares [8]. In doing so, non-tradable shareholders were requested to pay compensation to tradable shareholders to be able to sell their shares. The compensation is discussed through negotiation between the shareholders. This reform process was gradually implemented. Firstly, after 12 months of the agreement on the

compensation, the restricted shares held by owners holding less than 5% of the company ownership became tradable. Then, within the next 12–24 months following the agreement, the restricted shares owned by owners holding more than 5% of the company ownership became tradable. Finally, 36 months after the agreement process, all restricted shares had become tradable [8]. This reform aimed at revitalizing and further liberalizing the stock market by opening the door for the second privatization wave. This significant change in ownership structures in China has attracted the attention of several researchers. Some studies noted that it could reduce the principal-agent agency problem see [43,46,47]. Further, by addressing the economic impacts of the stock split reform, Sun et al. [47] found that it had decreased tunneling and crash risk. Hence, the stock split reform significantly influences ownership structure, moving the market towards lower ownership concentration and state control [48]. However, despite these reforms, the state remains a significant owner in many enterprises [38,49].

3. Ownership Structure and the Agency Problem: Theory

The separation of ownership (principals) and management (agents) may result in conflicts of interests, which increases agency costs [50,51]. These costs are related to monitoring and controlling managers' behaviors and the expected losses due to suboptimal performance. In contexts with significant ownership concentration, state ownership agency conflicts might appear, not only between owners and managers but also between large owners and minority owners [52,53]. Here, corporate governance mechanisms, including ownership structures, can have an influential role in monitoring the abusive behaviors of managers and owners. This could reduce the agency problem and direct organizational actions to serve the company's interests, instead of performing a particular group's interests [54].

Based on the agency theory, ownership concentration can work as an effective governance mechanism to decrease agency costs [55]. According to this perspective, when ownership is concentrated, individual investors have significant incentives to monitor and exercise more influence over the major company decisions [51,56]. This might eventually enhance the company's performance [33].

In contrast, according to the agency theory, state owners, with unique objectives that differ from other parties' objectives, may contribute to ineffective governance and lower managerial incentives [57]. This may result in lower corporate company performance compared to the case of privately-owned companies [58,59]. This is based on the argument that the state's "grabbing hand" (the principal owner) would divert resources away from the company [60]. Instead, SOEs direct resources towards achieving social and political objectives (such as securing votes for the ruling party) rather than business objectives (such as profit maximization) [36,61,62]. Further, state owners are likely to retain surplus employees or appoint political allies, regardless of the company's economic position [63]. In fact, they are reported to obtain supplies from expensive suppliers and make overinvestment decisions [57]. These suboptimal actions ultimately expropriate resources from minority owners and increase agency costs, negatively impacting corporate performance [36,53].

4. Literature Review and Hypothesis Development

CG mechanisms can induce managers to work in the company's best interest rather than serve their interests, i.e., they can resolve the agency conflict arising from the ownership–management relationship [55]. As discussed below, a critical CG mechanism is related to ownership, such as ownership concentration and state ownership (SO), which can have different implications for firm performance.

4.1. Ownership Concentration and Financial Performance

High ownership concentration can have unique impacts on CG issues and firm performance that are worthy of special investigation [64]. We observed different studies conducted in different contexts and reporting variant performance implications by review-

ing the literature [18,33]. On the positive side, by the knowledge and experience they have accumulated, and the power they have over managers, larger owners are noted to better control, monitor, or govern managers (agents) [18,19,65]. This can enable them to eliminate the opportunistic behaviors of managers, acting in the interest of minority owners and the whole company [66], see also [28,67,68]. In this regard, Joh [69] reported that higher levels of ownership concentration can enhance Korean companies' economic performance. Further, Omran [70] noted that ownership concentration enhances Egyptian companies' performance. Gaur et al. [21] observed that lower levels of ownership concentration are related to lower company performance in New Zealand. In the context of Pakistan, Waheed and Malik [71] found that ownership concentration can reduce the agency problem. In the Indian market, Nashier and Gupta [15] found that ownership concentration improves the monitoring of management, which eventually enhances corporate performance.

In contrast, another stream of studies noted that larger owners could work to serve their interests due to their information and power [72]. In this concern, Nguyen et al. [27] suggest that significant ownership concentration minimizes the positive impacts of CG mechanics, such as having more independent directors on the board [8]. This dominance of control by larger owners could ultimately manipulate the company and expropriate minority owners [73], resulting in conflicts between larger and minority owners [8,52,66]. For example, Leech and Leahy [74] and Mudambi and Nicosia [75] reported a negative relationship between ownership concentration and U.K. companies' economic performance see also [68,76,77].

Other studies reported a U-shaped relationship, such as Morck et al. [78] in the USA and Altaf and Shah [16] in India [19,79]. Finally, other studies did not report a significant association between ownership concentration and corporate performance. For example, concentrating on the context of some Arab countries, Omran et al. [80] found that ownership concentration has no impacts on corporate performance. Demsetz and Lehn [81] and Agrawal and Knoeber [82] found an insignificant association between ownership concentration and firm performance in the US context. Further, Yasser and Al Mamun [83] reported no significant association between Pakistani companies' financial performance and ownership concentration see also [84,85].

The case is not highly different in the context of China, where inconclusive results are also reported. For example, Xu and Wang [86] and Ma et al. [73] found that ownership concentration is associated with company performance. However, Tian [87] found a U-shaped relationship. Gunasekarage et al. [33] noted detrimental impacts of block ownership. Ding et al. [88] highlighted the expropriation problem by controlling owners due to ineffective governance systems.

In developing markets such as China, where governance mechanisms and legal systems are not as highly effective as is the case in developed markets, it is argued that ownership concentration impacts become more critical and apparent [17,35]. We contribute to studies in emerging economies by bringing extensive recent evidence from the Chinese market by testing the first hypothesis:

Hypothesis 1 (H1). *There is a significant positive relationship between ownership concentration and firm financial performance.*

4.2. State Ownership and Financial Performance

Significant research has examined the impact of state ownership on company performance. The majority of these studies indicate the inefficiency of state-held companies compared to private companies. However, as in the case of ownership concentration, the literature has reported different results see, e.g., [57,62,89,90], highlighting the context-dependence of the reported results. Using international evidence, Aguilera et al. [24] found that the relationship between state ownership and corporate financial performance varies across different contexts.

Several studies reported negative findings. For example, Liljeblom et al. [26] found a weaker corporate performance when state owners dominate corporate ownership and control in Russia. Musallam [91] found a negative relationship between state ownership and company value in Indonesia. Similar results are also noted by Aguilera et al. [24], who drew upon international evidence see also [49,92–95]. These results agree with some arguments in the literature regarding SO, such as the high probability of practicing ineffective monitoring rules [96], which might weaken CG mechanisms' impacts [27]. In addition, state owners are more risk-averse than private owners [97], and are associated with lower managerial quality [29]. Moreover, state owners give priority to socio-political goals (such as rising employment rates) instead of economic goals and means (such as pay-for-performance incentives) as in private enterprises [29]. Further, state owners are more likely to appoint their political allies in managerial positions, regardless of their expertise level [98,99].

Regarding the case of China, where a significant number of firms are classified as SOEs [44], contributing a high level of the country's GDP, mixed findings are also observed [100]. Some studies reported negative impacts of state ownership on corporate financial performance see, e.g., [33,49,59,101]. However, other studies reported positive or beneficial impacts of SO on corporate performance see [36,41,62,102]. For example, on the positive side, Liu et al. [103] noted that CG mechanisms contributed to enhancing corporate performance in SOEs. Likewise, Liu et al. [104] pointed out that state owners could reduce the adverse effects of product market competition. In contrast, supporting the mixed results in the previous studies, Zhou et al. [105] found that while state owners help Chinese companies obtain R&D resources, they make these companies less efficient in using these resources. These variant findings indicate the present complexity of the Chinese context [24]. We contribute to this debate by examining the effect of state ownership through testing the following hypothesis:

Hypothesis 2 (H2). *There is a significant negative relationship between state ownership and firm financial performance.*

4.3. The Role of Split-Share Structure Reform on the Relationship between State Ownership, Concentration, and Financial Performance

The mixed findings reported in the literature indicate the importance of interpreting results concerning the context where they occurred. That is, the context's institutions, regulations, and environment might matter in understanding the relationships under study [20]. In this regard, some studies argued that internal governance mechanisms such as ownership concentration become more vital in civil law—rather than common law—contexts, where investors' legal protection is lower [62,70,106]. Relatedly, Lepore et al. [20] associated the positive effects of ownership concentration on company performance with contexts having lower levels of investor protection, as in many emerging economies. Nguyen et al. [28] reported that the positive impact of ownership concentration on corporate performance is more pronounced in settings with ineffective (rather than well-established) governance structures. This supports the idea that ownership concentration can work as a substitute governed system in contexts where internal governance systems are ineffective. Likewise, Altaf and Shah [16] show that the effectiveness of investor protection in India moderates the association between ownership concentration and corporate performance.

This understanding has encouraged recent studies to examine the different impacts of economic policies and other changes in financial regulations on governance issues. For example, Omran [70] addressed the effect of ownership structure on Egyptian companies' performance following the adoption of privatization programs in the country, reporting a positive relationship. In Hong Kong, Chen et al. [107] examined the association between (family) ownership and the adopted dividend policy and found a weak association.

From this perspective, it is argued that the recent stock split structure reform in China can impact the ownership concentration–corporate financial performance relationship. Some studies have addressed the economic implications of the reform e.g., [8,38,46,47]. However, few studies have examined the effect of the stock split reform on the ownership

structure–corporate financial performance relationship [39]. For instance, Jiang et al. [39] examined the expected ownership structures following the 2005 stock reform policy. They observed that ownership concentration is the most critical factor in the concerned relationship. Further, Beltratti et al. [38] concluded that the stock split reform opened the door for significant changes in ownership and governance that may improve the Chinese companies' performance. This study argues that the anticipated positive effect of ownership concentration can be more pronounced in the period following the reform than before the reform. Thus, we develop the third hypothesis as follows:

Hypothesis 3 (H3). *The positive relationship between ownership concentration and firm financial performance has increased after the split-share structure reform.*

As mentioned above, new studies have started to investigate the impact of (state) ownership concerning the contextual environment. It is argued that the effect of state ownership on corporate performance can be better interpreted concerning the present institutional factors in the country [61,108,109]. In this regard, Borisova et al. [110], for instance, find that the negative relationship between state ownership and governance is related to contexts with an ineffective legal system. In contrast, as Estrin et al. [108] found, positive implications of state ownership can emerge in contexts with effective formal legal and informal institutions.

It is crucial to investigate the effect of economic policy and regulation changes on the SO–corporate performance relationship in this context. In this regard, Hanousek et al. [111], for example, note that, following the adoption of privatization programs, state ownership is less likely to improve corporate performance compared to private ownership. In the context of China, Wei and Varela [6] reported a negative association between state ownership and the financial performance of the recently privatized companies in 1994. Using a sample of companies registered on the Shanghai Stock Exchange as of year-end 2004, Jiang et al. [39] analyzed the effect of tradable share proportion and the state-owned share proportion on company performance before the stock split reform. The government-owned share proportion is reported to have a linear and positive influence on corporate performance. They found that the state ownership–firm performance relationship modifies when the percentage of tradable shares is accounted for in the analyses. Hou and Lee [8] noted that the 2005 stock split reform in China eliminated the trading restrictions for state owners. They also concluded that the stock split reform enhanced the incentive alignment between state and private owners, motivating them to monitor management. The present study uses a newer and more extensive data set to contribute to this debate by examining the SO–firm financial performance relationship related to 2005's stock split reform by testing the following (fourth) hypothesis:

Hypothesis 4 (H4). *The negative relationship between state ownership and firm financial performance has decreased after the split-share structure reform.*

5. Study Design

5.1. Sample Size

As shown in Table 1, the initial sample of this study comprises all firms listed on the Shanghai and Shenzhen Stock Exchanges from 2004 to 2013, totaling 2536 firms. After screening, 1544 firms were excluded, leaving 992 state-owned firms, by using the classification of ownership nature. For consistency and reliability reasons, this paper excludes 36 listed firms that issue B- and H-type shares and financial and public utilities firms—108 firms in total [112]. Following Del Bo et al. [113], this paper eliminates 66 sample data points with a ratio of state ownership of less than 20% in the initial year of the data sample. This paper also eliminates 13 firms with abnormal trading status, which are marked as ST firms. Finally, we exclude 350 firms with incomplete data. The final sample of this paper retained 234 firms, having 2340 annual observation values. All data were collected from

the China Stock Market and Accounting Research database (CSMAR). Although our study uses ten years of panel data, it contains far fewer observations prior to the reform than what is considered after the reform due to data availability.

Table 1. Sample selection.

The initial sample	2536
Less	
The non-state-owned firms.	(1544)
Firms on B-type shares and H-type shares.	(36)
Financial and Utility Firms	(108)
Firms with state ownership less than 20%	(66)
ST companies.	(13)
Firms with incomplete data	(350)
The Final Sample	234

5.2. Research Models

This paper examines the association between CG and the performance of Chinese SOEs by using regression analysis on panel data. The following two models are used, where β_0 is the intercept, β is the regression coefficient, and ε_i is an error term.

$$\begin{aligned}
 \text{TOBIN } Q/\text{MTB} = & \beta_0 + \beta_1 \text{OWNCON} + \beta_2 \text{STAOWN} + \beta_3 \text{REFORM} \\
 & + \beta_4 \text{OWNCON} * \text{REFORM} + \beta_5 \text{STAOWN} * \text{REFORM} + \beta_6 \text{GENDIV} + \beta_7 \text{BINDEP} \quad (1) \\
 & + \beta_8 \text{BSUPER} + \beta_9 \text{LNFSIZE} + \beta_{10} \text{LEV} + \varepsilon_i
 \end{aligned}$$

Our model includes two main independent variables, two dependent variables, and five control variables. Furthermore, this study addresses the impact of the split-share structure reform on the association between ownership and performance. Therefore, two interaction terms, $\text{REFORM} * \text{OWNCON}$ and $\text{REFORM} * \text{STAOWN}$, are introduced in the model to address the degree of change in the relationship before and after the reform. These two interaction terms refer to the incremental relationship between ownership concentration and the state ownership ratio of performance following the reform, respectively.

Our dependent variable is corporate financial performance measured using Tobin's Q. Tobin's Q is a market-based performance measurement method. It tends to be a forward-looking measure of firm financial performance that investors largely use [28,37,90,114,115]. Tobin's Q is defined as the proportion between the market value of assets and the book value of total assets at the end of the period. The market value is the sum of the company's equity value and debt value. As an alternative proxy of Tobin Q, this paper also presents the market-to-book value ratio (MBV) as the second dependent variable to measure firm performance. The market-to-book value ratio is the ratio of the market value to the book value.

Our principal independent variables are ownership concentration and state ownership. Consistent with previous studies, we employed the top ten shareholder ownership ratios to refer to the level of ownership concentration [114]. The ratio of state ownership is broadly employed to measure state ownership [111,112]. Thus, this study uses the state ownership ratio to study the association between state ownership and corporate performance.

Our study controls for some firm-level characteristics, namely, gender diversity, board independence, supervisor board, corporate size, and leverage. We employ the percentage of women on the board of directors as an indicator of board diversity and the ratio of independent directors in the board of directors to measure the independence of the board of directors [114,116]. Moreover, we employ the number of supervisory board members to measure the board of supervisors' impact on firm performance [37,117]. Previous empirical studies have shown that firm size and leverage affect corporate performance [37,116,118]. Therefore, we also incorporate the natural logarithm of the company's total assets to control the variables of firm size [37,116,119]. This study will also use the ratio of total liabilities

and total assets of the company as the company's leverage ratio [37,120]. Table 2 presents a summary of the variables.

Table 2. Definition of variables.

Variables	Description	Data Source
Tobin's Q	The sum of the company's equity value and debt value over the book value of assets.	China Stock Market and Accounting Research database (CSMAR)
The Market-to-Book Value Ratio	The ratio of market value to book value.	CSMAR
Ownership Concentration	Top ten shareholder ownership ratios.	
State Ownership	The state ownership ratio.	CSMAR
Gender Diversity of Board of Directors	The ratio of female directors on the board of directors.	CSMAR
Board Independence	The ratio of independent directors on the board of directors.	CSMAR
Supervisor Board	The number of supervisory board's members.	CSMAR
Gender Diversity of Board of Directors	The ratio of female directors on the board of directors.	CSMAR
Firm Size	The natural logarithm of total assets.	CSMAR
Leverage Ratio	The proportion of total liabilities and total assets.	CSMAR

6. Results and Discussion

6.1. Descriptive Analysis

According to Panel A, the proportion of the top ten shareholders in Chinese state-owned enterprises ranges from 15% to 97.1%, with an average of 55.7%. This suggests that Chinese SOEs generally have a high degree of ownership concentration. According to panel B, before the reform, the average ownership concentration of Chinese SOEs was 57.8%, and the minimum was 21%. According to Table 3, Panel C, following the reform, the average ownership concentration of Chinese SOEs is 53.6%, and the minimum is 15%, suggesting a significant decrease after the reform. Furthermore, as per Table 3, Panel A, the average proportion of state-owned shares in Chinese state-owned enterprises is 38.8%. Furthermore, we find that the average state ownership has declined from 40.9% before the reform to 36.6% following the reform, as shown in Table 3, Panels B and C. Thus, the ownership concentration and the proportion of state-owned shares have both obviously decreased after the reform. Nevertheless, the ownership structure concentration and state-owned share ratio of Chinese state-owned enterprises are both still relatively high.

Regarding control variables, the average ratio of female directors is only 7.2%. The standard deviation is 0.087, indicating that the overall power of female directors on the boards of Chinese SOEs is inadequate. Table 3, Panel A also shows that the average ratio of independent directors in Chinese SOEs is 35.6%. The supervisory board size of Chinese SOEs ranges from 1 member to 13 members, with an average of 4.394. Finally, the size of Chinese SOEs ranges from 19.256 to 27.955, with an average of 22.156. The average leverage proportion of Chinese SOEs is 0.527, the smallest leverage ratio is 0.05, and the largest leverage ratio is 0.955.

Table 3. Descriptive statistics.

Panel A: Descriptive Statistics of the Full Sample					
Variable	Obs.	Mean	Std. Dev.	Min	Max
TOBIN Q	2340	1.093	0.799	0.062	4.962
MBV	2340	2.371	1.517	0.38	9.878
OWNCON	2340	0.557	0.144	0.15	0.971
STAOWN	2340	0.388	0.158	0.042	0.841
REFORM	2340	0.5	0.5	0	1
GENDIV	2340	0.072	0.087	0	0.571
BINDEP	2340	0.356	0.049	0.091	0.714
BSUPER	2340	4.394	1.518	1	13
LNFSIZE	2340	22.156	1.207	19.256	27.955
LEV	2340	0.527	0.169	0.05	0.955
Panel B: Descriptive Statistics Before Reform					
Variable	Obs.	Mean	Std. Dev.	Min	Max
TOBIN Q	1170	1.082	0.823	0.085	4.962
MBV	1170	2.261	1.569	0.535	9.878
OWNCON	1170	0.578	0.139	0.21	0.971
STAOWN	1170	0.409	0.155	0.042	0.838
REFORM	1170	0	0	0	0
GENDIV	1170	0.068	0.083	0	0.333
BINDEP	1170	0.347	0.043	0.111	0.6
BSUPER	1170	4.468	1.621	1	13
LNFSIZE	1170	21.795	1.057	19.256	27.346
LEV	1170	0.505	0.163	0.05	0.852
Panel C: Descriptive Statistics After Reform					
Variable	Obs.	Mean	Std. Dev.	Min	Max
TOBIN Q	1170	1.104	0.775	0.062	4.528
MBV	1170	2.482	1.455	0.38	9.805
OWNCON	1170	0.536	0.147	0.15	0.961
STAOWN	1170	0.366	0.157	0.045	0.841
REFORM	1170	1.00	0.00	1.00	1.00
GENDIV	1170	0.075	0.091	0.00	0.571
BINDEP	1170	0.364	0.054	0.091	0.714
BSUPER	1170	4.321	1.405	2.00	10.00
LNFSIZE	1170	22.516	1.24	20.051	27.955
LEV	1170	0.548	0.173	0.069	0.955

Table 4 provides Pearson correlations between the continuous explanatory variables in the multivariate regressions. The correlation coefficient between OWNCON and Tobin Q is 0.053, which is significant at the 1% level. The finding indicates a positive correlation between ownership concentration and firm performance. We also find a negative correlation between STAOWN and Tobin Q, as the correlation coefficients between the ratio of state ownership and Tobin Q is 0.089, and significant at the 1% level. Table 4 shows a positive correlation between the ratio of female directors and Tobin Q and a negative correlation between BSUP, SIZE, LEV, and Tobin Q.

6.2. Main Analysis and Discussion

As discussed above, the main aim of this study is to investigate the relationship between two characteristics of ownership structure (concentrated and state ownership) and firm financial performance. Table 5 shows the multivariate regression findings between the variables and Tobin Q. The two main variables of interest are OWNCON and STAOWN. The first column presents the results of the first two hypotheses (H1 and H2), while columns 2 and 3 show the results of H3 and H4. Lastly, column 4 presents the findings of the four hypotheses using MTB as an alternative proxy. Along with H1, the coefficient of OWNCON

is positive and significant ($\beta_1 = 0.484$) at the 1% level. The results imply a significant positive impact of ownership concentration on corporate value. This result agrees with the literature, supporting the value or benefits that ownership concentration can bring about, especially the exercise of better monitoring of management, which is consistent with the agency perspective [18,65,121]. This result also agrees with some studies performed in different contexts, such as Omran [70] in Egypt and Gaur et al. [21] in New Zealand. However, this finding is different from other studies that perceived ownership concentration negatively, such as Aboud and Diab [122]. This inconsistency invited us to address the association between ownership concentration and firm performance concerning the context specificities, such as the major economic events in a particular context (e.g., the stock split reform in China), as explained below.

Table 4. Spearman correlation analysis.

	Tobin Q	OWNCON	STAOWN	GENDIV	BIND	BSUP	SIZE	LEV
Tobin Q	1							
OWNCON	0.0535 **	1						
STAOWN	−0.0869 ***	0.630 ***	1					
GENDIV	0.0420 *	−0.118 ***	−0.0824 ***	1				
BIND	−0.00259	−0.0288	−0.00417	0.0501 *	1			
BSUP	−0.0635 **	0.151 ***	0.0711 ***	−0.150 ***	−0.0820 ***	1		
SIZE	−0.484 ***	0.0118	−0.00063	−0.0439 *	0.0309	0.0512 *	1	
LEV	−0.346 ***	0.271 ***	0.184 ***	−0.150 ***	0.0840 ***	0.195 ***	0.370 ***	1

Note: Values with asterisks *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Regression analysis.

VARIABLES	1. Tobin Q	2. Tobin Q	3. Tobin Q	4. MBV
OWNCON	0.484 ** (2.299)	0.254 (1.175)	0.460 ** (2.194)	1.162 ** (2.547)
STAOWN	−0.390 ** (−2.359)	−0.400 ** (−2.400)	−0.686 *** (−3.861)	−0.883 ** (−2.416)
BIND	0.176 (0.549)	0.186 (0.575)	0.165 (0.505)	0.78 (1.091)
BSUP	0.0015 (0.102)	0.00233 (0.157)	0.00127 (0.0857)	0.0226 (0.699)
GENDIV	−0.136 (−0.593)	−0.152 (−0.660)	−0.16 (−0.699)	0.0564 (0.108)
LEV	−1.948 *** (−15.06)	−1.953 *** (−15.03)	−1.958 *** (−15.24)	1.162 *** (3.971)
SIZE	−0.162 *** (−7.136)	−0.165 *** (−7.097)	−0.164 *** (−7.124)	−0.417 *** (−7.755)
OWNCON * Reform		0.417 *** (4.803)		
STAOWN * REFORM			0.577 *** (4.823)	
REFORM	0.0327 *** (5.243)	−0.00307 (−0.429)	−0.00217 (−0.278)	0.0645 *** (4.724)
Constant	−60.09 *** (−4.917)	11.78 (0.822)	9.963 (0.640)	−119.2 *** (−4.464)
Observations	2340	2340	2340	2340
R-squared	0.283	0.289	0.29	0.085

Robust *t*-statistics in brackets. Values with asterisks ** and *** indicate significance at the 5%, and 1% levels, respectively.

Regarding H2, the coefficient of STAOWN (= −0.390 **) is negative and significant at the 5% level, suggesting that when the proportion of state ownership rises by one unit, the Tobin Q of the enterprise declines by 0.390 units. This finding is consistent with the extensive international evidence in the literature that perceived state ownership has negative influences on corporate performance e.g., [26] in Russia, 93 in Indonesia, [24]. This

finding stresses the idea that significant levels of state ownership are related to ineffective monitoring [96], weak governance, and lower managerial quality [29]. This could increase the agency conflict between owners and management or between large and minority owners [52]. Further, this result agrees with the suggestion that state owners pay more attention to politics than economic goals, which negatively affects the financial performance of the state-owned companies [29,98,99].

Regarding H3 and H4, this research examines the effect of the Chinese 2005 stock split reform on the association between ownership structure (concentrated and state ownership) and firm financial performance. We introduced two interaction terms ($REFORM * OWNCON$ and $REFORM * STAOWN$) to test how the reform shapes the positive impact of ownership concentration on firm financial performance and the negative effects of state ownership on corporate financial performance. Consistent with H3, we find that the coefficient of the interaction ($REFORM * OWNCON$) is positive (0.417 ***) and significant, indicating that the positive relationship between ownership concentration and corporate financial performance has increased following the split-share structure reform. This finding supports the studies that see the economic potential of the stock split reform e.g., [38,46,47]. Further, it supports the few studies in the literature that indicated the possible impacts of the stock split reform on the ownership concentration–firm performance relationship e.g., [39,123]. Further, this finding supports interpreting the association between ownership concentration and firm financial performance to context-specific features and events e.g., [16,20,28] For example, Lepore et al. [20] and Altaf and Shah [16] highlighted the importance of investor protection in understanding the ownership concentration–firm value relationship. Nguyen et al. [28] noted that the positive impact of ownership concentration on firm value is more pronounced in ineffective (rather than well-established) governance structures.

Moreover, our analysis shows that the split-share structure reform also shaped the effect of state ownership on firm financial performance. Table 5 indicates that the coefficient of $REFORM * STAOWN$ is positive (=0.577 ***) and significant at the 1% level, suggesting that the reform has mitigated the negative impact of state ownership on firm financial performance. This positive finding agrees with the literature, indicating that the stock split reform could play a positive role in state-owned enterprises [39]. In particular, Jiang et al. [39] noted that government-owned shares following the stock split could positively influence corporate performance. Further, this finding supports the context-dependent nature of the SO–firm value relationship [6,108,110]. In particular, Borisova et al. [110] and Estrin et al. [108] highlighted the importance of interpreting findings concerning the effectiveness of the country's legal system. Wei and Varela [6] and Hanousek et al. [111] linked the findings of the relationship between SO and firm performance to the value of the recently adopted economic reform (privatization) programs in China and the Czech Republic, respectively.

Hence, collectively, the findings of H3 and H4 imply that the split-share structure reform has improved the quality of CG and, therefore, the performance of Chinese firms, which supports the context-dependence of the governance–firm value relationship [28,66,70,106]. Hence, this finding highlights the importance of understanding and examining the ownership–firm financial performance relationship concerning the company's institutional context see [58,90,91,123–125].

Regarding the control variables, we observed that the SIZE and LEV are significant and negative, suggesting that firm financial performance is negatively related to financial leverage and corporate size. All other control variables are insignificant.

7. Conclusions

This research investigated the association between corporate governance structures (specifically concentrated and state ownership structures) and company financial performance by bringing new and extensive evidence from an emerging market. Further, this research examines the impact of the recent stock split reform in China on the ownership characteristics–firm financial performance relationship. We found that ownership concen-

tration is positively and significantly related to company performance. However, state ownership has a significant negative effect on firm value. Regarding the impact of the stock split reform on the ownership characteristics–firm financial performance relationship, we observed that the stock split reform has a significant and positive impact. In particular, the positive relationship between ownership concentration and corporate financial performance has increased following the split-share structure reform. The negative association between state ownership and corporate financial performance has been mitigated following the split-share structure reform.

This research contributes to the previous studies in some respects. Firstly, it brings evidence from an emerging market where a few studies have been conducted e.g., [17,28,35]. Investigating contexts such as this is important to understand how context specificities (including major economic events such as privatization programs and other economic reform programs) could bring remarkable results concerning the ownership characteristics–firm financial performance relationship see, e.g., [16,20,28,70,107].

Secondly, it contributes to the limited studies on the impact of ownership characteristics on firm financial performance in developing markets such as China, particularly the inconclusive evidence reported in the literature. Although some studies are concerned with concentrated ownership—in China, there was no clear evidence of the impact of ownership concentration on Chinese companies' performance. The same also applies to SO, where variant impacts are also reported, such as Qi et al. [59], Wei et al. [49], Gunasekarage et al. [33] on the negative side, and Sun et al. [41], Tian and Estrin [99], and Le and Buck [36] on the positive side.

Finally, to the best of our knowledge, this study presents newer and more precise evidence on the economic implications of the recent economic events in developing markets, such as the stock split reforms in China, for the companies' performance. The previous studies focused on the financial impact of these events, such as their effects on firm performance [38,46,47]. However, no clear and recent evidence was presented concerning their impacts on the ownership structure–firm financial performance relationship [38,39]. This finding highlights the importance of considering the impacts of the major economic events in the country on the examined relationships, especially the CG–firm financial performance relationship. This study agrees with the idea that the CG–firm performance relationship is not a universal one. Instead, it is dependent on the contextual features and economic environment under examination. This is also evident by the contrasting and unclear results concerning the ownership structures–firm performance relationship reported in the literature. For instance, Filatotchev et al. [17], Liljeblom et al. [26], Aguilera et al. [24], and Cuervo-Cazurra and Li [25] found a negative relationship. In contrast, Wu and Cui [34], Gompers et al. [22], Sami et al. [23], Gaur et al. [21] found positive relationships; and Omran et al. [80], Pham et al. [85], and Yasser and Al Mamun [83] did not report any relationship.

The study presents implications for regulators, investors, and researchers concerned with examining developing markets such as China. Our results imply that the institutional reform of the stock markets in developing countries could benefit the investors through enhancing firm performance. The results suggest that the reform of the stock market could shape the effect of ownership structure on corporate performance in a valuable way for effective capital allocation. In particular, it can reduce the incentive of large shareholders with monitoring power of a company's executives to pursue their interests against other investors. Consequently, it enhances the incentive alignment effect, as large shareholder interests are associated with the firm's performance. Furthermore, our findings imply that the stock market reform could augment the desire of state shareholders to oversee management and ensure they act to maximize shareholders' interests and, therefore, enhance firms' financial performance. Thus, collectively, economic reforms, especially those focusing on the stock market such as the split-share structure reform, can improve the quality of CG, which is pivotal to the progress of the country's economy.

However, despite using ten years of panel data, our study contains far fewer observations prior to the reform than what is considered after the reform due to data availability. Therefore, future research may address a more balanced dataset or, alternatively, examine the long-term impact of the stock split by using recent years.

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References

1. De Carvalho, A.G.; Dal'Bó, F.; Sampaio, J. Determinants of corporate governance practices in Brazil. *Emerg. Mark. Rev.* **2020**, *48*, 100771. [\[CrossRef\]](#)
2. Larcker, D.F.; Ormazabal, G.; Taylor, D.J. The market reaction to corporate governance regulation. *J. Financ. Econ.* **2011**, *101*, 431–448. [\[CrossRef\]](#)
3. Ararat, M.; Claessens, S.; Yurtoglu, B.B. Corporate governance in emerging markets: A selective review and an agenda for future research. *Emerg. Mark. Rev.* **2020**, *48*. [\[CrossRef\]](#)
4. Cheung, Y.L.; Jiang, P.; Limpaphayom, P.; Tong, L.U. Does corporate governance matter in China? *China Econ. Rev.* **2008**, *19*, 460–479. [\[CrossRef\]](#)
5. Cumming, D.; Verdoliva, V.; Zhan, F. New and future research in corporate finance and governance in China and emerging markets. *Emerg. Mark. Rev.* **2021**, *46*, 100792. [\[CrossRef\]](#)
6. Wei, Z.; Varela, O. State equity ownership and firm market performance: Evidence from China's newly privatized firms. *Glob. Financ. J.* **2003**, *14*, 65–82. [\[CrossRef\]](#)
7. Cao, C.; Li, X.; Xia, C. The complicit role of local government authorities in corporate bribery: Evidence from a tax collection reform in China. *China Econ. Rev.* **2021**, *65*, 101578. [\[CrossRef\]](#)
8. Hou, W.; Lee, E. Split Share Structure Reform, corporate governance, and the foreign share discount puzzle in China. *Eur. J. Financ.* **2014**, *20*, 703–727. [\[CrossRef\]](#)
9. Watanabe, M. Holding company risk in China: A final step of state-owned enterprises reform and an emerging problem of corporate governance. *China Econ. Rev.* **2002**, *13*, 373–381. [\[CrossRef\]](#)
10. Boubaker, S.; Labégorre, F. Ownership structure, corporate governance and analyst following: A study of French listed firms. *J. Bank. Financ.* **2008**, *32*, 961–976. [\[CrossRef\]](#)
11. Chen, G.; Firth, M.; Gao, D.N.; Rui, O.M. Ownership structure, corporate governance, and fraud: Evidence from China. *J. Corp. Financ.* **2006**, *12*, 424–448. [\[CrossRef\]](#)
12. Connelly, B.L.; Hoskisson, R.E.; Tihanyi, L.; Certo, S.T. Ownership as a form of corporate governance. *J. Manag. Stud.* **2010**, *47*, 1561–1589. [\[CrossRef\]](#)
13. Ghazali, N.A.M. Ownership structure, corporate governance and corporate performance in Malaysia. *Int. J. Commer. Manag.* **2010**, *20*, 109–119. [\[CrossRef\]](#)
14. Lemmon, M.L.; Lins, K.V. Ownership structure, corporate governance, and firm value: Evidence from the East Asian financial crisis. *J. Financ.* **2003**, *58*, 1445–1468. [\[CrossRef\]](#)
15. Nashier, T.; Gupta, A. Ownership concentration and firm performance in India. *Glob. Bus. Rev.* **2020**. [\[CrossRef\]](#)
16. Altaf, N.; Shah, F.A. Ownership concentration and firm performance in Indian firms: Does investor protection quality matter? *J. Indian Bus. Res.* **2018**, *10*, 33–52. [\[CrossRef\]](#)
17. Filatotchev, I.; Jackson, G.; Nakajima, C. Corporate governance and national institutions: A review and emerging research agenda. *Asia Pac. J. Manag.* **2013**, *30*, 965–986. [\[CrossRef\]](#)
18. Gomes, A. Going public without governance: Managerial reputation effects. *J. Financ.* **2000**, *55*, 615–646. [\[CrossRef\]](#)
19. Heugens, P.P.; Van Essen, M.; van Oosterhout, J.H. Meta-analyzing ownership concentration and firm performance in Asia: Towards a more fine-grained understanding. *Asia Pac. J. Manag.* **2009**, *26*, 481–512. [\[CrossRef\]](#)
20. Lepore, L.; Paolone, F.; Pisano, S.; Alvino, F. A cross-country comparison of the relationship between ownership concentration and firm performance: Does judicial system efficiency matter? *Corp. Gov.* **2017**, *17*, 321–340. [\[CrossRef\]](#)
21. Gaur, S.S.; Bathula, H.; Singh, D. Ownership concentration, board characteristics and firm performance: A contingency framework. *Manag. Decis.* **2015**, *53*, 911–931. [\[CrossRef\]](#)
22. Gompers, P.A.; Ishii, J.L.; Metrick, A. Corporate governance and equity prices. *Q. J. Econ.* **2003**, *118*, 107–155. [\[CrossRef\]](#)

23. Sami, H.; Wang, J.; Zhou, H. Corporate governance and operating performance of Chinese listed firms. *J. Int. Account. Audit. Tax.* **2011**, *20*, 106–114. [\[CrossRef\]](#)
24. Aguilera, R.; Duran, P.; Heugens, P.P.M.A.R.; Sauerwald, S.; Turturea, R.; VanEssen, M. State ownership, political ideology, and firm performance around the world. *J. World Bus.* **2021**, *56*. [\[CrossRef\]](#)
25. Cuervo-Cazurra, A.; Li, C. State ownership and internationalization: The advantage and disadvantage of stateness. *J. World Bus.* **2021**, *56*, 10112. [\[CrossRef\]](#)
26. Liljeblom, E.; Maury, B.; Hörhammer, A. Complex state ownership, competition, and firm performance—Russian evidence. *Int. J. Emerg. Mark.* **2020**, *15*, 189–221. [\[CrossRef\]](#)
27. Nguyen, T.T.M.; Evans, E.; Lu, M. Independent directors, ownership concentration and firm performance in listed companies: Evidence from Vietnam. *Pac. Account. Rev.* **2017**, *29*, 204–226. [\[CrossRef\]](#)
28. Nguyen, T.; Locke, S.; Reddy, K. Ownership concentration and corporate performance from a dynamic perspective: Does national governance quality matter? *Int. Rev. Financ. Anal.* **2015**, *41*, 148–161. [\[CrossRef\]](#)
29. Conyon, M.J.; He, L. Executive compensation and corporate governance in China. *J. Corp. Financ.* **2011**, *17*, 1158–1175. [\[CrossRef\]](#)
30. Buck, T.W.; Liu, X.; Skovoroda, R. Top executive pay and firm performance in China. *J. Int. Bus. Stud.* **2008**, *39*, 833–850. [\[CrossRef\]](#)
31. Green, S.; Liu, S.G. *Exit the Dragon? Privatization and State Control in China*; Chatham House, Blackwell: London, UK, 2005.
32. Park, S.H.; Luo, Y. Guanxi and organizational dynamics: Organizational networking in Chinese firms. *Strateg. Manag. J.* **2001**, *22*, 455–477. [\[CrossRef\]](#)
33. Gunasekarage, A.; Hess, K.; Hu, A.J. The influence of the degree of state ownership and the ownership concentration on the performance of listed Chinese companies. *Res. Int. Bus. Financ.* **2007**, *21*, 379–395. [\[CrossRef\]](#)
34. Wu, S.; Cui, H. *Consequences of the Concentrated Ownership Structure in Mainland China—Evidence of Year 2000*; Working Paper; City University of Hong Kong: Hong Kong, China, 2002.
35. Balsmeier, B.; Czarnitzki, D. Ownership concentration, institutional development and firm performance in Central and Eastern Europe. *Manag. Decis. Econ.* **2017**, *38*, 178–192. [\[CrossRef\]](#)
36. Le, T.V.; Buck, T. State ownership and listed firm performance: A universally negative governance relationship? *J. Manag. Gov.* **2011**, *15*, 227–248. [\[CrossRef\]](#)
37. Shao, L. Dynamic study of corporate governance structure and firm performance in China: Evidence from 2001–2015. *Chin. Manag. Stud.* **2019**, *13*, 299–317. [\[CrossRef\]](#)
38. Beltratti, A.; Bortolotti, B.; Caccavaio, M. The stock market reaction to the 2005 split share structure reform in China. *Pac. Basin Financ. J.* **2012**, *20*, 543–560. [\[CrossRef\]](#)
39. Jiang, B.B.; Laurenceson, J.; Tang, K.K. Share reform and the performance of China’s listed companies. *China Econ. Rev.* **2008**, *19*, 489–501. [\[CrossRef\]](#)
40. Hovey, M.; Naughton, T. A survey of enterprise reforms in China: The way forward. *Econ. Syst.* **2007**, *31*, 138–156. [\[CrossRef\]](#)
41. Sun, Q.; Tong, W.H.; Tong, J. How does government ownership affect firm performance? Evidence from China’s privatization experience. *J. Bus. Financ. Account.* **2002**, *29*, 1–27. [\[CrossRef\]](#)
42. Choi, J.J.; Sami, H.; Zhou, H. The impacts of state ownership on information asymmetry: Evidence from an emerging market. *China J. Account. Res.* **2010**, *3*, 13–50. [\[CrossRef\]](#)
43. Liao, L.; Liu, B.; Wang, H. Information discovery in share lockups: Evidence from the split-share structure reform in China. *Financ. Manag.* **2011**, *40*, 1001–1027. [\[CrossRef\]](#)
44. Allen, F.; Qian, J.; Qian, M. Law, finance, and economic growth in China. *J. Financ. Econ.* **2005**, *77*, 57–116. [\[CrossRef\]](#)
45. Liao, L.; Shen, H.B.; Li, J.L. An Empirical Study of the Split-share Structure Reform and Corporate Governance. *China Ind. Econ.* **2008**, *5*, 99–108.
46. Liao, L.; Liu, B.; Wang, H. China’s secondary privatization: Perspectives from the split-share structure reform. *J. Financ. Econ.* **2014**, *113*, 500–518. [\[CrossRef\]](#)
47. Sun, J.; Yuan, R.; Cao, F.; Wang, B. Principal–principal agency problems and stock price crash risk: Evidence from the split-share structure reform in China. *Corp. Gov. Int. Rev.* **2017**, *25*, 186–199. [\[CrossRef\]](#)
48. Jingu, T. Corporate governance for listed companies in China—recent moves to improve the quality of listed companies. *Nomura Cap. Mark. Rev.* **2007**, *10*, 36–52.
49. Wei, Z.; Xie, F.; Zhang, S. Ownership structure and firm value in China’s privatized firms: 1991–2001. *J. Financ. Quant. Anal.* **2005**, *40*, 87–108. [\[CrossRef\]](#)
50. Eisenhardt, K.M. Agency theory: An assessment and review. *Acad. Manag. Rev.* **1989**, *14*, 57–74. [\[CrossRef\]](#)
51. Jensen, M.C.; Meckling, W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [\[CrossRef\]](#)
52. Maury, B.; Pajuste, A. Multiple large shareholders and firm value. *J. Bank. Financ.* **2005**, *29*, 1813–1834. [\[CrossRef\]](#)
53. Young, M.N.; Peng, M.W.; Ahlstrom, D.; Bruton, G.D.; Jiang, Y. Corporate governance in emerging economies: A review of the principal–principal perspective. *J. Manag. Stud.* **2008**, *45*, 196–220. [\[CrossRef\]](#)
54. Maug, E. Large shareholders as monitors: Is there a trade-off between liquidity and control? *J. Financ.* **1998**, *53*, 65–98. [\[CrossRef\]](#)
55. Chen, X.C.; Yur-Austin, J. Re-measuring agency costs: The effectiveness of blockholders. *Q. Rev. Econ. Financ.* **2007**, *47*, 588–601. [\[CrossRef\]](#)
56. Fama, E.F.; Jensen, M.C. Agency problems and residual claims. *J. Law Econ.* **1983**, *26*, 327–349. [\[CrossRef\]](#)

57. Okhmatovskiy, I. Performance implications of ties to the government and SOEs: A political embeddedness perspective. *J. Manag. Stud.* **2010**, *47*, 1020–1047. [[CrossRef](#)]
58. Musacchio, A.; Lazzarini, S.G. State-owned enterprises as multinationals: Theory and research directions. In *State-Owned Multinationals*; Palgrave Macmillan: Cham, Switzerland, 2018; pp. 255–276.
59. Qi, D.; Wu, W.; Zhang, H. Shareholding structure and corporate performance of partially privatized firms: Evidence from listed Chinese companies. *Pac. Basin Financ. J.* **2000**, *8*, 587–610. [[CrossRef](#)]
60. Zhang, W. China's SOE reform: A corporate governance perspective. *Corp. Ownersh. Control* **2006**, *3*, 132–150. [[CrossRef](#)]
61. Lazzarini, S.G.; Musacchio, A. State ownership reinvented? Explaining performance differences between state-owned and private firms. *Corp. Gov. Int. Rev.* **2018**, *26*, 255–272. [[CrossRef](#)]
62. Shleifer, A.; Vishny, R.W. *The Grabbing Hand: Government Pathologies and Their Cures*; Harvard University Press: Cambridge, MA, USA, 1998.
63. Guriev, S.; Rachinsky, A. The Role of Oligarchs in Russian Capitalism. *J. Econ. Perspect.* **2005**, *19*, 131–150. [[CrossRef](#)]
64. Dobija, D. Exploring audit committee practices: Oversight of financial reporting and external auditors in Poland. *J. Manag. Gov.* **2015**, *19*, 113–143. [[CrossRef](#)]
65. Agrawal, A.; Mandelker, G.N. Large shareholders and the monitoring of managers: The case of antitakeover charter amendments. *J. Financ. Quant. Anal.* **1990**, *252*, 143–161. [[CrossRef](#)]
66. Shleifer, A.; Vishny, R.W. A survey of corporate governance. *J. Financ.* **1997**, *52*, 737–783. [[CrossRef](#)]
67. McConnell, J.J.; Servaes, H. Additional evidence on equity ownership and corporate value. *J. Financ. Econ.* **1990**, *27*, 595–612. [[CrossRef](#)]
68. Murtinu, S. Debt maturity, ownership concentration, and firm efficiency. *Econ. Bull.* **2015**, *35*, 2610–2616. [[CrossRef](#)]
69. Joh, S.W. Corporate governance and firm profitability: Evidence from Korea before the economic crisis. *J. Financ. Econ.* **2003**, *68*, 287–322. [[CrossRef](#)]
70. Omran, M. Post-privatization corporate governance and firm performance: The role of private ownership concentration, identity and board composition. *J. Comp. Econ.* **2009**, *37*, 658–673. [[CrossRef](#)]
71. Waheed, A.; Malik, Q.A. Board characteristics, ownership concentration and firms' performance: A contingent theoretical based approach. *South Asian J. Bus. Stud.* **2019**, *8*, 146–165. [[CrossRef](#)]
72. Burkart, M.; Panunzi, F.; Shleifer, A. Family firms. *J. Financ.* **2003**, *58*, 2167–2201. [[CrossRef](#)]
73. Ma, S.; Naughton, T.; Tian, G.G. Ownership and ownership concentration: Which is important in determining the performance of China's listed firms? *Account. Financ.* **2010**, *50*, 871–897. [[CrossRef](#)]
74. Leech, D.; Leahy, J. Ownership structure, control type classifications and the performance of large British companies. *Econ. J.* **1991**, *101*, 1418–1437. [[CrossRef](#)]
75. Mudambi, R.; Nicosia, C. Ownership structure and firm performance: Evidence from the UK financial services industry. *Appl. Financ. Econ.* **1998**, *8*, 175–180. [[CrossRef](#)]
76. Holderness, C.G.; Kroszner, R.S.; Sheehan, D.P. Were the good old days that good? Changes in managerial stock ownership since the great depression. *J. Financ.* **1999**, *54*, 435–469. [[CrossRef](#)]
77. Aboud, A.; Diab, A. The financial and market consequences of environmental, social and governance ratings: The implications of recent political volatility in Egypt. *Sustain. Account. Manag. Policy J.* **2019**, *10*, 498–520. [[CrossRef](#)]
78. Morck, R.; Shleifer, A.; Vishny, R.W. Management ownership and market valuation: An empirical analysis. *J. Financ. Econ.* **1988**, *20*, 293–315. [[CrossRef](#)]
79. Selarka, E. Ownership concentration and firm value: A study from the Indian corporate sector. *Emerg. Mark. Financ. Trade* **2005**, *41*, 83–108. [[CrossRef](#)]
80. Omran, M.M.; Bolbol, A.; Fatheldin, A. Corporate governance and firm performance in Arab equity markets: Does ownership concentration matter? *Int. Rev. Law Econ.* **2008**, *28*, 32–45. [[CrossRef](#)]
81. Demsetz, H.; Lehn, K. The structure of corporate ownership: Causes and consequences. *J. Political Econ.* **1985**, *93*, 1155–1177. [[CrossRef](#)]
82. Agrawal, A.; Knoeber, C.R. Firm performance and mechanisms to control agency problems between managers and shareholders. *J. Financ. Quant. Anal.* **1996**, *31*, 377–397. [[CrossRef](#)]
83. Yasser, Q.R.; Mamun, A.A. Effects of ownership concentration on firm performance: Pakistani evidence. *J. Asia Bus. Stud.* **2015**, *9*, 162–176. [[CrossRef](#)]
84. Himmelberg, C.P.; Hubbard, R.G.; Palia, D. Understanding the determinants of managerial ownership and the link between ownership and performance. *J. Financ. Econ.* **1999**, *53*, 353–384. [[CrossRef](#)]
85. Pham, P.K.; Suchard, J.A.; Zein, J. Corporate governance and alternative performance measures: Evidence from Australian firms. *Aust. J. Manag.* **2011**, *36*, 371–386. [[CrossRef](#)]
86. Xu, X.; Wang, Y. *Ownership Structure, Corporate Governance, and Corporate Performance: The Case of Chinese Stock Companies*; World Bank Publications: Washington, DC, USA, 1997; Volume 1794.
87. Tian, L. *Government Shareholding and the Value of China's Modern Firms*; Working Paper; London Business School: London, UK, 2002. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=299936 (accessed on 20 September 2021).
88. Ding, Y.; Zhang, H.; Zhang, J. Private vs state ownership and earnings management: Evidence from Chinese listed companies. *Corp. Gov. Int. Rev.* **2007**, *15*, 223–238. [[CrossRef](#)]

89. Vanteeva, N.; Hickson, C. The effect of state-private co-partnership system on Russian industry. *Rev. Ind. Organ.* **2016**, *48*, 333–356. [[CrossRef](#)]
90. Xin, W.Z. The impact of ownership structure and capital structure on financial performance of Vietnamese firms. *Int. Bus. Res.* **2014**, *7*, 64.
91. Musallam, S.R.M. State ownership and firm value: Simultaneous analyses approach. *J. Asia Bus. Stud.* **2020**, *14*, 50–61. [[CrossRef](#)]
92. Boardman, A.E.; Vining, A.R. Ownership and performance in competitive environments: A comparison of the performance of private, mixed, and state-owned enterprises. *J. Law Econ.* **1989**, *32*, 1–33. [[CrossRef](#)]
93. Dewenter, K.L.; Malatesta, P.H. State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *Am. Econ. Rev.* **2001**, *91*, 320–334. [[CrossRef](#)]
94. Grosman, A.; Aguilera, R.V.; Wright, M. Lost in translation? Corporate governance, independent boards and blockholder appropriation. *J. World Bus.* **2019**, *54*, 258–272. [[CrossRef](#)]
95. Inoue, C.F.; Lazzarini, S.G.; Musacchio, A. Leviathan as a minority shareholder: Firm-level implications of state equity purchases. *Acad. Manag. J.* **2013**, *56*, 1775–1801. [[CrossRef](#)]
96. Dharwadkar, B.; George, G.; Brandes, P. Privatization in emerging economies: An agency theory perspective. *Acad. Manag. Rev.* **2000**, *25*, 650–669. [[CrossRef](#)]
97. Tihanyi, L.; Aguilera, R.V.; Heugens, P.; van Essen, M.; Sauerwald, S.; Duran, P.; Turtorea, R. State ownership and political connections. *J. Manag.* **2019**, *45*, 2293–2321. [[CrossRef](#)]
98. Boycko, M.; Shleifer, A.; Vishny, R.W. A theory of privatisation. *Econ. J.* **1996**, *106*, 309–319. [[CrossRef](#)]
99. Djankov, S.; Murrell, P. Enterprise restructuring in transition: A quantitative survey. *J. Econ. Lit.* **2002**, *40*, 739–792. [[CrossRef](#)]
100. Zhang, C. *How Much Do State-Owned Enterprises Contribute to China's GDP and Employment?* World Bank: Washington, DC, USA, 2019. Available online: <https://openknowledge.worldbank.org/handle/10986/32306> (accessed on 5 June 2022).
101. Xu, X.; Wang, Y. Ownership structure and corporate governance in Chinese stock companies. *China Econ. Rev.* **1999**, *10*, 75–98. [[CrossRef](#)]
102. Tian, L.; Estrin, S. *Retained State Shareholding in Chinese PLCs: Does Government Ownership Reduce Corporate Value?* Working Paper 750; William Davidson Institute: Ann Arbor, MI, USA, 2005.
103. Liu, Y.; Miletkov, M.K.; Wei, Z.; Yang, T. Board independence and firm performance in China. *J. Corp. Financ.* **2015**, *30*, 223–244. [[CrossRef](#)]
104. Liu, L.; Qu, W.; Haman, J. Product market competition, state-ownership, corporate governance and firm performance. *Asian Rev. Account.* **2018**, *26*, 62–83. [[CrossRef](#)]
105. Zhou, K.Z.; Gao, G.Y.; Zhao, H. State ownership and firm innovation in China: An integrated view of institutional and efficiency logics. *Adm. Sci. Q.* **2017**, *62*, 375–404. [[CrossRef](#)]
106. Porta, R.L.; Lopez-de-Silanes, F.; Shleifer, A.; Vishny, R.W. Law and finance. *J. Political Econ.* **1998**, *106*, 1113–1155. [[CrossRef](#)]
107. Chen, Z.; Cheung, Y.L.; Stouraitis, A.; Wong, A.W. Ownership concentration, firm performance, and dividend policy in Hong Kong. *Pac. Basin Financ. J.* **2005**, *13*, 431–449. [[CrossRef](#)]
108. Estrin, S.; Meyer, K.E.; Nielsen, B.B.; Nielsen, S. Home country institutions and the internationalization of state owned enterprises: A cross-country analysis. *J. World Bus.* **2016**, *51*, 294–307. [[CrossRef](#)]
109. Clegg, L.J.; Voss, H.; Tardios, J.A. The autocratic advantage: Internationalization of state-owned multinationals. *J. World Bus.* **2018**, *53*, 668–681. [[CrossRef](#)]
110. Borisova, G.; Brockman, P.; Salas, J.M.; Zagorchev, A. Government ownership and corporate governance: Evidence from the EU. *J. Bank. Financ.* **2012**, *36*, 2917–2934. [[CrossRef](#)]
111. Hanousek, J.; Kočenda, E.; Svejnar, J. Origin and concentration: Corporate ownership, control and performance in firms after privatization. *Econ. Transit.* **2007**, *15*, 1–31. [[CrossRef](#)]
112. Muller, K.M.I.; Wang, L.; Wu, J. Board structure: An empirical study of firms in Anglo-American governance environments. *Manag. Financ.* **2014**, *40*, 681–699.
113. Del Bo, C.D.; Ferraris, M.; Florio, M. Governments in the market for corporate control: Evidence from M&A deals involving state-owned enterprises. *J. Comp. Econ.* **2017**, *45*, 89–109.
114. Shan, Y.G.; McIver, R.P. Corporate governance mechanisms and financial performance in China: Panel data evidence on listed non-financial companies. *Asia Pac. Bus. Rev.* **2011**, *17*, 301–324. [[CrossRef](#)]
115. Singh, S.; Tabassum, N.; Darwish, T.K.; Batsakis, G. Corporate Governance and Tobin's Q as a Measure of Organizational Performance. *Br. J. Manag.* **2017**, *29*, 171–190. [[CrossRef](#)]
116. Liu, Y.; Wei, Z.; Xie, F. Do women directors improve firm performance in China? *J. Corp. Financ.* **2014**, *28*, 169–184. [[CrossRef](#)]
117. Nguyen, T.; Locke, S.; Reddy, K. A dynamic estimation of governance structures and financial performance for Singaporean companies. *Econ. Model.* **2014**, *40*, 1–11. [[CrossRef](#)]
118. Darko, J.; Aribi, Z.A.; Uzonwanne, G.C. Corporate governance: The impact of director and board structure, ownership structure and corporate control on the performance of listed companies on the Ghana stock exchange. *Corp. Gov. Int. J. Bus. Soc.* **2016**, *16*, 259–277. [[CrossRef](#)]
119. Gorton, G.; Schmid, F.A. Universal banking and the performance of German firms. *J. Financ. Econ.* **2000**, *58*, 29–80. [[CrossRef](#)]
120. Farag, H.; Mallin, C. Monitoring corporate boards: Evidence from China. *Eur. J. Financ.* **2019**, *25*, 524–549. [[CrossRef](#)]

121. Bruton, G.D.; Peng, M.W.; Ahlstrom, D.; Stan, C.; Xu, K. State-owned enterprises around the world as hybrid organizations. *Acad. Manag. Perspect.* **2015**, *29*, 92–114. [[CrossRef](#)]
122. Aboud, A.; Diab, A. The impact of social, environmental and corporate governance disclosures on firm value: Evidence from Egypt. *J. Account. Emerg. Econ.* **2018**, *8*, 442–458. [[CrossRef](#)]
123. Wanke, P.; Skully, M.; Wijesiri, M.; Walker, T.; dalla Pellegrina, L. Does ownership structure affect firm performance? Evidence of Indian bank efficiency before and after the Global Financial Crisis. *Int. Trans. Oper. Res.* **2022**, *29*, 1842–1867. [[CrossRef](#)]
124. Lehmann, E.; Weigand, J. Does the governed corporation perform better? Governance structures and corporate performance in Germany. *Eur. Financ. Rev.* **2000**, *4*, 157–195. [[CrossRef](#)]
125. Grosman, A.; Wright, M.; Okhmatovskiy, I. State control and corporate governance in transition economies: 25 years on from 1989. *Corp. Gov.* **2016**, *24*, 200–221. [[CrossRef](#)]

Article

ESG Disclosure and the Cost of Capital: Is There a Ratcheting Effect over Time?

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Abstract: In recent years, the CSR disclosure–firm risk relationship has raised the acute interest of capital providers, regulators, debtholders, and academic researchers. In addition to the mounting corporate social responsibility (CSR) disclosure issues, one particular area that has increasingly attracted the attention of academics, practitioners, and policymakers is the dynamic of CSR disclosure. The effects of institutional pressures and the relative nature of reputation have amplified expectations over time, resulting in a dynamic CSR disclosure strategy to meet those expectations. However, studies on the relationship between CSR disclosure and firm risk over time are still in their premature stages. Thus, this paper seeks to contribute to the literature on firm risk and CSR disclosure by examining the effect of ESG disclosure on the cost of capital over time. The study examines a sample of 430 S&P 500 US firms observed over the 2011 to 2019 period. Our results indicate that the three dimensions do not have the same effect. Governance disclosure decreases the cost of capital during the first years, and in later years, the effect becomes positive. Over time, social disclosure increases the cost of capital. However, environmental disclosure shows a negative and significant effect on the cost of capital during the first years but no significant effect later in time. Our results contribute to explaining the dynamic effect of CSR disclosure. A predominant feature to consider is the evolution of CSR disclosure over time. Steadily, US firms are moving away from some CSR disclosure activities to others. However, firms that abandoned some existing CSR disclosure commitments may face aggressive responses from stakeholders. US firms have to be more cautious when linking CSR disclosure to firm risk over time, recognizing the long-term benefits and drawbacks of CSR disclosure.

Keywords: cost of capital; ESG disclosure; firm risk

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1. Introduction

Corporate responsibilities have evolved over time as companies themselves have changed. Before, the environment was very stable, whereas today, companies are facing much more dynamic situations requiring greater maturity to face them. As far as corporate responsibility issues are concerned, the public (society) expects more, and companies themselves give more. Companies are forced to adjust their CSR practices to face these issues [1]. This brings us back to the dynamics of CSR and refers to the earliest discussions of CSR in that “social responsibility is a moving target” [2], p. 6. Subsequently, a stream of research has supported this idea and described CSR as an “unstable arena of exploration” [3], “much different than it was five or ten years ago” [4], and “in constant flux” [5]. However, what was considered “good” CSR behavior three years ago may no longer be acceptable today [6], p. 102. Since decision making is closely linked to the needs of stakeholders, CSR disclosure helps to meet those needs. Firms disclose reports on CSR practices and try to establish more convenient and meaningful relationships with stakeholders to integrate them into the information transparency process and by doing so they take into consideration their interests.

More specifically, environmental, social, and governance (ESG) reporting is a consequence of CSR activities [7,8]. ESG disclosure addresses many issues that bear on environmental dimensions such as energy, water, pollution, emissions, waste, and emissions waste; social dimensions such as social equity, consumer safety, human rights, gender policies, products, and their impact on communities; and governance dimensions such as board structure and function and executive compensation. ESG disclosure provides a holistic view of the business and therefore mitigates information asymmetries. Over time, some companies have moved away from some CSR disclosure activities to others [9]. It is clear that CSR disclosure items are changing in response to research findings, regulatory constraints, and changing corporate values [1,10,11]. Thus, we argue that ESG reporting is also dynamic over time [1]. Given the dynamic nature of CSR disclosure, it is not very surprising that some companies do not make the best long-term decisions for two main reasons. *First*, companies that abandoned some existing CSR disclosure commitments face aggressive responses from stakeholders [12]; *Second*, CSR topics are also dynamic [13]. In some cases, legal behavior may be considered ethical behavior (such as environmental disclosure), leading to the risk of being overtaken by competitors when legal standards change.

Despite the emphasis on ESG disclosure, scholars have yet to reach a consensus on its financial value, considering its dynamic nature. From a corporate point of view, ESG reporting is a fundamental mechanism that is likely to enhance firm value, providing accountability to stakeholders but also increasing reputational benefits [10,14,15]. However, as stakeholder expectations on environmental, social, and governance issues are constantly evolving, managers need to be aligned with these expectations through their CSR disclosure policies to maintain their legitimacy and reputation and therefore to manage firm risk [16,17]. Firm risk can be approximated by the cost of capital, the main point of interest in any investment decision made by both investors and firms. Nevertheless, previous studies have not addressed this issue under a dynamic approach. Bearing on this approach, it is therefore interesting to examine the relationship between CSR disclosure and the cost of capital. Thus, managers are encouraged to align their CSR disclosure activities with core values and competencies and to be aware of the expectations of key stakeholders (especially debtholders and equity capital providers) to reduce firm risk. In this study, we argue that the focus on the role of CSR disclosure has resulted in a slow ratchet effect over time that may affect firm risk.

Some studies (e.g., [18]) have shown that a favorable overall ESG score decreases firm risk. For the separate effect of each CSR disclosure attribute, other studies [19,20] have shown that good disclosure policy about environmental, social, and governance issues reduces firm risk. In this line of thought, Suto and Takehara [21] conducted their study on Japanese-listed companies and called for a more empirical examination of this relationship. Moreover, the growing topic of dynamic CSR disclosure raises questions about its role in reducing firm risk. Thus, this paper is motivated by a lack of research that examined this topic under a dynamic approach. A predominant feature to consider in this study is the evolution of CSR disclosure over time. We then suggest that the relationship between firm risk and ESG reporting should consider the dynamics of the latter. Our study therefore tries to contribute to the previous literature.

Thus, the following question is formulated: Is the effect of ESG disclosure on the company's economic risk the same in the short term as in the long term?

Our paper differs from previous studies at several important levels. *First*, whereas most of the previous research on CSR disclosure has focused on an overall index of reporting, our paper focuses on CSR disclosure dimensions (environment, social, and governance) separately to check which dimension is the most relevant for reducing the cost of capital. *Second*, we argue that CSR reporting may intrinsically affect firm risk differently in the short than in the long run. *Finally*, by crossing CSR disclosure dimensions and time horizons, we test if these three dimensions may intrinsically affect firm risk differently in the short run than in the long run.

Under this perspective, few studies have shown that CSR disclosure is often dynamic. One most relevant study pursuing this line of research is that of [22]. Studying analysts' perceptions of risk in CSR reporting, Ioannou and Serafeim [22] adopted a dynamic approach. They estimated a model on different windows of years to detect how the relationship changes over time. Their estimation shows that analysts' unfavorable reactions to CSR scores fade over time, becoming favorable. Thus, their study shed light on the moderating effect of time. Their results are meaningful for our study.

We build on [22]'s study to check the effect of ESG disclosure on the cost of capital. More specifically, we assume that it takes time for the responsiveness of key stakeholders (equity capital providers and debtholders) to translate into lower levels of risk resulting in lower costs of capital. More explicitly, corporate CSR disclosure must be reviewed consistently over time to achieve its benefits through lower risk.

Our contribution goes beyond [22] in at least four ways: (1) Whereas the study of [22] was carried out also in a US context, our study period is different. Ref. [22] examined a large sample of publicly traded US firms during the period stretching from 1993 to 2007, whereas in our study we focus on a more recent period (2011 to 2019). The economic, environmental, and regulatory contexts present many dissimilarities between the two periods. Economic development, institutional environments, and corporate environmental practices are different during these two periods, leading to different CSR disclosure behavior. (2) In addition to the agency and stakeholder perspectives considered by [22] to hypothesize and discuss the dynamic of CSR, the legitimacy and signaling approaches are used in this study to investigate the effect of the evolution of CSR disclosure overtime on firm risk. (3) The CSR scores of [22] are provided by KLD. This paper, however, builds up ESG disclosure scores obtained from the Bloomberg database. In doing so, we take into account the recent debate about the careful use of the KLD database, as it aggregates strengths and concerns across dimensions to generate a composite CSP score that muddies our understanding of firms' social practices, as firms can present strengths and concerns simultaneously (Oikonomou, Brooks and Pavelin, 2014). (4) A composite measure of CSR is considered in the [22] study to test its dynamic effect. In the current study, we make some interesting contributions with our breakdown design that considers the three dimensions of CSR disclosure to test which dimension has a larger dynamic effect.

Therefore, our study examines 430 US firms listed on the S&P 500 index and observed during the 2011 to 2019 period.

The remainder of this paper is structured as follows. In the following section, we present our theoretical framework and develop the main hypotheses. In Section 3, we describe our data, define our variables, and present our methodology. In Section 4, we discuss our results, and in Section 5, we conclude.

2. Theoretical Framework: The Impact of ESG Disclosure on Firm Risk

As we examine firm risk, it would be relevant to discuss its link with capital structure. The tradeoff between debt cost and equity cost is therefore relevant. At this level, it is worth mentioning that the interest rate is the basis for calculating the cost of capital. Then, it will be useful for a firm to consider the effect of interest rate on some key financial metrics such as the economic value added [23] and the net present value [24]. These two metrics are widely affected by the interest rate and affect consequently the cost of capital. Moreover, solving the win-win puzzle is important when dealing with ESG disclosure. In attempting to solve the win-win puzzle, CEOs have to answer the question of what opportunities and threats are involved in ESG disclosure [25]. A cost-benefit analysis calculating the expected net present value of the future cash flow and the effect on the economic value added would likely be appropriate in making this decision [26,27]. Thus, the economic value added and the net present value as financial metrics fit well when dealing with the firm risk and ESG disclosure.

Research on the CSR disclosure–firm risk nexus has recently received considerable attention from finance and management practitioners [28,29]. Nowadays, companies do

not have to focus exclusively on maximizing wealth for shareholders, but they also should take into consideration the well-being of all stakeholders to avoid external pressure. CSR disclosure has therefore superseded its role as an indicator of a company's commitment to environmental, social, and governance issues to gain investors' trust. The aim is to reduce uncertainty and firm risk. The new wave of corporate sustainability awareness allowed investors to question which CSR disclosure attributes have the most impactful effect on firm risk. According to the risk mitigation view, initiatives enhancing CSR disclosure reduce firm risk.

Previous studies [30] have shown that CSR disclosure became a signaling tool for investors and acted as a transparency mechanism to diminish information asymmetry. Therefore, CSR has relevant implications for the equity and bond markets.

For the equity market, motivated by firms' CSR disclosure, investors engage in a favorable evaluation of the financial market [31]. More specifically, a high level of CSR disclosure leads to a higher level of firm value, profitability, growth, and sales from one side and lower idiosyncratic risk from another side [32]. In this line of thought, ESG disclosure is well perceived by investors as a sign of a good reputation in the equity market, inducing lower risk or perceived risk by investors, reducing the firm's actual financial risk [33].

For the bond market, firms with higher CSR disclosure are rewarded with lower bank costs [34–36] since it is negatively associated with information asymmetry [37]. Moreover, CSR disclosure positively correlates with credit ratings [38]. Accordingly, CSR reporting can significantly reduce perceived financial distress and consequently improve credit ratings.

Litigation risks are another form of risk that firms could lessen through CSR disclosure. Firms with a high CSR disclosure policy face lower total risk, consisting of both market risk and firm-specific risk, caused by low sensitivity to governmental sanctions [39]. Banks would also want to lend money to a firm having higher CSR disclosure since it is negatively associated with information asymmetry.

According to the above arguments, CSR disclosure as a risk mitigator closely relates to the cost of capital. However, today, CSR disclosure is becoming institutionalized with its own rules, norms, and beliefs about what companies should or should not disclose. This is happening at three levels: at the organizational level, across sectors, and organizational domains [40]. Reciprocal and reinforcing effects can be observed at each of these levels. Both the industry and the organizational domains can influence firms. Moreover, as firms evolve, their activities have consequences on the rules, norms, and beliefs of the industry and organizational domains to which they belong [40]. We argue that a dynamic process occurs in the CSR disclosure activities of companies to maintain a reputation at this level which in turn affects the level of corporate risk differently. Furthermore, the positioning of the company against its competitors has led to a slow ratchet effect. The actions of other companies lead to a gradual raising of company expectations over time, resulting in "CSR creep". Companies can no longer stagnate in terms of CSR disclosure, especially since it is seen as a means to guarantee their legitimacy [41]. Finally, the global drivers of CSR (like environmental conditions, socio-cultural issues, technology users, and political rights) are highly relevant to explaining the dynamics of CSR disclosure [42]. These drivers change over time because of the nature of the behavior (active or passive) of leaders and the power structure in society. This leads us to believe that there is no status quo for CSR disclosure.

2.1. Environmental Disclosure and Firm Risk

Environmental disclosure reports on many issues related to the company's impact on its natural living and non-living environment (including air, land, and water). It addresses many issues representing a company's commitment and effectiveness towards reducing environmental emissions, supporting research and development of eco-efficient products or services, and achieving an efficient use of natural resources in its production process [43]. Firms with good environmental disclosure policies tend to reduce the probability of lawsuits against them from regulators or NGOs and support fewer ecological fines and litigation

costs. These saved funds would be strategically converted into potential investment opportunities [44].

First, Freeman [45] states that through CSR commitment, firms might assimilate economic achievements with social, environmental, and ethical commitments. Stakeholder theory encourages environmental disclosure, since by addressing issues about, for example, CO₂ emissions, the amount of waste, the use of nuclear energy, the amount of environmental R&D expenditures, total water withdrawal, and environmental supply chain, firms would build long-term trust with all their stakeholders, which would help in creating a basis for a sustainable business model and an environment where companies would be ethical and profitably evolve with fewer conflicts of interest between stakeholders. In addition, with greater compliance to environmental regulations and the credibility of the reporting mechanisms, firms would enhance their stakeholders' engagement and reduce the information asymmetry and ultimately agency costs. Therefore, and bearing on stakeholder theory, environmental disclosure is associated with a convenient and meaningful way with which firms develop their relationships with different groups of stakeholders, which contributes to reducing their risk [45,46].

Second, based on signaling theory, several companies have decided to report environmental information to receive good reactions from investors who perceive this engagement as a "good signal". In this line of thought, much environmental information can be hidden by firms (such as CO₂ emissions, energy consumption, and energy efficiency policy) to avoid the negative reactions of investors. Therefore, and according to signaling theory, there are different measures to be taken to reduce information opacity. These actions could take the form of a premium that the agent would offer to the company to disclose hidden attributes through signals. In this regard, firms with good environmental disclosure policies would use reports to convey a positive signal and act as "good citizens" [47]. Credibility and inimitability attributes stated in signaling theory have a fundamental role in considering environmental disclosure as a signaling tool since firms would benefit from a positive valuation from all stakeholders. Meanwhile, firms with poor environmental disclosure policies would be punished by their stakeholders. The latter would support more social and fiduciary costs and consequently access to capital is more expensive and therefore the cost of capital is high.

As for legitimacy theory, good environmental disclosure provides a favorable opportunity for companies facing global campaigns criticizing their operations. Therefore, environmental disclosure may be perceived as a mechanism for repairing or maintaining legitimacy, which in return will increase profitability in the long run and reduce firm risk [25].

However, from an opposite point of view, the extent of the disclosure may vary depending on society's perception of companies' products (non-sinful or sinful such as tobacco and alcohol) [48]. In this line of thought, facing environmental scrutiny, "sinful" companies (persecuted companies) tend to increase their environmental disclosure by reporting positive information about their environmental engagements to offset the negative consequences of the scrutiny [49]. In this regard, managers may use environmental disclosure as a cover tool to hide their unethical reporting activities or to respond to their narcissistic behavior [50].

Environmental disclosure in this case does not satisfy stakeholders, thus increasing firm risk and subsequently the cost of capital. This argument is attributed to the authors of [51,52], who argued that engaging in CSR activities would be a threat to the foundations of a free society. Social disclosure and especially environmental issues should be dealt with by the government. This highlights the divergence between both shareholder theory and environmental disclosure objectives.

Finally, the effect of regulatory pressures and the role of image tend to amplify expectations about environmental disclosure over time, resulting in a dynamic environmental disclosure strategy to meet those expectations.

Hypothesis 1a (H1a). *Over time, corporate environmental disclosure increases the cost of capital.*

Hypothesis 1b (H1b). *Over time, corporate environmental disclosure decreases the cost of capital.*

2.2. Social Disclosure and Firm Risk

Social disclosure represents “a company’s capacity to generate trust and loyalty with its workforce, customers, and society [. . .]. It is a reflection of the company’s reputation and the health of its license to operate” [43]. Social disclosure refers to customer safety, the preservation of human rights, the maintenance of diversity and equal opportunity in the workforce, high-quality working conditions, a healthy and safe workplace, and training and development opportunities [8]. However, social disclosure does not respond to companies’ moral obligations to report about this issue but to companies’ concerns with sustainability. Social disclosure has become a judgmental criterion used by investors to foresee companies’ prospects.

According to stakeholder theory, social disclosure remains a fundamental asset in increasing firm competitiveness, since internal and external stakeholders have direct relationships with firms, through social engagement. It enables the better anticipation of firms’ overall risk and allows businesses to take advantage of the variability of social expectations. Thus, the social disclosure of key factors, such as employee well-being and enriched relationships with the community and especially between the firm and its capital providers, can lead lending institutions and shareholders to better appreciate firm value, building a long-term trust between these parties [53]. This would result in a low cost of capital. Consequently, firms improving such relationships with their capital providers create an intangible asset that supports their competitiveness and encourages their sustainable financial performance [54–56], which decreases firm risk. Moreover, by focusing on all stakeholders’ welfare, firms enhance their social disclosure by reporting information on salient concerns for society such as fair-trade policies, the amount of donations, human rights, flexible working schemes, and trade union representation. Thus, firms showcase their credibility to their stakeholders and consequently gain attraction, leading to positive evaluations by investors and cheaper capital access. In this regard, proponents of value creation achieved through the relationship between social disclosure and stakeholder theory assume that such disclosure leads to a better firm image [57] and improved productivity resulting from improved employers’ concern with the working environment [58,59]. This will gradually be reflected in stock prices leading to positive future returns and therefore less risk.

From the point of view of legitimacy theory, firms need to seek approval from communities. To do so, they align themselves with social values. This approval is fundamental since it would ensure corporations’ existence and continuity. Then, noncompliance with social expectations would be severely sanctioned by the community, which may even lead to their failure [60]. Consequently, business continuity is guaranteed through good social disclosure and without jeopardizing the values of the society in which it operates. In this line of thought, achieving a better image through an enhancement of legitimacy holds the promise of reducing the cost of capital.

However, according to agency theory, engaging in CSR disclosure leads to conflicts between social and shareholders’ interests and may undermine the ethical principles recognized in Friedman’s free-market economy [61,62] and which may lead to expensive capital access. Therefore, any social contribution should be covered by the corporate tax, meaning that shareholder theory prohibits the use of firm funds to engage in unprofitable investments such as charitable projects or social disclosure practices.

The environmental dynamic is forcing companies to focus on key social disclosure topics. Some companies are doing better than others in this dynamic environment [13] because they consider social disclosure as a moving target.

Hypothesis 2a (H2a). *Over time, corporate social disclosure increases the cost of capital.*

Hypothesis 2b (H2b). *Over time, corporate social disclosure decreases the cost of capital.*

2.3. Governance Disclosure and Firm Risk

Governance disclosure denotes a company's systems and processes that intend to ensure that the board of directors and executives act in the best interests of a company's long-term shareholders [50]. This type of disclosure bears on the best governance practices [43]. Thus, governance disclosure promotes transparency about firms' engagements with all their stakeholders. Achieving firm objectives is reflected in the value creation process since stakeholder theory specifies that efficient stakeholder accountability leads to creating value for all stakeholders. Consequently, governance disclosure would enhance firms' financial performance by mitigating risk and establishing strategic responses to pressure groups to unfortunate events and consequently decreasing risk.

According to signaling theory [63], information asymmetry could exasperate conflicts between managers and shareholders. Governance disclosure then brings visibility to stakeholders on firms' wide-range commitments and effectiveness towards following best-practice corporate governance principles, leading to a reduced firm risk. From a signaling theory perspective, entrenched managers would convey positive signals to the market through the governance disclosure of the effectiveness of board activities and functions as well as the political involvement of the company, leading to higher investor confidence and greater liquidity for securities and consequently covering suspicions of managers' opportunistic behavior, which reduces the perception of firm risk [64]. Therefore, governance disclosure is an essential contributor to firm risk since managers can mitigate information asymmetry between the company and its stakeholders by disclosing information on board structure and functions, executive compensation, and the political involvement of the company. Firms would then engage in governance disclosure if the benefits would outweigh the associated costs. Therefore, it would be hard for firms with poor governance disclosure to possibly mimic the operation.

From the point of view of legitimacy theory, governance disclosure is viewed as a legitimacy technique in response to possible threats to a corporation's reputation and mainly a defensive tool against pressure groups. Then, corporations use such disclosure to mitigate their specific problems, attenuate their risk, or protect their current reputation from possible unethical allegations [65]. Therefore, governance disclosure leads firms to slowly regain their legitimacy. Accordingly, the issue of legitimacy is crucial to explaining the relationship between firm risk and governance disclosure. The strengths of firms with good governance disclosure include their legitimacy, dense networks, and knowledge of issues. These strengths can lead these firms to be more transparent, resulting in a low cost of capital.

However, from an opposite point of view, the ethical and moral vision would be used as a defensive shield against conflicts that could arise between the principal and the agent. According to agency theory, other opponents of the governance disclosure–risk relationship argue that governance disclosure may lead managers to reinforce their opportunistic behavior and enhance their objectives. Therefore, managers use governance disclosure practices unethically as a self-defense strategy. This supports the assumption that agents would protect themselves from powerful stakeholders by committing to governance disclosure, and paying attention to the latter requires decreasing stakeholders' pressure.

It is worth noting that as corporate needs change over time, corporate and stakeholder expectations for governance disclosure change as well, leading to a dynamic governance disclosure strategy over time.

Hypothesis 3a (H3a). *Over time, corporate governance disclosure increases the cost of capital.*

Hypothesis 3b (H3b). *Over time, corporate governance disclosure decreases the cost of capital.*

3. Sample Selection, Variable Measurement, and Empirical Methodology

3.1. Sample

We examined a sample of US firms listed on the S&P 500 observed from 2009 to 2019 initially. We excluded regulated firms as well as financial institutions (SIC codes between 4900 and 4999 and those between 6000 and 6999). Financial and accounting data were downloaded from Thomson Reuters's DataStream with some additional data that were manually retrieved from the firms' annual reports and different internet sites. For ESG scores, data were obtained from the Bloomberg data set. After merging the latter databases and due to missing observations, we retained a final sample of 430 firms observed from 2011 to 2019.

Industry classification was based on the Global Industry Classification Standard (GICS), which is an industry taxonomy developed by Standard and Poor's in 1999.

3.2. Variable Measurement

3.2.1. Dependent Variable: The Cost of Capital

The cost of capital (COK) is the expected return rate that market participants require to attract funds to a particular investment [66]. COK is considered an opportunity cost since it is incurred by any entity willing to invest against an alternative similar-risk-and-liquidity investment [67]. In simpler terms, the cost of capital is the reward that an investor expects to receive from a company in the future. Ref. [66] states that COK is a fundamental tool in pricing risk and it can only be measured indirectly. The authors of [68] considered a simple firm as a set of assets. These assets may be financed partly out of borrowed money (debt) and partly by shareholders (equity financing). Both fund providers are considered capital providers. The firm capital structure consists of debt capital and equity capital. Each of these components has its own cost related to its respective risk. Capital is a key input received by corporations; understandably, the more costly this input is, the harder it will be for firms to generate profits regardless of the revenues they make.

Several authors have defined the cost of capital as the weighted average cost of capital (COK), an average cost of both capital components, thus an average cost of ownership interest and debt interest. From investors' standpoints, El Mehdi [69] considers that investors are generally risk-averse entities; consequently, they require a certain return that depends on investment risk. Ibbotson et al., [67] states that COK represents investors' expectations which are divided into two: a free risk rate which is mainly assimilated to government bonds and a risk premium which is a return required by an investor for a perceived level of risk.

We follow previous research [21,44] and estimate the firm cost of capital through the weighted average cost of capital model, presented by [68] as follows:

$$\text{COK} = \text{COE} \times \frac{\text{Equity}}{\text{Debt} + \text{Equity}} + \text{COD} \times \frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times (1 - t)$$

where:

COK: the cost of capital estimated through the weighted average cost of capital model.

COE: the cost of equity.

COD: the cost of debt.

Equity: the market value of firm equity.

Debt: the market value of firm debt.

t: the effective corporate tax rate.

3.2.2. Independent Variable: ESG Disclosure

Empirically, to measure ESG disclosure, we use a panel dataset with environmental, social, and governance (ESG) disclosure scores obtained from the Bloomberg database. Bloomberg rates a firm's ESG disclosure level [8,70,71]. The scores assess companies' CSR

disclosures of their environmental, social, and governance activities. Each activity is given a score from 0 to 100 so that the score increases with an increase in disclosed information.

The environmental score (E) addresses many issues intrinsic to the business environment and the relationship between the business and society (CO₂ emissions, energy consumption, energy efficiency policy, total waste, and emissions reduction policy). The environmental disclosure score (E) is used as a measure of environment-oriented CSR disclosure.

The social score (S) captures sensitive and salient concerns for society such as human rights, social equity, consumer safety, relationship with the community, etc. The social disclosure score (S) is used as a measure of social-oriented CSR disclosure.

Finally, the governance score (G) captures practices that do not primarily affect the public and take place primarily within the company. The governance disclosure score is used because it reflects information such as board diversity, anti-competitive practices, corruption within the company, cumulative voting, executive compensation, shareholders' rights, takeover defense, and staggered boards. The governance disclosure score (G) is used as a measure of governance-oriented CSR disclosure.

In this study, we examine the effect of CSR disclosure through each ESG individual dimension on the cost of capital.

We follow the methodology of both [14] and [72] and transform each ESG disclosure score into indicator variables (0, 1) (environmental Score (ENV_SC), social score (SOC_SC), and governance score (GOV_SC)). We first calculate the median of each disclosure score every year, then we give the value of one if firm has a disclosure score higher than the median and zero otherwise. This methodology has two advantages [14]. It mitigates bias in data coding, and it is more suitable for a large sample which is beneficial in our case since Bloomberg's ESG scores presented several missing values for the firms listed on the S&P 500 during the 2011 to 2019 period.

3.3. Control Variables

To control for company characteristics that are expected to have a direct or an indirect impact on the cost of capital and for firm risk profile, our review of the cost of capital literature suggests that five factors are most likely to affect the cost of capital. The following factors are used in our study.

The first is financial leverage (LVRG) measured by "the ratio of long-term debt to total assets". It represents a source of funding that a corporation needs to ensure its continuity. We include leverage in the model for two reasons. *First*, increasing leverage is the result of additional scrutiny from financial institutions, which affects the cost of capital [73]. *Second*, leverage has a direct impact on the cost of capital since it relates to financial distress [68]. Therefore, high leverage is expected to relate to a higher cost of capital. Previous studies [21,33,44,74,75] have shown that leverage positively relates to the cost of capital.

The second is firm size (SIZE) measured by the "logarithm of total assets". Previous studies [14,33,44,72] have shown that firm size has a negative and significant impact on COK; small firms are perceived as riskier than their larger peers. Large firms attract more media and analyst coverage [76], which could mitigate information asymmetry risk since they dispose of more information to disclose than their smaller peers [77].

The third is firm profitability (PROFI), which is considered a key determinant of future investment. Then, higher expected profitability will lessen frictions the firm faces in the market. We include return on assets approximated by the ratio "operating income before depreciation divided by total assets". Firms with a high return on assets enjoy a low cost of capital [78].

The fourth is information asymmetry and agency conflicts. Information asymmetry (INF_ASY) is approximated by the market-to-book ratio measured by the market value of equity/the book value of equity. This ratio depends on the extent to which a firm's returns on existing assets and expected future investments exceed its required rate of return on

equity [79]. We argue that the larger the MB ratio is, the larger information asymmetry between the market and the firm [79]. Firms with a high market-to-book ratio have a higher cost of capital [14]. Agency conflicts are measured by free cash flows (FCF), approximated by the ratio “[operating income before depreciation – interest expense – total taxes – dividends]/total assets” [79,80]. As indicated in the literature, a higher proportion of free cash flows can lead to agency conflicts between managers and shareholders [79–82]. We expect a positive relationship between firms’ free cash flows and their costs of capital.

Finally, firm age (FIRM_AGE) was also added to the research model because, as predicted by firm lifecycle theory, the cost of capital tends to fall for older firms [83]. We expect a negative relationship between the firm age and the cost of capital

Table 1 summarizes the measurements of variables, their definitions, and their expected signs.

Table 1. Variables’ definitions.

Variables	Definition	Expected Sign	Measurements
COK	Cost of capital		The weighted average cost of capital
ENV_SC	Environmental disclosure	+ / –	Equal to 1 if the firm disclosure score is higher than the median score for the current year, and zero otherwise
SOC_SC	Social disclosure	+ / –	
GOV_SC	Governance disclosure	+ / –	
LVRG	Financial leverage	+	Long-term debt/total assets
SIZE	Size	–	The logarithm of total assets
PROFI	Firm’s return on assets	–	Operation income before depreciation/total assets
INF_ASY	Market to book ratio	+	The market value of equity/the book value of equity
FCF	Free cash flows	+	(Operating income before depreciation – interest expense – total taxes – dividends)/total assets
FIRM_AGE	Firm age	–	Years since the company’s incorporation date

3.4. Empirical Methodology

Our empirical methodology aims at checking the above hypotheses and whether CSR disclosure leads to cheaper capital access or not over time. Thus, we examine the effect of each of the three main dimensions of ESG disclosure on the cost of capital. We run the following regressions:

$$\text{COK}_{i,t} = \beta_0 + \beta_1 \text{ENV_SC}_{i,t} + \text{CONTROL VARIABLES} + \text{YEARS} + \text{INDUSTRIES} + \varepsilon_{i,t}. \quad (1)$$

$$\text{COK}_{i,t} = \beta_0 + \beta_1 \text{SOC_SC}_{i,t} + \text{CONTROL VARIABLES} + \text{YEARS} + \text{INDUSTRIES} + \varepsilon_{i,t}. \quad (2)$$

$$\text{COK}_{i,t} = \beta_0 + \beta_1 \text{GOV_SC}_{i,t} + \text{CONTROL VARIABLES} + \text{YEARS} + \text{INDUSTRIES} + \varepsilon_{i,t}. \quad (3)$$

We use panel data methodology in our analysis. Indeed, unlike pooled regression, which neglects the time dimension and treats the data as cross-sectional by pooling across years [84], panel data models test group (individual-specific) effects, time effects, or both to deal with heterogeneity or individual effects that may or may be unobserved [85,86].

Furthermore, the panel data approach has several advantages over the analysis of individual time series or cross-sectional data. It gives more information with less collinearity among the variables, more degrees of freedom, and more efficiency, and it can control for individual heterogeneity [87,88]. Both fixed and random effects estimators were applied and distinguished on the basis of the Hausman test, which suggested that the random effects specification was more appropriate.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 reports the descriptive statistics. First, the mean of the cost of capital (COK) is 0.076. The results of the ESG scores show that American firms seem to be more focused on environmental disclosure (61.3% of firms exceed the industry median ENV_SC), followed by governance disclosure (half of the firms exceed the industry median GOV_SC) and then social disclosure (31.3% of firms exceed the industry median SOC_SC).

Table 2. Descriptive statistics.

Variables	Mean	Std. Dev.	Min	Max
COK	0.076	0.401	0	1
ENV_SC	0.613	0.202	0	1
SOC_SC	0.313	0.202	0.002	0.689
GOV_SC	0.505	0.613	0	1
LVRG	0.264	0.18	0	0.878
SIZE	7.616	1.434	3.655	15.62
PROFI	0.076	0.072	−0.614	0.721
INF_ASY	1.931	76.68	0.314	15.438
FCF	0.107	0.073	−0.492	0.684
FIRM_AGE	81.03	55.64	8	224

For the control variables, shows that the average firm year in our sample has a financial leverage (LVRG) of 0.264, a firm size (SIZE) of 7.616, a return on assets (PROFI) of 7.6%, a market-to-book ratio (INF_ASY) of 1.931, a free cash flow (FCF) of 0.107, and a firm age (Firm_AGE) of 81.03.

4.2. Multivariate Analysis: Impact of ESG Disclosure on the Cost of Capital

We examine the impact of the individual dimension of CSR disclosure on COK. Panels (A), (B), and (C) of Table 3 summarize the effect of ENV_SC, SOC_SC, and GOV_SC on COK, respectively. For the effect of each dimension of ESG disclosure, the effect of the social dimension is the most important effect. The increase in the cost of capital is mostly explained by this dimension. By attributing a rank to the effect of each of the CSR disclosure dimensions on the cost of capital, the social dimension would be in the lead, followed by the governance dimension and then the environmental dimension, which has little influence.

Table 3. Regression results of ESG disclosure and cost of capital.

	Panel A: COK–environmental disclosure relationship					
	Time period					
	2011–2014	2011–2015	2011–2016	2011–2017	2011–2018	2011–2019
ENV_SC	−0.06 ***	−0.0431 ***	−0.046 **	−0.057 *	0.027	0.053
LVRG	0.043 **	0.044 **	0.041 ***	0.033	0.021 ***	0.067 ***
SIZE	−0.022 ***	−0.021 ***	−0.011 ***	−0.012 ***	0.024 ***	−0.014 ***
PROFI	−0.007 ***	−0.003	−0.002 ***	−0.003 ***	−0.024 ***	−0.006 ***
INF_ASY	0.015 **	0.021	0.021	0.004	0.02	0.003
FCF	0.021 **	0.014 **	0.014	0.011	0.05 ***	0.022
FIRM_AGE	−0.02	−0.013	−0.013	−0.012 **	−0.049 ***	−0.023 ***
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
R-squared	0.185	0.177	0.196	0.209	0.311	0.326
Number of Observations	1701	2133	2569	3002	3429	3851

Table 3. Cont.

Panel B: COK–social disclosure relationship						
	Time period					
	2011–2014	2011–2015	2011–2016	2011–2017	2011–2018	2011–2019
SOC_SC	0.061 *	0.034 **	0.041 **	0.03 **	0.044 ***	0.05 ***
LVRG	0.044	0.041 **	0.045 **	0.049 *	0.068	0.074
SIZE	−0.001 **	−0.001 **	−0.002 **	−0.003 ***	−0.004 ***	−0.005 ***
PROFI	−0.013 ***	−0.006 ***	−0.011 ***	−0.018 ***	−0.044 ***	−0.036 ***
INF_ASY	0.014 ***	0.02 ***	0.002 ***	0.002 ***	0.003	0.023
FCF	−0.014	−0.007	−0.01	−0.016	−0.044	−0.036
FIRM_AGE	−0.007	−0.003	−0.001	−0.009 **	−0.006 **	−0.011 **
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
R-squared	0.144	0.165	0.184	0.211	0.259	0.363
Number of Observations	1701	2133	2569	3002	3429	3851

Panel C: COK–governance disclosure relationship						
	Time period					
	2011–2014	2011–2015	2011–2016	2011–2017	2011–2018	2011–2019
GOV_SC	−0.073 *	−0.055 *	0.072 **	0.074 ***	0.074 ***	0.073 ***
LVRG	0.053 ***	0.045 ***	0.043	0.05	0.067	0.074
SIZE	−0.002 **	−0.001 **	−0.003 **	−0.003 ***	−0.004 ***	−0.005 ***
PROFI	−0.003 *	−0.004 *	−0.001 **	−0.007 ***	−0.005 ***	−0.011 ***
INF_ASY	−0.008	−0.002	−0.006	−0.007	−0.009	−0.016
FCF	−0.02 ***	−0.009 ***	0.039 ***	−0.017 ***	−0.039 ***	−0.036 ***
FIRM_AGE	−0.024	−0.013	−0.042	−0.014 ***	−0.042 **	−0.034
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
R-squared	0.159	0.155	0.196	0.206	0.355	0.361
Number of Observations	1701	2133	2569	3002	3429	3851

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

Table 3 Panel A reports the main results of the OLS regression of the COK-ENV_SC relationship. We note that only in the first four columns of Table 3 (Panel A), the coefficient of environmental disclosure is negative. However, in the subsequent columns, the coefficient becomes statistically insignificant. This leads us to reject hypotheses H1a and H1b. Our estimations are very interesting since they put in evidence that the effect of environmental disclosure on firm risk changes over time. Legitimacy theory explains our results for the first four windows of years. There is a huge appeal from stakeholders and a positive reaction from the financial market for green products and environmental practices. This ecological commitment would then be translated into a competitive advantage since managers would use environmental disclosure to convey a proactive environmental image to maintain or increase the legitimacy of their firms. Therefore, given the growing stakeholder interest and media focus on environmental activities, it represents the perfect opportunity for CEOs to build a strong positive picture for stakeholders and society. The CEO, therefore, incites the firm into engaging in environmental disclosure. Such disclosure is a good way of increasing the legitimacy of the firm and consequently decreasing firm risk. Moreover, in the last decade, the request of investors to disclose environmental information (climate change, green environment, etc.) has become more pronounced. This awareness has been translated by a new environmental regulatory disclosure framework in the United States. More precisely, in 2010 the SEC issued guidance to help firms to assess the effect of their mandatory disclosure on climate change. Moreover, in 2011 the Environmental Protection Agency (EPA) issued requirements for disclosing some environmental activities. Consequently, firms have complied with this requirement and thus have gained the trust of stakeholders [50], especially equity capital providers and debtholders, leading to a decrease in the cost of capital. Thus, the compliance of most firms with these requirements could neutralize the effect of environmental disclosure on firm risk during the last two windows of years. Finally, with the improvement of consciousness on environmental issues and disclosure for government, companies, and investors, we can conclude that environmental

disclosure effect on firm risk changes over time. For the control variables, a positive effect is observed for financial leverage in almost all sub-periods except 2011–2017. However, a negative effect is observed over time for PROFI and firm size. Information asymmetry (INF_ASY) is significant only for the 2011–2014 period. Free cash flow exerts a positive effect on the cost of capital during the 2011–2014, 2011–2015, and 2011–2018 periods. Finally, a negative effect is observed for firm age during the 2011–2017, 2011–2018, and 2011–2019 periods.

Hypothesis 2a (2b) predicts that the social disclosure coefficient will initially be positive (negative) and increasingly positive (negative). Results are reported in Table 3 Panel B. We note a significant effect on firm risk for sub-periods starting with the first period, 2011–2014, with a more significant effect in the two last periods. Over time, social disclosure becomes increasingly more favorable for increasing firm risk, which lends support to H2a. Although in the US there is a limited number of mandated requirements for corporate social disclosure, the California Transparency in Supply Chains Act of 2010 (CTSCA) is one among these requirements intended for manufacturing and retail firms doing business in California (with worldwide sales over \$100 million) and having to address issues related to slavery and human trafficking issues in corporate supply chains. This act took effect on 1 January 2012. Although this act is specific for some firms, it has generated a great deal of awareness about social disclosure among investors and the stakeholders of other sectors. Even though this wave of awareness is increasing, the costs–benefits trade-off of disclosing social information explains our results. Thus, some firms' huge recourse to bank financing somehow calls off the role of social disclosure and therefore increases firm risk. Our results are in line with the assumptions of agency theory. This leads us to conclude that the more the companies improve their social disclosure, the less likely they attract debtholders and equity capital providers, thus increasing the cost of the capital over time. From 2018, we observe the strengthening effect of social disclosure on the cost of capital; a more significant relationship is observed. The main reason that explains this result is that social disclosure has evolved over time. To reduce the cost of capital, firms have to go beyond social disclosure by focusing on the global drivers of CSR as presented in the theoretical framework. For the control variables, financial leverage has a positive effect on firm risk during the 2011–2015, 2011–2016 and 2011–2017 periods. The effect of firm size is negative and more pronounced over time. Our results show also that there is a negative and significant relationship between the firm's accounting performance (PROFI) and the cost of capital, but in this case, the effect remains stable over time. The coefficient of the market-to-book ratio is significant only for the first four windows of years. However, the free cash flow variable is not significant for all columns of Panel B of Table 3. The effect of firm age remains almost the same as in the regression of environmental disclosure: negative and significant for the last three windows of years.

Turning now to the governance disclosure effect, our results (Table 3 Panel C) show a negative and significant effect on firm risk for the first two windows of years. These results are significantly different from those of the subsequent sub-periods. We see that until 2015, the governance disclosure coefficient is still negative, and the negative coefficient in the first two sub-periods becomes positive starting from the 2011–2016 period, which supports H3a. More precisely, until 2015, governance disclosure decreases firm risk. From 2016, we observe an opposite effect: the firm risk increases. Our estimations are very interesting since they put in evidence that the effect of governance disclosure on firm risk changes over time. Following the SEC disclosure rules on diversity and other governance matters, firms' governance practices converge quickly to such requirements. Thus, firms move from the first level of compliance to a higher level in few years. As observed in our study, until 2015, the enhancement of governance disclosure decreased the cost of capital. Consequently, governance disclosure is a relevant issue for the key stakeholders. Beyond this period, an opposite effect is observed. This result is mainly explained by downturns in governance reforms during the last years. Thus, as firms comply with the previous requirement, the key stakeholders (debtholders and equity capital providers)

are not sensitive to the enhancement of governance disclosure when negotiating the cost of their funds. Overall, our results highlight the dynamicity of governance disclosure over time. For the control variables, our results show that the coefficient of the financial LVRG variable is significant only during the two first windows of years: there is a positive relationship between the company's leverage and cost of capital during the 2011–2014 and 2011–2015 periods. The effect of firm size is negative and more pronounced over time. Our results show that there is a negative and significant relationship between the firm's accounting performance (PROFI) and the cost of capital, and this effect becomes more favorable over time. The coefficients of the market-to-book ratio are not significant over time. The negative coefficient of the free cash flow (FCF) variable over time denies the assumption that firms having a high proportion of FCF would be exposed to more conflicts of interest and hence higher incentives for managers to engage in opportunistic behavior, thus increasing cost of capital. Finally, the coefficient of firm age is negative and significant during the 2011–2017 and 2011–2018 periods.

We can conclude that over time, internally oriented CSR activities such as social and governance disclosure exerts a more acute undesirable effect on firm risk than externally oriented CSR activities such as environmental disclosure.

4.3. Robustness Checks

To ensure the robustness of our primary findings, several robustness tests are conducted. One of the most prominent issues in related papers that deal with CSR disclosure is endogeneity bias. *First*, for reverse causality in our regression equations, we examine the impact of ESG score on the future cost of capital (Columns (1) to (3) of Table 4) by taking the dependent variables at time $(t + 1)$. Our findings based on regression reaffirm our main findings. (We report results for the full sample period. In unreported results, we have also rerun our specifications using the sub-periods.)

Table 4. Robustness check results: ESG disclosure and cost of capital.

	COK t + 1			GMM		
	(1)	(2)	(3)	(4)	(5)	(6)
ENV_SC	−0.012			0.097		
SOC_SC		0.023 **			0.039 ***	
GOV_SC			0.016 ***			0.074 ***
LVRG	0.072	0.064	0.074	0.051	0.02	0.053
SIZE	0.027	0.032	0.026	−0.004	0.004	−0.002
PROFI	−0.016 ***	−0.002 ***	−0.014 ***	−0.014 ***	−0.006 **	−0.013 **
INF_ASY	−0.036 ***	−0.004 ***	−0.044 ***	−0.032 **	−0.019 *	−0.032 **
FCF	−0.012 *	−0.006 *	−0.047 *	−0.026	−0.007	−0.025
FIRM_AGE	0.071	−0.013 *	−0.045	−0.04	−0.007	−0.038 *
COKt-1				0.012 ***	0.023 ***	0.016 ***
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
R-squared	0.326	0.311	0.209			
Number of Observations	3429	3429	3429	3429	3429	3429
AR(2) <i>p</i> -value				0.455	0.326	0.232
Hansen Test <i>p</i> -value				0.265	0.881	0.987

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

Second, to control the potential concerns regarding endogeneities, simultaneities, and firm-specific heterogeneities in our main regressions, we employ the system Generalized Method of Moments (GMM) in re-estimating our results. We report the results in Table 4 (Columns (4) to (6)). Our results meet the threshold of the standard tests for the system GMM that AR (2) tests for second-order autocorrelation and Hansen tests for instrumental validity. Furthermore, our findings in these models corroborate the main findings and

highlight that our results are robust to potential spurious correlations that may arise from heterogeneities or endogeneities.

5. Conclusions

The financial literature has examined the relationship between CSR disclosure and firm risk. However, little attention has been given to the dynamic behavior of CSR disclosure. Some studies show that CSR disclosure changes over time [13,22,30]. We try to fill in this gap by investigating the impact of CSR disclosure on the cost of capital over time. To that end, we examined a sample of 430 US firms belonging to the S&P 500 observed over 9 years, from 2011 to 2019.

Like [22], we put in evidence that CSR disclosure effects change over time. More specifically, [22] shows that the reactions to CSR scores are unfavorable during the first few years of the study but over time become less and less unfavorable. In our study, the empirical findings are generally in line with agency theory assumptions. Although we have put in evidence that the reaction to CSR disclosure changes over time, the dynamic effect of each dimension of CSR disclosure on the cost of capital is different. Over time, the effect of social disclosure is more important. The effect of governance disclosure is negative during the first two windows of years, but during the subsequent windows, the effect becomes positive. Finally, the effect of environmental disclosure on the cost of capital is observed during the first four windows of years. After that time span, no significant effect is observed. This highlights the dynamic effect of each component of CSR disclosure on the cost of capital. Our results are consistent with the stream of the literature viewing firms as more reluctant to engage in social and governance practices because they perceive them as a threat or a burden and because these two dimensions do not decrease firm risk. Moreover, over time, debtholders and shareholders do not place enough emphasis on social and governance activities (ESG) in assessing firm risk. Our results on environmental disclosure are useful. Business managers have no incentives to enhance the levels of environmental disclosure since the conformity of most firms to the Environmental Protection Agency requirements (2011) attenuates the effect of this disclosure on firm risk in the years following the adoption of these requirements. However, during the last year, firms' environmental disclosure was largely driven by political/social factors rather than economic factors, leading managers to increase the levels of such disclosure. For economists, a trade-off between the cost and the benefit of environmental disclosure is valuable over time. Moreover, over the past years, disclosing environmental information has been more costly than disclosing information on other dimensions (social and governance) [8]. For academics, the environmental disclosure–firm risk relationship should be more at the forefront by integrating factors that moderate this relationship such as green intellectual capital, manager attributes, etc.

The implications of our results for the literature dealing with CSR disclosure and cost of capital are both interesting and quite straightforward.

For the CSR disclosure literature, this study has several implications. First, our study elucidates the dynamic of CSR disclosure. Second, it puts in evidence the flip side of CSR disclosure. Finally, over time, CSR disclosure is not the best strategic decision taken to reduce firm risk.

For the cost of capital literature, its assessment cannot be correctly achieved without taking into consideration the impact of the three dimensions of CSR disclosure: the environmental, the social, and the governance dimensions. Second, we add to the studies on the cost of capital a new obstacle: social and governance disclosure.

The managerial implications of our study include the consideration of whether enhanced CSR disclosure is a good strategy for reducing risk over time, the need to focus on low levels of the cost of capital when attempting to produce informative CSR disclosure experiences and potentially distinct strategies for inducing stakeholder satisfaction and especially shareholders' and debtholders' satisfaction. We have also identified some managerial implications of our conceptualization and analysis that can be used by managers

to review their strategies for improving CSR disclosure. Moreover, we stress that the CSR disclosure strategy requires the support of the whole organization, not only of the CEO. Finally, when establishing a CSR disclosure strategy, managers need to answer five questions: To whom does the CSR disclosure strategy need to be conducted? What should be done for key stakeholders such as equity capital providers and debtholders regarding CSR disclosure? In what way it should be accomplished? How formalized should the strategy be? Should the strategy be the same over time?

The findings from this study could also encourage further research and some managerial solutions.

A further study is needed to provide the excuse to take the strategic action we already thought was right regarding the level of CSR disclosure. In addition, more research is needed, as our results suggest that some assessment should be made about the trade-off between debt cost and equity cost. More precisely, it is interesting for future research to study the separate effect of CSR disclosure on each component of the cost of capital. Moreover, our results are important initial results that need to be replicated in other countries in a different setting to strengthen their generalizability. Because we limited our sample to 430 US firms listed on the S&P 500, it would be more interesting for future research to extend the CSR disclosure–cost of capital relationship on a global sample, including European markets and several emerging markets such as China, Brazil, Mexico, and India where CSR practices are flourishing. Finally, it is interesting to study the effect of CSR disclosure on the cost of capital during a turbulent period and especially during the COVID-19 pandemic, as this crisis is unprecedented and firms were found to be vulnerable.

As for managerial solutions, strong but prudent CSR disclosure policies are required. The role of equity capital providers and debtholders is to be more concerned over time. More precisely, *first*, firms have to be more aware of CSR disclosure benefits and be updated on new and better changes in such a policy. *Second*, a careful CSR disclosure strategy is important to avoid a high firm risk. Thus, the proper planning of CSR disclosure engagements may prevent a high cost of capital. Third, an adaptation of firms to stakeholders' interests is crucial to gain their trust, but CSR disclosure does not have to play only a self-defense strategy. *Fourth*, as we have identified some undesirable outcomes of CSR disclosure activities on equity capital providers and debtholders, firms have to be more cautious when adopting CSR disclosure strategies.

Regardless of our findings, this study has some limitations. Because of the lack of good instruments, our findings may be biased and subject to variable omissions. This study would have provided better results using the amount of analyst coverage as a control variable, for instance.

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References

- Aslan, A.; Poppe, L.; Posch, P. Are Sustainable Companies More Likely to Default? Evidence from the Dynamics between Credit and ESG Ratings. *Sustainability* **2021**, *13*, 8568. [[CrossRef](#)]
- Churchill, N. Toward a theory of social accounting. *Sloan Manag. Rev.* **1974**, *15*, 117–136.
- Lockett, A.; Moon, J.; Visser, W. Corporate Social Responsibility in Management Research: Focus, Nature, Salience and Sources of Influence. *J. Manag. Stud.* **2006**, *43*, 115–136. [[CrossRef](#)]
- Vogel, D.J. Is there a market for virtue? The business case for corporate social responsibility. *Calif. Manag. Rev.* **2005**, *47*, 19–45.
- Carroll, A. Corporate Social Responsibility: Evolution of a Definitional Construct. *Bus. Soc.* **1999**, *38*, 268–295. [[CrossRef](#)]

6. Morsing, M.; Midttun, A.; Palmås, K. Corporate Social Responsibility in Scandinavia: A Turn Toward the Business Case? In *The Debate over Corporate Social Responsibility*; May, S., Cheney, G., Roper, J., Eds.; Oxford University Press: Oxford, UK, 2007; pp. 87–104.
7. Kuo, K.-C.; Yu, H.-Y.; Lu, W.-M.; Le, T.-T. Sustainability and Corporate Performance: Moderating Role of Environmental, Social, and Governance Investments in the Transportation Sector. *Sustainability* **2022**, *14*, 4095. [[CrossRef](#)]
8. Dabbebi, A.; Lassoued, N.; Khanchel, I. Peering through the smokescreen: ESG disclosure and CEO personality. *Manag. Decis. Econ.* **2022**. [[CrossRef](#)]
9. Chen, L.; Yuan, T.; Cebula, R.J.; Shuangjin, W.; Foley, M. Fulfillment of ESG Responsibilities and Firm Performance: A Zero-Sum Game or Mutually Beneficial. *Sustainability* **2021**, *13*, 10954. [[CrossRef](#)]
10. Miralles-Quirós, M.M.; Miralles-Quirós, J.L.; Gonçalves, L.M.V. The Value Relevance of Environmental, Social, and Governance Performance: The Brazilian Case. *Sustainability* **2018**, *10*, 574. [[CrossRef](#)]
11. Ahmed Haji, A. Corporate social responsibility disclosures over time: Evidence from Malaysia. *Manag. Audit. J.* **2013**, *28*, 647–676. [[CrossRef](#)]
12. Bertels, S.; Pelozo, J. Running Just to Stand Still? Managing CSR Reputation in an Era of Ratcheting Expectations. *Corp. Reput. Rev.* **2008**, *11*, 56–72. [[CrossRef](#)]
13. Zeisel, S. Is sustainability a moving target? A methodology for measuring CSR dynamics. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 283–296. [[CrossRef](#)]
14. Dhaliwal, D.; Li, O.Z.; Tsang, A.; Yang, Y.G. Corporate social responsibility disclosure and the cost of equity capital: The roles of stakeholder orientation and financial transparency. *J. Account. Public Policy* **2014**, *33*, 328–355. [[CrossRef](#)]
15. Yoon, B.; Lee, J.H.; Byun, R. Does ESG Performance Enhance Firm Value? Evidence from Korea. *Sustainability* **2018**, *10*, 3635. [[CrossRef](#)]
16. Ferrero-Ferrero, I.; Fernández-Izquierdo, M.A.; Muñoz-Torres, M.J. The Effect of Environmental, Social and Governance Consistency on Economic Results. *Sustainability* **2016**, *8*, 1005. [[CrossRef](#)]
17. Sultana, S.; Zulkifli, N.; Zainal, D. Environmental, Social and Governance (ESG) and Investment Decision in Bangladesh. *Sustainability* **2018**, *10*, 1831. [[CrossRef](#)]
18. Beatty, R.P.; Welch, I. Issuer Expenses and Legal Liability in Initial Public Offerings. *J. Law Econ.* **1996**, *39*, 545–602. [[CrossRef](#)]
19. Golcic, S.L.; Smith, C.D. A Meta-Analysis of Environmentally Sustainable Supply Chain Management Practices and Firm Performance. *J. Supply Chain Manag.* **2013**, *49*, 78–95. [[CrossRef](#)]
20. Yeoh, P. Corporate governance failures and the road to crime. *J. Financ. Crime* **2015**, *23*, 216–230. [[CrossRef](#)]
21. Suto, M.; Takehara, H. CSR and cost of capital: Evidence from Japan. *Soc. Responsib. J.* **2017**, *13*, 798–816. [[CrossRef](#)]
22. Ioannou, I.; Serafeim, G. The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strat. Manag. J.* **2015**, *36*, 1053–1081. [[CrossRef](#)]
23. Dobrowolski, Z.; Drozdowski, G.; Panait, M.; Babczuk, A. Can the Economic Value Added Be Used as the Universal Financial Metric? *Sustainability* **2022**, *14*, 2967. [[CrossRef](#)]
24. Dobrowolski, Z.; Drozdowski, G. Does the Net Present Value as a Financial Metric Fit Investment in Green Energy Security? *Energies* **2022**, *15*, 353. [[CrossRef](#)]
25. Khanchel, I.; Lassoued, N.; Baccar, I. Sustainability and firm performance: The role of ESG disclosure and green innovation. *Manag. Decision.* **2022**; *accepted manuscript*.
26. Falck, O.; Heblich, S. Corporate social responsibility: Doing well by doing good. *Bus. Horiz.* **2007**, *50*, 247–254. [[CrossRef](#)]
27. Schiessl, D.; Korelo, J.C.; Cherobim, A.P.M.S. Corporate social responsibility and the impact on economic value added: The role of environmental innovation. *Eur. Bus. Rev.* **2022**, *34*, 396–410. [[CrossRef](#)]
28. Piechocka-Kaluzna, A.; Tluczak, A.; Lopatka, P. The Impact of CSR/ESG Reporting on the Cost of Capital: An Example of US Healthcare Entities. *Eur. Res. Stud. J.* **2021**, *24*, 679–690. [[CrossRef](#)]
29. Ramirez, A.G.; Monsalve, J.; González-Ruiz, J.D.; Almonacid, P.; Peña, A. Relationship between the Cost of Capital and Environmental, Social, and Governance Scores: Evidence from Latin America. *Sustainability* **2022**, *14*, 5012. [[CrossRef](#)]
30. Bing, T.; Li, M. Does CSR Signal the Firm Value? Evidence from China. *Sustainability* **2019**, *11*, 4255. [[CrossRef](#)]
31. Vitolla, F.; Salvi, A.; Raimo, N.; Petruzzella, F.; Rubino, M. The impact on the cost of equity capital in the effects of integrated reporting quality. *Bus. Strat. Environ.* **2020**, *29*, 519–529. [[CrossRef](#)]
32. Galema, R.; Plantinga, A.; Scholtens, B. The stocks at stake: Return and risk in socially responsible investment. *J. Bank. Financ.* **2008**, *32*, 2646–2654. [[CrossRef](#)]
33. Fombrun, C.J.; Gardberg, N.A.; Barnett, M.L. Opportunity Platforms and Safety Nets: Corporate Citizenship and Reputational Risk. *Bus. Soc. Rev.* **2000**, *105*, 85–106. [[CrossRef](#)]
34. Goss, A.; Roberts, G.S. The impact of corporate social responsibility on the cost of bank loans. *J. Bank. Financ.* **2011**, *35*, 1794–1810. [[CrossRef](#)]
35. Shad, M.K.; Lai, F.-W.; Shamim, A.; McShane, M. The efficacy of sustainability reporting towards cost of debt and equity reduction. *Environ. Sci. Pollut. Res.* **2020**, *27*, 22511–22522. [[CrossRef](#)] [[PubMed](#)]
36. Raimo, N.; Caragnano, A.; Zito, M.; Vitolla, F.; Mariani, M. Extending the benefits of ESG disclosure: The effect on the cost of debt financing. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1412–1421. [[CrossRef](#)]

37. Hamrouni, A.; Uyar, A.; Boussaada, R. Are corporate social responsibility disclosures relevant for lenders? Empirical evidence from France. *Manag. Decis.* **2020**, *58*, 267–279. [CrossRef]
38. Jiraporn, P.; Jiraporn, N.; Boeprasert, A.; Chang, K. Does Corporate Social Responsibility (CSR) Improve Credit Ratings? Evidence from Geographic Identification. *Financ. Manag.* **2014**, *43*, 505–531. [CrossRef]
39. Cornell, B.; Shapiro, A.C. Corporate Stakeholders and Corporate Finance. *Financ. Manag.* **1987**, *16*, 5–14. [CrossRef]
40. Hoffman, J. Defining Feminism. *Politics* **2001**, *21*, 193–199. [CrossRef]
41. Rahman, R.A.; Alsayegh, M. Determinants of Corporate Environment, Social and Governance (ESG) Reporting among Asian Firms. *J. Risk Financ. Manag.* **2021**, *14*, 167. [CrossRef]
42. Masoud, N. How to win the battle of ideas in corporate social responsibility: The International Pyramid Model of CSR. *Int. J. Corp. Soc. Responsib.* **2017**, *2*, 4. [CrossRef]
43. Thomson Reuters. Asset 4 ESG Data Glossary. DataStream. 2017. Available online: https://www.esade.edu/itemsweb/biblioteca/bbdd/inbdd/archivos/Thomson_Reuters_ESG_Scores.pdf (accessed on 6 February 2016).
44. Sharfman, M.P.; Fernando, C.S. Environmental risk management and the cost of capital. *Strateg. Manag. J.* **2008**, *29*, 569–592. [CrossRef]
45. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Pitman: Boston, MA, USA, 1984.
46. Donaldson, T.; Preston, L.E. The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *Acad. Manag. Rev.* **1995**, *20*, 65–91. [CrossRef]
47. Dye, R.A. Disclosure of Nonproprietary Information. *J. Account. Res.* **1985**, *23*, 123–145. [CrossRef]
48. Campbell, D.; Craven, B.; Shrive, P. Voluntary social reporting in three FTSE sectors: A comment on perception and legitimacy. *Account. Audit. Account. J.* **2003**, *16*, 558–581. [CrossRef]
49. Deegan, C.; Rankin, M. Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the environmental protection authority. *Account. Audit. Account. J.* **1996**, *9*, 50–67. [CrossRef]
50. Lassoued, N.; Khanchel, I. Voluntary CSR disclosure and CEO narcissism: The moderating role of CEO duality and board gender diversity. *Rev. Manag. Sci.* **2022**, *1*–49. [CrossRef]
51. Friedman, M. *Capitalism and Freedom*; The University of Chicago Press: Chicago, IL, USA, 1962.
52. Friedman, M. The Social responsibility of business is to increase its profits. *New York Time Magazine*, 13 September 1970; pp. 32–33, 122–126.
53. Verwijmeren, P.; Derwall, J. Employee well-being, firm leverage, and bankruptcy risk. *J. Bank. Financ.* **2010**, *34*, 956–964. [CrossRef]
54. Roberts, P.W.; Dowling, G.R. Corporate reputation and sustained superior financial performance. *Strat. Manag. J.* **2002**, *23*, 1077–1093. [CrossRef]
55. Whitehouse, L. Corporate social responsibility: Views from the frontline. *J. Bus. Ethics* **2006**, *63*, 279–296. [CrossRef]
56. Surroca, J.; Tribó, J.A.; Waddock, S. Corporate responsibility and financial performance: The role of intangible resources. *Strateg. Manag. J.* **2010**, *31*, 463–490. [CrossRef]
57. Fombrun, C.J. *Reputation: Realizing Value from the Corporate Image*; Harvard Business School Press: Boston, MA, USA, 1996.
58. Moskowitz, M.R. Choosing Socially Responsible Stocks. *Bus. Soc. Rev.* **1972**, *1*, 71–75.
59. Greening, D.W.; Turban, D.B. Corporate Social Performance As a Competitive Advantage in Attracting a Quality Workforce. *Bus. Soc.* **2000**, *39*, 254–280. [CrossRef]
60. Schiopoïu, B.A.; Popa, I. Legitimacy Theory. In *Encyclopedia of Corporate Social Responsibility*; Idowu, S.O., Capaldi, N., Zu, L., Gupta, A.D., Eds.; Springer: Berlin/Heidelberg, Germany, 2013.
61. Sternberg, E. *Corporate Governance Accountability in the Marketplace*, 2nd ed.; The Institute of Economic Affairs: London, UK, 2004.
62. Khanchel El Mehdi, I.; Ben Taleb, D. Is corporate voluntary disclosure a burden to shareholders? *Int. J. Revenue Manag.* **2022**; in press.
63. Leland, H.; Pyle, H. Informational Asymmetries, Financial Structure, and Financial Intermediation. *J. Financ.* **1977**, *32*, 371–387. [CrossRef]
64. Lassoued, N.; Elmir, A. Portfolio selection: Does corporate governance matter? *Corp. Gov.* **2012**, *12*, 701–713. [CrossRef]
65. Patten, D.M. Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. *Account. Organ. Soc.* **1992**, *17*, 471–475. [CrossRef]
66. Pratt, S.P.; Grabowski, R.J. *Cost of Capital: Applications and Examples*, 5th ed.; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2014.
67. Ibbotson, R.G.; Chen, Z.; Kim, D.; Hu, W.Y. Liquidity as an Investment. *Financ. Anal. J.* **2013**, *69*, 30–44. [CrossRef]
68. Modigliani, F.; Miller, M.H. The Cost of Capital, Corporation Finance and the Theory of Investment. *Am. Econ. Rev.* **1958**, *48*, 261–297.
69. El Mehdi, I.K. An Examination of the Naïve-Investor Hypothesis in Accruals Mispricing in Tunisian Firms. *J. Int. Financ. Manag. Account.* **2011**, *22*, 131–164. [CrossRef]
70. Ioannou, I.; Serafeim, G. What drives corporate social performance? The role of nation-level institutions. *J. Int. Bus. Stud.* **2012**, *43*, 834–864. [CrossRef]
71. Fatemi, A.; Glaum, M.; Kaiser, S. ESG performance and firm value: The moderating role of disclosure. *Glob. Financ. J.* **2018**, *38*, 45–64. [CrossRef]

72. El Ghouli, S.; Guedhami, O.; Kwok, C.C.; Mishra, D.R. Does corporate social responsibility affect the cost of capital? *J. Bank. Financ.* **2011**, *35*, 2388–2406. [[CrossRef](#)]
73. Clarkson, P.M.; Fang, X.; Li, Y.; Richardson, G. The relevance of environmental disclosures: Are such disclosures incrementally informative? *J. Account. Public Policy* **2013**, *32*, 410–431. [[CrossRef](#)]
74. Fama, E.F.; French, K.R. The Cross-Section of Expected Stock Returns. *J. Financ.* **1992**, *47*, 427–465. [[CrossRef](#)]
75. Dhaliwal, D.; Eheitzman, S.; Li, O.Z. Taxes, Leverage, and the Cost of Equity Capital. *J. Account. Res.* **2006**, *44*, 691–723. [[CrossRef](#)]
76. Lassoued, N.; Khanchel, I. Impact of COVID-19 Pandemic on Earnings Management: An Evidence from Financial Reporting in European Firms. *Glob. Bus. Rev.* **2021**. [[CrossRef](#)]
77. Sengupta, P. Corporate Disclosure Quality and the Cost of Debt. *Account. Rev.* **1998**, *73*, 459–474.
78. Dhaliwal, D.S.; Li, O.Z.; Tsang, A.; Yang, Y.G. Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. *Account. Rev.* **2011**, *86*, 59–100. [[CrossRef](#)]
79. Khanchel El Mehdi, I.; Seboui, S. Corporate diversification and earnings management. *Rev. Account. Financ.* **2011**, *10*, 176–196. [[CrossRef](#)]
80. Lassoued, N.; Osman, B.I. The impact of national culture on overinvestment. *Int. J. Revenue Manag.* **2021**, *12*, 213–235. [[CrossRef](#)]
81. Doukas, J.A.; Pantzalis, C. Geographic diversification and agency costs of debt of multinational firms. *J. Corp. Financ.* **2003**, *9*, 59–92. [[CrossRef](#)]
82. Jensen, M.C. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *Am. Econ. Rev.* **1986**, *76*, 323–329.
83. Lassoued, N.; Ben Rejeb Attia, M. Benefits and costs of political connections: Evidence from Tunisia. *Int. J. Account. Audit. Perform. Eval.* **2014**, *10*, 299–325. [[CrossRef](#)]
84. Ben Rejeb Attia, M.; Lassoued, N.; Chouikha, M. State ownership and firm profitability in emerging markets: A simultaneous equations analysis. *Int. J. Public Sect. Manag.* **2018**, *31*, 167–183. [[CrossRef](#)]
85. Lassoued, N. Capital structure and earnings quality in microfinance institutions. *Int. J. Manag. Financ.* **2022**, *18*, 240–260. [[CrossRef](#)]
86. Ben Rejeb Attia, M.; Sassi, H.; Lassoued, N. Signaling over income smoothing and IFRS adoption by banks: A panel data analysis on MENA countries. *Econ. Bull.* **2013**, *33*, 2340–2356.
87. Lee, C.C.; Chiu, Y.B. The impact of real income on insurance premiums: Evidence from panel data. *Int. Rev. Econ. Financ.* **2012**, *21*, 246–260. [[CrossRef](#)]
88. Ben Rejeb Attia, M.; Lassoued, N.; Sassi, H. Financial reporting timeliness and the value relevance of earnings: Evidence from banks in the MENA countries. *Int. Trade J.* **2019**, *33*, 277–301. [[CrossRef](#)]

Article

Government Ownership and Corporate Cash Holdings: Empirical Evidence from the Amman Stock Exchange

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Abstract: While the effect of ownership structure on the level of cash holdings has been widely examined, that of government ownership has been understudied. Using a generalized method of moments (GMM) estimation on the panel data of 107 Jordanian firms listed on the Amman Stock Exchange, this research adds to the limited literature on the relationship between government ownership and the level of corporate cash holdings. Consistent with agency theory, the findings reveal that firms with government ownership hold higher levels of cash and that such ownership creates agency problems. Other types of ownership, namely individual, foreign, and block holders, were found to be insignificant. The results provide an important implication for policy makers in Jordan: in order to reduce agency problems associated with government ownership, the government should revise its ownership policy and ensure it specifies clear purposes and expectations of business ownership and how it intends to exercise its rights as owner.

Keywords: cash holdings; government ownership; generalized method of moments

JEL Classification: G11; G30; G34; M41

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1. Introduction

To increase value, firms should not keep non-productive assets and should finance their investments with the cheapest sources of funds. External sources, if available, are thought to be more expensive than internal ones due to asymmetric information, transaction costs, tax benefits, and the cost of financial distress. If capital markets were perfect, this argument would be irrelevant, as there would be no uncertainty, information asymmetry, transaction costs, nor financial constraints. Firms would lend and borrow at the same interest rate, and the capital market would reflect all available information. If this were the case, firms would have no incentive to finance nor to invest in the short term; hence, working capital accounts would be unnecessary.

In the real world, however, issues of information asymmetry and transaction costs must be addressed. While firms have a variety of options, Scherr [1] claims that those including investment and financing through working capital accounts often provide a significant advantage. He argues that when a company is faced with uncertainty about its predicted future cash flows, it will incur significant costs if it has insufficient financial reserves to cover expenses. To deal with this unpredictability and the expenses it may entail, various techniques could be implemented, including working capital investment or financing, such as maintaining a reserve of short-term cash balances above estimated needs. Therefore, management of cash holdings and determination of the level of cash to be held is vital for firms' financial stability and success.

According to the Keynesian Liquidity Preference Theory [2], corporate economic activity requires money or liquidity. Keynes described the three motives in the theory. First, the transactions motive, which is driven by corporate decisions to favor liquidity for routine

business transactions or daily expenses. Instead of struggling or borrowing, businesses prefer to have liquidity to meet their short-term obligations. The second is the speculative motive, which describes how companies intend to profit speculatively from fluctuations in interest rates. It is believed that businesses may require more liquidity when interest rates are low because they anticipate an increase in rates in the future and, as a result, they retain cash. Finally, the precautionary demand motive, which represents the need to cover unforeseen investment possibilities, contingencies, or unexpected expenditures.

Between the opportunity costs of lost investments when holding cash (i.e., a non-earning asset) and the benefits of reducing the transaction costs of external funds and being able to finance projects when necessary, firms vacillate with regard to the levels of cash being held. To make matters more complicated, firms also need to deal with the expected agency problems associated with the high levels of cash, because cash is vulnerable to exploitation by managers [3]. Consequently, examining the factors that affect the level of cash holdings and how cash holdings are used is inevitable.

In Jordan, cash holdings have been examined extensively. A stream of research has examined the determinants of the levels of cash held by Jordanian firms; for example, working capital management [4], directors' ownership, organizational ownership and foreign ownership [5], and disclosure quality [6]. Another stream has examined the effect of cash holdings on firm value [7] and profitability [8]. However, the effect of government ownership on the level of cash holdings has yet to be examined. Therefore, this research intends to fill this gap.

Government ownership is expected to affect cash holdings in either of two ways. On the one hand, it can provide a type of guarantee to the investing firm, especially if the government, through this investment, has social or political goals, such as reducing the level of unemployment or helping certain industries to thrive. Therefore, the government will not allow such firms to fail, by providing capital directly or by serving as a guarantor to lending banks or by relaxing taxes. Therefore, firms are less likely to face distress [9] and will have a lower risk of default, lower capital costs, and hence lower cash holdings. On the other hand, government ownership might provide protection to firm management, resulting in moral hazards and managers who are not afraid of losing their job. In such a case, managers, and government (who might have other priorities), will cause the firm's value to fall and the risk of default to increase, leading to higher capital costs and cash holdings. Moreover, in this scenario, managers are also expected to hold higher levels of cash, because it is less costly to exploit and subject to less market discipline. Consequently, we expect that government ownership will affect the level of cash holdings of Jordanian firms.

Government ownership is important for several reasons. First, it is considered common in Middle Eastern countries [10]. Second, due to its power, the government is expected to exercise higher intervention [11], which will affect the attitudes of top management. Third, government owners are the only ones who are not solely concerned with profit maximization [12,13]; rather, they have social and political priorities that will affect decisions taken, which may create conflicts of interest with other owners. However, there is limited research on the effect of government ownership on the level of cash holdings [14]. Hence, here we examine the effect of government ownership on the level of cash holdings in Jordan.

The rationale for researching the Jordanian context is as follows. First, for many market participants, it is critical to provide evidence on how government ownership affects company cash holdings in the Jordanian market, namely the Amman Stock Exchange (ASE). With more than 280 companies listed since its founding in 1999, the ASE is regarded as a relatively high liquid market, with a market capitalization of roughly USD 26 billion, offering diversified choices for portfolio investors. The results of this research provide important insights into the effectiveness of government ownership in monitoring management and agency problems. Therefore, the economic significance of this market drives the importance of this research, which helps improve informational efficiency and sheds light on the factors that investors should consider before making investment decisions on the ASE.

Second, the Jordanian government has been attempting to globalize the ASE to encourage foreign inflow. In a bid to increase the efficiency of the market, since the late nineties the government has surrendered a large share of its equity ownership to the private sector. Firms owned by the government used to suffer from administrative interference, little autonomy, insufficient investment resources, and poorly constructed incentive systems; therefore, privatization in Jordan was aimed at improving firm efficiency and improving operational performance. However, the government still has ownership interests and exercises delegated powers in more than 9% of the listed firms on the Amman Stock Exchange [15]; such firms have received limited attention in the research on cash holdings. Furthermore, the Jordanian government is currently studying the privatization of certain other firms [16]; this research could be of great importance for the government in evaluating privatizing the remaining government ownership.

Consistent with the view that government ownership leads to ineffective monitoring and agency problems, we found that it is positively related to corporate cash holdings. The study contributes to the literature in several ways. First, we provide detailed analysis of the effect of government ownership on the levels of cash held. This issue, despite the dramatic recent increase in government intervention [17], has been little examined in the literature [14] for both developed and developing countries. Second, by understanding the effect of government investment on firms' cash holdings, we provide implications for various market players in Jordan. Third, we extend our analysis to ascertain why firms hold more cash in the case of government ownership and use our empirical evidence to gauge the theoretical explanation of Jordanian firms' attitude to cash holdings. Fourth, if the government of Jordan is to continue to own shares in those firms, it is advised to act as a diligent and informed owner, but at arm's length from management. Moreover, the government is advised to rethink its ownership policy; the policy should set forth the purposes of business ownership and the intended expectations of the owned firms by the government. It should also specify how it will fulfil its rights as owner.

The remainder of the study is organized as follows. In Sections 2 and 3, we present the theoretical background and a review of the literature, respectively, and develop our hypothesis. Section 4 presents the methodology employed to address the research question, while in Section 5, we provide the descriptive statistics and discuss the results. In Section 6, we discuss why government ownership is associated with higher levels of cash, and finally Section 7 presents the conclusion.

2. Government Ownership and the Agency Theory

According to agency theory, separation between owners (principals) and management (agents) raises a risk that owners' interests and management interests are not aligned, thus a conflict of interests arise, and agency costs become inevitable [18,19]. Such costs result from monitoring mechanisms employed to keep an eye on management and to rein in their self-interested actions. Corporate governance tools such as ownership structures can play a significant role in monitoring the opportunistic behavior of managers [20–23]. An ownership structure can be used to keep an eye on and exert more control over key corporate decisions. By doing so, the agency problem might be alleviated, and organizational activities might be directed toward the company's interests rather than those of a certain group [22–25]. This might eventually improve the performance of the business [24].

Different types of ownership include managerial, institutional, family, and government ownership; among these, government ownership has aims that are distinct from those of other groups. According to agency theory, government ownership may result in inefficient governance and reduced managerial incentives [17]. As a result, corporate performance could be less impressive than it would be for privately held businesses [26]. This is supported by the claim that the government's major ownership would divert funds away from the business. Instead of focusing on business objectives, such as wealth maximization, government ownership might direct resources toward achieving social and political goals, particularly if the government, through this investment, has social or political goals such as

lowering the unemployment rate, promoting certain industries, or supporting the ruling party [9]. Furthermore, regardless of the company's financial situation, government owners are more likely to keep surplus staff or hire political supporters [17]. These ineffective initiatives ultimately deprive minority shareholders of their resources and raise agency costs, which have an adverse effect on business performance [21].

3. Literature Review and Hypothesis Development

According to Keynesian theory, firms value liquidity for three reasons: first, the transaction motive, which facilitates the routine daily business transactions that meet its short-term obligations without facing the risk of insolvency; second, to provide for unforeseen expenditures and contingencies (as explained by the precaution motive); and third, to save opportunity costs associated with lost investments in the case of insufficient funds (a speculative motive), consistent with the pecking order and trade-off theories, otherwise known as the financing friction hypothesis.

Pecking order theory expects firms with expensive external financing and higher capital costs to depend on internal financing and to hold higher levels of cash, or vice-versa [3]. In addition, trade-off theory consistently expects that firms with higher capital costs will accrue more benefits from holding higher levels of cash, i.e., their optimal level of cash is expected to be higher [27]. Second, managers might hold cash to exploit it for personal interests, which is what the free cash flow theory expects; they will hold higher levels of cash to increase the assets under their control and to reduce the need for external financing, hence leading to less market discipline [28].

Studies on cash holdings provide support for the above-mentioned reasons. For example, regarding the transaction motive, the objective of corporate cash holdings is to ensure the liquidity levels required to meet short-term obligations, thus avoiding the risk of insolvency and the cost of short-term borrowing. In the Jordanian context, this argument is consistent with the findings of Shubita and Shubita [4]. With regard to the precautionary motive, firms have been found to hold higher cash levels when faced with difficulties in raising external capital [27] and by higher cash-flow uncertainty [29]. Al-Amareh [30] and Iskandrani et al. [31] found that firms in Jordan hold cash for precautionary reasons. In the same vein, McLean [32] found that firms faced with higher R&D expenses increase their cash holdings as a precaution. Firms in Jordan have been found to hold higher levels of cash when they have higher growth opportunities [33,34], consistent with the speculative motive. On the contrary, it has been found that firms hold more cash in case of higher agency problems at the firm and country levels [32,35].

Government ownership, as previously explained, can affect the level of cash holding through the predictions of Keynesian theory. Simply put, firms hold cash for speculation, precaution, and transaction motives. If the government provides different kinds of support, such as laxer taxes, direct finance of capital as part of its investment policy, or by guaranteeing firms will receive preferential loans [36,37], firms with government ownership will have easier access to cash, and will therefore have less motive to hold it. This is consistent with the expectations of the soft budget constraints theory [38], which expects that when a government owns shares in a firm, it will provide different kinds of support, such as laxer taxes and access to credit; moreover, in cases of financial distress, the government might intervene to save the firm [39]. If this holds true, government-owned firms will make fewer transactions and have fewer precautionary motives. As expected by pecking order and trade-off theories, such firms will therefore hold less cash.

On the other hand, agency theory predicts that government ownership will increase agency costs. Such costs are partly expected to rise because managers, under the pressure of government, might serve political interests rather than those of shareholders. Moreover, the managers in such firms are less subject to effective monitoring because, with the role played by government and politicians, fewer owners will engage in such action [40,41]. In fact, it has been found that state ownership increases agency problems because of ineffective monitoring [11,42,43]. Research on the effect of government ownership on cash holdings

has provided mixed results. Megginson et al. [44] found that it was negatively related to cash holdings in China, while Abramov et al. [45] demonstrated that government-owned firms increased their cash holdings to serve political interests. Chen et al. [14] argued that government ownership is positively related to cash holdings. Based on the mixed empirical and theoretical evidence, the following non-directional hypothesis is formulated:

Hypothesis 1 (H1). *Government ownership is significantly related to the level of cash holdings of Jordanian firms.*

4. Data and Methodology

4.1. Data

The study employs a panel dataset for 107 Jordanian listed companies in the service and industrial sectors covering the period 2009 to 2018. Financial data were gathered from the official website of the Amman Stock Exchange (ASE). The operational measures of the variables utilized in the analysis are shown in Table 1, and their summary statistics and correlation matrix can be seen in Table 2. The average value of cash holdings is 16.1%; compared to other developing countries, this is considered to be high. For example, Al-Najjar [46] reported an average CH of 5.6% for Brazil, Russia, India, and China over the period 2002 to 2008. For the period 2007 to 2012, Maheshwari and Rao [47] reported an average CH of 14.4% in India. This average is also high if compared to developed countries; for example, it was 5.9% for a sample of UK-listed firms [48] and 10.19% for Spanish firms [49].

The average value of the main independent variable, government ownership (Govt.), is 7.5%. This is considered low compared to other developing countries, for example, 24.35% in Vietnam [52] and 25% in China [14]. However, it is still high compared to firms in Kuwait, another Middle Eastern country, where government ownership is on average 3% [52,53]. Averages for other types of ownership, as in Table 1, are block-holders (Block) at 63.7%, Individuals (Indiv) at 48%, and Foreigners (Foreign) at 19.2%. Cash flow from operations (CFlow) is on average 6.1%, although some firms had negative operating cash flows. Debt issues (DbtIssues) stood at 15.2%, meaning that Jordanian firms increase their debt by 15% on average. SGr is 13.6%, indicating that, on average, firms increase sales by approximately 14%. Finally, CapEx is on average of 24.7%, meaning that firms increase their capital expenditure on average by 25%. The criterion of non-multicollinearity was confirmed, and there was no evidence of multicollinearity among the variables in the correlation coefficient matrix.

Table 1. Operational measures of the variables.

Variable	Measurement	References
Cash holdings (CH)	(Cash + cash equivalent)/total assets at time $t - 1$.	[34,49]
Sales growth (Sgr)	Change in net sales/net sales at time $t - 1$.	[49,50]
Debt issues (DbtIssues)	Annual change in long-term debt/total assets at time $t - 1$.	[35,50]
Cash flow (CFlow)	Total internally generated funds/total assets at time $t - 1$.	[34,50,51]
Block Holders (Block)	Percentage of non-management equity owners with more than 5% ownership	[13,24]
Individuals (Indiv)	Percentage of shares held by individuals	[7]
Government (Govt)	Percentage of shares held by the government	[12–14]
Foreign (Foreign)	Percentage of shares held by foreign investors	[13,17]
Capital expenditure (CapEx)	Annual change in net fixed assets/total assets at time $t - 1$.	[34,35]

Table 2. Pair-wise correlation matrix and descriptive statistics.

Variable	MEAN	S.D.	Obs	CH	SGr	DbtIssues	CFlow	Block	Indiv	Govt	Foreign	CapEx
CH	0.161	0.378	1062	1.000								
SGr	3.020	12.954	980	0.029	1.000							
DbtIssues	0.152	0.411	843	0.264 ***	0.077 **	1.000						
CFlow	0.061	0.490	1075	0.322 ***	−0.032	0.098 ***	1.000					
Block	0.637	0.234	1086	0.006	0.013	0.055	−0.017	1.000				
Indiv	0.480	0.299	1086	0.005	−0.059 *	−0.080 **	−0.002	−0.433 **	1.000			
Govt	0.075	0.156	1086	0.124 ***	0.066 *	0.149 ***	0.056 **	0.081 ***	−0.355 **	1.000		
Foreign	0.192	0.246	1086	0.003	−0.004	−0.049	0.004	0.153 ***	−0.301 **	−0.071 **	1.000	
CapEx	0.247	0.590	939	0.227 ***	0.076 **	0.338 ***	0.209 ***	0.002	0.059 *	0.012	−0.004	1.000

*, **, and *** reflect significance at levels of 10%, 5% and 1%, respectively.

4.2. Methodology

According to Roodman [54], the generalized method of moments (GMM) is the most appropriate econometric estimator for dynamic model estimation. The system-GMM estimator is designed to accommodate a variety of data-generation assumptions and to deal with the dynamic generating process, which occurs when lagged dependent variables affect the dependent variable. It also manages the existence of unobserved heterogeneity and takes into account unobserved time-invariant effects. Third, the endogeneity issue caused by the explanatory factors is addressed by this methodology. Fourth, it is specially developed to deal with panels that have many individuals and few time periods (large N and small T), as well as to deal with the assumption that good instruments are available internally based on the lags of the instrumented variables and are not available outside the immediate dataset. Accordingly, to examine how government ownership affects the level of cash holdings (the aim of this research), the analysis is based on the following regression model:

$$CH_{i,t} = \beta_1 CH_{i,t-1} + \beta_2 SGr_{i,t} + \beta_3 DbtIssues_{i,t} + \beta_4 CFlow_{i,t} + \beta_5 Block_{i,t} + \beta_6 Indiv_{i,t} + \beta_7 Govt_{i,t} + \beta_8 Foreign_{i,t} + \beta_9 CapEx_{i,t} + f_i + d_t + \varepsilon_{i,t} \quad (1)$$

In order to control for corporate growth and investment demand, as discussed in the accelerator theory, SGr has been added to the model, together with DbtIssues and CFlow, which are used to control for trade-off and pecking order theories, and CapEx, which is used to control for capital expenditures. The model also controls for firm-fixed effects (f_i) and year-fixed effects (d_t). However, due to the lack of information in Jordanian firms' annual reports, we were unable to add equity issues and research and development expenditure to the list of predictors.

Due to the study model's dynamic structure and the endogeneity of its predictors, traditional least squares regressions produced somewhat inconsistent results. The association between the lagged dependent variable and the unobservable fixed effects, as well as the endogenous nature of the predictors, explain this inconsistency [55]. As a result, Arellano and Bond [56] introduced the differenced-GMM estimator and took the initial difference to solve this issue; nonetheless, this approach does not completely avoid the association between the disturbances and the lagged dependent variable. To solve the endogeneity problem, it is crucial to utilize instruments that are not correlated with the residuals, but with the explanatory factors. However, as Blundell and Bond [57] and Alkhataybeh [50] point out, in the presence of weak instruments, estimates of the difference-GMM are not totally reliable because estimations tend to be downward biased (According to Alkhataybeh [50], inconsistent difference-GMM estimates can be discovered if the coefficient of the lagged dependent variable falls between OLS (upward-biased) and fixed-effect (downward-biased) estimates, with being closer to the second).

Blundell and Bond [57] created the system GMM estimator, which involves a set of the moment conditions for the differenced equation as well as for the equation in level to improve the estimator. It is preferable to utilize one-step or two-step estimation while using it. Homoscedastic errors are assumed in the one-step estimator, while heteroscedastic

ones are assumed in the two-step version. Flannery and Hankins [55] found that the two-step estimator was asymptotically more efficient in this setting, but that its standard error estimates were frequently biased downwards. As a result, the use of finite-sample standard error correction is encouraged. This study therefore considers the use of finite sample correction in the estimation of the two-step system-GMM. It should be emphasized that the instruments employed for the level equation in this study are the lagged difference and lagged level endogenous variables (dated $t - 2$ to $t - 2$) for the equation in difference.

5. Results and Discussion

The estimation results of the dynamic GMM model for the CH determinants are shown in Table 3. The lagged dependent variable (cash) has a positive and significantly different from zero coefficient, indicating that lagged cash levels positively influence current cash levels. Sgr, a control for growth opportunities, is almost zero. According to our results, sales growth does not have an impact on the level of CH. This is consistent with previous research [48,58,59] Therefore, growth opportunities do not play an important role in determining CH. This is inconsistent with the predictions of theories explaining CH levels. As mentioned previously, the financial system in Jordan is bank oriented, and government ownership also ensures preferential access to credit. Therefore, the opportunity costs of lost investments and growth opportunities are less relevant in Jordan.

Table 3. Estimation results of the dynamic cash holding model.

	One-Step GMM	Two-Step GMM
	CH	CH
$CH_{i,t-1}$	0.140 * (0.080)	0.140 * (0.080)
$Sgr_{i,t}$	−0.002 (0.002)	−0.002 (0.002)
$DbtIssues_{i,t}$	0.063 * (0.037)	0.064 * (0.037)
$CFlow_{i,t}$	0.295 *** (0.112)	0.294 *** (0.111)
$Block_{i,t}$	0.011 (0.181)	0.014 (0.175)
$Indiv_{i,t}$	0.157 (0.135)	0.157 (0.135)
$Govt_{i,t}$	0.605 *** (0.210)	0.603 *** (0.209)
$Foreign_{i,t}$	0.150 (0.129)	0.148 (0.130)
$CapEx_{i,t}$	0.082 * (0.043)	0.082 * (0.043)
Firm dummies	Yes	Yes
Year dummies	Yes	Yes
# of observations	625	625
# of firms	107	107
# of instruments	105	105
AR (1)	−2.91 ($p = 0.004$)	−2.58 ($p = 0.010$)
AR (2)	1.07 ($p = 0.285$)	1.14 ($p = 0.256$)
Hansen-test	92.18 ($p = 0.332$)	92.18 ($p = 0.332$)

*, **, and *** indicate significance of the coefficients at levels of 10%, 5%, and 1%, respectively.

$DbtIssues$ is found to be significantly and positively related to the level of CH , indicating that firms with new debt issues tend to hold more cash; this is in line with the findings of Maheshwari and Rao [47] and with trade-off theory. Such theory expects that firms with

higher debt levels will hold higher levels of cash because of the greater risk of bankruptcy. Companies with insolvency problems and facing the risk of bankruptcy tend to hold more cash [60] as a precaution. Therefore, such firms will raise more debt, if available, to increase their cash reserves.

CFlow has a positive significant effect on CH; in other words, firms tend to hold more cash when higher cash flows are in place, a finding that is consistent with free cash flow and pecking order theory. The positive result is consistent with the works of Ozkan and Ozkan [48] and Sher [51]. Capital expenditure (CapEx) is positively and statistically related to the levels of cash holdings, which is consistent with Jinkar [61] and Jebran et al. [62]. Supporting trade-off theory, this indicates that with higher capital expenditure in place, firms tend to hold higher levels of cash as a precaution in anticipation of investment frictions and time lags.

Finally, regarding our main variable, government ownership (Govt) was found to be significantly and positively associated with the levels of CH. Therefore, firms in Jordan with more shares owned by the government tend to hold higher levels of cash. The result is consistent with Gao et al. [63] and Chen et al. [14]. The results of the Arellano–Bond test of autocorrelation and Hansen’s J-test for the validity of the used instruments confirm the consistency of the one-step and two-step system-GMM estimates.

Robustness Tests and Results

To check the robustness of the main findings, we ran two alternative model specifications to investigate the impact of government ownership on corporate cash holdings. First, following Tobin’s q theory, we considered an alternative controlling proxy for corporate growth and investment demand; that is, the market to book ratio (MBR) instead of the SGR. As presented in Table 4, the inclusion of this control verified the initial findings reported in Table 3, despite the apparent slight variations in the coefficients’ magnitude. We continued to find statistical effects of DbtIssues, CFlow, CapEx, and Govt on corporate cash holdings.

Table 4. Estimation results of the dynamic cash holding model (controlling for MBR).

	Two-Step GMM	Two-Step GMM
	CH	CH
$CH_{i,t-1}$	0.149 * (0.009)	0.149 * (0.087)
$MBR_{i,t}$	0.009 (0.011)	0.008 (0.011)
$DbtIssues_{i,t}$	0.100 ** (0.040)	0.101 ** (0.040)
$CFlow_{i,t}$	0.334 *** (0.106)	0.335 *** (0.103)
$Block_{i,t}$	0.214 (0.236)	0.211 (0.230)
$Indiv_{i,t}$	0.260 (0.153)	0.263 (0.155)
$Govt_{i,t}$	0.656 *** (0.213)	0.657 *** (0.213)
$Foreign_{i,t}$	0.075 (0.122)	0.078 (0.120)
$CapEx_{i,t}$	0.080 ** (0.039)	0.080 ** (0.040)
Firm dummies	Yes	Yes
Year dummies	Yes	Yes
# of observations	625	625
# of firms	107	107
# of instruments	105	105

Table 4. Cont.

	Two-Step GMM	
	CH	CH
AR (1)	−2.14 (<i>p</i> = 0.032)	−1.40 (<i>p</i> = 0.061)
AR (2)	1.40 (<i>p</i> = 0.162)	1.44 (<i>p</i> = 0.149)
Hansen-test	94.01 (<i>p</i> = 0.285)	94.01 (<i>p</i> = 0.285)

*, **, and *** indicate significance of the coefficients at levels of 10%, 5%, and 1%, respectively.

Second, the potential interaction effect of different types of ownership on corporate cash holding was investigated. The inclusion of the ownership type interaction variables shown in Table 5 does not demonstrate that these interactions boost the model's explanatory power or make a statistical contribution. Despite the slight changes in the magnitudes of the coefficients, we continued to observe statistical effects of *DbtIssues*, *CFlow*, *CapEx*, and *Govt* on corporate cash holdings, which is consistent with the initial findings shown in Table 3.

Table 5. Estimation results of the dynamic cash holding model with ownership interactions.

	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM
	CH	CH	CH	CH	CH	CH
$CH_{i,t-1}$	0.130 (0.081)	0.137 * (0.082)	0.140 * (0.080)	0.141 * (0.078)	0.138 * (0.062)	0.121 (0.074)
$SgR_{i,t}$	−0.001 (0.002)	−0.002 (0.002)	−0.002 (0.002)	−0.002 (0.002)	−0.002 (0.002)	−0.002 (0.002)
$DbtIssues_{i,t}$	0.066 * (0.038)	0.066 * (0.087)	0.062 * (0.036)	0.063 * (0.037)	0.064 * (0.036)	0.070 * (0.039)
$CFlow_{i,t}$	0.294 *** (0.111)	0.298 *** (0.001)	0.295 ** (0.111)	0.292 *** (0.108)	0.296 *** (0.101)	0.304 *** (0.098)
$Block_{i,t}$	−0.053 (0.192)	0.005 (0.179)	0.137 (0.403)	0.016 (0.188)	0.030 (0.186)	0.103 (0.555)
$Indiv_{i,t}$	0.153 (0.132)	0.167 (0.133)	0.308 (0.438)	0.173 (0.172)	0.151 (0.123)	0.274 (0.489)
$Govt_{i,t}$	0.079 (1.074)	0.659 *** (0.215)	0.591 ** (0.232)	0.612 ** (0.218)	0.600 ** (0.214)	0.281 (1.229)
$Foreign_{i,t}$	0.153 (0.130)	0.184 (0.143)	0.140 (0.139)	0.164 (0.186)	0.249 (0.819)	0.705 (1.135)
$CapEx_{i,t}$	0.085 ** (0.042)	0.083 * (0.044)	0.081 ** (0.042)	0.082 * (0.042)	0.084 * (0.042)	0.086 * (0.044)
$Block \times Govt_{i,t}$	0.708 (1.416)					−0.537 (1.729)
$Block \times Foreign_{i,t}$		−0.713 (0.794)				−0.579 (1.282)
$Block \times Indiv_{i,t}$			−0.212 (0.538)			−0.111 (0.638)
$Indiv \times Foreign_{i,t}$				−0.052 (0.308)		−0.174 (0.388)
$Govt \times Foreign_{i,t}$					−0.124 (1.021)	−1.027 (1.064)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	625	625	625	625	625	625
# of firms	107	107	107	107	107	107
# of instruments	105	105	105	105	105	105

Table 5. Cont.

	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM	Two-Step GMM
	CH	CH	CH	CH	CH	CH
AR (1)	−2.57 (<i>p</i> = 0.010)	−2.58 (<i>p</i> = 0.010)	−2.59 (<i>p</i> = 0.010)	−2.59 (<i>p</i> = 0.009)	−2.60 (<i>p</i> = 0.009)	−2.62 (<i>p</i> = 0.009)
AR (2)	1.16 (<i>p</i> = 0.248)	1.15 (<i>p</i> = 0.251)	1.20 (<i>p</i> = 0.230)	1.16 (<i>p</i> = 0.245)	1.14 (<i>p</i> = 0.253)	1.19 (<i>p</i> = 0.233)
Hansen-test	90.63 (<i>p</i> = 0.345)	91.93 (<i>p</i> = 0.311)	92.03 (<i>p</i> = 0.309)	94.33 (<i>p</i> = 0.253)	91.25 (<i>p</i> = 0.329)	89.25 (<i>p</i> = 0.274)

*, **, and *** indicate significance of the coefficients at levels of 10%, 5%, and 1%, respectively.

6. Why Do Jordanian Firms Hold Cash?

We continued to investigate why firms with government ownership in Jordan hold more cash by following Gao et al. [63], examining whether they use cash for investments, use capital expenditures as a proxy or for pay outs, or use dividends as a proxy. The results are reported in Appendix A Table A1 for the former and Appendix A Table A2 for the latter.

Other types of ownership did not have an impact on the level of cash holdings and were found to be statistically insignificant, which is very surprising due to the high average stakes held by the owners. Government ownership is more salient to the levels of cash, even when a high number of shares are held by other types of owners. In fact, a study by Tayem [64] found that ownership (by the largest shareholder) had no effect on the level of cash holdings in Jordan. It could be inferred that ownership structure as a governance mechanism in Jordan is not effective, except for the government for political reasons. However, this question will be left for future research.

According to our results, firms with higher levels of government ownership tend to hold higher levels of cash. On the one hand, this could be attributed to the agency problems associated with government ownership, as predicted by the free cash flow theory. While government owners are more interested in political and social goals rather than shareholder interests, the managers of such firms are more likely to be directed towards also exploiting other shareholders' interests [64]. The weakness of corporate governance and the moral hazards associated with government ownership also need to be considered [65–67]. Therefore, in such an environment of weak internal monitoring, managers find it more convenient to hold greater levels of cash and reduce the need for external financing and their associated monitoring and scrutiny.

On the other hand, government-owned firms might use cash to make investments in research and development, acquisitions, and capital expenditure or to pay dividends. Therefore, we extend our analysis to examine why such firms hold higher levels of cash. To further understand this question, we investigate the effect of government ownership on the relationship between cash holdings and pay Not necessarily-out policies, and cash holdings and investment decisions.

Specifically, we examine the interaction between government ownership and cash holdings in investment decisions and pay-out policies. Capital expenditure is employed as a proxy for investment policies, and dividends as a proxy for pay-out policies. We were unable to examine other proxies, for example, research and development and acquisitions, due to data unavailability.

As shown in Appendix A Table A1, the coefficient on Govt. \times Ch is statistically insignificant; therefore, according to the results, as government ownership increases, firms are unlikely to increase capital expenditure. The coefficient on Govt \times Ch, as shown in Appendix A Table A2, is also insignificant, indicating that as government ownership increases, firms are unlikely to use more cash to pay dividends.

The evidence suggests that, as government ownership increases, firms in Jordan do not hoard higher levels of cash for investments nor for paying dividends. Alternatively, we interpret our results to support the expectations of free cash flow theory, that higher

government ownership is associated with more agency problems, which is consistent with the work of Firth et al. [68] and Chen et al. [14]. As the most liquid asset, cash is expected to be the first and most vulnerable to be exploited by management [3]; therefore, in light of government political goals, the way firms manage their cash holdings can be a clear measure of the existence of agency problems. Moreover, according to our results, managers in Jordan are more likely to implement the convenience mechanism [68]; higher cash holdings keep firms at a convenient and significant distance from market scrutiny, so managers prefer the convenience of cash and hold higher levels of it.

Our results support the common understanding that government ownership suffers from poorly structured governance and moral hazards. It was found to increase agency problems, so it is recommended that government ownership policy is revised to clarify its roles as an owner of firms and to set the objectives and expectations of its business ownership to ensure that it acts as a diligent owner and maintains an arm's length relation with the client. Moreover, the Jordanian government is considering the privatization of more listed firms in an attempt to enhance the performance of the capital market; the results of this research provide support for this step to be evaluated.

7. Conclusions

The research has examined the effect of government ownership on the level of cash holdings in 107 Jordanian listed firms covering the period 2009 to 2018. GMM was employed to investigate the main hypothesis. We provide evidence of the dynamic nature of cash holdings; firms tend to adjust their cash to reach an optimal level. It was found that capital expenditure and cash flow were positively and significantly associated with the level of holdings. With regard to the hypothesis, the results support the explanation of the free cash flow theory regarding the level of cash holdings. Agency costs in Jordanian firms with government ownership are high; managers who are protected by the government tend to hoard high levels of cash to serve political or their own interests.

The research provides implications for investors in Jordan. Prior to making investment decisions in any firm, they are advised to consider its ownership structure, more specifically the level of government ownership. For example, in firms with higher government ownership levels, investors should expect higher cash holdings, which are likely to be used for non-profit maximization objectives. In addition, an implication for corporate managers seeking to maximize the wealth of their principals (other than government) is to find horizons that lead to increasing the value of the firm and to attracting potential new investors who might be needed as a future means of finance.

The research is not without limitations. Due to the small sample size, we were unable to examine the differences in the level of cash holdings between different groups of firms; for example, dividend-paying and non-paying ones, and young and mature firms. In addition, market researchers are particularly advised to consider the ineffectiveness of the various types of ownership as a governance mechanism with regard to the level of cash holdings. Finally, we would recommend that researchers consider agency cost proxies to investigate the impact of agency conflict of corporate cash holdings.

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Appendix A

Table A1. Random Effects Logistic Regression Estimates.

Investment Decision (Increase CapEx)			
Variable	Coef	Std Error	p-Value
CH _{i,t-1}	−0.402	0.861	0.640
Govt × Ch	10.728	12.354	0.385
Sgr _{i,t}	0.010	0.013	0.405
DbtIssues _{i,t}	1.512 *	0.799	0.058
CFlow _{i,t}	1.889 **	0.883	0.032
Block _{i,t}	0.192	0.735	0.793
Indiv _{i,t}	0.012	0.635	0.984
Govt _{i,t}	2.416 *	1.396	0.084

Table A1. Cont.

Investment Decision (Increase CapEx)			
Variable	Coef	Std Error	p-Value
Foreign _{i,t}	−0.915	0.725	0.207
Divid _{i,t}	0.133	0.218	0.541
Industry dummy	Yes		
Year dummy	Yes		
# of firms	107		
# of observations	788		
Chi-Sq (21)	38.98		0.001

***, **, and * denote significance at levels of 1%, 5%, and 10%, respectively. Increase Capex: a dummy variable equal to 1 if a firm increases capital expenditures in the following year.

Table A2. Random Effects Logistic Regression Estimates.

Pay-Out Policy (Increase Div)			
Variable	Coef	Std Error	p-Value
CH _{i,t-1}	12.584 ***	2.903	0.000
Govt × Ch	7.622	56.293	0.892
Sgr _{i,t}	0.025	0.028	0.377
DbtIssues _{i,t}	0.109	1.010	0.913
CFlow _{i,t}	1.916 *	1.049	0.068
Block _{i,t}	−0.553	1.137	0.626
Indiv _{i,t}	1.037	0.948	0.274
Govt _{i,t}	5.206 **	2.235	0.020
Foreign _{i,t}	1.795	1.335	0.179
CapEx _{i,t}	2.650	1.639	0.106
Industry dummy	Yes		
Year dummy	Yes		
# of firms	107		
# of observations	724		
Chi-Sq (21)	35.23		0.008

***, **, and * denote significance at levels of 1%, 5%, and 10%, respectively. INCREASE DIV: a dummy variable equal to 1 if a firm increases the sum of dividends in the following year.

References

- Scherr, F.C. *Modern Working Capital Management: Text and Cases*; Prentice Hall: Upper Saddle River, NJ, USA, 1989.
- Keynes, J.M. The general theory of employment. *Q. J. Econ.* **1937**, *51*, 209–223. [[CrossRef](#)]
- Myers, S.C.; Majluf, N. Corporate financing and investment decisions when firms have information that investors do not have. *J. Financ. Econ.* **1984**, *13*, 187–221. [[CrossRef](#)]
- Shubita, R.; Shubita, M. The impact of foreign ownership on corporate governance: Evidence from an emerging market. *Investig. Manag. Financ. Innov.* **2019**, *16*, 101–115. [[CrossRef](#)]

5. Afifa, M.A.; Saleh, I.; Haniah, F. Direct and mediated associations among ownership structure, cash holdings, and firm value: The case of Jordanian insurance firms. *Vis. J. Bus. Perspect.* **2021**, *5*, 98–112. [[CrossRef](#)]
6. Alsmadi, S.; Alkhataybeh, A.; Shakhatreh, M.Z. Corporate cash holdings and disclosure violations: An empirical investigation of Jordanian listed companies. *J. Islamic Account. Bus. Res.* **2022**, *13*, 568–580. [[CrossRef](#)]
7. Jaradat, H.Z.; Alnaimi, A.A.; Alsmadi, S.A. The effect of cash holdings and corporate governance on firm value: Evidence from the Amman Stock Exchange [Special issue]. *J. Gov. Regul.* **2021**, *10*, 272–281. [[CrossRef](#)]
8. Abushammala, S.N.; Sulaiman, J. Cash holdings and corporate profitability: Some evidences form Jordan. *Int. J. Innov. Appl. Stud.* **2014**, *8*, 898–907.
9. Zeitun, R.; Tian, G.G. Does ownership affect a firm's performance and default risk in Jordan? *Corp. Gov. Int. J. Bus. Soc.* **2007**, *7*, 66–82. [[CrossRef](#)]
10. Al-Janadi, Y.; Rahman, R.A.; Alazzani, A. Does government ownership affect corporate governance and corporate disclosure? Evidence from Saudi Arabia. *Manag. Audit. J.* **2016**, *31*, 871–890. [[CrossRef](#)]
11. Boycko, M.; Shleifer, A.; Vishny, R.W. A theory of privatisation. *Econ. J.* **1996**, *106*, 309–319. [[CrossRef](#)]
12. Ab Razak, N.H.; Ahmad, R.; Aliahmed, H.J. Government ownership and performance: An analysis of listed companies in Malaysia. *Corp. Ownersh. Control.* **2008**, *6*, 434–442. [[CrossRef](#)]
13. Udin, S.; Khan, M.A.; Javid, A.Y. The effects of ownership structure on likelihood of financial distress: An empirical evidence. *Corp. Gov. Int. J. Bus. Soc.* **2017**, *17*, 589–612. [[CrossRef](#)]
14. Chen, R.R.; El Ghoul, S.; Guedhami, O.; Nash, R. State ownership and corporate cash holdings. *J. Financ. Quant. Anal.* **2018**, *53*, 2293–2334. [[CrossRef](#)]
15. U.S. Department of State. *2020 Investment Climate Statements: Jordan.* Available online: <https://www.state.gov/reports/2020-investment-climate-statements/jordan/> (accessed on 25 August 2022).
16. Office of King Hussein 1. Privatization. Available online: <http://www.kinghussein.gov.jo/economy5.html> (accessed on 25 August 2022).
17. Boubakri, N.; Cosset, J.C.; Saffar, W. The role of state and foreign owners in corporate risk-taking: Evidence from privatization. *J. Financ. Econ.* **2013**, *108*, 641–658. [[CrossRef](#)]
18. Eisenhardt, K.M. Agency theory: An assessment and review. *Acad. Manag. Rev.* **1989**, *14*, 57–74. [[CrossRef](#)]
19. Jensen, M.C.; Meckling, W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [[CrossRef](#)]
20. Maury, B.; Pajuste, A. Multiple large shareholders and firm value. *J. Bank. Financ.* **2005**, *29*, 1813–1834. [[CrossRef](#)]
21. Young, M.N.; Peng, M.W.; Ahlstrom, D.; Bruton, G.D.; Jiang, Y. Corporate governance in emerging economies: A review of the principal–principal perspective. *J. Manag. Stud.* **2008**, *45*, 196–220. [[CrossRef](#)]
22. Maug, E. Large shareholders as monitors: Is there a trade-off between liquidity and control? *J. Financ.* **1998**, *53*, 65–98. [[CrossRef](#)]
23. Chen, X.C.; Yur-Austin, J. Re-measuring agency costs: The effectiveness of blockholders. *Q. Rev. Econ. Financ.* **2007**, *47*, 588–601. [[CrossRef](#)]
24. Aboud, A.; Diab, A. Ownership Characteristics and Financial Performance: Evidence from Chinese Split-Share Structure Reform. *Sustainability* **2022**, *14*, 7240. [[CrossRef](#)]
25. Fama, E.F.; Jensen, M.C. Agency problems and residual claims. *J. Law Econ.* **1983**, *26*, 327–349. [[CrossRef](#)]
26. Okhmatovskiy, I. Performance implications of ties to the government and SOEs: A political embeddedness perspective. *J. Manag. Stud.* **2010**, *47*, 1020–1047. [[CrossRef](#)]
27. Opler, T.; Pinkowitz, L.; Stulz, R.; Williamson, R. The Determinants and Implications of Corporate Cash Holdings. *J. Financ. Econ.* **1999**, *52*, 3–46. [[CrossRef](#)]
28. Jensen, M.C. Agency costs of free cash flow, corporate finance, and takeovers. *Am. Econ. Rev.* **1986**, *76*, 323–329.
29. Duchin, R. Cash holdings and corporate diversification. *J. Financ.* **2010**, *65*, 955–992. [[CrossRef](#)]
30. Al-Amarnah, A. Corporate Cash Holdings and Financial Crisis: Evidence from Jordan. *Int. Bus. Res.* **2015**, *8*, 212–222. [[CrossRef](#)]
31. Iskandrani, M.; Hamad, A.; Yaseen, H.; AlZoubi, T.; Almaharmeh, M. Earnings Quality and Cash Holdings of Listed Firms in Jordan. *Acad. Account. Financ. Stud. J.* **2020**, *24*, 1–10.
32. McLean, L.D. Understanding Creativity in Organizations: The Relationships among Cross-Level Variables and Creativity in Research and Development Organizations. Ph.D. Dissertation, University of Minnesota, Minneapolis, MN, USA, 2011.
33. Al-Amarnah, A. Why do Jordanian firms hold cash? An empirical examination of the industrial companies listed in ASE. *Int. J. Acad. Res.* **2013**, *5*, 103–111. [[CrossRef](#)]
34. Khataybeh, M.A. Do financing constraints hinder corporate fixed investment? Evidence from the Amman Stock Exchange. *Cogent Bus. Manag.* **2021**, *8*, 1910161. [[CrossRef](#)]
35. Dittmar, A.; Mahrt-Smith, J.; Servaes, H. International corporate governance and corporate cash holdings. *J. Financ. Quant. Anal.* **2003**, *38*, 111–133. [[CrossRef](#)]
36. Faccio, M. Differences between politically connected and nonconnected firms: A cross-country analysis. *Financ. Manag.* **2010**, *39*, 905–928. [[CrossRef](#)]
37. Song, L.; Yang, J.; Zhang, Y. State-owned enterprises' outward investment and the structural reform in China. *China World Econ.* **2011**, *19*, 38–53. [[CrossRef](#)]

38. Pinkowitz, L.; Stulz, R.; Williamson, R. Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis. *J. Financ.* **2006**, *61*, 2725–2751. [[CrossRef](#)]
39. Kornai, J. Resource-Constrained versus Demand-Constrained Systems. *Econometrica* **1979**, *47*, 801–819. [[CrossRef](#)]
40. Faccio, M.; Masulis, R.W.; McConnell, J.J. Political connections and corporate bailouts. *J. Financ.* **2006**, *61*, 2597–2635. [[CrossRef](#)]
41. Laffont, J.J.; Tirole, J. *A Theory of Incentives in Procurement and Regulation*; MIT Press: Cambridge, MA, USA, 1993.
42. Vickers, J.; Yarrow, G.K. *Privatization: An Economic Analysis (18)*; MIT Press: Cambridge, MA, USA, 1988.
43. Shleifer, A.; Vishny, R.W. Politicians and firms. *Q. J. Econ.* **1994**, *109*, 995–1025. [[CrossRef](#)]
44. Megginson, W.L.; Ullah, B.; Wei, Z. State ownership, soft-budget constraints, and cash holdings: Evidence from China’s privatized firms. *J. Bank. Financ.* **2014**, *48*, 276–291. [[CrossRef](#)]
45. Abramov, A.; Radygin, A.; Entov, R.; Chernova, M. State ownership and efficiency characteristics. *Russ. J. Econ.* **2017**, *3*, 129–157. [[CrossRef](#)]
46. Al-Najjar, B. The financial determinants of corporate cash holdings: Evidence from some emerging markets. *Int. Bus. Rev.* **2013**, *22*, 77–88. [[CrossRef](#)]
47. Maheshwari, Y.; Rao, K.V. Determinants of corporate cash holdings. *Glob. Bus. Rev.* **2017**, *18*, 416–442. [[CrossRef](#)]
48. Ozkan, A.; Ozkan, N. Corporate cash holdings: An empirical investigation of UK companies. *J. Bank. Financ.* **2004**, *28*, 2103–2134. [[CrossRef](#)]
49. Martínez-Sola, C.; García-Teruel, P.J.; Martínez-Solano, P. Cash holdings in SMEs: Speed of adjustment, growth and financing. *Small Bus. Econ.* **2018**, *51*, 823–842. [[CrossRef](#)]
50. Alkhataybeh, A. Working capital and R&D smoothing: Evidence from the Tel Aviv stock exchange. *J. Appl. Econ.* **2021**, *24*, 91–102.
51. Sher, G. *Cashing in for Growth: Corporate Cash Holdings as an Opportunity for Investment in Japan*; Working paper; International Monetary Fund: Washington, DC, USA, 2014.
52. Nguyen, T.T.H.; Wong, W.K. Do state ownership and business environment explain corporate cash holdings? Empirical evidence from an emerging country. *Asian Acad. Manag. J. Account. Financ.* **2021**, *17*, 1–33. [[CrossRef](#)]
53. Alfaraih, M.; Alanezi, F.; Almujaed, H. The influence of institutional and government ownership on firm performance: Evidence from Kuwait. *Int. Bus. Res.* **2012**, *5*, 192–200. [[CrossRef](#)]
54. Roodman, D. How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata J.* **2009**, *9*, 86–136. [[CrossRef](#)]
55. Flannery, M.J.; Hankins, K.W. Estimating dynamic panel models in corporate finance. *J. Corp. Financ.* **2013**, *19*, 1–19. [[CrossRef](#)]
56. Arellano, M.; Bond, S.R. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Rev. Econ. Stud.* **1991**, *58*, 277–297. [[CrossRef](#)]
57. Blundell, R.; Bond, S. Initial conditions and moment restrictions in dynamic panel data models. *J. Econom.* **1998**, *87*, 115–143. [[CrossRef](#)]
58. Orlova, S.V.; Rao, R.P. Cash holdings speed of adjustment. *Int. Rev. Econ. Financ.* **2018**, *54*, 1–14. [[CrossRef](#)]
59. Kalcheva, I.; Lins, K.V. International evidence on cash holdings and expected managerial agency problems. *Rev. Financ. Stud.* **2007**, *20*, 1087–1112. [[CrossRef](#)]
60. Harford, J.; Mansi, S.A.; Maxwell, W.F. Corporate governance and firm cash holdings in the US. *J. Financ. Econ.* **2008**, *87*, 535–555. [[CrossRef](#)]
61. Jinkar, R.T. Analisa faktor-faktor penentu kebijakan cash holding perusahaan manufaktur di Indonesia [Analysis of the determinants of cash holding policy of manufacturing companies in Indonesia]. *Mini Econ.* **2013**, *42*, 129–146.
62. Jebran, K.; Iqbal, A.; Bhat, K.U.; Khan, M.A.; Hayat, M. Determinants of corporate cash holdings in tranquil and turbulent period: Evidence from an emerging economy. *Financ. Innov.* **2019**, *5*, 3. [[CrossRef](#)]
63. Gao, H.; Harford, J.; Li, K. Determinants of corporate cash policy: Insights from private firms. *J. Financ. Econ.* **2013**, *109*, 623–639. [[CrossRef](#)]
64. Tayem, G. The determinants of corporate cash holdings: The case of a small emerging market. *Int. J. Financ. Res.* **2017**, *8*, 143–154. [[CrossRef](#)]
65. Borisova, G.; Brockman, P.; Salas, J.M.; Zagorchev, A. Government ownership and corporate governance: Evidence from the EU. *J. Bank. Financ.* **2012**, *36*, 2917–2934. [[CrossRef](#)]
66. Boubakri, N.; Cosset, J.C. The financial and operating performance of newly privatized firms: Evidence from developing countries. *J. Financ.* **1998**, *53*, 1081–1110. [[CrossRef](#)]
67. Su, S.; Zhu, F.; Zhou, H. A Systematic Literature Review on Ownership and Corporate Social Responsibility in Family Firms. *Sustainability* **2022**, *14*, 7817. [[CrossRef](#)]
68. Firth, M.; Malatesta, P.H.; Xin, Q.; Xu, L. Corporate investment, government control, and financing channels: Evidence from China’s Listed Companies. *J. Corp. Financ.* **2012**, *18*, 433–450. [[CrossRef](#)]

Article

Islamic Religiosity and CSR Attitudes—The Case of Egyptian Managers

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Abstract: In this research, we investigated the complex relationship between Islamic religious beliefs and corporate social responsibility (CSR) attitudes and behaviour. We defined four aspects of religiosity, four types of individual attitudes toward CSR, and five types of CSR behaviour. The empirical analysis of the responses of 274 questionnaires showed that there is a very different picture of the Islamic religiosity of the Egyptian managers, with low correlations between the cognitive, intrinsic, extrinsic, and behavioural aspects of religiosity. The results show that there are significant and negative impacts of Islamic religious beliefs on various types of CSR attitudes and behaviour. The joint mediating role of attitudes toward CSR is almost non-existent and Islamic religious beliefs exert a direct impact on CSR behaviour. Our findings offer important implications for CSR scholars to use a multidimensional measure to assess the religious beliefs of managers and their impacts on CSR attitudes. These findings also enhance business managers' awareness of the interconnection of religiosity and CSR.

Keywords: Islamic religiosity; individual responsibility; CSR; managers; Egypt

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1. Introduction

Friedman [1] stated that with one that perceives the task of the corporate manager as simply maximising profits for shareholders, being subject only to legal constrictions rather than broader concerns for other stakeholders or society as a whole. The view that more corporate social responsibility (CSR) than just shareholder-based performance indicators needs to be taken into account, leads to at least three further questions: the first question identifies which additional stakeholders might be seen as legitimate and accorded due regard in the management of corporation, with Phillips [2] (p. 130), as one example, discussing stakeholders and “non-stakeholders” (chapter 6), though the corporation is seen as having an ethical obligation to even non-stakeholders “as humans”; the second question is whether this broader responsibility should apply to all corporations or just certain ones, for example, Looser and Wehrmeyer [3] address the motivations of large versus small corporations; the third question considers how performance evaluation for other known stakeholders should be measured and reported.

Extant CSR literature has mainly focused on corporate and organisational levels and on the influence of both internal (e.g., managers and employees) and external stakeholders (e.g., investors and customers) [4]. However, CSR, by its nature, is a construct that links micro to macro levels [5]. As a result, CSR scholars have recently begun investigating CSR at the micro-level, for example, the relationship between the religious beliefs of corporate managers and their CSR [6–8]. Although the relationship between managers' religious

beliefs and CSR might seem clear, empirical studies have produced inconsistent and mixed results [9,10].

Some CSR studies found no difference between religious and non-religious managers; some established a negative impact of religious managers on CSR attitudes, whereas others showed a positive impact [9,11]. Nevertheless, these conflicting and mixed results agree that religious beliefs have a strong influence on workplace and personal values that affect CSR attitudes and behaviour [9,12–14]. Both managers' beliefs and personal values are significant in shaping their managerial decisions and affect the values, beliefs, and behaviour of their followers [12,15].

In our study, we intend to contribute to the extant literature by examining the impact of religious beliefs on CSR attitudes and behaviour in addressing the three methodological problems that Weaver and Agle [16] specify. *First*, although the existing literature aims to theorise and measure religious beliefs as a one-dimensional concept of individual behaviour, such as participating in worship activities [16,17], or cognitive components [18], we adopted the Mazereeuw-van der Duijn Schouten et al. [9] classification of the different aspects of religiosity as religiosity cannot be perceived as a single phenomenon.

Second, we intend to contribute to CSR research by assessing managers' attitudes toward CSR and their CSR behaviour [4,19]. Weaver and Agle [16] found that prior studies focused on attitudinal methods of business morals. For example, Ibrahim et al. [8] examined the association between religiousness and CSR orientation, Parboteeah, Hoegl, and Cullen [20] tested the impact of religion on views of the workplace, and Ramasamy et al. [21] investigated the impact of religiosity on consumers' support for CSR. Because attitudinal matrices, in particular, may suffer from societal interest bias, this study also assesses the CSR behaviour of managers, see also [22].

Third, this study contributes to existing CSR literature by collecting and analysing 274 questionnaires from Egyptian Muslim managers. This method is unique, as prior researchers used samples of undergraduate and/or postgraduate students [7,10,23]. Likewise, Loe et al. [24] contend that the use of industry professionals (e.g., Accountants, Financial Analysts, Managers, and Executives) improves the reliability of the research results.

Based on the above debate, understanding this relationship is crucial for two purposes. *First*, as governments face critical and organisational challenges in monitoring and minimising societal and environmental problems, there is a strong interest in CSR for understanding and responding to public sustainable development goals [10,25]. It is crucial to identify the factors that are likely to affect the decision-making processes of corporate managers [13,26]. *Second*, managers need to understand the ways in which their religious beliefs affect their CSR attitudes and behaviours [13]. According to Murphy et al. [10], religion could encourage managers to adopt religious values that promote CSR values, such as stewardship, charitable activities, morality, etc. Therefore, it is very important to understand the influence of managers' religious beliefs on CSR attitudes and behaviour.

This study is structured as follows. First, key aspects of the religiosity and CSR literature are highlighted. We then explain our methodology, and then, our findings. Finally, we discuss our conclusions, and come up with the research implications, and limitations of the research and then suggest some avenues for future research.

2. Literature Review

Empirical investigations of the relationship between religious beliefs and managers' behaviour could be divided into four groups of research questions [16]: (1) questions investigating the legal and ethical matters of the concept and influence of religion in organisations; (2) questions testing the normative works applying religious values to issues of business morals; (3) questions analysing the religious institutions that implore elements of organisational sociology; and (4) questions examining the impact of religious beliefs on corporate economic performance. Although the first three groups of questions are predominantly of interest to solicitors, theorists, and sociologists, this study focuses on

the fourth group of questions—the impact of religious beliefs on managerial attitudes and behaviour. Accordingly, this group will be explained in turn.

2.1. *Islamic Ethics and Individual Responsibility*

Islamic ethics address the human being as an individual and makes it clear that every human being is accountable for his actions and will be penalised or rewarded for what he did [25]. Islamic Law (Shari'ah Law) gives Muslims crucial personal character traits in which they may get a common, correct vision of themselves and everything around them and the right manner and behaviour. This Islamic Law covers every aspect of life: ethical, physical, economic, etc., [26]. Based on the Islamic teachings, we, as God's creatures, are obligated to make a vigorous effort to protect and take care of his living and non-living creatures. Thus, every Muslim, has three main responsibilities toward his people (i.e., the community), the environment, and other creations [25]. The first responsibility is the responsibility toward other human beings. Therefore, they have a social character which is based on the interaction and communication with other human beings and the community in which they live. To live in harmony and to work together with his people, God placed rules and laws (on every aspect of life) to assist human beings in their interactions with each other. These rules precisely govern the responsibilities and rights of every human being according to his position, status, and total of his characters. In Islam, all human beings are equal in the sight of God; the most honoured one is the best one in behaviour [25]. In Islam, a human being is valued and appreciated just because he is a human being, and therefore, human rights have a very high position in Islam. Disrespecting those rights means showing unwillingness to accept the laws and rules of God, and being unjust to people.

The second responsibility is responsibility toward the environment (i.e., nature and its resources). The environment is defined as the features of the world surrounding us, and the place where we live [25]. Everything in the universe is standardised and well-adjusted. Meanwhile, human beings (The Vicegerent) have acquired authority and control in some domains to a certain level, so they should accomplish them properly and fairly for the sake of their God. Islamic Law prohibits environmental degradation, pollution, destruction, the clearing of trees and plants, abuse, exhaustion of resources, and every kind of corruption on the earth [25]. Therefore, the appropriate use of environmental goods and everything around us is of great importance concerning our welfare, advantage, and richness. Lastly, the third responsibility is the human responsibility toward other God's creations such as animals, birds, plants, etc., [25]. They are creations of God brought under the control of man. Most of these creations are considered respectable creatures, and therefore, Islam considers their rights and has set up a specified protocol regarding them [26]. People must show kindness to them and should not hurt them by burning, beating, grieving, distressing, or loading onto them more than they can bear. To conclude, Islam wants everyone to take responsibility for his or her actions and to begin to identify adverse situations by seeing how he or she has fallen short in meeting the conditions overall. Fulfilling these individual ethical responsibilities can lead to the formulation of a well-established person, family, company, and ultimately a community with good attitudes and behaviour toward CSR support.

2.2. *Theory of Planned Behaviour*

The TPB identifies that attitude toward behaviour, subjective norms, and perceived behavioural control, together shape a person's behavioural purposes and behaviours [27]. According to TPB, individual action is guided by three aspects: (a) behavioural beliefs, (b) normative beliefs, and (c) control beliefs, see also [28,29]. These three aspects are central in the circumstances/programs/schemes when changing the behaviour of individuals. However, not all individuals respond or act in the same way, even under the same conditions. There are several determinants at play, and these are what psychologists and philosophers have attempted to study and make sense of in the past few decades. One of these determinants is religion and its impact on human prosocial behaviour. For example,

studies indicate that the relationship between religious beliefs and prosocial behaviour is complicated in two ways. *Firstly*, the findings of these studies have shown that individuals' religious beliefs affect their prosocial attitudes. McNichols and Zimmerer [30] and Kennedy and Lawton [23] discovered the substantial influence of religious beliefs on negative attitudes toward certain undesirable behaviour. Similarly, Rice [11] found that religious teachings and religion were related to the pro-environmental behaviour of Egyptian citizens. Vitell et al. [17] observed that religious beliefs and personal attitudes were significant determinants of consumer ethical behaviour. *Secondly*, although religious beliefs are significantly related to ethical attitudes, the relationship between religion and prosocial behaviour is much weaker. For instance, although religious persons report positive planned helping behaviour, these reports seem unrelated to unplanned helping behaviours. Religiosity shows a great discrepancy between altruistic beliefs and actual altruistic behaviour [31].

The attitude toward a behaviour is a condition of fundamental behavioural beliefs. Behavioural beliefs, therefore, are a person's beliefs about the implications of certain behaviour. So, the individual's religiosity and values are shaping these beliefs [28,29]. Therefore, this study will follow this principle when developing the measures of CSR attitudes and behaviours [9]. Based on the above discussion, the relationship between religious beliefs and values, personal attitudes and behaviours, and CSR support can be explained by the TPB [27,29].

2.3. Managers' Religiosity and CSR Attitudes

Managers' religious beliefs may affect their attitudes toward CSR in two ways. *First*, religiosity is a key source of individual values [10,32]. These values serve as the basis for the formation of individuals' attitudes, see for example [28]. *Second*, religiosity denotes believers with principles by which to live [32]. Religious attitudes may prove a strong association with actual personal behaviour [29]. According to the TPB, managers' attitudes toward CSR may stimulate their CSR behaviour [22].

Accordingly, this study will investigate whether managers' CSR attitudes affect their CSR behaviour. As stated by the TPB, religiosity may thus influence managers' CSR behaviour indirectly through CSR attitudes. Though religiosity may also affect individual behaviour directly because it also involves specific reinforcements and penalties to enhance ethical behaviour [32]. Religion comprises instructions relating to economic activities and sustainability agendas that inspire directors to perform in a socially responsible manner [16]. Because these instructions stimulate executives' attitudes to CSR, there may also be a direct effect of managers' religiosity on their CSR behaviour, without interference by managers' attitudes.

In their study, Mazereeuw-van der Duijn Schouten et al. [9] state that the cognitive component of religion is about what someone believes. The notion of God and his creatures and the view on the key responsibilities of creatures in a religious system have major moral consequences. This individual attitude reveals the degree to which human beings are dedicated to their religious teachings [33]. Religious literature defines two non-mutually exclusive types of religious motivation. *Firstly*, people are fundamentally oriented toward their religion, and this means that their religion is a meaning-endowing framework in terms of which all of their life is understood. *Secondly*, an extrinsic religious orientation where faithfulness is informed by societal agreement and well-being, a self-serving instrumental method shaped to suit oneself [9]. As a result, if a religious person is intrinsically motivated (i.e., treats religious belief as an end in itself), religious convictions and norms are more likely to be translated into his behaviour and actions. The power of religious behaviour supports the influence of religious belief on business behaviour [10].

In conclusion, this study aims to analyse the impact of the religiosity of managers on their personal attitudes toward CSR and CSR behaviour. Their behavioural attitudes may also affect companies' CSR practices as managers design and develop their corporate CSR strategy and policy [10,25]. Based on the above discussion, the core research questions of this study are:

RQ1. How do various aspects of Egyptian Managers' religiosity influence their attitudes toward CSR?

RQ2. How do Egyptian Managers' attitudes toward CSR influence their CSR behaviour?

RQ3. Do Egyptian Managers' attitudes strengthen the influence of various aspects of their religiosity on CSR behaviour?

3. Methodology

3.1. Sample and Procedure

Our investigation to answer the above research questions was based on data collected by a self-administered questionnaire used in other relevant research covering the different aspects of religiosity and CSR [21,34,35]. Considering Guiso, Sapienza, and Zingales's [36] concerns that cross-country research about religion and business ethics gets confused by differences in other institutional factors, this research is limited to Egyptian Muslim Managers, thereby minimizing cultural and institutional differences. Egypt, the largest country in the Arab world with over 100 million citizens, most of them are Muslims (95%), was a suitable site for conducting this research [10]. Since the original survey was developed in English, it was translated into Arabic and piloted using three bilinguals. After getting approval, fifteen Egyptian Muslim Managers were randomly chosen from different sectors for the pilot study to ensure that the pilot testers had the same features as those involved in the main research. To collect data, a self-administered questionnaire was used. The questionnaire was attached with a cover letter explaining the purpose of the study and assuring complete confidentiality. The study employed a snowball sampling technique to reach potential participants.

Of the 500 distributed questionnaires, 274 were completed and returned, resulting in a response rate of 55%. Comery and Lee [37] recommended that the adequate size of a research sample should be 200 or more. Therefore, the 274 collected questionnaires are considered an adequate sample size to answer the research questions and to generalise the findings, at least, in an Egyptian context. The average age of the managers was 41 years; 70% of the respondents were male; and 43% have 1 to 15 years of work experience. The respondents represented five different industrial sectors: manufacturing (15%), construction (13%), trade (15%), financial services (15%), and other services (42%). Many respondents held senior positions in their organisations: 12% were Director-Owners, 29% were CEOs, and 59% held other senior positions (e.g., Head of Department, Production and Operations Manager). Finally, we tested the non-response bias by comparing "early" respondents ($n = 160$) with "late" respondents ($n = 114$), as a surrogate for those who had not responded to the questionnaire and found no significant variance between "early" and "late" respondents [38]. Different procedures were followed to control the response bias such as explaining that responses would remain confidential [39] and conducting a confirmatory factor analysis [40–42].

3.2. Measures

3.2.1. Religiosity

Religiosity was measured using four aspects: the cognitive, intrinsic, extrinsic affective, and behavioural aspects of religiosity, developed by Mazereeuw-van der Duijn et al. [9]. The cognitive aspect of religiosity was measured using five questions concerning the respondents' conception of God, views on individuals, and expectations regarding eternity. The answers to these questions were recalculated to the same scale. Since the internal consistency of the answers proved to be good (Cronbach's $\alpha = 0.94$), the answers were taken together to form the variable 'cognitive aspect of religiosity'. The effective element of religiosity was measured using the intrinsic/extrinsic religiousness scale [43]. The scale consists of 16 statements (8 statements for each), measuring the intrinsic and extrinsic inspiration of the participants toward their religious beliefs. The internal consistency of the intrinsic motivation was 0.84. Averaging the scores on eight statements regarding

participants' extrinsic enthusiasm toward their religious beliefs produced the extrinsic measure. The internal consistency of both intrinsic and extrinsic motivation was 0.73.

The behavioural aspect of the religiosity of the respondents was assessed using five questions including the attendance of religious ceremonies, participation in other activities of the religious community, and time spent in private prayer, work-related prayer, and meditation. Since these five items strongly correlate with each other, we created one measure, named the intensity of religious behaviour, based on the average score of these five questions [9]. The internal consistency of this measure was 0.69 [43]. A correlation analysis was conducted on the four measures of religiosity to control any potential cross-relationships between the various aspects of religiosity. Consistent with the findings of Mazereeuw-van der Duijn et al. [9], Table 1 demonstrates a positive, weak, but significant correlation between the cognitive and extrinsic effects. The Intrinsic affective aspect of religiosity also proves to be a positive and significant correlation with the extrinsic effect and the behavioural aspects of religiosity. The Extrinsic effect also indicates a positive and significant correlation with the behavioural aspects of religiosity. This implies that there are no strong and significant correlations between the aspects of religiosity.

Table 1. Means, Standard Deviations, and Correlations of the Aspects of Religiosity.

	Mean	SD	Reliability	1	2	3
1—Cognitive Aspects of Religiosity	0.910	0.101	0.940			
2—Intrinsic Religious Motivation	3.570	0.415	0.730	0.072		
3—Extrinsic Religious Motivation	3.500	0.660	0.730	0.180 **	0.316 **	
4—Intensity of Religious Behaviour	3.130	0.653	0.690	0.036	0.230 **	0.304 **

Note: ** $p < 0.01$.

3.2.2. Attitudes toward CSR

The attitudes toward CSR were measured as financial, legal, ethical, and philanthropic responsibilities, respectively. The study adopted a scale developed by Aupperle et al. [44]. The participants were asked to allocate 10 points to each of the five groups of four statements measuring the importance the participants attributed to each of these four CSR attitudes. Following Aupperle et al.'s [44] recommendation, we used this forced-choice approach to minimise a social desirability response bias. We also created four reduced-scale items for financial, legal, ethical, and philanthropic orientation and subjected the reduced-scale items to confirmatory factor analysis. The internal consistencies of the factors were 0.87 for financial orientation, 0.71 for legal orientation, 0.65 for ethical orientation, and 0.76 for philanthropic orientation.

3.2.3. CSR Behaviour

CSR behaviour was measured using 16 items developed by Graafland et al. [34]. These 16 items are all related to the personal contributions of the Egyptian Muslim managers toward CSR. As discussed before, an important condition for the relationship between attitudes and behaviour is the so-called principle of compatibility: the measure of attitude must match the measure of behaviour in terms of the level of generalisation. Since the questions regarding CSR behaviour are far more specific than the questions regarding attitudes toward CSR, we reduced the set of behavioural items to a smaller set of more reliable and less specific measures. As a result, a Principal Component Analysis with a Varimax Rotation on the items was conducted. As seen in Table 2, the analysis presented four factors with eigenvalues greater than one. Within these factors, we retained individual items if their loading was greater than 0.50. Loadings of 0.50 or greater were considered very significant [45].

Table 2. Results of Exploratory Principal Component Analysis for CSR Behaviour.

	Internal Stakeholders	External Stakeholders	Diversity	Natural Environment
Employee safety	0.603			
Prevent abuse	0.647			
Employee training	0.651			
Respectful relation with customer		0.686		
Respectful relation with suppliers		0.746		
Respectful relation with competitors		0.783		
Offering equal opportunity to women			0.717	
Offering equal opportunities to immigrants			0.711	
Preventing Child labor			0.646	
Reintegration of disabled people			0.633	
Increasing employees attention to environment				0.707
Reducing pollution of the own country				0.845
Reducing pollution within the business chain				0.741
Reducing overconsumption of natural resources				0.804
Initial eigenvalue	1.310	1.044	1.545	6.453
Proportion of total variance	13.959	13.377	15.874	21.487
Cumulative explained variance	51.320	64.697	37.361	21.487
Cronbach's Alpha reliability	0.709	0.712	0.651	0.873

Based on the results, we created four measures for the behavioural component of CSR: (1) 'internal stakeholders' (the average score of the statements with respect to employee safety, employee training, and the prevention of abuse); (2) 'external stakeholders' (the average score of the statements with respect to the relationship with customers, suppliers, and competitors); (3) 'diversity' (the average score of the statements with respect to offering equal opportunities to women and ethnic minorities), and (4) 'natural environment' (the average score of the statements with respect to the reduction in environmental impact and the increase in employees' awareness of environmental sustainability). Finally, we exposed the reduced-scale items to positive factor analysis. The internal consistency of the factors was 0.71 for internal stakeholders, 0.71 for external stakeholders, 0.65 for diversity, and 0.87 for the natural environment, and Cronbach's Alpha is equal to 0.83, which is also very satisfying [43].

3.2.4. Control Variables

To control any potentially omitted variables bias, we included some control variables representing the relationship between religiosity and CSR. These included age, gender, position, and type of industry. Prior research suggests that joiner managers are more likely to believe that good business ethical practice is positively associated with positive business performance [10,46]. Previous research also suggests that females have a more favourable attitude toward moral behaviour than males [10]. Regarding the position of the participants, we focused on managers because of their level of sovereignty (e.g., owner, CEO, and senior manager). Finally, we differentiated between the participants' five industries: manufacturing, construction, trade, financial services, and other services.

4. Results

4.1. Descriptive Statistics

Table 3 shows the means and standard deviations for all study variables. The correlation analysis between all variables shows significant correlations between some independent variables. As presented in Table 3, there is some multicollinearity between the behaviour aspects of religiosity and the attitudinal variables, and between the CSR behaviour variables and the CSR attitudinal variables. As this may affect the statistical results of the impact of these variables on both CSR behaviour and attitudes, the Variance Inflation Factor (VIF) was used to check whether these correlations would bias the study findings [45].

Table 3. Descriptive Statistics and Correlation Coefficients.

	Mean	SD	1	1a	1b	1c	1d	2a	2b	2c	2d	3
1	3.73	0.83										
1a	4.08	0.86	0.82 **									
1b	4.24	0.93	0.73 **	0.48 **								
1c	3.05	1.21	0.81 **	0.55 **	0.46 **							
1d	3.54	1.14	0.82 **	0.63 **	0.46 **	0.48 **						
2a	0.91	0.10	-0.08	-0.09	-0.00	-0.20 **	0.01					
2b	3.57	0.42	0.18 **	0.14 **	0.17 **	0.13 *	0.15 **	-0.07				
2c	3.50	0.66	0.03	0.05	0.07	-0.46	0.04	0.18 **	0.32 **			
2d	3.13	0.65	0.12 *	0.08	0.06	0.12 *	0.13 *	0.04	0.23 **	0.30 **		
3	1.97	1.69	0.07	0.03	0.05	0.07	0.07	-0.07	0.06	-0.04	-0.04	
4	1.89	1.27	-0.01	0.04	0.02	-0.07	-0.03	-0.07	-0.06	0.04	-0.18 **	-0.31 **
5	2.01	1.36	-0.03	-0.04	-0.02	-0.02	-0.02	0.05	0.06	0.04	0.19 **	0.62 **
6	2.19	1.64	-0.04	-0.03	-0.08	0.01	-0.11 *	-0.07	-0.01	-0.10	-0.33 **	-0.24 **
7	4.01	1.84	0.09	0.10	0.02	0.05	0.09	-0.01	0.01	-0.01	-0.06	-0.06
8	1.30	0.46	-0.14 *	-0.08	-0.12 *	-0.12 *	-0.12 *	-0.06	-0.06	-0.60	0.11 *	-0.07
9a	0.04	0.19	0.10 *	0.04	0.11 *	0.06	0.02	-0.12 *	-0.01	-0.03	-0.11 *	0.06
9b	0.11	0.31	0.01	0.01	-0.02	-0.03	-0.07	-0.07	-0.08	-0.01	-0.13 *	0.14 *
9c	0.19	0.39	0.11 *	0.09	0.10 *	0.10 *	0.05	-0.01	0.04	-0.04	0.06	-0.03
10a	0.30	0.46	0.04	-0.04	0.08	-0.03	0.08	0.07	0.08	0.10 *	-0.04	-0.03
10b	0.04	0.21	-0.02	0.01	0.03	-0.01	0.07	0.06	-0.04	0.06	-0.06	-0.01
10c	0.08	0.28	0.03	-0.02	0.09	0.01	-0.05	-0.06	-0.03	0.04	0.02	-0.02
10d	0.11	0.31	0.02	0.05	-0.01	0.08	0.17 **	0.01	0.07	-0.03	-0.02	0.04
10e	0.27	0.40	-0.03	-0.01	-0.04	-0.02	0.16 **	-0.06	0.01	-0.10 *	-0.05	0.08
	4	5	6	7	8	9a	9b	9c	10a	10b	10c	10d
5	-0.33 **											
6	-0.33 **	-0.24 **										
7	0.01	-0.06	0.01									
8	0.06	-0.07	0.06	-0.07								
9a	0.09	0.06	0.10	-0.06	-0.04							
9b	-0.04	0.02 *	-0.04	0.20 **	-0.05	-0.01						
9c	0.03	0.03	0.03	0.36 **	-0.11 *	-0.10	-0.17 **					
10a	-0.06	-0.03	-0.06	0.17 **	-0.08	0.04	0.13 *	-0.01				
10b	-0.01	-0.01	-0.01	0.05	-0.14 *	0.15 **	0.10	0.04	-0.14 **			
10c	-0.06	-0.02	-0.06	0.02	0.01	0.08	0.11 *	0.06	-0.20 **	-0.07		
10d	0.03	0.04	0.03	0.01	0.06	-0.07	-0.08	0.05	-0.23 **	-0.07	-0.10 *	
10e	0.09	0.08	0.09	-0.17 **	0.05	-0.08	-0.14 *	-0.02	-0.41 **	-0.13 *	-0.19 **	-0.21 **

Note: 1: CSR Behaviour in general; 1a: Internal Stakeholders; 1b: External Stakeholders; 1c: Diversity (Human Rights); 1d: Natural Environment; 2a: Cognitive Aspect of Religiosity; 2b: Intrinsic Religiosity; 2c: Extrinsic Religiosity; 2d: Behavioural Aspects of Religiosity; 3: Attitude toward CSR as a Financial Responsibility; 4: Attitude toward CSR as a Legal Responsibility; 5: Attitude toward CSR as an Ethical Responsibility; 6: Attitude toward CSR as a Philanthropic Responsibility; 7: Age; 8: Gender; 9a: Owner; 9b: CEO; 9c: Senior Manager; 10a: Manufacturing; 10b: Construction; 10c: Trade; 10d: Financial Services, and 10e: Other services. * $p < 0.05$, ** $p < 0.01$.

4.2. Religiosity and Attitudes toward CSR

Based on our first research question: ‘How do various aspects of Egyptian Managers’ religiosity influence their attitudes toward CSR?’, we tested the impact of the four aspects of religiosity (e.g., cognitive, intrinsic, extrinsic, and behaviour) on the Egyptian Muslim managers’ attitude toward CSR as financial, legal, ethical, and philanthropic responsibility. Table 4 presents the results of the regression analyses that tested this impact. The results show that the behavioural aspect of religiosity is the only religious variable that affects the Egyptian Muslim managers’ attitude toward CSR. However, this effect is complex as it implements contrasting impacts on the different attitudes toward CSR. Although it has a negative influence on managers’ attitude toward CSR as a legal responsibility, it performs a positive impact on managers’ attitude toward CSR as an ethical responsibility. None of the religious variables had a significant impact on the managers’ attitude toward CSR as a financial or a philanthropic responsibility [11,16,47].

Table 4. Religiosity and Attitudes toward CSR.

	Model 1: Attitude toward CSR as a Financial Responsibility	Model 2: Attitude toward CSR as a Legal Responsibility	Model 3: Attitude toward CSR as an Ethical Responsibility	Model 4: Attitude toward CSR as a Philanthropic Responsibility
Independent Variables				
Cognitive Aspects of Religiosity	−0.81 (1.07)	−0.69 (0.78)	0.22 (0.84)	1.98 (1.03)
Intrinsic Religiosity	0.27 (0.28)	−0.17 (0.20)	0.13 (0.22)	−0.38 (0.20)
Extrinsic Religiosity	−0.16 (0.18)	0.22 (0.13)	−0.01 (0.14)	−0.12 (0.17)
Behavioural Aspects of Religiosity	−0.11 (0.17)	−0.38 ** (0.12)	0.39 * (0.13)	0.06 (0.16)
Control Variables				
Age	−0.02 (0.06)	0.08 (0.05)	−0.07 (0.05)	0.03 (0.06)
Gender	−0.17 (0.23)	0.26 (0.17)	−0.18 (0.18)	0.15 (0.22)
Owner	−0.71 (0.57)	−0.52 (0.41)	0.53 (0.45)	0.91 (0.55)
CEO	−0.28 (0.36)	−0.65 (0.26)	0.87 * (0.28)	−0.18 (0.35)
Senior Manager	−0.28 (0.30)	0.03 (0.21)	0.09 (0.23)	0.17 (0.29)
Manufacturing	0.48 (0.31)	−0.32 (0.22)	−0.01 (0.24)	−0.13 (0.30)
Construction	0.79 (0.57)	−0.50 (0.41)	−0.14 (0.44)	−0.02 (0.54)
Trade	0.49 (0.43)	−0.18 (0.31)	−0.04 (0.34)	0.36 (0.42)
Financial services	0.01 (0.40)	−0.47 (0.30)	0.31 (0.32)	0.20 (0.39)
Other Services	−0.10 (0.31)	−0.42 (0.23)	0.36 (0.24)	0.18 (0.30)
Intercept	2.88	3.26 *	0.43	1.80
R2	0.05	0.12	0.09	0.06
R2 Change	0.01	0.04 *	0.04	0.03
F	0.90	2.39 **	1.84 *	1.08
VIF	1.10–1.90	1.10–1.90	1.10–1.90	1.10–1.90

Note: Unstandardized Coefficients are shown, with standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$.

4.3. Religiosity, Attitude toward CSR and CSR Behaviour

To answer our second research question: ‘How do Egyptian Managers’ attitudes toward CSR influence their CSR behaviour?’ we tested the relationship between managers’ attitudes toward CSR and their CSR behaviour. As the four attitudes are jointly dependent, they cannot be comprised together in the regression test. Table 4 above shows that religiosity neither affects financial nor philanthropic attitudes. We used these variables as reference variables and thus included only legal and ethical attitudes in further analyses.

Table 5 presents the results of the regression models, relating the CSR behaviour of cognitive, intrinsic, extrinsic, and behaviour aspects of religiosity to legal and ethical attitudes. In Model 5, CSR behaviour is used as a common notion including all 16 items of the CSR scale. In Models 6 to 9, the four specific types of CSR behaviour, as stated in the factor analysis, are the dependent variables. To control potential multicollinearity problems, we measured the VIF. As seen in Table 5, the highest value of the VIF was 1.9 for Models 6 to 9, which is below the limit of 5.00 [45]. This implies that the multicollinearity between the contained attitudinal variables does not affect the findings of the regression analysis reported in Table 5. Table 5 also shows that managers’ attitudes toward CSR did not affect their CSR behaviour. Model 5 shows that the attitudes toward CSR as legal and ethical responsibilities did not contribute to CSR behaviour in general.

Table 5. Religiosity, Attitudes to CSR, and CSR Behaviour.

	Model 5: CSR Behaviour in General	Model 6: Internal Stakeholders	Model 7: External Stakeholders	Model 8: Diversity (Human Right)	Model 9: Natural Environment
Independent Variables					
Attitude toward CSR as a Legal Responsibility	0.04 (0.05)	0.07 (0.06)	0.05 (0.05)	−0.01 (0.07)	0.04 (0.07)
Attitude toward CSR as an Ethical Responsibility	−0.04 (0.04)	−0.04 (0.05)	0.00 (0.05)	−0.01 (0.05)	−0.12 (0.17)
Cognitive Aspects of Religiosity	−0.65 (0.50)	−0.37 (0.60)	0.30 (0.61)	−0.11 * (0.59)	0.85 (0.60)
Intrinsic Religiosity	0.37 * (0.12)	0.18 (0.15)	0.29 * (0.15)	0.26 (0.15)	0.21 (0.15)
Extrinsic Religiosity	0.04 (0.08)	−0.05 (0.09)	0.14 (0.09)	−0.03 (0.09)	0.06 (0.09)
Behavioural Aspects of Religiosity	0.17 (0.08)	0.04 (0.10)	0.01 (0.10)	0.20 (0.09)	0.16 (0.09)
Control Variables					
Age	−0.02 (0.06)	0.02 (0.04)	−0.02 (0.04)	0.01 (0.04)	0.05 (0.04)
Gender	−0.20 (0.11)	−0.08 (0.14)	−0.16 (0.13)	−0.27 (0.16)	−0.24 (0.15)
Owner	0.56 * (0.28)	−0.02 (0.35)	0.57 (0.32)	0.51 (0.40)	0.84 * (0.38)
CEO	0.13 (0.18)	0.20 (0.22)	0.02 (0.20)	0.09 (0.26)	0.29 (0.24)
Senior Manager	0.21 (0.14)	−0.04 (0.18)	0.25 (0.16)	0.26 (0.21)	0.17 (0.20)
Manufacturing	−0.01 (0.15)	−0.38 * (0.19)	−0.32 (0.17)	−0.18 (0.22)	−0.04 (0.21)
Construction	−0.26 (0.14)	−0.30 (0.34)	0.20 (0.31)	−0.32 (0.40)	−0.76 * (0.37)
Trade	0.03 (0.21)	−0.31 (0.26)	0.49 * (0.24)	−0.16 (0.30)	−0.09 (0.29)
Financial services	0.02 (0.20)	−0.12 (0.24)	0.19 (0.22)	0.19 (0.28)	−0.33 (0.27)
Other Services	0.06 (0.15)	0.07 (0.19)	0.25 (0.17)	−0.01 (0.22)	−0.02 (0.21)
Intercept	2.70	3.26 *	2.56 **	4.07 ***	1.34
R2	0.09	0.04	0.07	0.10	0.10
R2 Change	0.04	0.02	0.02	0.07	0.04
F	1.52	0.60	1.48	1.71 *	1.64 *
VIF	1.10–1.90	1.10–1.90	1.10–1.90	1.10–1.90	1.10–1.90

Note: Unstandardized Coefficients are shown, with standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Regarding the direct impact of religiosity on CSR behaviour, Model 8 shows that the cognitive aspects of religiosity have a significant negative impact on CSR behaviour in terms of diversity. We also did not find a significant association between the cognitive aspects of religiosity and CSR behaviour in general (Model 5) or CSR behaviour regarding internal stakeholders, external stakeholders, and the natural environment (Models 6, 7, and 9). Model 5 shows that intrinsic religiosity has a significant positive impact on CSR in terms of CSR behaviour, and on CSR behaviour regarding external stakeholders. Furthermore, there was no significant association between intrinsic religiosity and CSR behaviour regarding internal stakeholders (Model 6), diversity, and the environment (Models 8, and 9). Extrinsic

religious orientation and behavioural aspects of religiosity had no significant impact on any kind of CSR behaviour.

4.4. Direct and Indirect Effects of Religiosity on CSR Behaviour

To test our third research question: ‘Do Egyptian Managers’ attitudes strengthen the influence of various aspects of their religiosity on CSR behaviour?’ we followed Zhao et al. [48] to examine if CSR attitude is a mediator in the association between religiosity and CSR behavior. Zhao et al. [48] suggest the following regression equations: (1) regressing the mediators (CSR attitudes) on the independent variables (religiosity); (2) regressing the dependent variables (CSR behaviour) on the independent variable (religiosity) only; and (3) regressing the dependent variables (CSR behaviour) on both the independent variable (religiosity) and the mediators (CSR attitudes). Accordingly, we used the bootstrap estimation technique to offer reliable estimates of the significance of the mediation impact.

The bootstrap technique was used to test the importance of the mediation impact in our model, separating the direct and indirect impacts of religiosity on CSR behaviour. The total impact of religiosity on CSR behaviour can be stated as the sum of the direct and indirect effects. Regarding the cognitive aspect of religiosity, as seen in Table 6, we found significant mediation paths for the legal CSR attitude toward diversity as a CSR behaviour. For the intrinsic and extrinsic religious and behavioural aspects of religiosity, there was no significant mediation impact. Additionally, Table 6 shows that the mediation effects through the various CSR attitudes are partly cancelled out due to the tiny or opposing effects of both legal and ethical attitudes toward CSR. Consequently, the total indirect effect of the joint mediation by CSR attitudes is relatively small (i.e., the highest indirect effect is the cognitive aspect of religiosity toward the legal attitude of CSR regarding diversity, 0.07). Finally, for diversity, the total positive impact of the behaviour aspect of religiosity became significant when the direct and indirect effects were combined.

Table 6. Direct and Indirect influence of Religiosity on CSR Behaviour.

	CSR in General	Internal Stakeholders	External Stakeholders	Diversity	Natural Environment
Direct effects					
Cognitive Aspects of Religiosity	−0.65 (0.50)	−0.37 (0.60)	0.30 (0.61)	−0.11 ^a (0.59)	0.85 (0.60)
Intrinsic Religiosity	0.37 ^a (0.12)	0.18 (0.15)	0.29 ^a (0.15)	0.26 (0.15)	0.21 (0.15)
Extrinsic Religiosity	0.04 (0.08)	−0.05 (0.09)	0.14 (0.09)	−0.03 (0.09)	0.06 (0.09)
Behavioural Aspects of Religiosity	0.17 (0.08)	0.04 (0.10)	0.01 (0.10)	0.20 (0.09)	0.16 (0.09)
Indirect effect Cognitive Aspects of Religiosity					
Attitudes toward CSR as a Legal Responsibility	0.02 (0.05)	−0.02 (0.06)	−0.04 (0.06)	0.08 ^a (0.09)	0.02 (0.07)
Attitudes toward CSR as an Ethical Responsibility	−0.01 (0.04)	−0.01 (0.05)	0.00 (0.04)	0.00 (0.05)	−0.02 (0.06)
Total	0.01 (0.06)	−0.04 (0.08)	−0.03 (0.07)	0.07 (0.11)	0.00 (0.08)
Indirect effect Intrinsic Religiosity					
Attitudes toward CSR as a Legal Responsibility	0.00 (0.01)	−0.01 (0.01)	−0.01 (0.01)	0.01 (0.02)	0.00 (0.02)
Attitudes toward CSR as an Ethical Responsibility	−0.01 (0.01)	−0.01 (0.01)	0.00 (0.01)	0.00 (0.01)	−0.01 (0.02)
Total	0.00 (0.02)	−0.01 (0.02)	−0.01 (0.02)	0.01 (0.02)	0.00 (0.02)
Indirect effect Extrinsic Religiosity					
Attitudes toward CSR as a Legal Responsibility	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	−0.01 (0.01)	0.00 (0.01)
Attitudes toward CSR as an Ethical Responsibility	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Total	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	−0.01 (0.01)	0.00 (0.01)

Table 6. Cont.

	CSR in General	Internal Stakeholders	External Stakeholders	Diversity	Natural Environment
Indirect effect Behavioural Aspects of Religiosity					
Attitudes toward CSR as a Legal Responsibility	0.00 (0.01)	−0.01 (0.02)	−0.01 (0.02)	0.02 (0.02)	0.01 (0.02)
Attitudes toward CSR as an Ethical Responsibility	−0.01 (0.01)	−0.01 (0.02)	0.00 (0.02)	0.00 (0.02)	−0.02 (0.02)
Total	−0.01 (0.02)	−0.02 (0.02)	−0.01 (0.02)	0.02 (0.02)	−0.01 (0.03)
Total effect					
Cognitive Aspects of Religiosity	−0.64 (0.50)	−0.41 (0.60)	0.27 (0.60)	−0.04 ^a (0.59)	0.85 (0.60)
Intrinsic Religiosity	0.37 ^a (0.12)	0.17 (0.15)	0.29 ^a (0.14)	0.28 (0.15)	0.20 (0.15)
Extrinsic Religiosity	0.04 (0.08)	−0.05 (0.09)	0.14 (0.09)	−0.03 (0.09)	0.06 (0.09)
Behavioural Aspects of Religiosity	0.16 (0.08)	0.02 (0.10)	0.00 (0.10)	0.22 ^a (0.09)	0.15 (0.09)

Note: Unstandardized Coefficients are shown, with standard errors in parentheses. For the indirect effect, the bootstrap estimates of the indirect effect are reported, using 1000 bootstrap samples. ^a The bias-corrected confidence interval (at 95%) does not include 0, which means that mediation is established.

5. Discussion

As specified, this research aims to fill the gaps in the present literature regarding the relationships between religiosity and CSR [34,49]. We used a multidimensional definition of religion to investigate these relationships and performed empirical research using Egyptian managers.

5.1. Impact of Various Aspects of Managers' Religiosity on CSR Attitudes

To assess Weaver and Agle's point of view, we used measures for the cognitive, intrinsic, and extrinsic affective, and behavioural components of religiosity [16]. The analysis of these variables indicated a weak or no significant relationship between the measures of religiosity. Our findings indicate that the multidimensional measurement of religiosity introduced by Weaver and Agle [16] was found in Egyptian Muslim managers and was not exaggerated. These results also disagree with the claims in previous literature that religiosity can be measured as a one-dimensional construct [16,17]. Religiosity, therefore, needs to be defined and measured as a multidimensional concept that comprises behavioural, cognitive, and motivational aspects of religiosity [33].

Regarding our first research question on the relationship between religiosity and Egyptian Muslim Managers' attitude to CSR, we found no association between the three measures—cognitive, intrinsic, and extrinsic of religiosity—and their attitude to CSR. We also found that the Egyptian Muslim managers' behaviour aspect of religiosity was the only religious variable that affected their attitude toward CSR. These results were different to the findings of Mazereeuw-van der Duijn et al. [9] and Parboteeah, Hoegl and Cullen [50], who stated that there is a relationship between Christen executives' intrinsic religiosity and their financial and ethical responsibilities as attitudes to CSR and between their extrinsic religiosity and their philanthropic responsibility. In contrast to the findings of Mazereeuw-van der Duijn et al. [9], our analysis showed no association between the four measures of religiosity and the attitude toward CSR as financial and philanthropic responsibilities. Indeed, our findings confirmed previous research claiming that there is no difference between religious and nonreligious managers [11,12,16].

5.2. Impact of Managers' CSR Attitudes on CSR Behaviour

With respect to the second research question on the relationship between the different attitudes to CSR and CSR behaviour, we found no relationship between the Egyptian Muslim Managers' attitude to CSR as legal and ethical responsibilities and any form of CSR behaviour. Likewise, Mazereeuw-van der Duijn Schouten et al. [9] found that not all CSR attitudes affected all CSR behaviour. Although McNichols and Zimmerer [30], Kennedy and Lawton [23], and Vitell et al. [17] confirmed the relationships between religious beliefs

and negative attitudes toward certain unacceptable behaviour, Rice [11] found that Islamic teachings were related to the pro-environmental behaviour of Egyptian citizens. Such debate confirms that religiosity is a strong forecaster of individuals' attitudes, but not necessarily of their CSR behaviour [22,32]. To conclude, every Muslim has some responsibilities and obligations toward his people, natural environment, and other creations [25].

5.3. Direct and Indirect Impacts of Managers' Religiosity on CSR Behaviour

Regarding the third research question about the contrast between the direct and indirect impacts of religiosity on CSR behaviour through CSR attitudes, the empirical results proved that intrinsic religiosity was the only religious orientation that had a direct influence on CSR behaviour in general. When we differentiated between the different types of CSR behaviour, the cognitive aspect of religiosity had a significant negative effect on CSR related to diversity. It was also found that intrinsic religiosity had a significant positive effect on CSR related to external stakeholders. This is in contrast with Mazereeuw-van der Duijn Schouten et al.'s [9] findings which stated that intrinsic religiosity had a significant negative impact on CSR related to diversity and a significant positive impact on CSR related to charitable activities.

Our findings on the negative effect of religiosity on CSR related to diversity are supported by other relevant studies, see for example [36]. Religious individuals tend to be more racist and less sympathetic toward working females, as this was checked in the CSR related to diversity questions. This negative impact of religiosity on CSR related to diversity may be based on historic religious teachings and customs [36]. In Islam, all creatures, male and female, are equal in the sight of God. Thus, the equality of the religious society does not encourage traditional religious managers to support women. Accordingly, women have a dependent personality and are traditionally responsible for household activities.

The significant positive impact of intrinsic religiosity on CSR relating to external stakeholders (e.g., customers and others) is also supported in Islam. Therefore, this positive association between religiosity and external stakeholders may proceed from historic religious teachings, emphasising the significance of honesty, integrity, and respect for all external bodies. Despite the direct effect of the cognitive aspects of religiosity on diversity as a form of CSR behaviour, we found that legal responsibility was the only CSR attitude that significantly mediated the influence of religiosity on diversity. The mediation role of legal attitude positively affected the relationship between the cognitive aspects of religiosity and diversity. Likewise, there was a direct impact of intrinsic religiosity on external stakeholders; however, an indirect effect did not exist due to the impact of the mediator role on CSR attitudes. These findings confirmed the view of the TPB that religiosity might affect managers' CSR behaviour indirectly through their CSR attitudes [29]. However, beside the direct effects of all religiosity orientations on CSR behaviour in general and other CSR behavioural aspects, we found no strong indication that CSR attitudes significantly mediated the impact of religiosity on CSR behaviour.

While differentiating CSR attitudes from CSR behaviour by examining the impact of religious beliefs on CSR, we found not only reasonable diverse relations between religiosity and CSR attitudes but also between religiosity and CSR behaviour, even though mediation impacts do not help very much to clarify these impacts of religiosity on CSR behaviour. Therefore, we find similar findings as for the direct impacts, namely that cognitive aspects of religiosity have a significant negative impact on diversity. The significant positive impact of intrinsic religiosity on external stakeholders was similar to the results of direct impacts. However, the total positive impact of behavioural aspects of religiosity becomes significant only for diversity when direct and indirect impacts are accumulated. The positive impact of behavioural aspects of religiosity on diversity is logical according to Islam who calls for gender equality [25], although this result opposes the above findings of the negative direct impact of the cognitive aspects of Egyptian Muslim managers' religiosity on diversity. This contradiction reveals that CSR attitudes mediate the relationship between religiosity and CSR behaviour [9]. Lastly, it is noteworthy that we found no positive significant association

between religiosity and CSR behaviour related to internal stakeholders (e.g., employees) and the natural environment. These surprising findings reflect that although religious beliefs are significantly related to ethical attitudes, the association between religious beliefs and definite prosocial behaviour is insignificant [9,22,31,51].

5.4. Implications for CSR Scholars and Community of Managers

Four important implications for CSR scholars and business managers stand out from our findings. *First*, in response to the critique on the use of a one-dimensional concept and measure of religiosity in the existing literature, we used a multidimensional concept to measure the religious beliefs of managers. Our empirical analysis of the different dimensions of religious beliefs showed a very different picture of the Islamic religiosity of the executives in our sample. Thus, measuring religiosity as a multidimensional concept provides an additional understanding of the association between religiosity and CSR. *Second*, measuring CSR as a multidimensional concept provided rich insights into the multifaceted associations between religiosity and CSR. We found significant but opposing impacts of Islamic religiosity on various types of CSR. As claimed by Parboteeah et al. [20], most major religions have similar views toward work. Therefore, future research could study the development of scales and measures to investigate the impact of religiosity on CSR. *Third*, the differentiation between CSR attitudes and CSR behaviour does not explain the impact of Islamic religiosity on CSR behaviour. The joint mediating role of the attitudes toward CSR is almost non-existent and Islamic religiosity primarily exerts a direct impact on CSR behaviour. *Fourth*, this study may increase managers' awareness of the interconnection of religiosity and CSR. Managers' values such as human dignity, stewardship, and kindness also contribute to integrating CSR into their business behaviour [32]. As we find different impacts of religiosity on CSR behaviour, Muslim employers should develop different programs to match religious beliefs with the personal values of managers to promote CSR behaviour.

5.5. Limitations and Future Research

Like other studies, this empirical study faced some limitations and therefore offers some avenues for future research. *First*, our sample represents Egyptian Muslim managers only. Therefore, future research is needed to confirm that these results can be generalised to other Islamic nations. Continued research to include comparisons of different managers' religious beliefs in cross-cultural settings and in different nations is also needed. *Second*, this study examined the influence of religiosity on managers' contributions to CSR activities, but managers' religious beliefs may also affect CSR, as managers have a great impact on setting corporate sustainability strategies and policies as well as influencing the behaviour of workers and impacting on the natural environment. Therefore, in-depth interviews with executives and senior managers might offer some interesting insights into the justifications religious managers use to neglect their employees' concerns and their environmental responsibilities. Guidelines could be developed to encourage these managers to accomplish more activities directing CSR toward their internal stakeholders and the protection of the environment. *Third*, our study focuses only on the religious influences that may affect managers' attitudes and behaviours toward CSR. Undoubtedly, other factors also affect these managerial behaviours and decisions related to CSR matters. These factors might include ideological factors, availability of finance to fund CSR initiatives, regulations, media pressure, civil and environmental activists, and societal expectations.

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References

- Friedman, M. *Capitalism and Freedom*; University of Chicago Press: Chicago, IL, USA, 1962.
- Phillips, R. *Stakeholder Theory and Organizational Ethics*; Berrett Koehler Publishers: San Francisco, CA, USA, 2003.
- Looser, S.; Wehrmeyer, W. Doing well or doing good? Extrinsic and intrinsic CSR in Switzerland. *UWF Umw.* **2015**, *23*, 227–240. [[CrossRef](#)]
- Gond, J.-P.; El Akremi, A.; Swaen, V.; Babu, N. The psychological microfoundations of corporate social responsibility: A person-centric systematic review. *J. Organ. Behav.* **2017**, *38*, 225–246. [[CrossRef](#)]
- Bowen, H. *Social Responsibilities of the Businessman*; Harper & Row: New York, NY, USA, 1953.
- Agle, B.; Van Buren, H. God and Mammon: The modern relationship. *Bus. Ethics Q.* **1999**, *9*, 563–582. [[CrossRef](#)]
- Conroy, S.; Emerson, T. Business ethics and religion: Religiosity as a predictor of ethical awareness among students. *J. Bus. Ethics* **2004**, *50*, 383–396. [[CrossRef](#)]
- Ibrahim, N.; Howard, D.; Angelidis, J. The relationship between religiousness and corporate social responsibility orientation: Are there differences between business managers and students? *J. Bus. Ethics* **2004**, *78*, 165–174. [[CrossRef](#)]
- Mazereeuw-van der Duijn Schouten, C.; Graafland, J.; Kaptein, M. Religiosity, CSR attitudes, and CSR behaviour: An empirical study of executives' religiosity and CSR. *J. Bus. Ethics* **2014**, *123*, 437–459. [[CrossRef](#)]
- Murphy, M.; MacDonald, J.; Antoine, G.; Smolarski, J. Exploring Muslim attitudes toward corporate social responsibility: Are Saudi business students different? *J. Bus. Ethics* **2019**, *154*, 1103–1118. [[CrossRef](#)]
- Rice, G. Pro-environmental behaviour in Egypt: Is there a role for Islamic environmental ethics. *J. Bus. Ethics* **2006**, *65*, 373–390. [[CrossRef](#)]
- Zdonek, I.; Mularczyk, A.; Polok, G. The idea of corporate social responsibility in the opinion of future managers—Comparative research between Poland and Georgia. *Sustainability* **2021**, *13*, 7045. [[CrossRef](#)]
- Hemingway, C.; MacLagan, P. Managers' personal values as drivers of corporate social responsibility. *J. Bus. Ethics* **2004**, *50*, 33–44. [[CrossRef](#)]
- Ramasamy, B.; Yeung, M. Chinese consumers' perception of corporate social responsibility (CSR). *J. Bus. Ethics* **2009**, *88* (Suppl. 1), 119–132. [[CrossRef](#)]
- Brown, D.; Vetterlein, A.; Roemer-Mahler, S. Theorizing transnational corporations as social actors: An analysis of corporate motivations. *Bus. Politics* **2010**, *12*, 1–37. [[CrossRef](#)]
- Weaver, G.; Agle, B. Religiosity and ethical behaviour in organizations: A symbolic interactionist perspective. *Acad. Manag. Rev.* **2002**, *27*, 77–97. [[CrossRef](#)]
- Vitell, A.; Singh, J.; Paolillo, J. Consumers' ethical beliefs: The roles of money, religiosity and attitude toward business. *J. Bus. Ethics* **2007**, *73*, 369–379. [[CrossRef](#)]
- Cornwall, M.; Albrecht, S.; Cunningham, P.; Pitcher, B. The dimensions of religiosity: A conceptual model with an empirical test. *Rev. Relig. Res.* **1986**, *27*, 226–244. [[CrossRef](#)]
- Vlachos, P.; Panagopoulos, N.; Bachrach, D.; Morgeson, F. The effects of managerial and employee attributions for corporate social responsibility initiatives. *J. Organ. Behav.* **2017**, *38*, 1111–1129. [[CrossRef](#)]
- Parboteeah, K.; Hoegl, M.; Cullen, J. Religious dimensions and work obligation: A country institutional profile model. *Hum. Relat.* **2009**, *62*, 119–148. [[CrossRef](#)]
- Ramasamy, B.; Yeung, M.; Au, A. Consumer support for corporate social responsibility (CSR): The role of religion and values. *J. Bus. Ethics* **2010**, *91*, 61–72. [[CrossRef](#)]
- Hood, R.; Hill, P.; Spilka, B. *The Psychology of Religion: An Empirical Approach*, 4th ed.; Guilford: New York, NY, USA, 2009.
- Kennedy, E.; Lawton, L. Religiousness and business ethics. *J. Bus. Ethics* **1998**, *17*, 163–175. [[CrossRef](#)]
- Loe, T.; Ferrell, L.; Mansfield, P. A review of empirical studies assessing ethical decision making in business. *J. Bus. Ethics* **2000**, *24*, 185–204. [[CrossRef](#)]
- Helfaya, A.; Kotb, A.; Hanafi, R. Qur'anic ethics for environmental responsibility: Implications for business practice. *J. Bus. Ethics* **2018**, *150*, 1105–1128. [[CrossRef](#)]
- Abdelzaher, D.; Kotb, A.; Helfaya, A. Eco-Islam: Beyond the principles of why and what, and into the principles of how. *J. Bus. Ethics* **2019**, *155*, 623–643. [[CrossRef](#)]
- Ajzen, I. The theory of planned behaviour. *Organ. Behav. Hum. Decis. Processes* **1991**, *50*, 179–211. [[CrossRef](#)]
- Ajzen, I.; Fishbein, M. *Understanding Attitudes and Predicting Social Behaviour*; Prentice Hall: Englewood Cliffs, NJ, USA, 1980.
- Ajzen, I.; Fishbein, M. The Influence of Attitudes on Behaviour. In *The Handbook of Attitudes*; Albarracín, B., Johnson, T., Zanna, M.P., Eds.; Erlbaum: Mahwah, NJ, USA, 2005; pp. 173–221.

30. McNichols, C.; Zimmerer, T. Situational ethics: An empirical study of differentiators of student attitudes. *J. Bus. Ethics* **1985**, *4*, 175–180. [[CrossRef](#)]
31. Ji, C.; Pendergraft, L.; Perry, M. Religiosity, altruism, and altruistic hypocrisy: Evidence from protestant adolescents. *Relig. Res.* **2006**, *48*, 156–178.
32. Cui, J.; Jo, H.; Velasquez, M. Christian religiosity and corporate community involvement. *Bus. Ethics Q.* **2019**, *29*, 85–125. [[CrossRef](#)]
33. Parboteeah, K.; Hoegl, M.; Cullen, J. Ethics and religion: An empirical test of a multidimensional model. *J. Bus. Ethics* **2007**, *80*, 387–398. [[CrossRef](#)]
34. Graafland, J.; Kaptein, M.; Mazereeuw-van der Duijn Schouten, C. Business dilemmas and religious belief: An explorative study among Dutch executives. *J. Bus. Ethics* **2006**, *66*, 53–70. [[CrossRef](#)]
35. Graafland, J.; Kaptein, M.; Mazereeuw-van der Duijn Schouten, C. Conceptions of god, normative convictions and socially responsible business conduct: An explorative study among executives. *Bus. Soc.* **2007**, *43*, 331–369. [[CrossRef](#)]
36. Guiso, L.; Sapienza, P.; Zingales, L. People's opium? Religion and economic attitudes. *J. Monet. Econ.* **2003**, *50*, 225–282. [[CrossRef](#)]
37. Comery, A.; Lee, H. *A First Course in Factor Analysis*, 2nd ed.; Lawrence Erlbaum Associates: Mahwah, NJ, USA, 1992.
38. Field, A. *Discovering Statistics Using IBM SPSS Statistics*; Sage Publications: London, UK, 2013.
39. Donaldson, S.; Grant-Vallone, E. Understanding self-report bias in organizational behaviour research. *J. Bus. Psychol.* **2002**, *17*, 245–262. [[CrossRef](#)]
40. Bagozzi, R.; Yi, Y. Assessing method variance in multitrait-multimethod matrices: The case of self-reported affect and perceptions at work. *J. Appl. Psychol.* **1990**, *75*, 547–560. [[CrossRef](#)]
41. Becker, T.; Vance, R. Construct validity of three types of organizational citizenship behavior: An illustration of the direct product model with refinements. *J. Manag.* **1993**, *19*, 663–682. [[CrossRef](#)]
42. Jackson, D.; Gillaspay, A.; Purc-Stephenson, R. Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychol. Methods* **2009**, *14*, 6–23. [[CrossRef](#)]
43. Gorsuch, R.; McPherson, S. Intrinsic/extrinsic measurement: I/E-revised and single-item scales. *J. Sci. Study Relig.* **1989**, *28*, 348–354. [[CrossRef](#)]
44. Aupperle, K.; Carroll, A.; Hatfield, J. An empirical examination of the relationship between corporate social responsibility and profitability. *Acad. Manag. J.* **1985**, *28*, 446–463.
45. Hair, J.; Black, W.; Babin, B.; Anderson, R. *Multivariate Data Analysis*, 7th ed.; Prentice Hall: Upper Saddle River, NJ, USA, 2014.
46. Luthar, H.; DiBattista, R.; Gautschi, T. Perception of what the ethical climate is and what it should be: The role of gender, academic status, and ethical education. *J. Bus. Ethics* **1997**, *16*, 205–217. [[CrossRef](#)]
47. Srnka, K.; Gegez, A.; Arzova, S. Why is it (Un-)ethical? Comparing potential European partners: A Western Christian and An Eastern Islamic country—On arguments used in explaining ethical judgments. *J. Bus. Ethics* **2007**, *74*, 101–118. [[CrossRef](#)]
48. Zhao, X.; Lynch, J.; Chen, Q. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *J. Consum. Res.* **2010**, *37*, 197–206. [[CrossRef](#)]
49. Cui, J.; Jo, H.; Velasquez, M. The Influence of Christian Religiosity on Managerial Decisions Concerning the Environment. *J. Bus. Ethics* **2015**, *132*, 203–231. [[CrossRef](#)]
50. Parboteeah, K.; Hoegl, M.; Cullen, J. Religious groups and work values: A focus on Buddhism, Christianity, Hinduism, and Islam. *Int. J. Cross Cult. Manag.* **2009**, *9*, 51–67. [[CrossRef](#)]
51. Hunt, S.; Vitell, J. The general theory of marketing ethics: A revision and three questions. *J. Macromark.* **2006**, *26*, 143–153. [[CrossRef](#)]

Article

Transformational Leadership, Organizational Innovation, and ESG Performance: Evidence from SMEs in China

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Abstract: ESG is a sustainable development concept that integrates environmental, social, and corporate governance. Most studies on ESG have been conducted based on secondary data from listed companies and have not used questionnaires as a method for analysis. Given this research gap, this paper examines whether transformational leadership influences ESG performance in SMEs, whether organizational innovation mediates the relationship between transformational leadership and ESG performance, and the moderating effect of external social capital on transformational leadership and organizational innovation. Based on higher-order theory, resource-based theory, stakeholder theory, etc., we tested this hypothesis by conducting a regression analysis with a questionnaire collected from SMEs in China. After controlling for firm ownership, firm size, firm industry, and years in business, the results of the study indicate that transformational leadership has a positive effect on ESG performance and that organizational innovation partially mediates the relationship between transformational leadership and corporate ESG performance. Furthermore, external social capital moderates the direct relationship between transformational leadership and organizational innovation and moderates the role of organizational innovation as a mediator between transformational leadership and ESG performance. This study adds to our further understanding of the relationship between transformational leadership and ESG performance in SMEs, expanding the antecedent research on ESG performance and providing a basis for sustainable SME development.

Keywords: transformational leadership; external social capital; ESG performance; organizational innovation

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1. Introduction

Through economic, societal, and scientific and technological development, humans have accomplished great things [1,2]. The public's demand for environmental, social, and ethical responsibility of business has increased due to severe climate changes, depleting natural resources, harsh work conditions, and the proliferation of corporate scandals. More investors and consumers are focusing on corporate social responsibility and sustainability. Moreover, they expect companies to align their operating philosophies with social values [3]. In response to the emergence of these issues, the United Nations Commission on Environment and Development issued the "Brundtland Report" [4], and the concept of sustainable development was proposed. The ESG value concept is founded on sustainable development, and enterprises, as the fundamental units and organization of human economic and social operation, play a central role in sustainable development [5,6]. Therefore, for businesses to achieve sustainable economic and social development, the ESG value concept must be implemented.

ESG values can be traced back to the concept of socially responsible investment in the 1960s. It was not until 2004, when the United Nations Global Compact released its report [7], that ESG was introduced to the public as a holistic concept. ESG is an acronym for environmental, social, and governance. It provides a comprehensive framework for enterprises

and investors to integrate environmental, social, and corporate governance concerns [8]. It conveys the development concept of pursuing integrated economic and social benefits, a sustainable development concept that has recently emerged in corporate management and financial investment. Environmental concerns include pollution control, renewable energy use, greenhouse gas emissions, and other factors, as well as the resulting environmental impact [9]. The social dimension refers to a company's responsibility to its employees, consumers, communities, suppliers, and other stakeholders while maximizing profits within the confines of the law [10]. Governance refers to business ethics, anti-competitive behavior, and protecting shareholders' rights. It is the internal mechanism established by the company to achieve self-management, effective decision-making, compliance with laws and regulations, and the satisfaction of external stakeholders' needs [11]. The core concept of ESG is that enterprises should pursue economic benefits in economic and social activities and pay attention to environmental resource protection, corporate social responsibility, and corporate governance effectiveness to achieve balanced development across multiple dimensions [12]. As a new value concept, ESG can promote corporate transformation from "profit maximization" to "sustainable development". It has a significant effect on how companies manage their strategies and integrate their resources [13]. It is also an important tool for promoting high-quality economic growth and sustainable development [14]. Amid economic globalization, enterprises can only stand out in the increasingly fierce market competition if they can comprehensively address environmental, social, and corporate governance issues [15].

At the same time, investors at the international or regional level in developed countries take ESG investments seriously. According to KPMG, the global ESG disclosure rate for N100 companies was 76% in 2022, while 96% of G250 companies published ESG reports, indicating that ESG reporting has become an important management and investment concept for companies and financial institutions. In addition, the importance of ESG disclosure is being recognized by increasing numbers of regulators, stock exchanges, and investors. Moreover, many stock exchanges worldwide have begun to provide ESG disclosure requirements or guidelines for listed companies in countries such as the USA, the UK, Brazil, Canada, India, Malaysia, Norway, South Africa, France, Germany, the Philippines, Italy, and Singapore [16]. In the past few years, ESG has become one of the focal points of China's economic development activities. Although ESG development in China is still in its infancy, ESG investment in China is improving as ESG becomes more common in the international market and corporate managers, consumers, investors, and regulators are becoming increasingly aware of the importance of ESG concepts [17]. Furthermore, the Chinese market has seen rapid developments in the areas of environmental, social, and governance reporting [18]. To encourage Chinese companies in the active practice of ESG responsibilities as well as to help balance economic growth and environmental sustainability, the CDFI released the 2018 Report on the ESG Rating System for Chinese Listed Companies and the Green Investment Guidelines (Trial), which require listed companies to become carbon-neutral by 2060. In addition, the "double carbon" target manifests China's green development philosophy; to achieve this goal, China has to accelerate the construction of an ESG system to enhance its voice in the global sustainable development agenda [19]. On a global scale, after the COVID-19 pandemic shocked the global economy in 2020, systemic risks such as pandemics and climate change showed the need for sustainable development and green economies again, leading many countries to incorporate sustainability goals into their post-pandemic recovery plans [20].

With the emphasis on the ESG value concept in corporate strategic management, numerous theoretical and empirical studies on ESG have been conducted at home and abroad. Most studies examine the relationship between ESG evaluation systems or ESG investment and corporate performance; however, the research results are highly contentious and present two contradictory views. On the one hand, neoclassical economic theory suggests that a firm's mission is to maximize profits, ESG has strong negative externalities, and managers may use it as a self-interest tool, so firms' investment in ESG will lead to

a waste of corporate resources and higher costs, resulting in a decline in corporate performance [21–24]. On the other hand, based on resource stakeholder theory and stakeholder theory, ESG disclosure helps increase a company's transparency. In addition, investing in ESG can help companies develop internal resources to increase intrinsic earnings by enhancing corporate reputation [25–27]. The realization of corporate value is not limited to shareholders; environmental, social, and corporate governance factors should also be considered [20,28]. Financial factors significantly impact a company's ESG rating [6]. Companies whose environmental, social, and corporate governance work is sound and whose relationships with stakeholders are strengthened can achieve good performance [16,29]. During the COVID-19 pandemic, portfolios with high ESG scores showed a higher risk tolerance. Furthermore, share prices of companies with good ESG performance were less volatile, thus demonstrating their investors' confidence [14]. In other words, better ESG performance guarantees the anti-risk ability and long-term competitiveness of an enterprise. Apparently, the ESG investment concept can help align capital allocations with the goals of sustainable economic development [15]. Therefore, it is necessary to study the factors that influence corporate ESG in the context of the ESG investment concepts being promoted.

Although ESG theories have proliferated in recent years, however, most studies focus on developed markets [30], and very few studies investigate emerging markets [31,32]. China is on a high-quality development path but is still in the early stages of ESG development. Investors and companies still do not have a clear understanding of what ESG performance means in terms of corporate sustainability, or of the mechanisms underlying the role of leadership in corporate ESG performance. This paper uses higher-order behavior theory, social network theory, resource-based theory, and stakeholder theory as a foundation to investigate the effect of transformational leadership through organizational innovation on ESG performance of SMEs in China by distributing questionnaires to leaders and employees as a sample, as well as the moderating role of external social capital in transformational leadership and organizational innovation. The result indicates that transformational leadership has a positive impact on the ESG performance of SMEs. Organizational innovation partially mediates the relationship between transformational leadership and corporate ESG performance. Furthermore, the role of transformational leadership in organizational innovation is stronger when firms have higher levels of external social capital.

This study will offer three original contributions. First, it will enrich the research on the ESG performance of SMEs in developed countries. Most studies on ESG performance are based on secondary data from capital markets or listed companies in developed countries; there are no empirical studies based on primary data. To bridge this gap in the literature, this paper will distribute questionnaires to Chinese SMEs, which is an unexplored approach to ESG performance research. Second, it will enrich knowledge of the antecedents of ESG performance in SMEs. Most studies focus on the impact of ESG indicators or ESG investment on corporate financial performance but do not focus on ESG performance as a dependent variable, which means this study's approach is a useful supplement to previous studies. Third, this study helps policymakers, stakeholders, regulators, and scholars improve their understanding of corporate sustainability. It also provides key theoretical and practical values for promoting corporate sustainability. This paper is organized as follows: first, a literature review based on pertinent theories and the establishment of research hypotheses; second, measurement of relevant variables and empirical analysis based on data and elaboration of research results; and third, a discussion of research findings, management insights, research limitations, and suggestions for future research.

2. Theoretical Background and Research Hypothesis

2.1. Transformational Leadership and ESG Performance

Higher-order theory is derived from Hambrick and Mason [33]. The theory is that executives are the subjects of strategic decision-making within an organization. They make limited rational decisions based on their psychological characteristics and highly

individualized interpretations and decisions regarding the organizational situations they encounter. Senior managers participate in strategy formulation and play important roles such as control, coordination, and leadership in the process of strategy implementation. The top leaders who hold the decision-making power in the company have the strongest influence on the formation and adjustment of corporate behavior [34]. Therefore, strong leadership is required to formulate forward-looking corporate strategies and implement necessary organizational changes [35].

Transformational leadership theory was developed by Bass [36]. Transformational leaders possess four dimensions: idealized influence or charisma, inspirational motivation, intellectual stimulation, and individualized consideration [37]. In addition, transformational leaders have a solid sense of intrinsic value and a conceptual system. They provide a clear vision for their subordinates, stimulate their high-level needs by making them aware of the importance of the tasks they undertake, build a climate of mutual trust, motivate them to sacrifice their self-interest for the good of the organization, and ultimately achieve performance beyond expectations [38,39].

Researchers have looked into transformational leadership from various perspectives, including psychological factors such as personality, mindset, and cognition of business leaders, as well as environments that affect transformational leadership behaviors [40–42]. For example, transformational leaders influence their followers by the following means: (a) setting examples of appropriate behaviors; (b) projecting a view of the future that shows employees what to strive for and where to go; (c) taking an active interest in the lives and work of their employees; and (d) fostering independence and active participation in tasks to increase their employees' job satisfaction, organizational commitment, organizational identity, etc., and thus enhance job performance [43–46].

Transformational leaders communicate a clear and consistent vision regarding environmental responsibility by disseminating environmental information to demonstrate environmental commitment and values for action and discussing sustainability's significance [47,48]. Moreover, transformational leaders can inspire a shared organizational vision, demonstrate the value and significance of environmental stewardship, and provide cohesive and information-sharing rallying points, thereby integrating environmental performance into corporate strategic planning [49,50]. According to social identity theory, individuals' attitudes and behaviors can influence their group membership in CSR [51]. The humanistic perspective of transformational leaders, which is based on altruism, justice, and the greater good, effectively creates a collective identity based on appealing values, which may include catering to the more significant needs of stakeholder groups and the social good and are in line with corporate social responsibility [52,53]. Thus, followers will associate their organization's identity with the greater social good and be motivated to engage in CSR [54,55].

In 1963, the Stanford Research Institute introduced stakeholder theory, which emphasizes the mutual influence between a firm and its stakeholders. Stakeholders are individuals or groups, such as investors and employees, who are dependent on the firm to achieve their goals and who the firm depends on for its development [56]. Based on previous research, Freeman and Mcvea [57] defines stakeholders as "individuals or groups of individuals who can influence or are influenced by the achievement of a firm's organizational goals". This definition considers the individuals and groups that influence the goals of the company as stakeholders, also considers the individuals and groups that are affected by the achievement of the company's goals as stakeholders, and formally includes entities such as communities, governments, and environmental protection organizations in the study of stakeholders, all of which greatly expand the connotation of "stakeholders [58]". At the level of corporate governance, transformational leaders begin with the organization's shared vision and consider not only the interests of shareholders but also those of other stakeholders, such as small- and medium-sized shareholders, external investors, creditors, employees, and the government [59]. They also improve the transparency of corporate

information and develop a sound corporate governance system [60,61]. Based on the initial assertion, we propose the following hypothesis:

Hypothesis 1 (H1). *Transformational leadership has a positive impact on ESG performance.*

2.2. Transformational Leadership and Organizational Innovation

Organizational innovation can be a new product or service, a new production process technology, a new structure or management system, or a new program or project involving organizational members [62]. OCED [63] distinguishes four types of innovation: product innovation, process innovation, marketing innovation, and management innovation. Innovation within an organization generates the most valuable, organizational, and difficult-to-replicate strategic assets that lead to enhanced business performance [64]. According to resource-based theory, a resource is anything in an organization that demonstrates the organization's core competencies, both in the form of tangible assets and intangible assets [65]. A company's competitive advantage and performance depend on how it uses its strategic resources, which are valuable, rare, and difficult for market rivals to imitate [66]. Therefore, organizational innovation is a direct source of competitive advantage and one of the essential sources of sustained competitiveness for modern businesses [67].

The impact of leadership style on organizational innovation has been the subject of extensive research. Most studies conclude that different leadership styles affect organizational innovation [68,69]. For example, transformational leadership, ethical leadership, servant leadership, and responsible leadership have a positive impact on organizational innovation [70,71], but authoritarian leadership has a negative impact on organizational innovation [72]. In addition, absorptive capacity, knowledge integration, organizational culture, and knowledge sharing at the organizational level also have a positive impact on organizational innovation [73–76]. Transformational leadership articulates the significant vision and mission of the organization. It enhances the significance of employees' interest in the organization by stimulating their high-level needs for self-actualization, enabling employees to identify with and be motivated by intrinsic motivation to achieve their goals and assisting them in achieving organizational goals [77]. Transformational leadership also fosters dedication to long-term goals, mission, and vision by demonstrating high expectations and confidence in employees' abilities and providing intellectual stimulation that encourages employees to think creatively and adopt innovative work practices [78]. The resulting increase in employee motivation and self-esteem will boost organizational innovation [79]. Based on the initial assertion, we propose the following hypothesis:

Hypothesis 2 (H2). *Transformational leadership has a positive impact on organizational innovation.*

2.3. Organizational Innovation and ESG Performance

Hellström [80] formulated the theory of responsible innovation. In 2011, the European Commission published the report [81], in which the concept of "responsible innovation" was included for the first time as a vital element of the EU's development strategy. Meanwhile, the report "Addressing Ethical and Regulatory Challenges in Research Policy at the Global Level" outlined the fundamental elements of responsible innovation as social interest, moral and ethical acceptability, and risk management. According to the theory, responsible innovation requires innovative understanding and practice characterized by methodological features such as respect and preservation of human rights, the promotion of social well-being, and the full and active assumption of responsibilities [82]. To manage innovation practices in a way that seeks to improve innovations for society, it is also characterized by more elements being included in the responsibility system, greater consideration of human rights, and the pursuit of green and inclusive innovation outcomes [83]. Introducing this concept provides an operational path for businesses to realize sustainable development, which is a result of the deepening development of the global concept of "sustainable development" at present [84]. Therefore, businesses should consider the

interests of both direct and indirect stakeholders in the innovation process and the ethical, ecological, and social dimensions in addition to the economic dimension [85,86].

The impact of organizational innovation on the economic performance and innovation performance of businesses has been the subject of numerous studies. Most academics believe that the influence of organizational innovation on enterprises includes reducing management or transaction costs to improve the performance of enterprises; increasing labor productivity by improving workplace satisfaction; acquiring assets that cannot be traded directly, such as non-coding knowledge or reduced supply costs; and flattening the inter-organizational or intra-organizational structure, which means employees and stakeholders are promoted to carry out potential innovation activities [87,88]. However, research on organizational innovation and ESG performance is scant. Legitimacy theory views legitimacy as an overarching concept or presumption in which organizations seek to establish coherence between the social values associated with or implied by their activities and the norms of acceptable behavior in the more extensive social system to which they belong [89]. Companies should consciously comply with social norms and contracts, actively fulfill their environmental responsibilities, and act to promote environmental protection to protect their interests [90]. Therefore, to achieve sustainable long-term business development as an ultimate business goal, innovation with only economic benefits can no longer meet the needs of enterprise development, which now requires strength in both economic and environmental performance [91]. By incorporating green concepts into organizational innovation, businesses can increase the environmental consciousness of their employees, which can lead to environmentally responsible actions [92]. On the other hand, innovation based on production process improvement can help reduce pollution emissions, reduce production costs, and improve the performance of the company's products, thereby satisfying the environmental ethics requirements of stakeholders and enhancing competitive advantage [93].

Porter [94] formally introduced the theory of competitive advantage. The theory states that a firm's competitive advantage refers to its ability to outperform other competitors in the process of providing consumers with products or services of a specific value in an effective "contestable market" and to create market dominance or profitability that is higher than the average of the industry in which it is located for a certain period [95]. A firm has a competitive advantage when it implements a value-creation strategy that is not implemented by any current or potential competitor. Innovation, according to Zeng et al. [96], is an efficient method for organizations to acquire and transform resources and shape resource differentiation, which can result in scarce, unique, and irreplaceable core competencies. Innovation influences CSR in a great variety of ways, such as by increasing the productivity of businesses to improve their ability to fulfill economic responsibility, by increasing the size of businesses to improve their ability to fulfill product responsibility, and by increasing the size of businesses to improve their ability to fulfill philanthropic responsibility [97]. Product innovation can result in product quality enhancement and product structure optimization, which better fulfill product responsibility; the development of enterprises enables them to engage in social charity and enhance their capacity to feed society [98]. The innovation drive also encourages businesses to fulfill their social responsibilities more effectively, enhancing their reputation and fostering a favorable external environment for future development [99].

The traditional principal-agent theory argued that the separation of ownership and control of modern companies is a significant source of governance issues and that in the principal-agent relationship, the principal and the agent pursue different goals. Agents seek to improve their social standing, income, and other concerns. With the separation of the two powers, corporate managers have more power and are likely to sacrifice the interests of corporate owners for their interests, resulting in moral hazard in the principal-agent relationship [100]. However, theory-based stakeholder co-governance was proposed as people began to question the unidirectional governance model of shareholders [101]. This model holds that businesses operate in an open market environment and that all stake-

holders, including employees, suppliers, creditors, and investors, participate in corporate governance. Through a network of mutual interaction and influence, stakeholders create value and share risk [102].

Studies have examined the impact of corporate governance on technological innovation, considering factors such as equity concentration, board size, the number of independent directors, and executive incentives [103–106]. However, organizational innovation also impacts corporate governance effectiveness to some extent. For businesses to maintain their competitive advantage and achieve significant market expansion, continuous innovation is required [94]. New management techniques can reduce transaction costs and protect shareholders' and other stakeholders' interests [107]. In addition, organizational innovation can better motivate employees, make them realize they are the company's owners, and increase their participation in the business's day-to-day operations [108]. Therefore, organizational innovation influences corporate governance positively. Based on the initial assertion, we propose the following hypothesis:

Hypothesis 3 (H3). *Organizational innovation has a positive impact on ESG performance.*

Based on the above theoretical development, this study argues that the impact of transformational leadership on ESG performance may vary depending on the role of organizational innovation mechanisms as mediators. Transformational leadership increases employees' intrinsic motivation and work motivation through their organizational commitment, thereby fostering organizational innovation and enhancing ESG performance. Based on the statement above, the mediating-role hypothesis is proposed.

Hypothesis 4 (H4). *Transformational leaders have a positive impact on ESG performance through organizational innovation.*

2.4. The Moderating Role of External Social Capital

According to social network theory, organizations have social utility. People in social situations think and act in similar ways because of the bonds they share. Social networks represent not only two interrelated actors but an aggregate of polyglot indirect relationships and paths that encompass all actors in society [109]. Moreover, the network relationships created bring opportunities and challenges to organizations [110]. Furthermore, the social capital of enterprises consists of the resources that are embedded in the social network and acquired and mobilized through purposeful actions [111]. It has been noted that, in a trust-based relationship network, the ability to borrow resources through the relationship network and the enterprise assets created and accumulated by the economic or non-economic actions taken to achieve an enterprise's goals constitute actual or potential resource aggregation, and the assets are considered important capital, in addition to material capital, human capital, and cultural capital [112]. According to the theory of resource dependence, the business activities of enterprises require resources [113]. Enterprise development depends on internal and external information and resource exchanges [114]. As the "collection of actual or potential resources" of an enterprise, social capital is one of the key business resources that affect or even determine the acquisition of other enterprise resources, such as capital and human resources, information resources, and legal support [115].

The external social capital of a company refers to the positive network ties that a company maintains through its customers, suppliers, financial institutions, government agencies, and other organizations to maintain mutually viable relationships [116]. Mainly, external social capital reflects the resource acquisition capability embedded in an organization's external social network and emphasizes the organization's diverse external social relationships and the network's relationship quality [117]. Most researchers on external social capital believe that external social capital is conducive to an enterprise's access to various types of information, reduces the cost of information search, and brings

information diversification to businesses [118]. Moreover, social capital promotes resource exchange and integration between enterprises, enhances cooperation between enterprises, reduces transaction costs [119], and promotes knowledge sharing and cooperation between organizations, which is conducive to the generation of new ideas and innovations in enterprises [120]. First, enterprises are in the same industrial chain as their suppliers and customers, and customers and suppliers are both the closest business partners in the production and operation of enterprises as well as the primary providers of important product information to these enterprises [121]. Furthermore, establishing good relationships with companies with low external social capital can enable leaders to access useful information and feedback, which will have an important impact on the innovation activities of enterprises [122]. Second, firms maintain good relationships with their business partners to help form complementary resource models with other entities over time. Moreover, firms share resources to master complex technologies, promote resource integration and knowledge exchange, and acquire valuable external knowledge, thus helping leaders reduce search and information costs, negotiation and decision costs, and regulatory and enforcement costs, thus enhancing organizational innovation capabilities [123]. Finally, government agencies have jurisdiction over regulations, R&D funding, standard settings, procurement, and other functions that shape the innovation capabilities of firms. They also hold more innovative and strategic resources and intervene more in the economy [124]. Establishing and maintaining good relationships with the government also helps business leaders gain access to a variety of scarce innovative resources controlled by the government [125]. Based on this, the following hypotheses are proposed:

Hypothesis 5 (H5). *External social capital can positively moderate the relationship between transformational leadership and organizational innovation.*

Integrating H4 and H5, this study proposes a mediating-role model moderated with the following hypothesis:

Hypothesis 6 (H6). *External social capital positively moderates the mediating role of organizational innovation in the relationship between transformational leadership and ESG performance.*

The research framework is shown in Figure 1.

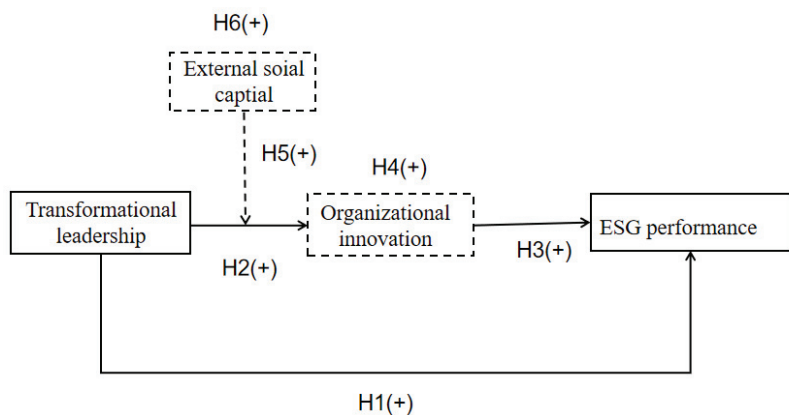


Figure 1. Research Framework.

3. Methodology

3.1. Data and Samples

This study employed a questionnaire survey to collect data. In July 2022, 500 questionnaires were distributed twice to Chinese managers and employees of enterprises; company

employees evaluated transformational leaders, and leaders reported basic company information. In total, 370 questionnaires were collected in October 2022, and the questionnaire recovery rate was approximately 74%. After eliminating invalid questionnaires, we finally obtained 350 valid questionnaires. The valid questionnaire recovery rate was 70%. From the recovered samples, 47% were male and 53% were female; 76.3% had a bachelor's degree or higher. Years in business was concentrated in less than 5 years category, which accounted for 34.86%. There were 87 state-owned enterprises, which accounted for 24.86%; 82 private enterprises, which accounted for 23.43%; 98 foreign enterprises, which accounted for 28.00%; and other businesses, which accounted for 29%. The finance and insurance industry employed 21 individuals, which accounted for 6%; the education industry employed 32 individuals, which accounted for 9.14%; and the transportation industry employed 26 individuals, which accounted for 7.43%. The manufacturing industry employed 41 individuals, which accounted for 11.71%, and services and 7 other industries accounted for 65.72%. Enterprises with 0–50 employees represented 23.14%, those with 50–200 employees represented 20.57%, those with 200–500 employees represented 32.86%, and those with more than 500 employees represented 23.43%. The demographic characteristics of the investigated respondents are shown in Table 1.

Table 1. Participants' demographic profiles.

Characteristic	Options	No.	Percentage
Gender	Male	165	47.14
	Female	185	52.86
Age	20–30 years old	90	25.71
	30–40 years old	103	29.43
	40–50 years old	97	27.71
	Over 50 years old	60	17.14
Education	High school	83	23.71
	College degree	107	30.57
	Bachelor's degree	78	22.29
	Master's degree or above	82	23.43
Years in business	Less than 5 years	122	34.86
	5–10 years	31	8.86
	10–20 years	110	31.43
	More than 20 years	87	24.86
Firm ownership	State-owned enterprise	87	24.86
	Private enterprise	82	23.43
	Foreign enterprise	98	28.00
	Others	83	23.71
Firm industry	Manufacturing industry	41	11.71
	Finance and insurance industry	21	6.00
	Culture, sports, and entertainment industry	25	7.14
	Wholesale, retail, and service industry	29	8.29
	Real estate industry	35	10.00
	Information transportation, computer services, and software industry	41	11.71
	Scientific research, technical services, geological prospecting, and energy industry	38	10.86
	Health and social security industry	33	9.43
	Transportation industry	26	7.43
	Education industry	32	9.14
	Others	29	8.29
Firm size	0–50 people	81	23.14
	50–200 people	72	20.57
	200–500 people	115	32.86
	More than 500 people	82	23.43
	Total	350	100.0

3.2. Variable Measurement

The variables measured in this study were selected from established domestic and international scales, and the items were modified and adapted based on the actual situation. All scales were measured using a 5-point Likert scale, with 5 representing “strongly agree” and 1 representing “strongly disagree”.

Transformational leadership: This study measures transformational leadership using a scale developed by scholars including Alrowwad and Chen [126,127]. The eight-item scale has demonstrated high levels of reliability and validity in previous research. Representative items on the scale include “the leader shows determination in accomplishing goals” and “the leader portrays an inspiring future”. In this study, Cronbach’s alpha coefficient for the scale is 0.895.

Organizational innovation: This study measures organizational innovation using a scale developed by scholars including Jansen and Zhou [128,129]. Previous research has demonstrated the reliability and validity of the five-item scale. Representative items on the scale include “the company introduces a new management system” and “the company introduces a new approach to planning and budgeting”.

External social capital: This study measures external social capital using a scale developed by academics including Bornay-Barrachina et al. [130,131]. Previous research has demonstrated the reliability and validity of the six-item scale. Representative items on the scale include “The company maintains good relationships with government departments” and “The company maintains good cooperative relationships with its suppliers”.

ESG performance: This study measures ESG performance using a scale developed by scholars such as De Roeck and Li [132,133], as well as data from databases such as Thomson Reuters. Environmental performance, corporate social responsibility, and corporate governance are the three dimensions of the scale. The environmental performance consists of six measures, such as “the company reduces environmentally harmful behaviors” and “the company uses clean energy and fuels”. Corporate social responsibility consists of twelve measures, such as “the company values the welfare of its employees” and “the company participates in long-term social welfare activities”. Finally, corporate governance consists of six measures, such as “the company has a good information disclosure mechanism” and “the company has good business ethics”.

Control variables: Based on prior research, years in business, firm ownership, industry, and size were utilized as control variables. The number of employees determines the size of a company: 1 represents 0 to 50 employees, 2 represents 50 to 200 employees, 3 represents 200 to 500 employees, and 4 represents more than 500 employees. There are four types of firm ownership: state-owned enterprises, private enterprises, enterprises funded by foreign investors, and others. In addition, the firm industries are the financial industry, the real estate industry, and the service industry, among others. Construct and items are shown in Appendix A.

3.3. Reliability and Validity Test

Reliability test: The reliability test of the survey questionnaire is referred to as the reliability test. The alpha coefficient of Cronbach is primarily used for reliability tests. If Cronbach’s alpha coefficient is greater than 0.7, each questionnaire item has a high degree of reliability. For example, in this study, Cronbach’s alpha coefficients for transformational leadership, organizational innovation, external social capital, and corporate ESG performance are 0.895, 0.834, 0.882, and 0.880, respectively, all greater than 0.7, indicating that the questionnaire items for each variable have good reliability.

Validity test: Validity refers to the design and content accuracy of the questionnaire. As shown in Table 2, the variance explained and factor loading are used to test the validity of the questionnaire in this study. All KMO values exceed 0.8, indicating that the scale is appropriate for factor analysis. All variables in this study can be distinguished with precision. All the factor loadings of the questionnaire questions were greater than 0.7. This indicates that the questionnaire’s convergent validity is high.

Table 2. Confirmatory factor analysis, reliability, and validity of measurement model.

Construct	Items	Factor Loading	Variance Explained	Cronbach's Alpha	KMO Value
Transformational Leadership (TL)	TL1	0.863	0.576	0.895	0.932
	TL2	0.746			
	TL3	0.737			
	TL4	0.731			
	TL5	0.724			
	TL6	0.755			
	TL7	0.772			
	TL8	0.739			
Organizational innovation (OL)	OI1	0.866	0.601	0.834	0.845
	OI2	0.777			
	OI3	0.748			
	OI4	0.754			
	OI5	0.723			
External social capital (SC)	SC1	0.868	0.631	0.882	0.903
	SC2	0.821			
	SC3	0.799			
	SC4	0.785			
	SC5	0.705			
	SC6	0.777			
Environmental performance (EP)	EP1	0.911	0.633	0.884	0.893
	EP2	0.771			
	EP3	0.765			
	EP4	0.796			
	EP5	0.772			
	EP6	0.751			
Corporate social responsibility (CR)	CSR1	0.903	0.603	0.940	0.917
	CSR2	0.753			
	CSR3	0.773			
	CSR4	0.761			
	CSR5	0.752			
	CSR6	0.757			
	CSR7	0.809			
	CSR8	0.769			
	CSR9	0.774			
	CSR10	0.753			
	CSR11	0.741			
	CSR12	0.763			
Corporate governance (CG)	CG1	0.905	0.651	0.892	0.901
	CG2	0.811			
	CG3	0.777			
	CG4	0.771			
	CG5	0.777			
	CG6	0.791			

3.4. Confirmatory Factor Analysis

We validated the primary variables of the study (transformational leadership, organizational innovation, external social capital, and ESG performance). According to the theoretical dimensions designed by the variable scale, ESG performance includes three first-order factors (corresponding to environmental performance, corporate social responsibility, and corporate governance, respectively). As shown in Table 3, the six-factor model assumed in this study has the best-fit index relative to other models, indicating that the six variables have good discriminant validity and correspond to six distinct constructs. The values of their χ^2/df , TLI, CFI, RMR, and RMSEA were 1.380, 0.960, 0.962, 0.069, and 0.033, respectively, which were superior to those of the five-factor, four-factor, three-factor, two-factor, and one-factor models, indicating that the variables designed for this study had superior discriminant validity. As shown in Table 4, each construct's composite reliability (CR) was high, with the lowest value being 0.838, indicating that the constructs have good convergent validity. The study used AVE values for discriminant validity testing, and Table 4 shows that the AVE values of all variables are higher than 0.5, so it can be concluded that the variables have good discriminant validity.

Table 3. Results of confirmatory factor analysis.

Model	χ^2	df	χ^2/df	TLI	CFI	RMR	RMSEA
Six-factor TL, SC, OI, EP, CSR, GC	1166.300	845	1.380	0.960	0.962	0.069	0.033
Five-factor TL, SC + OI, EP, CSR, GC	1663.093	850	1.957	0.898	0.904	0.088	0.052
Four-factor TL + SC + OI, EP, CSR, GC	2390.761	854	2.799	0.809	0.819	0.096	0.072
Three-factor TL, SC + OI, EP + CSR + GC	3135.968	857	3.659	0.717	0.732	0.129	0.087
Two-factor TL + SC + OI, EP + CSR + GC	3863.568	859	4.498	0.628	0.647	0.134	0.100
One-factor TL + SC + OI + EP + CSR + GC	4362.877	860	5.073	0.567	0.588	0.132	0.108

Note: TL = transformational leadership, SC = external social capital, OI = organizational innovation, EP = environmental performance, CSR = corporate social responsibility, and GC = corporate governance. "+" indicates combined variables. Same applies below.

Table 4. Model AVE and CR indicator results.

Factor	Average Variance of Extracted AVE Values	CR Value of Combined Confidence
TL	0.520	0.896
SC	0.561	0.884
OI	0.509	0.838
EP	0.569	0.887
CSR	0.569	0.940
GC	0.588	0.895

3.5. Multicollinearity Analysis

To avoid serious correlations between variables, this study used the analysis of variance inflation factor (VIF) to determine if there is multicollinearity amongst the explanatory variables. An analysis of the results shown in Table 5 shows that the VIF values of each explanatory variable are below 5, with a tolerance greater than 0.1, indicating that there is no multicollinearity amongst the explanatory variables.

Table 5. Multicollinearity analysis.

Variable	VIF	1/VIF
EP	1.72	0.583
CSR	1.62	0.616
TL	1.56	0.640
CG	1.53	0.648
SC	1.49	0.673
OI	1.43	0.698
Mean VIF	1.56	

4. Research Results

The mean, standard deviation, and correlation coefficient of each variable are shown in Table 6. The results of the correlation analysis indicate a significant positive relationship between transformational leadership and ESG performance, with a correlation coefficient value of 0.593, which is greater than 0. In addition, there is a significant positive relationship between external social capital and organizational innovation, with a correlation coefficient value of 0.367, which is greater than 0. There is a positive relationship between transformational leadership and external social capital, with a correlation coefficient of 0.351, which is greater than 0. Finally, there is a significant positive relationship between organizational

innovation and ESG performance, with correlation coefficient values of 0.519, which is greater than 0.

Table 6. Means, standard deviations, and correlation coefficients of variables.

Variable	Mean	SD	1	2	3	4	5	6	7	8
Years in business	2.460	1.203	1							
Firm ownership	2.510	1.107	−0.049	1						
Firm industry	5.990	3.111	0.032	−0.004	1					
Firm size	2.570	1.087	−0.065	0.019	0.020	1				
TL	3.255	0.822	0.016	0.071	0.057	−0.030	1			
SC	3.254	0.892	0.030	−0.003	0.034	−0.040	0.351 **	1		
OI	3.280	0.841	0.026	0.036	0.071	0.026	0.377 **	0.367 **	1	
ESG	3.087	0.741	0.055	−0.008	0.043	−0.005	0.593 **	0.563 **	0.519 **	1

Note: N = 350, ** is $p < 0.01$, two-tailed test.

In order to test the proposed hypotheses, this study conducted a multiple linear regression of the variables of interest using SPSS 26.0 software to test the research model while controlling for years in business, firm ownership, firm industry, and firm size (see Table 7). Table 7 shows that control variables are not statistically significant for organizational innovation and ESG performance. Transformational leadership positively affects ESG performance ($b = 0.421, p < 0.001$), and H1 is supported. Transformational leadership has a significant positive effect on organizational innovation ($b = 0.288, p < 0.001$), indicating that H2 is supported. Organizational innovation has a significant positive effect on ESG performance ($b = 0.304, p < 0.001$); thus, H3 is supported. In addition, as shown in Table 8, the bootstrap test indicates that this mediating effect is statistically significant, with a mediating effect value of 0.116, 95% CI = [0.079, 0.157], excluding 0; thus, H4 is supported.

Table 7. Results of regression analysis.

Variable	ESG Performance				Organizational Innovation			
	β	SE	<i>t</i> -Value	<i>p</i> -Value	β	SE	<i>t</i> -Value	<i>p</i> -Value
Constant	2.123	0.176	12.074	0.000 **	3.143	0.181	16.901	0.000 **
TL	0.421	0.039	10.819	0.000 **	0.288	0.052	5.654	0.000 **
SC					0.258	0.048	5.440	0.000 **
TL * SC					0.215	0.057	3.755	0.000 **
Firm ownership	−0.035	0.027	−1.305	0.193	0.010	0.033	0.294	0.769
Firm industry	−0.002	0.010	−0.243	0.808	0.013	0.013	1.004	0.316
Firm size	0.001	0.027	0.029	0.977	0.030	0.037	0.824	0.410
Years in business	0.023	0.025	0.917	0.360	0.010	0.033	0.294	0.769
OI	0.304	0.038	8.009	0.000 **				
R			0.676				0.491	
R ²			0.457				0.241	
F-value			48.178				15.517	

Note: N = 350, ** is $p < 0.01$.

Table 8. Decomposition of the total, direct, and indirect effect (Bootstrap = 5000).

	Effect	SE	LLCI	ULCI
Total effect	0.537	0.039	0.460	0.614
Direct effect	0.421	0.039	0.344	0.497
Indirect effect	0.116	0.020	0.079	0.157

The results indicate that external social capital significantly positively affects organizational innovation ($b = 0.258, p < 0.001$). There is a significant impact of the interaction term between transformational leadership and external social capital on ESG performance ($b = 0.215, p < 0.001$). The slope of the simple analysis indicates (see Figure 2) that when external social capital is low, the effect of transformational leadership on ESG performance is insignificant ($b = 0.096, p = 0.184$). The effect of transformational leadership on ESG

performance is more significant when the external social capital is high ($b = 0.479, p < 0.001$), and H5 is supported.

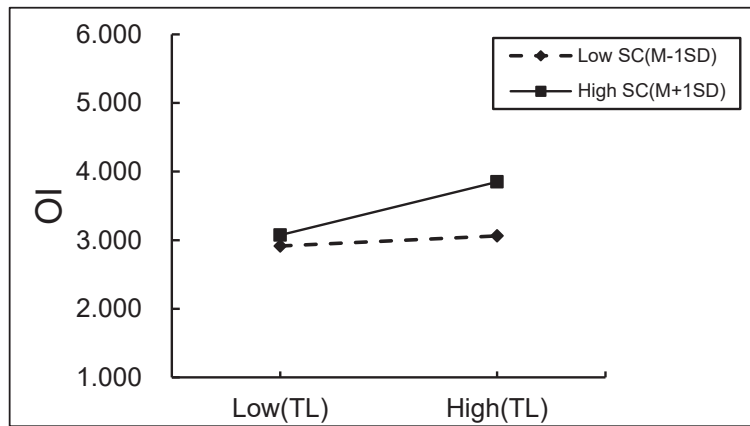


Figure 2. The moderating role of external social capital in the relationship between transformational leadership and organizational innovation.

According to Table 9, the analysis of moderated mediated effects reveals that when the external social capital is low, the indirect relationship between transformational leadership and ESG performance via organizational innovation is 0.029, 95% CI = [−0.018, 0.076]. When the external social capital is high, the indirect relationship between transformational leadership and ESG performance via organizational innovation is 0.146, 95% CI = [0.098, 0.200], and there is a significant difference in the indirect effect at both high and low levels, with a difference of 0.117, 95% CI = [0.028, 0.108]. Hence, H6 is supported.

Table 9. Results of bootstrap test for the moderated mediated-effects model.

TL→OI→ESG				
SC	Effect	SE	LLCI	ULCI
Low group	0.029	0.024	−0.018	0.076
High group	0.146	0.027	0.098	0.200
Differences between groups	0.117	0.020	0.028	0.108

Note: Results for bootstrap = 5000. The test to distinguish between indirect and direct effects is based on the confidence interval of bootstrap estimates after bias correction.

5. Discussion

This study advances knowledge about how a firm's ESG performance can be enhanced by its transformational leadership style. While the existing literature has investigated consequences of ESG performance, empirical studies on the transformational leadership–ESG performance outcome link are lacking. This study explored the action mechanisms between transformational leadership and ESG performance of SMEs from a strategic perspective, using a combination of higher-order theory, a resource-based view, and stakeholder theory. A questionnaire was administered to SME employees and senior leaders in a Chinese context, with transformational leadership as the dependent variable, corporate ESG performance as the independent variable, organizational innovation as a mediating variable between transformational leadership and ESG performance, and external social capital as a moderating variable between transformational leadership and organizational innovation. The conclusions of the study follow:

First, transformational leadership positively affects ESG performance in SMEs. Transformational leadership is an inherent element that focuses on the personal development of employees and creates a positive environment for their development through visionary motivation and personalized care [134]. In short, it is a leadership style that creates a positive environment for employees to develop. Transformational leaders are well positioned to integrate corporate sustainability with ESG performance, leading by example and communicating to employees through vision statements so that the employees have a clear understanding of the importance of ESG performance to corporate sustainability.

Second, organizational innovation partially mediates the linkages between transformational leadership and corporate ESG performance. For instance, transformational leaders help employees acquire knowledge and skills to enhance innovation through intellectual stimulation and visionary motivation, adopt innovative approaches to effectively increase employee motivation, and continuously improve employee motivation levels so that employees internalize organizational innovation goals as their own valued goals [135], thus improving ESG performance.

Third, external social capital positively moderates the direct relationships between transformational leadership and organizational innovation. External social capital is the bridging capital that connects the entire social relationship network. At the same time, it can expand diversified knowledge-source channels for the firm [136]. When an organization has a lot of external social capital, transformational leaders can broaden information channels through problem identification, information search, and accessing external knowledge and resources. This helps the organization improve its capabilities for organizational innovation [127].

5.1. Theoretical Significance

First, this study reveals that transformational leadership is an essential factor that effectively contributes to ESG performance, which is a valuable addition to previous research. Contemporary leadership approaches, in terms of their uniqueness and importance, have been increasingly studied by both academics and practitioners. Prior research on specific contemporary theories of transformational leadership has generally been on the implementation of the theory and its relationship with organizational citizenship behavior or firm performance [137–139]. This study is considered a significant contributor to the present literature, since it provides a perspective on the effects of leadership theories on ESG performance, in an area of scarce empirical research [140].

Second, this study enriches knowledge of the antecedents of ESG performance in SMEs. Most existing studies examined ESG performance as an influencing factor and explored its effects on corporate financing costs and financial performance; this research focus highlights the importance of corporate ESG performance, but there is no focus on ESG performance as a dependent variable. However, this paper explores corporate ESG performance as a dependent variable and looks into ways to improve ESG management. In addition, most studies only focus on one aspect of environmental performance, corporate social responsibility, or corporate governance, rarely combining these three aspects to examine corporate performance. By doing so, this study provides new perspectives and valuable directions.

Third, this study explores the internal mechanisms of transformational leadership and ESG performance in SMEs, thus opening the black box concerning the connections between transformational leadership and ESG performance in SMEs. To more fully reveal how transformational leadership affects ESG performance in SMEs, this paper provides a new perspective and theoretical model for the study of corporate ESG performance, constructs a model of leadership traits–organizational mechanisms–corporate ESG performance, clarifies the role of transformational leadership in influencing corporate ESG performance, remedies the shortcomings of previous studies, and provides a new reference for enhancing corporate strategic management theory. In short, it provides a new referential basis for deepening the theory of corporate strategic management.

Finally, this study introduces external social capital into the model, explores the impact and conditions of transformational leadership on organizational innovation, and establishes a mediating-effect model that is moderated to reveal the positive interaction effects of transformational leadership and external social capital on corporate ESG performance, thus changing the single model used in previous studies on factors affecting organizational innovation.

5.2. Practical Significance

First, businesses should prioritize the development of transformational leadership characteristics. For businesses to gain a competitive advantage, it is essential to identify and cultivate exceptional transformational leaders or even leadership teams [141]. Organizations can properly cultivate transformational leadership styles. For instance, a company can establish a leadership style analysis group, develop a transformational leadership training and evaluation system based on the dimensions of transformational leadership and the company's characteristics, and conduct regular audits and training on the transformational leadership styles of its leaders. According to the evaluation results, the leader can be provided with suggestions for improving his or her leadership style.

Second, organizational enterprise innovation should be strengthened. Organizational innovation is a key measure for enterprises to enhance their competitive advantages [142]. Enterprises should optimize workflow, adjust staff tasks and functions, revise management rules and regulations, and explore more efficient management methods and novel management techniques to better adapt to external environmental changes, enhance enterprise resilience, and promote enterprise development through organizational innovation [143]. In addition, managers should establish innovative work models for their employees; provide them with intellectual stimulation, inspirational motivation, and personalized care; help them establish high-level innovation goals; develop innovative ways of thinking; and enrich their innovation skills [144].

Third, businesses should consider ESG performance. When formulating strategies and implementing decisions, enterprises should consider their development and stakeholder demands, comprehensively analyze the impact on society and the environment, and maximize the total value [145]. By bolstering environmental responsibility and ethics, businesses integrate environmentally responsible behavior and executive ethical commitment with corporate strategy, enhancing their competitive advantage [146]. Responsible management can be practiced in numerous facets of R&D, design, manufacturing, and product sales [147]. At the same time, enterprises should integrate the practice of social responsibility into supply chain management, systematically manage the suppliers' and partners' compliance, safety, environmental protection, and operation transparency and realize the joint fulfillment of corporate social responsibility. In addition, enterprises should strengthen their daily information disclosure efforts and maintain immediate communication with various stakeholders to gain the community's understanding and support through extensive use of traditional and new media.

Fourth, firms should focus on establishing social capital and strengthening the cultivation and maintenance of external social capital. Firstly, in terms of the relationship network of market competition, firms should establish a positive corporate image, strengthen their communication and cooperation channels with other enterprises, and learn advanced management modes and service concepts to build a stable relationship network [148]. Secondly, businesses should focus on and maintain their relationship networks with governments, strengthen the cooperation between government and enterprises by building a good relationship with the government, broaden information channels, and obtain the heterogeneous resources needed for the development and growth of enterprises.

5.3. Prospects and Limitations

Although this study has made progress in terms of its theoretical and practical implications, it still contains shortcomings that can be addressed in future research. First, in this

paper, only firm type, firm size, years in business, and firm industry are selected as control variables; other control variables, such as the market value of equity, earnings per share, and return on asset may be selected in future research. Second, this paper only selects organizational innovation as the mediating variable between transformational leadership and ESG performance; in the future, other mediating variables, such as technological innovation, may be selected to investigate the mechanism underlying the relationship between transformational leadership and ESG performance. Third, this paper conducts empirical research using only a questionnaire and no qualitative research. Enterprises can be used as case studies for qualitative research in the future. In addition, future studies could include secondary data to make the study more rigorous and comprehensive. Fourth, this study only examines the impact of transformational leadership on corporate ESG performance, and it does not examine it from other leadership perspectives. In the future, the impact of different leadership styles on corporate ESG performance, such as ethical leadership and responsible leadership, can be studied.

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Appendix A

Table A1. Study's construct and items.

Construct	Items	Statement
Transformational leadership (TL)	TL1	The leader shows determination in accomplishing goals.
	TL2	The leader is respected by all for the way they handle things.
	TL3	The leader does not care about personal gain or loss for the sake of the team or collective good.
	TL4	The leader demonstrates competent, driven and confident traits.
	TL5	The leader is very focused on the interests of the organization.
	TL6	The leader expresses expectations for high performance to their subordinates.
	TL7	The leader portrays an inspiring future to everyone.
	TL8	The leader conveys a sense of mission to everyone.
Organizational innovation (OL)	OL1	The company introduced a new management system.
	OL2	The company introduces new practices of organizational improvement (process reengineering, quality management, etc.).
	OL3	The company introduces new management processes (new work manual, new recruitment and assessment system).
	OL4	The company introduces a new approach to planning and budgeting.
	OL5	The company actively implements new policies to improve organizational performance.
External social capital (sc)	SC1	The company maintains good relationships with government departments.
	SC2	The company can get support and resources from the government.
	SC3	The company establishes good relationships with its partners.
	SC4	The company regularly conducts technical exchanges with its partners.
	SC5	The company establishes good relationships with financial institutions.
	SC6	The company maintains good cooperative relationships with its suppliers.

Table A1. Cont.

Construct	Items	Statement
Environmental performance (EP)	EP1	The company takes the initiative to use low-carbon energy-saving products and equipment.
	EP2	The company uses clean energy and fuels.
	EP3	The company has a comprehensive energy-saving system and measures for energy conservation, comprehensive recycling of resources, green office, etc., and has implemented them effectively.
	EP4	The company has built a perfect environmental protection organization management system and environmental management system.
	EP5	The company reduces environmentally harmful behaviors.
	EP6	The company actively participates in various social environmental causes and environmental protection acts such as ecological protection.
Corporate social responsibility (CSR)	CSR1	The company encourages employees to develop their skills and careers.
	CSR2	The company pays attention to the needs of employees.
	CSR3	The company attaches great importance to the training of employees.
	CSR4	The company values the welfare of its employees.
	CSR5	The company focuses on the improvement of employees' production and operation conditions.
	CSR6	The company supports the assistance of community personnel (vulnerable groups).
	CSR7	The company's operations will not have a negative impact on the community.
	CSR8	The Company participates in various charitable activities.
	CSR9	The company participates in long-term social welfare activities.
	CSR10	The company attaches great importance to customer satisfaction.
	CSR11	The company provides customers with comprehensive and accurate information about the products it sells.
	CSR12	The company respects the protection of consumer rights.
Corporate governance (CG)	CG1	The company has a good information disclosure mechanism.
	CG2	The company fully considers the interests of shareholders and other stakeholders.
	CG3	The company has a good anti-risk response mechanism.
	CG4	The company has good business ethics.
	CG5	The company has a good anti-bribery mechanism to eliminate corruption.
	CG6	The company operates legally and compliantly.

References

- Giovannoni, E.; Fabietti, G. What Is Sustainability? A Review of the Concept and Its Applications. In *Integrated Reporting*; Busco, C., Frigo, M.L., Riccaboni, A., Quattrone, P., Eds.; Springer International Publishing: Cham, Switzerland, 2013; pp. 21–40, ISBN 978-3-319-02167-6.
- Eccles, N.S.; Viviers, S. The Origins and Meanings of Names Describing Investment Practices that Integrate a Consideration of ESG Issues in the Academic Literature. *J. Bus. Ethics* **2011**, *104*, 389–402. [\[CrossRef\]](#)
- Galbreath, J. ESG in Focus: The Australian Evidence. *J. Bus. Ethics* **2013**, *118*, 529–541. [\[CrossRef\]](#)
- Brundtland, G.H. Our Common Future—Call for Action*. *Environ. Conserv.* **1987**, *14*, 291–294. [\[CrossRef\]](#)
- Tarmuji, I.; Maelah, R.; Tarmuji, N.H. The Impact of Environmental, Social and Governance Practices (ESG) on Economic Performance: Evidence from ESG Score. *IJTEF* **2016**, *7*, 67–74. [\[CrossRef\]](#)
- Buallay, A. Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *MEQ* **2019**, *30*, 98–115. [\[CrossRef\]](#)
- UN Global Compact. Who Cares Wins Conference Report: Investing for Long-Term Value. 2005. Available online: https://pt.scribd.com/fullscreen/16876744?access_key=key-mfg3d0usaiuob4taki (accessed on 11 October 2022).
- Gillan, S.L.; Koch, A.; Starks, L.T. Firms and social responsibility: A review of ESG and CSR research in corporate finance. *J. Corp. Financ.* **2021**, *66*, 101889. [\[CrossRef\]](#)
- Li, T.-T.; Wang, K.; Sueyoshi, T.; Wang, D.D. ESG: Research Progress and Future Prospects. *Sustainability* **2021**, *13*, 11663. [\[CrossRef\]](#)
- Lindgreen, A.; Swaen, V. Corporate Social Responsibility. *Int. J. Manag. Rev.* **2010**, *12*, 1–7. [\[CrossRef\]](#)
- Henisz, W.; Koller, T.; Nuttall, R. Five ways that ESG creates value. *The McKinsey Quarterly* **2019**, *11*, 1–12.
- Huang, D.Z.X. Environmental, social and governance (ESG) activity and firm performance: A review and consolidation. *Acc. Financ.* **2021**, *61*, 335–360. [\[CrossRef\]](#)
- Drempetic, S.; Klein, C.; Zwergel, B. The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *J. Bus. Ethics* **2020**, *167*, 333–360. [\[CrossRef\]](#)

14. Broadstock, D.C.; Chan, K.; Cheng, L.T.W.; Wang, X. The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Financ. Res. Lett.* **2021**, *38*, 101716. [[CrossRef](#)]
15. Avramov, D.; Cheng, S.; Lioui, A.; Tarelli, A. Sustainable investing with ESG rating uncertainty. *J. Financ. Econ.* **2022**, *145*, 642–664. [[CrossRef](#)]
16. Zhao, C.; Guo, Y.; Yuan, J.; Wu, M.; Li, D.; Zhou, Y.; Kang, J. ESG and Corporate Financial Performance: Empirical Evidence from China's Listed Power Generation Companies. *Sustainability* **2018**, *10*, 2607. [[CrossRef](#)]
17. Ruan, L.; Liu, H. Environmental, Social, Governance Activities and Firm Performance: Evidence from China. *Sustainability* **2021**, *13*, 767. [[CrossRef](#)]
18. Zahid, R.M.A.; Saleem, A.; Maqsood, U.S. ESG performance, capital financing decisions, and audit quality: Empirical evidence from Chinese state-owned enterprises. *Environ. Sci. Pollut. Res.* **2023**, *1*, 1–14. [[CrossRef](#)]
19. Liu, H.; Lyu, C. Can ESG Ratings Stimulate Corporate Green Innovation? Evidence from China. *Sustainability* **2022**, *14*, 12516. [[CrossRef](#)]
20. Bahadori, N.; Kaymak, T.; Seraj, M. Environmental, social, and governance factors in emerging markets: The impact on firm performance. *Bus. Strat. Dev.* **2021**, *4*, 411–422. [[CrossRef](#)]
21. Do, Y.; Kim, S. Do Higher-Rated or Enhancing ESG of Firms Enhance Their Long-Term Sustainability? Evidence from Market Returns in Korea. *Sustainability* **2020**, *12*, 2664. [[CrossRef](#)]
22. Di Tommaso, C.; Thornton, J. Do ESG scores effect bank risk taking and value? Evidence from European banks. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 2286–2298. [[CrossRef](#)]
23. Friede, G.; Busch, T.; Bassen, A. ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *J. Sustain. Financ. Invest.* **2015**, *5*, 210–233. [[CrossRef](#)]
24. Duque-Grisales, E.; Aguilera-Caracuel, J. Environmental, Social and Governance (ESG) Scores and Financial Performance of Multilatinas: Moderating Effects of Geographic International Diversification and Financial Slack. *J. Bus. Ethics* **2021**, *168*, 315–334. [[CrossRef](#)]
25. Alsayegh, M.F.; Abdul Rahman, R.; Homayoun, S. Corporate Economic, Environmental, and Social Sustainability Performance Transformation through ESG Disclosure. *Sustainability* **2020**, *12*, 3910. [[CrossRef](#)]
26. Ting, I.W.K.; Azizan, N.A.; Bhaskaran, R.K.; Sukumaran, S.K. Corporate Social Performance and Firm Performance: Comparative Study among Developed and Emerging Market Firms. *Sustainability* **2019**, *12*, 26. [[CrossRef](#)]
27. Mohammad, W.M.W.; Wasiuzzaman, S. Environmental, Social and Governance (ESG) disclosure, competitive advantage and performance of firms in Malaysia. *Clean. Environ. Syst.* **2021**, *2*, 100015. [[CrossRef](#)]
28. Bhaskaran, R.K.; Ting, I.W.K.; Sukumaran, S.K.; Sumod, S.D. Environmental, social and governance initiatives and wealth creation for firms: An empirical examination. *Manag. Decis. Econ.* **2020**, *41*, 710–729. [[CrossRef](#)]
29. Alareeni, B.A.; Hamdan, A. ESG impact on performance of US S&P 500-listed firms. *CG* **2020**, *20*, 1409–1428. [[CrossRef](#)]
30. Nekhili, M.; Boukadhaha, A.; Nagati, H.; Chtioui, T. ESG performance and market value: The moderating role of employee board representation. *Int. J. Hum. Resour. Manag.* **2021**, *32*, 3061–3087. [[CrossRef](#)]
31. Garcia, A.S.; Mendes-Da-Silva, W.; Orsato, R.J. Sensitive industries produce better ESG performance: Evidence from emerging markets. *J. Clean. Prod.* **2017**, *150*, 135–147. [[CrossRef](#)]
32. Farooq, O. Financial Centers And The Relationship Between ESG Disclosure And Firm Performance: Evidence From An Emerging Market. *JABR* **2015**, *31*, 1239. [[CrossRef](#)]
33. Hambrick, D.C.; Mason, P.A. Upper Echelons: The Organization as a Reflection of Its Top Managers. *Acad. Manag. Rev.* **1984**, *9*, 193. [[CrossRef](#)]
34. Lv, Y.; Cao, C.; Yao, H. Does the Promotion of CSR by Senior Leaders Contribute to CSR Performance. *Sci. Technol. Dev.* **2020**, *16*, 508–515.
35. Thomas, H.; Thomas, L. Perspectives on leadership in business schools. *J. Manag. Dev.* **2011**, *30*, 526–540. [[CrossRef](#)]
36. Bass, B.M. Two Decades of Research and Development in Transformational Leadership. *Eur. J. Work. Organ. Psychol.* **1999**, *8*, 9–32. [[CrossRef](#)]
37. Bass, B.M.; Avolio, B.J. Developing Transformational Leadership: 1992 and Beyond. *J. Eur. Ind. Train.* **1990**, *14*, 231–272. [[CrossRef](#)]
38. Siangchokyo, N.; Klinger, R.L.; Campion, E.D. Follower transformation as the linchpin of transformational leadership theory: A systematic review and future research agenda. *Leadersh. Q.* **2020**, *31*, 101341. [[CrossRef](#)]
39. Bakker, A.B.; Hetland, J.; Kjelleveold Olsen, O.; Espevik, R. Daily transformational leadership: A source of inspiration for follower performance? *Eur. Manag. J.* **2022**, *4*, 1–9. [[CrossRef](#)]
40. Phaneuf, J.-É.; Boudrias, J.-S.; Rousseau, V.; Brunelle, É. Personality and transformational leadership: The moderating effect of organizational context. *Personal. Individ. Differ.* **2016**, *102*, 30–35. [[CrossRef](#)]
41. Jin, S.; Seo, M.-G.; Shapiro, D.L. Do happy leaders lead better? Affective and attitudinal antecedents of transformational leadership. *Leadersh. Q.* **2016**, *27*, 64–84. [[CrossRef](#)]
42. Lord, R.G.; Brown, D.J.; Harvey, J.L.; Hall, R.J. Contextual constraints on prototype generation and their multilevel consequences for leadership perceptions. *Leadersh. Q.* **2001**, *12*, 311–338. [[CrossRef](#)]
43. Lee, K.-M. The Effect of Transformational Leadership on Job Engagement and Employee Creativity: The Mediating Role of LMX. *J. CEO Manag. Stud.* **2020**, *23*, 49–70. [[CrossRef](#)]

44. Farahani, M.; Taghadosi, M.; Behboudi, M. An Exploration of the Relationship between Transformational Leadership and Organizational Commitment: The Moderating Effect of Emotional Intelligence: Case Study in Iran. *IBR* **2011**, *4*, p211. [\[CrossRef\]](#)
45. Pradhan, R.K.; Panda, M.; Jena, L.K. Transformational leadership and psychological empowerment: The mediating effect of organizational culture in Indian retail industry. *JEIM* **2017**, *30*, 82–95. [\[CrossRef\]](#)
46. Pillai, R.; Williams, E.A. Transformational leadership, self-efficacy, group cohesiveness, commitment, and performance. *J. Organ. Chang. Manag.* **2004**, *17*, 144–159. [\[CrossRef\]](#)
47. Sun, X.; El Askary, A.; Meo, M.S.; Zafar, N.u.A.; Hussain, B. Green transformational leadership and environmental performance in small and medium enterprises. *Econ. Res. Ekon. Istraživanja* **2022**, *35*, 5273–5291. [\[CrossRef\]](#)
48. Kura, K.M. Linking Environmentally Specific Transformational Leadership and Environmental Concern to Green Behaviour at Work. *Glob. Bus. Rev.* **2016**, *17*, 1S–14S. [\[CrossRef\]](#)
49. Kim, M.; Stepchenkova, S. Does environmental leadership affect market and eco performance? Evidence from Korean franchise firms. *JBIM* **2018**, *33*, 417–428. [\[CrossRef\]](#)
50. Liu, X.; Jie, X. Can Manager’s Environmentally Specific Transformational Leadership Improve Environmental Performance? In Proceedings of the Thirteenth International Conference on Management Science and Engineering Management, Cape Town, South Africa, 3–6 August 2023; Advances in Intelligent Systems and Computing. Springer International Publishing: Cham, Switzerland, 2020; Volume 1002, pp. 730–742, ISBN 978-3-030-21254-4.
51. Tourigny, L.; Han, J.; Baba, V.V.; Pan, P. Ethical Leadership and Corporate Social Responsibility in China: A Multilevel Study of Their Effects on Trust and Organizational Citizenship Behavior. *J. Bus. Ethics* **2019**, *158*, 427–440. [\[CrossRef\]](#)
52. Khan, H.u.R.; Ali, M.; Olya, H.G.T.; Zulqarnain, M.; Khan, Z.R. Transformational leadership, corporate social responsibility, organizational innovation, and organizational performance: Symmetrical and asymmetrical analytical approaches. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 1270–1283. [\[CrossRef\]](#)
53. Groves, K.S.; LaRocca, M.A. Does Transformational Leadership Facilitate Follower Beliefs in Corporate Social Responsibility? A Field Study of Leader Personal Values and Follower Outcomes. *J. Leadersh. Organ. Stud.* **2012**, *19*, 215–229. [\[CrossRef\]](#)
54. Waldman, D.A.; Siegel, D.S.; Javidan, M. Components of CEO Transformational Leadership and Corporate Social Responsibility. *J. Manag. Stud.* **2006**, *43*, 1703–1725. [\[CrossRef\]](#)
55. Waldman, D.A.; Siegel, D.S.; Javidan, M. Ceo Transformational Leadership and Corporate Social Responsibility. *Rensselaer Work. Pap. Econ.* **2004**, *6*, 1–42.
56. Frooman, J. Stakeholder Influence Strategies. *Acad. Manag. Rev.* **1999**, *24*, 191–205. [\[CrossRef\]](#)
57. Freeman, R.E.; McVea, J. A Stakeholder Approach to Strategic Management. In *The Blackwell Handbook of Strategic Management*; Hitt, M.A., Freeman, R.E., Harrison, J.S., Eds.; Blackwell Publishing Ltd.: Oxford, UK, 2017; pp. 183–201, ISBN 978-1-4051-6402-3.
58. Donaldson, T.; Preston, L.E. The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *Acad. Manag. Rev.* **1995**, *20*, 65–91. [\[CrossRef\]](#)
59. Parmar, B.L.; Freeman, R.E.; Harrison, J.S.; Wicks, A.C.; Purnell, L.; de Colle, S. Stakeholder Theory: The State of the Art. *Acad. Manag. Ann.* **2010**, *4*, 403–445. [\[CrossRef\]](#)
60. Bandsuch, M.; Pate, L.; Thies, J. Rebuilding Stakeholder Trust in Business: An Examination of Principle-Centered Leadership and Organizational Transparency in Corporate Governance. *Bus. Soc. Rev.* **2008**, *113*, 99–127. [\[CrossRef\]](#)
61. Sözbilir, F.; Ye, S. Impact of Transformational Leadership and Corporate Governance on Business Performance. *Int. J. Corp. Gov.* **2017**, *13*, 268. [\[CrossRef\]](#)
62. Schumpeter, J.; Backhaus, U. The theory of economic development. In *Joseph Alois Schumpeter*; Springer: Berlin/Heidelberg, Germany, 2003; pp. 61–116.
63. OECD. *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*; The Measurement of Scientific, Technological and Innovation Activities; OECD: Paris, France, 2015; ISBN 978-92-64-23880-0.
64. Birkinshaw, J.; Hamel, G. Management Innovation. *Acad. Manag. Rev.* **2008**, *33*, 825–845. [\[CrossRef\]](#)
65. Barney, J.B. The Resource-Based Theory of the Firm. *Organ. Sci.* **1996**, *7*, 469. [\[CrossRef\]](#)
66. Grant, R.M. The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. *Calif. Manag. Rev.* **1991**, *33*, 114–135. [\[CrossRef\]](#)
67. Khosravi, P.; Newton, C.; Rezvani, A. Management innovation: A systematic review and meta-analysis of past decades of research. *Eur. Manag. J.* **2019**, *37*, 694–707. [\[CrossRef\]](#)
68. Gumusluoglu, L.; Ilsev, A. Transformational Leadership and Organizational Innovation: The Roles of Internal and External Support for Innovation. *J. Prod. Innov. Manag.* **2009**, *26*, 264–277. [\[CrossRef\]](#)
69. Paulsen, N.; Maldonado, D.; Callan, V.J.; Ayoko, O. Charismatic leadership, change and innovation in an R&D organization. *J. Organ. Chang. Manag.* **2009**, *22*, 511–523. [\[CrossRef\]](#)
70. Zhang, Y.; Yang, F. How and when spiritual leadership enhances employee innovative behavior. *PR* **2020**, *50*, 596–609. [\[CrossRef\]](#)
71. Yoshida, D.T.; Sendjaya, S.; Hirst, G.; Cooper, B. Does servant leadership foster creativity and innovation? A multi-level mediation study of identification and prototypicality. *J. Bus. Res.* **2014**, *67*, 1395–1404. [\[CrossRef\]](#)
72. Hou, B.; Hong, J.; Zhu, K.; Zhou, Y. Paternalistic leadership and innovation: The moderating effect of environmental dynamism. *EJIM* **2019**, *22*, 562–582. [\[CrossRef\]](#)
73. Hamdoun, M.; Chiappetta Jabbour, C.J.; Ben Othman, H. Knowledge transfer and organizational innovation: Impacts of quality and environmental management. *J. Clean. Prod.* **2018**, *193*, 759–770. [\[CrossRef\]](#)

74. Fu, W.; Revilla Diez, J.; Schiller, D. Interactive learning, informal networks and innovation: Evidence from electronics firm survey in the Pearl River Delta, China. *Res. Policy* **2013**, *42*, 635–646. [\[CrossRef\]](#)
75. Chang, S.; Lee, M. The linkage between knowledge accumulation capability and organizational innovation. *J. Knowl. Manag.* **2008**, *12*, 3–20. [\[CrossRef\]](#)
76. Büschgens, T.; Bausch, A.; Balkin, D.B. Organizational Culture and Innovation: A Meta-Analytic Review: Organizational Culture and Innovation. *J. Prod. Innov. Manag.* **2013**, *30*, 763–781. [\[CrossRef\]](#)
77. Chang, Y.-Y. Multilevel transformational leadership and management innovation: Intermediate linkage evidence. *Leadersh. Organ. Dev. J.* **2016**, *37*, 265–288. [\[CrossRef\]](#)
78. Qu, R.; Janssen, O.; Shi, K. Transformational leadership and follower creativity: The mediating role of follower relational identification and the moderating role of leader creativity expectations. *Leadersh. Q.* **2015**, *26*, 286–299. [\[CrossRef\]](#)
79. Jung, D.I.; Chow, C.; Wu, A. The Role of Transformational Leadership in Enhancing Organizational Innovation: Hypotheses and Some Preliminary Findings. *Leadersh. Q.* **2003**, *14*, 525–544. [\[CrossRef\]](#)
80. Hellström, T. Systemic innovation and risk: Technology assessment and the challenge of responsible innovation. *Technol. Soc.* **2003**, *25*, 369–384. [\[CrossRef\]](#)
81. European Commission. *Ethical and Regulatory Challenges to Science and Research Policy at the Global Level*; Publications Office of the European Union: Luxembourg, 2012; p. 60.
82. Blok, V. Look who's talking: Responsible innovation, the paradox of dialogue and the voice of the other in communication and negotiation processes. *J. Responsible Innov.* **2014**, *1*, 171–190. [\[CrossRef\]](#)
83. Asante, K.; Owen, R.; Williamson, G. Governance of new product development and perceptions of responsible innovation in the financial sector: Insights from an ethnographic case study. *J. Responsible Innov.* **2014**, *1*, 9–30. [\[CrossRef\]](#)
84. Liu, Z. Responsible innovation research review: Background, current status and trend. *Sci. Technol. Prog. Policy* **2015**, *32*, 155–160.
85. Owen, R.; Stilgoe, J.; Macnaghten, P.; Gorman, M.; Fisher, E.; Guston, D. A Framework for Responsible Innovation. In *Responsible Innovation*; Owen, R., Bessant, J., Heintz, M., Eds.; John Wiley & Sons, Ltd.: Chichester, UK, 2013; pp. 27–50, ISBN 978-1-118-55142-4.
86. Maak, T. Responsible Leadership, Stakeholder Engagement, and the Emergence of Social Capital. *J. Bus. Ethics* **2007**, *74*, 329–343. [\[CrossRef\]](#)
87. Lee, R.; Lee, J.-H.; Garrett, T.C. Synergy effects of innovation on firm performance. *J. Bus. Res.* **2019**, *99*, 507–515. [\[CrossRef\]](#)
88. Arranz, N.; Arroyabe, M.F.; Li, J.; de Arroyabe, J.C.F. An integrated model of organisational innovation and firm performance: Generation, persistence and complementarity. *J. Bus. Res.* **2019**, *105*, 270–282. [\[CrossRef\]](#)
89. Suchman, M.C. Managing Legitimacy: Strategic and Institutional Approaches. *Acad. Manag. Rev.* **1995**, *20*, 571. [\[CrossRef\]](#)
90. Tilling, M.V. Some thoughts on legitimacy theory in social and environmental accounting. *Soc. Environ. Account. J.* **2004**, *24*, 3–7. [\[CrossRef\]](#)
91. Yang, D.; Xie, Y. Corporate Social responsibility, Green Innovation Ability and Corporate Environmental Performance. *Commun. Financ. Accounting* **2019**, 100–104. [\[CrossRef\]](#)
92. Li, Y. Environmental innovation practices and performance: Moderating effect of resource commitment. *J. Clean. Prod.* **2014**, *66*, 450–458. [\[CrossRef\]](#)
93. Rehman, S.U.; Kraus, S.; Shah, S.A.; Khanin, D.; Mahto, R.V. Analyzing the relationship between green innovation and environmental performance in large manufacturing firms. *Technol. Forecast. Soc. Chang.* **2021**, *163*, 120481. [\[CrossRef\]](#)
94. Porter, M.E. Competitive strategy. *Meas. Bus. Excell.* **1997**, *1*, 12–17. [\[CrossRef\]](#)
95. Barney, J. Firm Resources and Sustained Competitive Advantage. *J. Manag.* **1991**, *17*, 99–120. [\[CrossRef\]](#)
96. Zeng, H.; Chen, J.; Zhou, Z. Dynamic Interaction of Innovation Ability and Corporate Social Responsibility. *RD Manag.* **2020**, *32*, 111–125. [\[CrossRef\]](#)
97. Asongu, J.J. Innovation as an Argument for Corporate Social Responsibility. *J. Bus. Public Policy* **2007**, *1*, 1–21.
98. Gallego-Álvarez, I.; Manuel Prado-Lorenzo, J.; García-Sánchez, I. Corporate social responsibility and innovation: A resource-based theory. *Manag. Decis.* **2011**, *49*, 1709–1727. [\[CrossRef\]](#)
99. Pan, J.; Han, S.; Xiao, W. A Study on the Effects of Innovation Quality on the Corporate Social Responsibility—Evidence from the Listed Companies on Shenzhen A—Share Stock Market. *J. Macro—Qual. Res.* **2021**, *9*, 99–113. [\[CrossRef\]](#)
100. Bosse, D.A.; Phillips, R.A. Agency theory and bounded self-interest. *Acad. Manag. Rev.* **2016**, *41*, 276–297. [\[CrossRef\]](#)
101. Spitzack, H.; Hansen, E.G. Stakeholder governance: How stakeholders influence corporate decision making. *Corp. Gov. Int. J. Bus. Soc.* **2010**, *10*, 378–391. [\[CrossRef\]](#)
102. Amis, J.; Barney, J.; Mahoney, J.T.; Wang, H. From the Editors—Why We Need a Theory of Stakeholder Governance—And Why This is a Hard Problem. *AMR* **2020**, *45*, 499–503. [\[CrossRef\]](#)
103. Zhou, B.; Li, Y.; Sun, F.; Zhou, Z. Executive compensation incentives, risk level and corporate innovation. *Emerg. Mark. Rev.* **2021**, *47*, 100798. [\[CrossRef\]](#)
104. Belloc, F. Corporate governance and innovation: A survey: Corporate governance and innovation. *J. Econ. Surv.* **2012**, *26*, 835–864. [\[CrossRef\]](#)
105. Asensio-López, D.; Cabeza-García, L.; González-Álvarez, N. Corporate governance and innovation: A theoretical review. *EJMBE* **2019**, *28*, 266–284. [\[CrossRef\]](#)
106. Galia, F.; Zenou, E. Board composition and forms of innovation: Does diversity make a difference? *EJIM* **2012**, *6*, 630. [\[CrossRef\]](#)

107. Gonzales-Bustos, J.P.; Hernández-Lara, A.B. Corporate governance and innovation: A systematic literature review. *COC* **2016**, *13*, 33–45. [[CrossRef](#)]
108. Dang, Y. Corporate Governance and Technology Innovation: Review and Implications. *Rev. Ind. Econ.* **2012**, *3*, 62–75. [[CrossRef](#)]
109. Kilduff, M.; Brass, D.J. Organizational Social Network Research: Core Ideas and Key Debates. *Acad. Manag. Ann.* **2010**, *4*, 317–357. [[CrossRef](#)]
110. Burt, R.S. The network structure of social capital. *Res. Organ. Behav.* **2000**, *22*, 345–423. [[CrossRef](#)]
111. Bolino, M.C.; Turnley, W.H.; Bloodgood, J.M. Citizenship Behavior and the Creation of Social Capital in Organizations. *Acad. Manag. Rev.* **2002**, *27*, 505. [[CrossRef](#)]
112. Adler, P.S.; Kwon, S.-W. Social Capital: Prospects for a New Concept. *Acad. Manag. Rev.* **2002**, *25*, 17–40. [[CrossRef](#)]
113. Hillman, A.J.; Withers, M.C.; Collins, B.J. Resource Dependence Theory: A Review. *J. Manag.* **2009**, *35*, 1404–1427. [[CrossRef](#)]
114. Engbers, T.A.; Thompson, M.F.; Slaper, T.F. Theory and Measurement in Social Capital Research. *Soc. Indic. Res.* **2017**, *132*, 537–558. [[CrossRef](#)]
115. Servaes, H.; Tamayo, A. The Role of Social Capital in Corporations: A Review. *Oxf. Rev. Econ. Policy* **2017**, *33*, 201–220. [[CrossRef](#)]
116. Cuevas-Rodríguez, G.; Cabello-Medina, C.; Carmona-Lavado, A. Internal and External Social Capital for Radical Product Innovation: Do They Always Work Well Together?: Social Capital for Product Innovation. *Brit. J. Manag.* **2014**, *25*, 266–284. [[CrossRef](#)]
117. Lin, N. Building a Network Theory of Social Capital. *Connections* **1999**, *22*, 28–51.
118. Nahapiet, J.; Ghoshal, S. Social Capital, Intellectual Capital, and the Organizational Advantage. *Acad. Manag. Rev.* **1998**, *23*, 242. [[CrossRef](#)]
119. Chen, Y.; Jin, B.; Ren, Y. Impact Mechanism of Corporate Social Responsibility on Technological Innovation Performance: The Mediating Effect Based on Social Capital. *Sci. Res. Manag.* **2020**, *41*, 87–98. [[CrossRef](#)]
120. Huggins, R.; Johnston, A.; Thompson, P. Network Capital, Social Capital and Knowledge Flow: How the Nature of Inter-organizational Networks Impacts on Innovation. *Ind. Innov.* **2012**, *19*, 203–232. [[CrossRef](#)]
121. Landry, R.; Amara, N.; Lamari, M. Does social capital determine innovation? To what extent? *Technol. Forecast. Soc. Chang.* **2002**, *69*, 681–701. [[CrossRef](#)]
122. Jamali, D.; Yianni, M.; Abdallah, H. Strategic partnerships, social capital and innovation: Accounting for social alliance innovation. *Bus. Ethics A Eur. Rev.* **2011**, *20*, 375–391. [[CrossRef](#)]
123. Sanchez-Famoso, V.; Maseda, A.; Iturralde, T. The role of internal social capital in organisational innovation. An empirical study of family firms. *Eur. Manag. J.* **2014**, *32*, 950–962. [[CrossRef](#)]
124. Zeng, P.; Deng, T.; Song, T. The Relationship among Social Capital, Dynamic Capabilities, and Enterprise Innovation. *Sci. Res. Manag.* **2013**, *34*, 50–59. [[CrossRef](#)]
125. Jane, E. Fountain Social capital: Its relationship to innovation in science and technology. *Sci. Public Policy* **1998**. [[CrossRef](#)]
126. Alrowwad, A.; Obeidat, B.Y.; Tarhini, A.; Aqqad, N. The Impact of Transformational Leadership on Organizational Performance via the Mediating Role of Corporate Social Responsibility: A Structural Equation Modeling Approach. *IBR* **2016**, *10*, 199. [[CrossRef](#)]
127. Chen, L.; Zheng, W.; Yang, B.; Bai, S. Transformational leadership, social capital and organizational innovation. *LODJ* **2016**, *37*, 843–859. [[CrossRef](#)]
128. Jansen, J.J.P.; Van Den Bosch, F.A.J.; Volberda, H.W.; Ignacio, G. Vaccaro Management Innovation and Leadership: The Moderating Role of Organizational Size: Management Innovation and Leadership. *J. Manag. Stud.* **2012**, *49*, 28–51. [[CrossRef](#)]
129. Zhou, F.; Lin, C.; Sun, R. A Research on the Relationship between Ethical Leadership and Organization Management Innovation: Mediation Effect of Informal Knowledge Sharing. *Manag. Rev.* **2015**, *27*, 169–177. [[CrossRef](#)]
130. Bornay-Barrachina, M.; López-Cabrales, A.; Valle-Cabrera, R. How do employment relationships enhance firm innovation? The role of human and social capital. *Int. J. Hum. Resour. Manag.* **2017**, *28*, 1363–1391. [[CrossRef](#)]
131. Luo, J.; Jia, X. Corporate Social Responsibility (CSR) Initiatives and Firm Innovation—Based on the Social Capital Theory. *RD Manag.* **2017**, *29*, 104–114. [[CrossRef](#)]
132. Li, J.; Zhang, G.; Xie, L. Environmental Knowledge Learning, Green Innovation and Environmental Performance. *Sci. Technol. Prog. Policy* **2019**, *36*, 122–128.
133. De Roeck, K.; Farooq, O. Corporate Social Responsibility and Ethical Leadership: Investigating Their Interactive Effect on Employees' Socially Responsible Behaviors. *J. Bus. Ethics* **2018**, *151*, 923–939. [[CrossRef](#)]
134. Kark, R.; Shamir, B.; Chen, G. The two faces of transformational leadership: Empowerment and dependency. *J. Appl. Psychol.* **2003**, *88*, 246–255. [[CrossRef](#)]
135. Bartel, C.A.; Garud, R. The Role of Narratives in Sustaining Organizational Innovation. *Organ. Sci.* **2009**, *20*, 107–117. [[CrossRef](#)]
136. Robison, L.J.; Schmid, A.A.; Siles, M.E. Is Social Capital Really Capital? *Rev. Soc. Econ.* **2002**, *60*, 1–21. [[CrossRef](#)]
137. Boehm, S.A.; Dwertmann, D.J.G.; Bruch, H.; Shamir, B. The missing link? Investigating organizational identity strength and transformational leadership climate as mechanisms that connect CEO charisma with firm performance. *Leadersh. Q.* **2015**, *26*, 156–171. [[CrossRef](#)]
138. Masa'deh, R.; Obeidat, B.Y.; Tarhini, A. A Jordanian empirical study of the associations among transformational leadership, transactional leadership, knowledge sharing, job performance, and firm performance: A structural equation modelling approach. *J. Manag. Dev.* **2016**, *35*, 681–705. [[CrossRef](#)]

139. Atmojo, M. The Influence of Transformational Leadership on Job Satisfaction, Organizational Commitment, and Employee Performance. *IRJBS* **2012**, *5*, 113–128. [[CrossRef](#)]
140. Kim, M.-S.; Thapa, B. Relationship of Ethical Leadership, Corporate Social Responsibility and Organizational Performance. *Sustainability* **2018**, *10*, 447. [[CrossRef](#)]
141. Aga, D.A.; Noorderhaven, N.; Vallejo, B. Transformational leadership and project success: The mediating role of team-building. *Int. J. Proj. Manag.* **2016**, *34*, 806–818. [[CrossRef](#)]
142. Rowe, L.A.; Boise, W.B. Organizational Innovation: Current Research and Evolving Concepts. *Public Adm. Rev.* **1974**, *34*, 284. [[CrossRef](#)]
143. Damanpour, F. *Organizational Innovation*; Edward Elgar Publishing: Cheltenham, UK, 2020; ISBN 978-1-78811-744-9.
144. Sapprasert, K.; Clausen, T.H. Organizational innovation and its effects. *Ind. Corp. Chang.* **2012**, *21*, 1283–1305. [[CrossRef](#)]
145. Aguinis, H.; Glavas, A. What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda. *J. Manag.* **2012**, *38*, 932–968. [[CrossRef](#)]
146. Zhang, Y.; Wei, F. SMEs' charismatic leadership, product life cycle, environmental performance, and financial performance: A mediated moderation model. *J. Clean. Prod.* **2021**, *306*, 127–147. [[CrossRef](#)]
147. Du, S.; Bhattacharya, C.B.; Sen, S. Corporate Social Responsibility and Competitive Advantage: Overcoming the Trust Barrier. *Manag. Sci.* **2011**, *57*, 1528–1545. [[CrossRef](#)]
148. Parra-Requena, G.; Ruiz-Ortega, M.J.; García-Villaverde, P.M.; Rodrigo-Alarcón, J. The Mediating Role of Knowledge Acquisition on the Relationship Between External Social Capital and Innovativeness. *Eur. Manag. Rev.* **2015**, *12*, 149–169. [[CrossRef](#)]

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Article

Executive's Environmental Protection Background and Corporate Green Innovation: Evidence from China

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Abstract: Green innovation is crucial to the sustainable development of corporates. The executive's environmental protection background has an impact on their comprehensive skills, value orientation, management style, and behavioral patterns, thus playing an important role in corporate green innovation strategy. Therefore, this study aims to explore the relationship between executives' environmental protection background and corporate green innovation and its boundary mechanisms. Using data of A-share listed companies in China from 2007 to 2021, this relationship was empirically investigated using Stata analysis software and the establishment of a fixed-effects analysis model. Based on the upper echelons theory, this study finds that executive environmental protection background positively affects corporates' green innovation. The above positive relationship persists when measures of green innovation and alternative regression models address robustness. Furthermore, this study explores the moderating role of the external environment and internal organizational factors (i.e., media attention and board independence). This study concludes that media attention and board independence positively moderate the positive relationship between executives' environmental protection background and green innovation. The study contributes to the upper echelons theory and provides new insights into green innovation in emerging economies.

Keywords: green innovation; environmental protection background; media attention; board independence

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1. Introduction

At the 75th session of the United Nations General Assembly in September 2020, the Chinese government committed itself to peak carbon emissions by 2030 and to achieve carbon neutrality by 2060 [1]. Enterprises are the main actors in green governance, playing a key role in achieving peak carbon and carbon-neutral targets. China is in a new normal phase, committed to the green transformation of its energy system to reduce heavy pollution [2]. With the implementation of a series of environmental regulation policies and the increased importance society attaches to sustainable development, green innovation is gaining attention from the government, enterprises, and the market. As a means to achieve sustainable development, green innovation is considered conducive to a win-win situation of economic growth and environmental protection [3]. Regulating and guiding enterprises toward cleaner production has become an important way to promote green development. Enterprises face high costs in transitioning and upgrading to cleaner directions, so they find it challenging to meet the needs of green development. Therefore, exploring the optimal development of green innovation has become essential in deepening sustainable goals.

With the implementation of a series of environmental regulation policies and the improvement of society's attention to sustainable development, green innovation has been gradually more valued by the government, enterprises, and the market [4]. Green innovation refers to new or improved products, processes, technology, or practice innovations that mitigate environmental damage [5], and focus on and achieve innovative models of environmental sustainability [6]. At the same time, based on the upper echelons theory, it is believed that executive characteristic factors tend to influence the strategic decisions

of corporates, which means that the influence of executive characteristics on corporate strategy has become an important focus of academic attention. Prior research has conducted a series of discussions on the antecedents of green innovation, including technological capabilities [7], environmental regulations [8], green knowledge sharing [9], consumer pressure [10], and market demand [11]. However, existing studies are less likely to explore the impact of green innovation from the perspective of executive characteristics. Recent upper echelons theory points out that executives with long experience in a field may develop selective cognition and consider decisions based on cognitive preferences from long prior experience [12]. Executives inject much of their personality, experiences, and values into their behavior. This degree of individualization can determine the formation of strategy or the actions of others, and the organization becomes a reflection of the executives [13]. These characteristics shape the cognitive structure of the enterprise and thus affect the green innovation of enterprises [14]. Executives' reactions to environmental changes as strategic decision-makers in their firms are influenced by their perceptions of environmental issues. If executives view environmental issues as opportunities for corporate growth, they choose forward-looking environmental strategies, which enhance corporate environmental performance [15]. Therefore, this study focuses on an essential but understudied executive characteristic: environmental protection background. This characteristic represents the individual's experience and background in environmental protection. It is unclear whether and how the environmental protection background of executives influences green innovation, and this study aims to fill this gap. Therefore, the motivation of this study is mainly to explore the relationship between an executive's environmental protection background and corporate green innovation and its boundary conditions.

Further to this, an executive's environmental protection background is internalized in the enterprise's strategic decisions, leading the corporate to protect the environment and demonstrate to the outside world that the enterprise is committed to environmental causes. Existing research assumes that the interests of the firm and the managers are perfectly aligned and therefore managers will follow the development of the firm and take the necessary actions for the firm to achieve its goals. However, agency theory emphasizes that there is an inherent conflict of interest in the agency–principal relationship and therefore the need for proper governance [16]. Thus, corporate oversight mechanisms also play a crucial role in aligning the interests of managers and shareholders. Given that media coverage and board independence are two key oversight mechanisms, we explore how they shape the impact of executives' environmental backgrounds on green innovation strategies. On the one hand, media coverage is recognized as an essential monitoring mechanism, as it can act as a watchdog and motivate corporates to work in the interests of shareholders [17]. This is because the media is used as an important tool for external stakeholders to evaluate managers [18]. Stakeholders will not only think that the evaluation role of the media is legitimate, but also use it to trigger their actions against companies with poor performance and thus affect managers' capital [19]. On the other hand, the board of directors has been recognized as the primary internal oversight force [20]. Independent directors are more likely to punish managers than inside directors because they "have the incentive to build a reputation as experts in decision control" [21]. However, there is little literature on these topics. This study integrates the upper echelons theory and agency theory, collects data on the executive profiles of the Chinese-listed companies from 2007 to 2021, and uses textual-mining analysis to combine panel data to investigate the impact of executive environmental background on green innovation.

The contributions of this study are: First, this study adds value to the literature on upper echelons theory and green innovation research. Differing from previous studies that only focus on the influence of executives' overseas experience, educational background, and functional background on corporate green strategic behavior, this study incorporates executives' environmental background as an occupational background experience into the upper echelons theory, explores the relationship between executives with environmental background and green innovation, and further improves the research content of the upper

echelons theory from a green innovation perspective, thereby making a new contribution to the upper echelons theory of Hambrick and Mason (1984) [22], as the contributions to this area of the literature in the field of green innovation are few, with some very recent exceptions. This study's framework and insights can help upper echelons theory scholars to understand the environmental context of executives as a tool to understand their green innovation strategies. This study analyzes the influence of executives with environmental protection background on the green innovation strategy from the perspective of their power structure and advances the traditional external incentive determinism of green development to the level of enterprises' independent incentive, which provides a development direction for further improving the incentive path of green development, realizing green transformation, and upgrading. Second, from the perspective of green innovation and based on agency theory, this study explores how the impact of the environmental protection background of senior executives on green innovation depends on media coverage and the independence of the board of directors. The findings of this study on the relative importance of executives' environmental protection backgrounds in green innovation also represent an important development in the study of upper echelons theory and agency theory, as executives' understanding of how firms reallocate resources and capabilities in the face of internal and external supervisory role, enriching the literature on how executive background characteristics influence how firms adjust their strategic choices to accommodate corporate green growth.

2. Literature Review and Research Hypothesis

2.1. Literature Review

This study focuses on the impact of executive characteristics on green innovation. Green innovation refers to new or improved products, processes, technology, or practice innovations that mitigate environmental damage [5]. As a vital force for green development driven by energy conservation and environmental protection, green innovation has the double advantage of combining low-carbon energy conservation and efficiency improvement, and is essential for driving a new development pattern of "win-win" for environmental quality improvement [23]. Green innovation has the characteristics of investment uncertainty and a long cycle and reflects the long-term strategic orientation of enterprises [24]. Compared to traditional innovation, green innovation is considered to have knowledge externalities that have a positive impact on the environment during the R&D and diffusion phases.

The upper echelons theory states that executives' experiences, values, and personalities will influence their vision, selective perceptions, interpretations, and ultimately firm outcomes. The literature on upper echelons theory examines how executive characteristics impact green innovation. These studies suggest that executive characteristics can affect green innovation. For example, pilot certificates for executives, better educational experiences, and transformational leadership can lead to better green innovation [25]. Another stream of the literature suggests that executive characteristics can be negative, trivial, or nonlinear in their impact on green innovation [26].

Scholars have studied the impact of executive experience on green innovation based on the upper echelons theory. For example, based on executives' military experience, political experience, academic experience, overseas experience, financial experience, hometown tenure, and richness of career experience, among other perspectives, ref. [27] found a significant effect of executive career experience on green innovation, risk-taking, and economic performance of firms [28]. However, whether the background of executives' environmental protection experience contributes to corporate environmental behavior decisions deserves further research. In addition, the literature closely related to this study focuses on the emotional level of executives' environmental protection awareness. For example, Peng and Liu (2016) [29] found that executive environmental risk awareness and environmental protection benefit awareness play different moderating roles between various stakeholders' environmental protection orientation on corporate eco-innovation.

Existing studies have not analyzed the connection to executives' environmental protection background, and studies in the literature have focused more on the impact of executives' environmental protection awareness on their green development, ignoring the analysis of the impact of executives' special experience of environmental protection background on green innovation. Therefore, this study, based on the critical perspective of executives' environmental protection background, will theoretically analyze and validate the mechanism and influencing factors of green innovation to fill the gap in the existing literature.

2.2. Research Hypothesis

2.2.1. Executive's Environmental Protection Background and Green Innovation

Based on the influence of upper echelons theory on decision-making, this study predicts that the positive impact of executives' environmental protection background on corporate green innovation is reflected in the following two aspects.

First, according to the upper echelons theory, the executive's experiential background will influence the corporate's strategic decisions [30]. This study proposed that executives' environmental protection background is a psychological preference from previous work experience in environmental protection positions. Environmental protection backgrounds are associated with individuals' environmental intentions. Individuals establish ongoing emotional ties to their previous environmental protection experiences in their behavior. As an essential component of corporate green strategy, green innovation consumes fewer resources, produces less waste, improves corporate sustainability, and reduces pollution and damage to the external environment [31]. Therefore, executives with an environmental protection background may be more concerned about the corporate's environmental protection by improving environmental performance.

Second, individuals are more likely to pursue the public interest due to the executive's environmental protection background. Individuals may develop an emotional attachment to the firm and pay more attention to the executive's reputation. They may consider economic factors and the interests of the social group when making strategic decisions [32]. An environmental protection background may stimulate pro-social motivation in individuals, prompting them to focus on goals that benefit others based on their concern for the welfare of the social group. Executives with an environmental protection background may be more concerned about the welfare of social groups and may have an ethical obligation to prevent or solve environmental problems. As a sustainable development model, green innovation benefits both the firm and the ecological environment by reducing environmental protection hazards and improving environmental protection quality [33]. Green innovation strategic decisions affect the firm and extend beyond organizational boundaries to customers, suppliers, employees' families, and other stakeholder members. Therefore, green innovation is seen as a pro-social behavior of firms [34].

Third, executives' environmental protection background enhances green innovation by enriching executives' social network resources as well as enhancing executives' risk appetite propensity. Executives with environmental protection backgrounds have worked in environmental protection functions, companies, industries, geographies, and organizations due to their previous experience. The economic behavior of executives in their social structure will be embedded in their social network relationships, forming a kind of "social capital" [35]. The background of environmental protection experience allows executives to build a wide range of social relationships at work. It also allows the market to recognize executives more fully through their environmental performance and thus have a higher level of trust in their capabilities [36]. In fact, having an environmentally friendly experience gives executives a higher environmental protection philosophy and more prosperous social network relationships that provide many different types of allocatable resources. Wernerfelt (1984) [37] pointed out that in the resource-based view (RBV), a firm is a collection of various resources, and resources are the basis for implementing a corporate's strategy. As an informal institution, social networks can facilitate the search for scarce resources and thus facilitate the development of green innovation [38].

In conclusion, executives' management skills are developed from their personal, especially career experiences that determine their idiosyncratic cognitive structures, values, and decision-making patterns [39]. Executives with environmental protection experience background will impact management psychology and style, showing irrational tendencies such as risk preference, which will affect their cognitive abilities and behavioral choices, and influence green innovation [40]. This study argued that executives from environmental protection backgrounds exhibit pro-social motivations and behaviors. While seeking economic benefits, executives from environmental protection backgrounds are more likely to protect the environment through green innovations. Thus, the following hypothesis is proposed:

Hypothesis 1. *Executive's environmental protection background positively impacts green innovation.*

2.2.2. Moderation Effect of Media Attention

Media attention refers to the extent to which media organizations (major Internet media) pay attention to the business strategy behavior of a specific object such as the listed companies in this study [41,42], "usually gauged by the sheer volume of stories or space dedicated to topics in newspapers, television news and so on". Media attention is an essential external governance factor that influences the role of executives with an environmental protection background. The media is the information vehicle or form of communication that achieves a communication purpose, and it drives the progress of an event through attention and publicity coverage [43]. The media acts as both a bystander and a facilitator of the process in the marketplace [44,45]. This study argues that the media feeds the internal information of listed companies into the capital market, and stakeholders identify and analyze the information reported by the media, forming external supervision and legitimacy pressure, thus influencing the strategic decisions of executives with the environmental protection background on green innovation.

Media attention can enhance the relationship between executives' environmental protection backgrounds and green innovation. First, the higher the level of media attention, the greater the pressure executives receive from external stakeholders to monitor them. It has been shown that high levels of media coverage may prompt firms to take risky and exploratory actions. For example, Chatterjee and Hambrick (2011) [46] found that media attention encourages managers and thus triggers risk-taking behavior. Firms will passively disclose environmental information and improve its quality to more effectively assess executives' environmental protection behavior, i.e., media attention imposes implicit constraints on executives with environmental protection backgrounds. For a corporate to maintain its reputation, maintain market share, and avoid being eliminated from the market, media reinforces executives' awareness of being influenced by their environmental protection backgrounds and enhances their willingness to take risks, thus contributing to green innovation.

Second, the media has an impact on the reputation of executives. Media attention can change corporate strategic behavior by influencing executives' reputations. Executives can obtain external resource support needed for strategic development by receiving social recognition [19]. The most important matter is gaining social recognition, and the media plays a crucial role by influencing public opinion through its coverage of events and personalities. For example, the social resources generated by the executive's idiosyncratic career experience element will be an influencing factor in strategic decisions [47]. Media coverage of green innovation strategies of executives with environmental protection backgrounds will send signals of positive corporate development to external stakeholders, which in turn will generate various resources needed for corporate development and to promote green innovation. The reputation effect of the media will enhance the company's ability to raise funds, ensure sustainable investment in green innovation, address executives' concerns about the development of green innovation, and give full play to the role of executives with environmental protection backgrounds in strategic decision-making [48]. In addition,

executives with environmental protection backgrounds will view media attention as a market-oriented signal from the perspective of strategic legitimacy, and tap into the real needs of multiple stakeholders to promote green innovation [49]. This study argues that media attention will enhance the legitimacy pressure faced by companies through monitoring and reputation influences, and increase stakeholders' attention to green innovation, thus strengthening the positive relationship between executives' environmental protection background and green innovation. Thus, the following hypothesis is proposed:

Hypothesis 2. *Media attention positively moderates the relationship between the executive's environmental protection background and green innovation.*

2.2.3. Moderation Effect of Board Independence

The board of directors plays a crucial role in corporate governance in terms of management control and oversight of decision-making [50]. The law gives the board formal authority to approve initiatives, evaluate management performance, and control management compensation [51]. Agency theory views monitoring management's actions as the board's primary responsibility to protect shareholder interests. The field of strategy research argues that the composition of the board of directors may impact the outcome of a corporate's strategic choices [52]. As board members, independent directors hold only directorships, and do not have relationships with the company and shareholders that could impede their ability to exercise impartial judgment. Independent directors come from outside the company, have no other interests with the company, and seem to lack the motivation to enhance corporate value. Nonetheless, they do not give in to managers' improper demands to protect their reputations from damage. They can maintain a more independent and objective position in monitoring managers. Independent directors are essential in mitigating conflicts of interest between managers and shareholders and overseeing executives' decisions.

This study argues that board independence can enhance the positive effect of the environmental protection background of executives on green innovation. Independent directors can improve the corporate's internal governance mechanism, including the supervisory and advisory functions. First, in terms of supervisory function, the greater the proportion of independent directors on the board of directors, the more independent directors can play a supervisory role and supervise management on behalf of shareholders [53]. When executives with environmental protection backgrounds make high-risk strategic decisions, such strategic change decisions may not be in the interest of corporate shareholders. Independent directors can identify opportunistic behaviors of executives and can monitor behaviors that are detrimental to corporate performance in the execution of executives' strategies [54]. In addition, independent directors can prevent abuse of power and over-investment in allocating green innovation resources by executives with environmental protection backgrounds.

Second, in advisory functions, independent directors can provide advice based on their areas of expertise [55]. Independent directors with relevant professional knowledge, experience, and skills can solve problems by grasping corporate strategic decisions and improving motivation for green innovation. They can help executives with environmental protection backgrounds to find the right direction for green innovation, avoiding the risk of "success traps" that executives may overlook due to the risk of green innovation, allowing executives with environmental protection backgrounds to evaluate and make strategic decisions from their viewpoints in a centralized manner, thereby reducing irrational decisions due to the cognitive limitations of managers. In addition, due to the complexity and ambiguity of management practices, independent directors use the degree of strategy implementation as a proxy for management effectiveness [56]. This study argues that the independent board of directors plays a supervisory and advisory role in promoting executives to grasp the timing of green development, thus strengthening the positive relationship

between executives' environmental protection background and green innovation. Thus, the following hypothesis is proposed, and Figure 1 shows the theoretical research model:

Hypothesis 3. Board independence positively moderates the relationship between the executive's environmental protection background and green innovation.

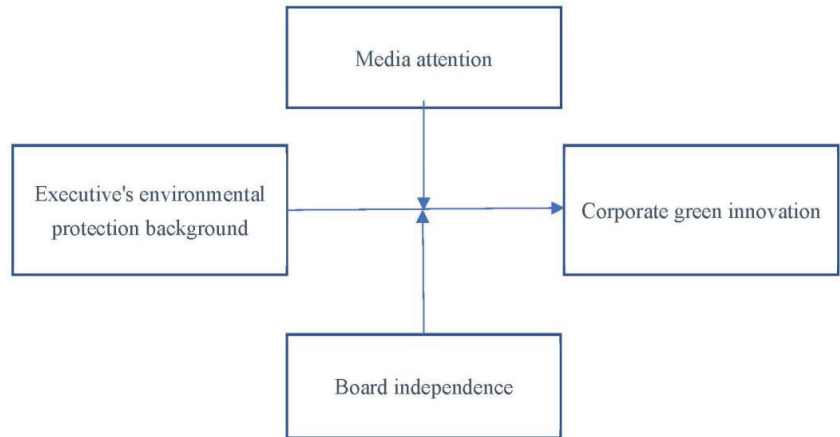


Figure 1. Theoretical research model.

3. Data and Methodology

3.1. Data and Samples

This study used panel data of Chinese-listed companies in A-shares from 2007–2021 as a research sample to test the influence of executives with environmental protection backgrounds on corporate green innovation. First, the original data on executives' environmental protection backgrounds were obtained from the publicly available executive biographical information in the China Stock Market Accounting Research Database (CSMAR) and the WIND database (WIND), and the data on executive characteristics were collected. Second, the green innovation data were obtained from the China Research Data Platform (CNRDS) and the "International Patent Classification Green List" released by the World Intellectual Property Organization (WIPO) in 2010. Third, financial and corporate governance structure data were obtained from the CSMAR database. These databases provide reliable analytical data on all listed companies in China and have been used for other management and strategy studies [57]. Furthermore, the specific data samples selection process: (i) excluded listed insurance and finance companies; (ii) excluded special treatment (ST) sample companies that had abnormal financial indicators; (iii) excluded sample companies listed less than one year; (iv) eliminated the missing samples; and (v) obtained a total of 19,975 observations. The sample calculation process in this paper is shown in Table 1. In addition, this study performed data analysis based on stata15 statistical software.

Table 1. Sample data calculation process.

Calculation Process	Number of Samples
Obtain the original sample of Chinese listed companies from the CSMAR database	27,767
Exclude listed finance and insurance company's samples	1571
Exclude special treatment (ST) samples	836
Exclude the companies listed in that year	1765
Eliminate the missing samples	3620
Effective sample size result	19,975

3.2. Variables Definition

3.2.1. Dependent Variable

Corporate green innovation (GI). Consistent with existing green innovation studies in the Chinese context and considering the availability of Chinese data, this study used green patents as an indicator of GI [58]. First, the other proxies for green innovation, such as research and development (R&D) expenditure [59], represented actual output efficiency [60]. Second, as green patents are capable of generating positive externality for environmental protection and emission control in the long term, which is helpful to sustainable growth [61], this study used the number of green patent applications by Chinese listed companies to measure green innovation, specifically, matching the patent classification numbers of invention patents and model patents of listed companies, and the patent data retrieved from China Research Data Platform (CNRDS) according to the “Green List of International Patent Classification” issued by the World Intellectual Property Organization (WIPO) in 2010. The number of green patent applications was obtained by matching the patent data retrieved from CNRDS based on the “International Patent Classification Green List” issued by WIPO in 2010. The quality of green innovation was measured by the number of green invention patent applications, and the number of green utility model patent applications measured the quantity of green innovation. The above two measures are summed up to obtain the total number of green innovations (GRInno).

3.2.2. Independent Variable

Executive environmental protection background (EP). Referring to the idea of Hao et al. (2019) [62] that the perceptions and values of executives can be inferred from the demographic characteristics of their members, the original data on the environmental protection background of executives were obtained from the biographical information published by the CSMAR database, which includes “environment”, “environmental protection”, “new energy”, “sustainable” in the biographical of executives. “Clean energy”, “ecology”, “low carbon”, “sustainable”, “energy saving”, “green” and other keywords, were used to determine that the sample has an environmental protection background. On this basis, this study counted the number of executives with environmental protection backgrounds.

3.2.3. Moderation Variables

Media attention (MA). To measure media attention, basic company statistics of news information data of sample companies were used [63]. News reports from sources other than major business publications such as China Securities Journal, Economic Observer, and Securities Times were excluded. These media outlets usually act as opinion leaders influencing other media coverage, so the sample of these publications should represent the overall coverage of a company in the media. In addition, the annual number of all news articles mentioning the company’s name was counted. Finally, the total number of annual company news articles was recorded to establish this study’s measure of media attention. It is worth noting that this study was followed to calculate the number of all media items related to the company.

Board independence (BI). According to Zaid et al. (2020) [64], board independence is measured by the percentage of independent directors on the overall board.

3.2.4. Control Variables

The following control variables are selected in this study: total assets (Size), fixed assets ratio (Far), Tobin’s Q (TQ), return on net assets (Roe), the shareholding ratio of the largest shareholder (Top1), the gearing ratio (Debt), chairman and general manager (Dual), board size (Board), etc. The data were obtained from the CSMAR database. This study also controlled for year and industry fixed effects. Based on this, Table 2 shows the descriptive statistics of the main variables.

Table 2. Variable definitions.

Variables		Description	Reference
Dependent Variable	GRInno	Apply the number of green patent applications of listed companies plus 1 and take the natural logarithm.	Wang et al. (2022) [61]
Independent Variable	hbhjdum	If the company hires one or more executives with environmental protection backgrounds in the same year, it will score 1, and the opposite is 0.	Hao et al. (2019) [62]
	Inhbhj	The number of companies containing executives with environmental protection background in the year and add 1 to take the natural logarithm.	Hao et al. (2019) [62]
Moderation Variables	MA	The number of all media coverage related to the company.	Luo et al. (2022) [63]
	BI	The percentage of independent directors on the overall board.	Zaid et al. (2020) [64]
Control Variables	Size	The natural logarithm of total assets.	
	Far	Net fixed assets as a percentage of total assets.	
	TQ	Tobin's Q value.	
	Roe	Net income as a percentage of the average balance of shareholders' equity.	Jia et al. (2019) [65]
	Top1	The shareholding ratio of the first largest shareholder.	Xu et al. (2019) [66]
	Debt	Total corporate debts as a percentage of total assets.	
	Dual	If the chairman and the CEO are the same person, the value is 1, and the opposite is 0.	
Board	Number of the corporate board of directors for the year.		

3.3. Models

This study used a fixed-effects panel regression model to test our hypothesis. The dependent variable was treated with a one-period lag to address potential endogeneity due to reverse causality. Therefore, the following regression models were used to test the effect of the executive's environmental protection background on green innovation, the moderating role of media attention and board independence. In addition, we performed data analysis based on stata15 statistical software, using a fixed-effects model commonly used in the previous literature for testing [67]:

$$GRInno_{i,t+1} = \alpha_0 + \alpha_1 EP_{i,t} + \alpha_k \sum Control_{it} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (1)$$

$$GRInno_{i,t+1} = \beta_0 + \beta_1 EP_{i,t} + \beta_2 MA_{i,t} + \beta_3 EP_{i,t} \times MA_{i,t} + \beta_4 BI_{i,t} + \beta_5 EP_{i,t} \times BI_{i,t} + \beta_k \sum Control_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (2)$$

where i and t denote firm and year; GRInno is the level of green innovation, respectively; EP is the executive's environmental protection background; MA and BI are the moderating variables, which refer to the media attention and board independence; and $\sum Industry$ and $\sum Year$ represents industry fixed effect and year fixed effect, respectively.

4. Empirical Findings

4.1. Descriptive Statistics and Correlation Analysis

Table 3 provides the results of descriptive statistics and correlation tests. The mean value of GRInno is 0.394, and the standard deviation is 0.805, indicating that most of the companies in this study carried out green innovation activities during the sample period, but there were significant differences in the level of green innovation among these companies. The mean and standard deviation values of hbhjdum are 0.310 and 0.463, respectively, indicating that the overall level of executives with environmental protection backgrounds in companies was low and the percentage of executives with environmental protection backgrounds varied significantly between companies. The mean value of MA is 5.024, and the standard deviation is 1.121, indicating that listed companies generally

received media attention. The mean and standard deviation of BI are 0.379 and 0.069, respectively, indicating a relatively high percentage of independent directors in listed companies. The variables hbbjdum, lnhbhj, and GRInno are positively correlated at the 1% level, indicating that executives with environmental protection backgrounds helped to enhance the level of green innovation. Hypothesis 1 was initially verified.

Table 3. Descriptive statistics and correlation analysis.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GRInno	0.394	0.805	1												
2.hbbjdum	0.310	0.463	0.129 ***	1											
3. lnhbhj	0.323	0.550	0.164 ***	0.877 ***	1										
4. MA	5.024	1.121	0.219 ***	0.052 ***	0.046 ***	1									
5. BI	0.379	0.069	0.028 ***	0.01	0.002	0.084 ***	1								
6. Size	22.015	1.235	0.236 ***	0.030 ***	0.025 ***	0.464 ***	-0.008	1							
7. Far	0.238	0.169	-0.064 ***	0.017 **	0.002	0.002	-0.065 ***	0.185 ***	1						
8. TQ	3.075	2.229	-0.084 ***	0.003	-0.004	0.045 ***	0.069 ***	-0.436 ***	-0.228 ***	1					
9. Roe	0.077	0.140	0.040 ***	0.007	0.011	0.034 ***	0.014 **	0.053 ***	-0.138 ***	0.112 ***	1				
10. Top1	0.359	0.149	0.028 ***	-0.029 ***	-0.028 ***	0.068 ***	0.023 ***	0.235 ***	0.099 ***	-0.087 ***	0.096 ***	1			
11. Debt	0.421	0.207	0.082 ***	0.018 **	0.026 **	0.131 ***	-0.052 ***	0.509 ***	0.199 ***	-0.370 ***	-0.174 ***	0.056 ***	1		
12. Dual	0.071	0.256	-0.025 ***	0.016 **	0.016 **	-0.046 ***	-0.0110	-0.125 ***	-0.078 ***	0.098 ***	0.032 ***	-0.003	-0.104 ***	1	
13. Board	10.125	2.495	0.051 ***	0.042 ***	0.038 ***	0.166 ***	-0.100 ***	0.278 ***	0.138 ***	-0.121 ***	-0.044 ***	0.013 *	0.175 ***	-0.020 ***	1

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2. Multiple Regression Analysis

4.2.1. The Effect of Executive’s Environmental Protection Background on Green Innovation

Table 4 reports the impact of whether and how corporates on green innovation hire many executives with environmental protection backgrounds. Among them, Columns (1)–(2) show the effect of whether or not a firm employs an executive with environmental protection background on green innovation, and Columns (3)–(4) show the impact of the number of executives with environmental protection background hired by a corporate on green innovation. From the regression results in Column (2), the regression coefficient between whether or not to hire executives with environmental protection backgrounds (hbbjdum) and green innovation is significantly positive, indicating that hiring executives with environmental protection background promotes green innovation. The results in Column (4) show that the regression coefficient between the number of executives with environmental protection backgrounds (lnhbhj) hired by corporates and green innovation is significantly positive at the 5% level, indicating that the more executives with environmental protection backgrounds hired by corporates, the more they can promote green innovation. Therefore, Hypothesis 1 of this study is supported.

Table 4. The regression results of environmental protection background on green innovation.

Variables	(1)	(2)	(3)	(4)
	GRInno	GRInno	GRInno	GRInno
hbbjdum	0.048 *** (2.750)	0.033 * (1.874)		
lnhbhj			0.056 *** (2.958)	0.041 ** (2.149)
Size	0.490 *** (38.065)	0.418 *** (25.505)	0.489 *** (38.049)	0.418 *** (25.502)
Far	0.040 (0.629)	0.061 (0.957)	0.040 (0.623)	0.061 (0.954)
TQ	0.108 *** (25.886)	0.113 *** (22.589)	0.108 *** (25.886)	0.113 *** (22.600)
Roe	0.550 *** (12.706)	0.607 *** (13.701)	0.549 *** (12.704)	0.607 *** (13.702)
Top1	-0.672 *** (-7.148)	-0.507 *** (-5.340)	-0.673 *** (-7.160)	-0.508 *** (-5.349)
Debt	-0.038 (-0.676)	0.056 (0.989)	-0.037 (-0.662)	0.056 (0.997)
Dual	-0.068 *** (-3.217)	-0.067 *** (-3.164)	-0.068 *** (-3.220)	-0.067 *** (-3.170)

Table 4. Cont.

Variables	(1)	(2)	(3)	(4)
	GRInno	GRInno	GRInno	GRInno
Board	−0.005 *	−0.006 **	−0.005 *	−0.006 **
	(−1.824)	(−2.047)	(−1.852)	(−2.069)
Constant	−10.168 ***	−8.709 ***	−10.157 ***	−8.704 ***
	(−35.554)	(−24.181)	(−35.550)	(−24.193)
Industry FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
N	19,975	19,975	19,975	19,975
Adj.R ²	0.501	0.507	0.501	0.507

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As pointed out by the upper echelons theory, executives' pre-career experience continuously internalizes the mindset and behavior of executives in their later work, which in turn affects the behavioral decisions and even the strategic layout of the market. Therefore, executives with environmental protection backgrounds are more likely to integrate their environmental experience into corporate strategic decisions and pay more attention to green sustainability performance. Further, to control the fixed effect of the industry is to control the factors that are relatively constant relative to the industry. For example, there are unique differences in different industries that do not change with time, and the food industry is an industry that is less affected by the economic cycle, but the steel industry is cyclical. By controlling the fixed effect of the industry, this study can control the differences between industries, and help to estimate the regression results more reasonably [62].

4.2.2. Moderation Effect Test

Table 5 shows the regression results of the moderating effect of media attention and board independence. Columns (1)–(2) show the results of the moderating effect of media attention, and columns (3)–(4) show the results of the moderating effect of board independence. Models (1) and (2) introduce the moderating terms $hbbjdum \times MA$ and $lnhbbj \times MA$ for media attention to test whether media attention has a significant linear moderating effect. The regression results show that the coefficients of the interaction terms $hbbjdum \times MA$ and $lnhbbj \times MA$ are 0.047 and 0.042, respectively, and are significant at the 1% level, indicating that there is a significant linear moderating effect of media attention, suggesting that the positive relationship between executives' environmental protection background and green innovation is strengthened when the media attention is greater. Therefore, Hypothesis 2 of this study is supported. Models (3) and (4) introduce the first-order moderators of director independence, $hbbjdum \times BI$ and $lnhbbj \times BI$, to test whether there is a significant linear moderating effect of director independence. The regression results show that the coefficients of the interaction terms $hbbjdum \times BI$ and $lnhbbj \times BI$ are 0.308 and 0.309, respectively, and significant at the 1% level, indicating that there is a significant linear moderating effect of board independence. When board independence is higher, the positive relationship between executive environmental protection background and green innovation is strengthened. Therefore, Hypothesis 3 of this study is supported.

Table 5. The moderating effect result of media attention and board independence.

Variables	(1)	(2)	(3)	(4)
	GRInno	GRInno	GRInno	GRInno
$hbbjdum$	0.033 *		0.034 *	
	(1.946)		(1.940)	
MA	0.147 ***	0.147 ***		0.042 **
	(16.659)	(16.660)		(2.220)
$hbbjdum \times MA$	0.047 ***			

Table 5. Cont.

Variables	(1)	(2)	(3)	(4)
	GRInno	GRInno	GRInno	GRInno
	(4.225)			
Inhbbj		0.040 ** (2.113)		
Inhbbj × MA		0.042 *** (3.958)		
BI			0.086 (0.484)	0.047 (0.279)
hbbjdum × BI			0.308 *** (3.331)	
Inhbbj × BI				0.309 *** (3.341)
Size	0.375 *** (22.863)	0.374 *** (22.820)	0.419 *** (25.605)	0.419 *** (25.623)
Far	0.020 (0.312)	0.015 (0.242)	0.058 (0.915)	0.058 (0.912)
TQ	0.097 *** (18.932)	0.097 *** (18.919)	0.113 *** (22.591)	0.113 *** (22.599)
Roe	0.584 *** (13.507)	0.583 *** (13.486)	0.605 *** (13.670)	0.604 *** (13.674)
Top1	−0.456 *** (−4.881)	−0.452 *** (−4.846)	−0.502 *** (−5.292)	−0.503 *** (−5.303)
Debt	0.034 (0.611)	0.034 (0.605)	0.053 (0.938)	0.053 (0.946)
Dual	−0.060 *** (−2.908)	−0.060 *** (−2.886)	−0.062 *** (−2.968)	−0.062 *** (−2.978)
Board	−0.006 ** (−2.267)	−0.006 ** (−2.300)	−0.007 *** (−2.617)	−0.007 *** (−2.643)
Constant	−7.688 *** (−21.338)	−7.673 *** (−21.287)	−8.700 *** (−24.237)	−8.693 *** (−24.246)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	19,975	19,975	19,975	19,975
Adj.R ²	0.515	0.515	0.507	0.507

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2.3. Endogeneity Test

2SLS regression method. This study assesses the relationship between the hiring of executives with environmental protection backgrounds and green innovation, which may be interfered with by endogeneity issues, as listed firms with green innovation may hire more executives with environmental protection backgrounds to meet the decision-making needs of green innovation, thus creating endogeneity issues caused by reverse causality. In this study, the number of pollution incidents (IV) reported on news websites or government websites in the city where the core executives are from is used as an instrumental variable for the environmental protection background of executives, where the core executives include the chairman, vice chairman, president, general manager, and deputy general manager of the firm, and the core executives have power to choose the personnel of the firm. On the one hand, based on the executives' hometown complex, core executives tend to be concerned about pollution incidents in their hometown, which may lead them to take environmental precautionary measures for companies and motivate them to engage in green business practices, such as hiring more executives with environmental protection backgrounds to manage companies. On the other hand, pollution events in the cities where the core executives are based can only influence the strategic decisions by affecting the personal behavior of the core executives, while environmental events in the cities where

the core executives are based do not directly influence the green innovation decisions, in line with the hypothesis of correlation and exogeneity of the instrumental variables.

Table 6 reports the results of using the instrumental variable (IV) to test the influence of executives from environmental protection backgrounds on green investors. Columns (1) and (3) show the results of the first-stage regressions with IV estimated coefficients of 0.053 and 0.045, and are positive at the 1% level, indicating that there is a significant positive relationship between the occurrence of pollution incidents in the executive's place of origin and the corporate's hiring of executives with environmental protection backgrounds, consistent with theoretical expectations. Columns (2) and (4) show the results of the second-stage regression, and the results show that the effects of hiring executives with environmental protection background on green innovation are both significantly positive at the 5% level under the two-stage least squares (2SLS) estimation, which indicates the robustness of the results.

Table 6. 2SLS regression method result.

Variables	(1)	(2)	(3)	(4)
	First-Stage	Second-Stage	First-Stage	Second-Stage
	hbbjdum	GRInno	Inhbbj	GRInno
IV	0.053 *** (6.362)		0.045 *** (5.962)	
hbbjdum		0.449 ** (2.137)		
Inhbbj				0.519 ** (2.128)
Size	−0.022 ** (−2.064)	0.138 *** (5.404)	−0.005 (−0.511)	0.131 *** (5.153)
Far	0.018 (0.306)	−0.156 (−1.183)	−0.001 (−0.012)	−0.148 (−1.110)
TQ	−0.003 (−0.838)	0.119 *** (11.304)	−0.004 (−1.165)	0.120 *** (11.296)
Roe	0.079 * (1.792)	0.754 *** (9.501)	0.077 ** (2.077)	0.749 *** (9.295)
Top1	−0.083 (−0.991)	−0.157 (−0.886)	0.032 (0.416)	−0.211 (−1.207)
Debt	0.009 (0.197)	0.315 *** (2.741)	0.007 (0.165)	0.315 *** (2.735)
Dual	−0.004 (−0.246)	−0.115 *** (−2.601)	−0.010 (−0.614)	−0.112 ** (−2.533)
Board	0.005 ** (2.167)	−0.006 (−1.056)	0.006 *** (2.958)	−0.007 (−1.209)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Kleibergen-Paap RK LM statistic		76.764 ***		66.972 ***
Cragg-Donald Wald F statistic		126.673		113.809
Kleibergen-Paap RK Wald F statistic		40.434		35.566
N	6181	6181	6181	6181
Adj.R ²	0.667	0.055	0.669	0.049

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2.4. Robustness Test

Replacing the regression model. This study uses the Tobit model and Poisson model. The number of dependent variables, green innovation, is generally scattered in the positive range, but there are a considerable number of zero values and a non-negative integer

skewed distribution, which is often estimated using the Tobit and Poisson models. Therefore, the Tobit and Poisson models were used to test the robustness of the relationship between corporate hiring of executives with environmental backgrounds in green innovation. Columns (1) and (3) of Table 7 show the regression results of the impact of whether firms hire executives with environmental background (hbbjdum) and the number of executives with environmental protection background (lnhbbj) on green innovation when tested using the mixed Tobit model. Columns (2) and (4) show the regression results of the impact of whether firms hire executives with environmental protection background (hbbjdum) and the number of executives with environmental protection background (lnhbbj) on green innovation tested using the Poisson model. The results show that after changing the estimation method, the independent variables of corporate hiring of executives with environmental protection backgrounds are all positive at the 1% level, confirming the robustness of the previous benchmark regression results.

Table 7. Robustness test of the replacement regression model.

Variables	(1)	(2)	(3)	(4)
	Tobit	Poisson	Tobit	Poisson
	GRInno	GRInno	GRInno	GRInno
hbbjdum	0.147 *** (6.156)	0.103 *** (5.506)		
lnhbbj			0.189 *** (9.328)	0.134 *** (8.564)
Size	0.743 *** (56.704)	0.481 *** (53.725)	0.745 *** (56.876)	0.482 *** (53.863)
Far	0.009 (0.103)	0.030 (0.428)	0.023 (0.276)	0.040 (0.567)
TQ	0.190 *** (29.701)	0.108 *** (24.419)	0.190 *** (29.777)	0.109 *** (24.459)
Roe	2.667 *** (25.493)	2.199 *** (26.019)	2.657 *** (25.445)	2.193 *** (25.933)
Top1	−0.769 *** (−9.844)	−0.560 *** (−9.109)	−0.758 *** (−9.725)	−0.546 *** (−8.870)
Debt	−0.658 *** (−9.509)	−0.458 *** (−8.240)	−0.665 *** (−9.625)	−0.467 *** (−8.388)
Dual	−0.177 *** (−4.067)	−0.177 *** (−4.710)	−0.179 *** (−4.120)	−0.178 *** (−4.738)
Board	−0.011 ** (−2.334)	−0.008 ** (−2.217)	−0.011 ** (−2.437)	−0.008 ** (−2.286)
Constant	−16.792 *** (−54.006)	−11.563 *** (−51.057)	−16.823 *** (−54.168)	−11.600 *** (−51.181)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	19,975	19,975	19,975	19,975
Pseudo.R ²	0.139	0.158	0.140	0.159

Notes: ** $p < 0.05$, *** $p < 0.01$.

Replacing the measurement method of green innovation. This study classifies the application of green invention patents (GRInva) and utility patents (GRUma). As a replacement variable for the original dependent variable green innovation, the promotion effect of executives with environmental protection backgrounds on green innovation is examined. The results are shown in Table 8. The results show that the regression results of whether listed firms hire executives with environmental protection background (hbbjdum) and the number of executives hired with environmental protection background (lnhbbj) on green innovation are both significantly positive at the 5% level, indicating the robustness of the study findings.

Table 8. Robustness test of the replacement the measurement method of green innovation.

Variables	(1)	(4)	(5)	(8)
	GRInva	GRUma	GRInva	GRUma
hbbjdum	0.025 ** (2.282)	0.029 ** (1.978)		
lnhbbj			0.035 *** (3.031)	0.026 (1.631)
Size	0.170 *** (17.887)	0.306 *** (22.475)	0.169 *** (17.871)	0.306 *** (22.448)
Far	−0.034 (−0.813)	0.054 (0.993)	−0.035 (−0.820)	0.054 (0.992)
TQ	0.050 *** (18.978)	0.120 *** (27.694)	0.050 *** (18.998)	0.120 *** (27.707)
Roe	0.280 *** (10.259)	0.512 *** (11.678)	0.280 *** (10.239)	0.512 *** (11.667)
Top1	−0.210 *** (−3.705)	−0.326 *** (−3.778)	−0.211 *** (−3.719)	−0.326 *** (−3.779)
Debt	0.004 (0.123)	0.162 *** (3.316)	0.004 (0.134)	0.162 *** (3.323)
Dual	−0.022 (−1.523)	−0.137 *** (−8.200)	−0.022 (−1.530)	−0.137 *** (−8.195)
Board	−0.004 ** (−2.166)	−0.003 (−1.506)	−0.004 ** (−2.203)	−0.003 (−1.510)
Constant	−3.336 *** (−15.881)	−6.584 *** (−21.812)	−3.333 *** (−15.881)	−6.577 *** (−21.794)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	19,975	19,975	19,975	19,975
Adj.R ²	0.346	0.442	0.346	0.442

Notes: ** $p < 0.05$, *** $p < 0.01$.

5. Conclusions and Discussion

As the main actors of environmental protection and green governance at the micro level, corporates play a crucial role in achieving sustainability goals. Based on the upper echelons theory, it is believed that executives from environmental protection backgrounds tend to integrate previous “green” cognitive experience into decision-making behavior, ensuring the improvement of their environmental and economic performance. This study focuses on whether listed companies employing executives with environmental protection backgrounds can promote green innovation and its boundary conditions. The study finds that executives with environmental protection backgrounds enhance green innovation. The positive relationship remains robust when instrumental variables and a series of robustness tests address the endogeneity issue. Further, the positive relationship between executives’ environmental protection background and green innovation is strengthened when media attention and board independence are greater. The findings provide insights into the view that executive characteristics impact green innovation.

This study extends the literature on the governance effects of management characteristics and provides new empirical evidence for the study of green innovation. First, this study adds value to the literature on upper echelons theory and green innovation research. Prior research on the effects of executive characteristics on green innovation has focused on the effects of characteristics such as executive compensation, educational background, overseas experience, and executive tenure [5]. However, few studies have put the perspective of the executive’s environmental protection background affecting green innovation. Therefore, this study extends the executive’s environmental protection background to the field of green innovation research based on upper echelons theory. Second, it adds to the work of Khanra et al. (2022) [27] who examined the strategic management actions taken by executives in introducing green innovation initiatives, further adding to this literature by focusing

on how the executive's environmental protection background influences the boundary mechanisms of green innovation. While previous research has focused on the direct effects of executive characteristics on various strategic choices of firms, scholars have recently called for further exploration of factors that mitigate or enhance these effects [6]. Based on insights from agency theory, this study examines the moderating role of media attention and board independence. This study also supplements the previous interpretation of agency theory and introduces the role of internal and external supervision mechanism [68]. This study extends the view that integrating agency theory and upper echelons theory enriches understanding of the governance functions of these two supervisory mechanisms in the executive's environmental protection background.

6. Recommendation

To enhance corporate green governance and sustainable development, it is important to leverage the governance strengths of executives and add an "environmental barrier" to corporate business decisions. The government should guide companies to set scientific standards for executive staffing and hire executives who value corporate environmental governance, so that business development can balance financial performance with environmental performance. In addition, executives with environmental protection backgrounds should be given the same rights as their positions to ensure they have a sufficient voice in corporate decision-making to promote sustainable development. Based on the research findings, several practical recommendations are made for governments and corporates.

For the government, it must increase its policy support to encourage corporates to implement green innovation. As a way for corporates to take up social and environmental responsibility, green innovation goals are not only based on the realization of their economic benefits, but also take into account the embodiment of social responsibility, urging enterprises to improve environmental performance and enhance green innovation. The government should build a perfect green innovation system, actively guide the flow of green funds to corporates, and prompt them to eliminate their backward production methods to promote environmental protection and sustainable development of the economy. For example, in the context of low-carbon development, the government should introduce policies and measures to promote green innovation to ensure resource efficiency. It could establish a special fund for corporate green finance or credit. It should follow the principle of differentiation and formulate targeted preferential policies, according to the actual situation of corporates, to support the deep integration of green products, organizational structures, and management processes.

For corporates, it is important to emphasize the role of the environmental protection background of executives in enhancing green innovation. First, boards must consider this characteristic when selecting executives and ensuring that their decisions are consistent with corporate goals. For example, suppose corporates are under pressure for environmental legitimacy (e.g., corporate pollution). In that case, executives with environmental protection backgrounds may be an effective way to make the necessary strategic changes [48]. Executives with an environmental protection background are beneficial from an environmental protection perspective, especially in the context of green innovation, an area considered important for corporate strategy. Hiring executives with environmental protection backgrounds in listed companies helps to encourage green investors to invest in such companies. As the number of executives with environmental protection backgrounds increases, their contribution to green innovation becomes more evident. Therefore, corporates should improve their governance mechanisms. Including executives with environmental protection backgrounds in corporate management can improve management diversity, thus reducing the myopia of management and facilitating the management to make green innovation decisions.

Second, in the era of big data, corporates should promote information dissemination and corporate governance through the media, so that stakeholders can better understand the corporate and improve its information transparency. Corporates should raise the

environmental protection awareness of their executives and be more active in disclosing green innovation information. This can alleviate the information asymmetry between enterprises and stakeholders and compensate for the lack of contrast resulting from high stakeholder expectations. Corporates can gain the trust and support of stakeholders, thus promoting green innovation. Corporates should promote information dissemination and corporate governance through the media so that stakeholders can improve the transparency of information and social responsibility of corporates.

Third, since the higher the proportion of independent directors, the easier it is for executives with environmental protection backgrounds to play a role and thus promote green innovation, it is necessary to improve the corporate governance mechanism and improve the supervision mechanism on executives' decision-making process, which can be achieved through measures such as increasing the proportion of independent directors and designing an investment risk-sharing mechanism.

7. Limitations and Future Research

This study has limitations that provide avenues for future research. First, this study explores the relationship between an executive's environmental protection background and corporate green innovation based on upper echelons theory and agency theory. For example, upper echelons theory suggests that organizational strategic decisions can be viewed as a function of managerial characteristics [13]. By focusing on the factors of the executive's environmental protection background, in future, the researcher can measure the executive environmental background in various ways, such as by combining case studies and questionnaires, to determine the differences in the competencies of the executive's background and their roles. Second, although this study introduces internal board independence and media attention, we believe that future research needs to examine more moderating factors of other supervisory factors, such as managers' knowledge, ability, CEO autonomy, and institutional factors. Third, this study draws our findings from a sample of Chinese-listed companies. Because there are differences in the incentive structure of enterprises under different national institutional backgrounds [69], they may lead to differences in executives' preferences and knowledge, which in turn affect organizational strategy. Therefore, it makes sense to use samples from different countries to test the model.

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References

1. Zhao, X.; Ma, X.W.; Chen, B.Y.; Shang, Y.P.; Song, M.L. Challenges toward carbon neutrality in China: Strategies and countermeasures. *Resour. Conserv. Recycl.* **2022**, *176*, 105959. [[CrossRef](#)]
2. Xu, F.; Cui, F.S.; Xiang, N. Roadmap of green transformation for a steel-manufacturing intensive city in China driven by air pollution control. *J. Clean. Prod.* **2021**, *283*, 124643. [[CrossRef](#)]
3. Xiang, X.J.; Liu, C.J.; Yang, M. Who is financing corporate green innovation? *Int. Rev. Econ. Financ.* **2022**, *78*, 321–337. [[CrossRef](#)]
4. Yousaf, Z. Go for green: Green innovation through green dynamic capabilities: Accessing the mediating role of green practices and green value co-creation. *Environ. Sci. Pollut. Res.* **2021**, *28*, 54863–54875. [[CrossRef](#)] [[PubMed](#)]
5. Takalo, S.K.; Tooranloo, H.S.; Parizi, Z.S. Green innovation: A systematic literature review. *J. Clean. Prod.* **2021**, *279*, 122474. [[CrossRef](#)]
6. Abatecola, G.; Cristofaro, M. Hambrick and Mason's "Upper Echelons Theory": Evolution and open avenues. *J. Manag. Hist.* **2020**, *26*, 116–136. [[CrossRef](#)]

7. Cuerva, M.C.; Triguero-Cano, A.; Corcoles, D. Drivers of green and non-green innovation: Empirical evidence in Low-Tech SMEs. *J. Clean. Prod.* **2014**, *68*, 104–113. [[CrossRef](#)]
8. Demirel, P.; Kesidou, E. Stimulating different types of eco-innovation in the UK: Government policies and firm motivations. *Ecol. Econ.* **2011**, *70*, 1546–1557. [[CrossRef](#)]
9. Awan, U.; Arnold, M.G.; Golgeci, I. Enhancing green product and process innovation: Towards an integrative framework of knowledge acquisition and environmental investment. *Bus. Strategy Environ.* **2021**, *30*, 1283–1295. [[CrossRef](#)]
10. Zhang, F.; Zhu, L. Enhancing corporate sustainable development: Stakeholder pressures, organizational learning, and green innovation. *Bus. Strategy Environ.* **2019**, *28*, 1012–1026. [[CrossRef](#)]
11. Zhang, Y.L.; Sun, J.; Yang, Z.J.; Wang, Y. Critical success factors of green innovation: Technology, organization and environment readiness. *J. Clean. Prod.* **2020**, *264*, 121701. [[CrossRef](#)]
12. Tagliabue, M.; Squatrito, V.; Presti, G. Models of Cognition and Their Applications in Behavioral Economics: A Conceptual Framework for Nudging Derived from Behavior Analysis and Relational Frame Theory. *Front. Psychol.* **2019**, *10*, 2418. [[CrossRef](#)] [[PubMed](#)]
13. Hambrick, D.C. Upper echelons theory: An update. *Acad. Manag. Rev.* **2007**, *32*, 334–343. [[CrossRef](#)]
14. Horbach, J.; Jacob, J. The relevance of personal characteristics and gender diversity for (eco-)innovation activities at the firm-level: Results from a linked employer-employee database in Germany. *Bus. Strategy Environ.* **2018**, *27*, 924–934. [[CrossRef](#)]
15. Yong, J.Y.; Yusliza, M.Y.; Ramayah, T.; Jabbour, C.J.C.; Sehnem, S.; Mani, V. Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management. *Bus. Strategy Environ.* **2020**, *29*, 212–228. [[CrossRef](#)]
16. Jensen, M.C.; Meckling, W.H. Theory of firm—Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [[CrossRef](#)]
17. Bhimani, H.; Mention, A.L.; Barlatier, P.J. Social media and innovation: A systematic literature review and future research directions. *Technol. Forecast. Soc. Chang.* **2019**, *144*, 251–269. [[CrossRef](#)]
18. Zhou, P.Y.; Zhou, S.Y.; Zhang, M.; Miao, S.J. Executive Overconfidence, Digital Transformation and Environmental Innovation: The Role of Moderated Mediator. *Int. J. Environ. Res. Public Health* **2022**, *19*, 5990. [[CrossRef](#)] [[PubMed](#)]
19. Graf-Vlachy, L.; Oliver, A.G.; Banfield, R.; Konig, A.; Bundy, J. Media Coverage of Firms: Background, Integration, and Directions for Future Research. *J. Manag.* **2020**, *46*, 36–69. [[CrossRef](#)]
20. Crossland, C.; Hambrick, D.C. Differences in managerial discretion across countries: How nation-level institutions affect the degree to which ceos matter. *Strateg. Manag. J.* **2011**, *32*, 797–819. [[CrossRef](#)]
21. Hu, R.; Karim, K.; Lin, K.J.; Tan, J.S. Do investors want politically connected independent directors? Evidence from their forced resignations in China. *J. Corp. Financ.* **2020**, *61*, 101421. [[CrossRef](#)]
22. Hambrick, D.C.; Mason, P.A. Upper echelons—The organization as a reflection of its top managers. *Acad. Manag. Rev.* **1984**, *9*, 193–206. [[CrossRef](#)]
23. Hojnik, J.; Ruzzier, M. What drives eco-innovation? A review of an emerging literature. *Environ. Innov. Soc. Transit.* **2016**, *19*, 31–41. [[CrossRef](#)]
24. Oh, W.Y.; Chang, Y.; Cheng, Z. When CEO Career Horizon Problems Matter for Corporate Social Responsibility: The Moderating Roles of Industry-Level Discretion and Blockholder Ownership. *J. Bus. Ethics* **2016**, *133*, 279–291. [[CrossRef](#)]
25. Huang, J.W.; Li, Y.H. Green Innovation and Performance: The View of Organizational Capability and Social Reciprocity. *J. Bus. Ethics* **2017**, *145*, 309–324. [[CrossRef](#)]
26. Tolliver, C.; Fujii, H.; Keeley, A.R.; Managi, S. Green Innovation and Finance in Asia. *Asian Econ. Policy Rev.* **2021**, *16*, 67–87. [[CrossRef](#)]
27. Khanra, S.; Kaur, P.; Joseph, R.P.; Malik, A.; Dhir, A. A resource-based view of green innovation as a strategic firm resource: Present status and future directions. *Bus. Strategy Environ.* **2022**, *31*, 1395–1413. [[CrossRef](#)]
28. Benmelech, E.; Frydman, C. Military CEOs. *J. Financ. Econ.* **2015**, *117*, 43–59. [[CrossRef](#)]
29. Peng, X.R.; Liu, Y. Behind eco-innovation: Managerial environmental awareness and external resource acquisition. *J. Clean. Prod.* **2016**, *139*, 347–360. [[CrossRef](#)]
30. Carpenter, M.A.; Geletkanycz, M.A.; Sanders, W.G. Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *J. Manag.* **2004**, *30*, 749–778. [[CrossRef](#)]
31. Dangelico, R.M.; Pujari, D.; Pontrandolfo, P. Green Product Innovation in Manufacturing Firms: A Sustainability-Oriented Dynamic Capability Perspective. *Bus. Strategy Environ.* **2017**, *26*, 490–506. [[CrossRef](#)]
32. Bramwell, B. Governance, the state and sustainable tourism: A political economy approach. *J. Sustain. Tour.* **2011**, *19*, 459–477. [[CrossRef](#)]
33. Song, M.L.; Fisher, R.; Kwoh, Y. Technological challenges of green innovation and sustainable resource management with large scale data. *Technol. Forecast. Soc. Chang.* **2019**, *144*, 361–368. [[CrossRef](#)]
34. Zhai, Y.M.; Cai, Z.H.; Lin, H.; Yuan, M.; Mao, Y.; Yu, M.C. Does better environmental, social, and governance induce better corporate green innovation: The mediating role of financing constraints. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 1513–1526. [[CrossRef](#)]
35. Norbutas, L.; Corten, R. Network structure and economic prosperity in municipalities: A large-scale test of social capital theory using social media data. *Soc. Netw.* **2018**, *52*, 120–134. [[CrossRef](#)]

36. Custodio, C.; Ferreira, M.A.; Matos, P. Do General Managerial Skills Spur Innovation? *Manag. Sci.* **2019**, *65*, 459–476. [[CrossRef](#)]
37. Wernerfelt, B. The resource-based view of the firm—10 years after. *Strateg. Manag. J.* **1995**, *16*, 171–174. [[CrossRef](#)]
38. Dahl, M.S.; Pedersen, C.O.R. Social networks in the R&D process: The case of the wireless communication industry around Aalborg, Denmark. *J. Eng. Technol. Manag.* **2005**, *22*, 75–92. [[CrossRef](#)]
39. Schoar, A.; Zuo, L. Shaped by Booms and Busts: How the Economy Impacts CEO Careers and Management Styles. *Rev. Financ. Stud.* **2017**, *30*, 1425–1456. [[CrossRef](#)]
40. Faleye, O.; Kovacs, T.; Venkateswaran, A. Do Better-Connected CEOs Innovate More? *J. Financ. Quant. Anal.* **2014**, *49*, 1201–1225. [[CrossRef](#)]
41. Zyglidopoulos, S.C.; Georgiadis, A.P.; Carroll, C.E.; Siegel, D.S. Does media attention drive corporate social responsibility? *J. Bus. Res.* **2012**, *65*, 1622–1627. [[CrossRef](#)]
42. Kioussis, S. Explicating media salience: A factor analysis of New York Times issue coverage during the 2000 US presidential election. *J. Commun.* **2004**, *54*, 71–87. [[CrossRef](#)]
43. Bakaki, Z.; Bohmelt, T.; Ward, H. The triangular relationship between public concern for environmental issues, policy output, and media attention. *Environ. Polit.* **2020**, *29*, 1157–1177. [[CrossRef](#)]
44. Tan, D. Making the news: Heterogeneous media coverage and corporate litigation. *Strateg. Manag. J.* **2016**, *37*, 1341–1353. [[CrossRef](#)]
45. Bednar, M.K.; Boivie, S.; Prince, N.R. Burr Under the Saddle: How Media Coverage Influences Strategic Change. *Organ. Sci.* **2013**, *24*, 910–925. [[CrossRef](#)]
46. Chatterjee, A.; Hambrick, D.C. Executive Personality, Capability Cues, and Risk Taking: How Narcissistic CEOs React to Their Successes and Stumbles. *Adm. Sci. Q.* **2011**, *56*, 202–237. [[CrossRef](#)]
47. Beck, J.B.; Wiersema, M.F. Executive Decision Making: Linking Dynamic Managerial Capabilities to the Resource Portfolio and Strategic Outcomes. *J. Leadersh. Organ. Stud.* **2013**, *20*, 408–419. [[CrossRef](#)]
48. Kim, A.; Moravec, P.L.; Dennis, A.R. Combating Fake News on Social Media with Source Ratings: The Effects of User and Expert Reputation Ratings. *J. Manag. Inf. Syst.* **2019**, *36*, 931–968. [[CrossRef](#)]
49. Nisar, T.M.; Prabhakar, G.; Ilavarasan, P.V.; Baabdullah, A.M. Up the ante: Electronic word of mouth and its effects on firm reputation and performance. *J. Retail. Consum. Serv.* **2020**, *53*, 101726. [[CrossRef](#)]
50. Naciti, V. Corporate governance and board of directors: The effect of a board composition on firm sustainability performance. *J. Clean. Prod.* **2019**, *237*, 117727. [[CrossRef](#)]
51. Fama, E.F.; Jensen, M.C. Agency problems and residual claims. *J. Law Econ.* **1983**, *26*, 327–349. [[CrossRef](#)]
52. Chams, N.; Garcia-Blandon, J. Sustainable or not sustainable? The role of the board of directors. *J. Clean. Prod.* **2019**, *226*, 1067–1081. [[CrossRef](#)]
53. Fogel, K.; Ma, L.P.; Morck, R. Powerful independent directors. *Financ. Manag.* **2021**, *50*, 935–983. [[CrossRef](#)]
54. Masulis, R.W.; Zhang, E.J. How valuable are independent directors? Evidence from external distractions. *J. Financ. Econ.* **2019**, *132*, 226–256. [[CrossRef](#)]
55. Saona, P.; Muro, L.; Alvarado, M. How do the ownership structure and board of directors' features impact earnings management? The Spanish case. *J. Int. Financ. Manag. Account.* **2020**, *31*, 98–133. [[CrossRef](#)]
56. Jenwittayaroje, N.; Jiraporn, P. Do Independent Directors Improve Firm Value? Evidence from the Great Recession. *Int. Rev. Financ.* **2019**, *19*, 207–222. [[CrossRef](#)]
57. Zhou, N.; Park, S.H. Growth or profit? Strategic orientations and long-term performance in China. *Strateg. Manag. J.* **2020**, *41*, 2050–2071. [[CrossRef](#)]
58. Zheng, M.B.; Feng, G.F.; Jiang, R.A.; Chang, C.P. Does environmental, social, and governance performance move together with corporate green innovation in China? *Bus. Strategy Environ.* **2022**. Online version of record before inclusion in an issue. [[CrossRef](#)]
59. Jaffe, A.B.; Palmer, K. Environmental regulation and innovation: A panel data study. *Rev. Econ. Stat.* **1997**, *79*, 610–619. [[CrossRef](#)]
60. Yang, H.C.; Feng, G.F.; Zhao, X.X.; Chang, C.P. The impacts of energy insecurity on green innovation: A multi-country study. *Econ. Anal. Policy* **2022**, *74*, 139–154. [[CrossRef](#)]
61. Wang, Q.J.; Wang, H.J.; Chang, C.P. Environmental performance, green finance and green innovation: What's the long-run relationships among variables? *Energy Econ.* **2022**, *110*, 106004. [[CrossRef](#)]
62. Hao, Y.J.; Fan, C.C.; Long, Y.G.; Pan, J.Y. The role of returnee executives in improving green innovation performance of Chinese manufacturing enterprises: Implications for sustainable development strategy. *Bus. Strategy Environ.* **2019**, *28*, 804–818. [[CrossRef](#)]
63. Luo, Y.D.; Xiong, G.B.; Mardani, A. Environmental information disclosure and corporate innovation: The “Inverted U-shaped” regulating effect of media attention. *J. Bus. Res.* **2022**, *146*, 453–463. [[CrossRef](#)]
64. Zaid, M.A.A.; Abuhijleh, S.T.F.; Pucheta-Martinez, M.C. Ownership structure, stakeholder engagement, and corporate social responsibility policies: The moderating effect of board independence. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1344–1360. [[CrossRef](#)]
65. Jia, N.; Huang, K.G.; Zhang, C.M. Public governance, corporate governance, and firm innovation: An examination of state-owned enterprises. *Acad. Manag. J.* **2019**, *62*, 220–247. [[CrossRef](#)]
66. Xu, D.; Zhou, K.Z.; Du, F. Deviant versus aspirational risk taking: The effects of performance feedback on bribery expenditure and R&D intensity. *Acad. Manag. J.* **2019**, *62*, 1226–1251. [[CrossRef](#)]

67. McNeish, D.; Kelley, K. Fixed Effects Models Versus Mixed Effects Models for Clustered Data: Reviewing the Approaches, Disentangling the Differences, and Making Recommendations. *Psychol. Methods* **2019**, *24*, 20–35. [[CrossRef](#)]
68. Zona, F.; Gomez-Mejia, L.R.; Withers, M.C. Board Interlocks and Firm Performance: Toward a Combined Agency-Resource Dependence Perspective. *J. Manag.* **2018**, *44*, 589–618. [[CrossRef](#)]
69. Meyer, K.E.; Peng, M.W. Theoretical foundations of emerging economy business research. *J. Int. Bus. Stud.* **2016**, *47*, 3–22. [[CrossRef](#)]

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Article

Corporate Digital Responsibility: A Board of Directors May Encourage the Environmentally Responsible Use of Digital Technology and Data: Empirical Evidence from Italian Publicly Listed Companies

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Abstract: This paper presents a framework for our hypotheses that the independence of a board of directors and the use of digital technology might influence the way a corporation performs environmentally. For empirical verification of our thesis, we take a sample of 53 publicly listed Italian companies and look at data on their board composition, greenhouse gas emissions, and expenditures for the use of digital technologies of Enterprise Resource Planning (ERP) over a period of five years. What emerges from the test partially supports our predictions. In particular, we find that a higher level of board independence is associated with better environmental performance. There is no direct, statistically significant association between the use of digital technologies and environmental performance, so a greater use of digital technologies is not, in itself, sufficient to improve the environmental performance of a firm. However, our empirical analyses find that environmental performance is positively influenced by the use of digital technologies in firms that include a proportionately high number of independent directors on their boards. This research improves our understanding of antecedents of Corporate Digital Responsibility (CDR), showing how the share of independent directors on a board has a positive impact on CDR, understood here as the set of practices and behaviours that help an organisation use data and digital technologies in ways that are environmentally responsible.

Keywords: board of directors; Corporate Digital Responsibility (CDR); corporate governance; digital transformation; enterprise resource planning (ERP); environmental impacts; information systems

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1. Introduction

The board of directors is a company's main agency of corporate governance and is responsible for protecting the appropriate interests of stakeholders by directing the firm's operations and supporting its decision-making [1]. Independent board directors are individuals whose only business relationship with the firm is their directorship. Anderson and Reeb use the proportion of a board that is composed of independent members as a measure of the board's independence [2]. We adopt a theoretical framework to formulate hypotheses according to which increasing board independence and greater expenditure on ERP digital technologies, evaluated first separately and then together, will result in firms having a better environmental performance.

It was suggested by Jensen and Meckling that, should they have the opportunity, and should egotism and guile be their main drives, then managers might adopt opportunistic behaviour and follow a course of action that does not work in the best interests of external investors [3]. As indicated by Shleifer and Vishny, shareholders might adopt various forms of corporate governance, for example, contractual relations, incentives, and strategies of board monitoring, as a means to combat such opportunism [4]. The agency view of corporate governance assumes that shareholder interests are considered paramount,

and emphasis is placed on economic (financial) efficiency [5]. In terms of its impact on Corporate Social Responsibility (CSR), that is, companies' non-financial results, agency theorists indicate that corporate governance strategies ought to be designed in such a way that CSR practices will only be adopted if they guarantee an increase in efficiency [6].

Here, we look at the board of directors as a governance mechanism that has an impact on the firm's environmental performance. In our empirical analyses, we will use the data on how much greenhouse gas the firm emits as a negative proxy of its green performance. In particular, the environmental performances will be measured as the natural logarithm of the quantity (Kg) of the emissions of CO_{2eq} (CO₂ equivalent) multiplied by -1 . Therefore, a good environmental performance will be indicated by higher values of the variable.

According to agency theory, boards attempt to control managers so as to avoid agency conflict. We focus on the degree to which a board of directors may be independent and the impact this has on the firm's environmental performance. From this perspective, it has been said that one consequence of an independent board is that it will reduce conflict of interest within the firm and make sure that management acts in the best interests of the stakeholders [7]. This is also true for stakeholders' environmental demands [8,9]. Those who diminish the role played by independent directors suggest, rather, that independent directors are often appointed on the basis of their financial awareness, and, indeed, some suggest that independent directors do not represent stakeholders as well as they do shareholders [10].

ERP Systems are packaged software solutions that have the function of integrating the complete range of a firm's processes and operations in order to present a holistic view of the business within a single information and IT architecture. This is desired because it paves the way for organisations to have business processes and operations that are environmentally friendly [11,12]. Moreover, an organisation that aims to improve its environmental performance has to be able to evaluate the components on which it depends, so it needs to implement environmental accounting instruments. ERP systems provide functionalities that can be used relatively easily to implement IT-based Environmental Accounting Instruments. Therefore, it may be interesting to study this application of ERP technologies in order to understand the implications that modern digital technologies might have for the relationships between a firm and its stakeholders, with particular attention to their environmental protection expectations. In Section 2, predictions are made regarding governance practices and the use of ERP-type digital technologies that might help improve corporate environmental performance. The empirical research is presented, and the variables, methodology, and data are described in Section 3. A sample of 265 yearly observations of firms is the focus of our research. The results we obtained indicate that the more independent a board is, the better the firm will perform environmentally and that using ERP technologies more intensively does not always correlate with better environmental performance. In particular, we find that greater use of ERP systems only increases the positive effects that the above-mentioned board independence produces on environmental performance. In Section 4, we discuss in detail the results of the empirical analysis and the conclusions that can be drawn.

Corporate governance may have a positive effect on promoting environmentally friendly practices [13]. To date, there are still only a few works that investigate the relationships between the characteristics of the structure of boards of directors and firms' environmental performance [8,9,14–16]. This paper aims to extend this area of study by looking at how the relationship between environmental performance and the adoption of digital technologies evolves as the independence of the board of directors changes. Our empirical analysis found that a firm's green performance and control of pollution are influenced by the characteristics of its corporate governance and that greater use of digital technology such as ERP leads to more "green friendly" results when the board's independence is also reinforced.

Boards influence the moral codes and ethical considerations and guide the behaviour of the collectivity and individuals within the organisation. We conclude that the presence

of independent directors on a board has an impact on the organisation's judgement and choices in digital matters. Firms with independent boards use digital technology to attain certain goals that are perceived as socially, economically, and environmentally more responsible. This finding is useful both to practitioners who are looking for the governance mechanisms to implement in a firm that will best meet stakeholders' environmental expectations and to researchers who wish to study the antecedents of CDR.

2. Framework and Hypothesis

Digital technologies increase a firm's productivity and open new horizons while also posing ethical and social problems. The fact that new technologies pose a social risk makes them a subject of study with regard to their social responsibility [17]. Problems arise in situations that clearly involve all of us, given that we are all citizens and consumers. Some examples of this are smart devices that constantly record data or self-driving vehicles that might put people in danger. Many similar ethical problems may emerge in firm contexts, although here, they will sometimes be less obvious. The company ethic is defined as the rules and standards which guide the firm's business judgements and choices [18]. Recent theories based on the general idea of ethics define CDR as the set of specific values and rules which guide the organisation's judgements and choices in digital matters [19–21]. These CDR-related values and choices share some principles and objectives with CSR, that is, the efforts the organisation makes and the responsibility it takes for social and ecological causes in general. Despite this eventual similarity, Lobschat et al. claim that CDR should be considered explicitly and separately from CSR because of the peculiarities of digital technologies [19]. Three characteristics are highlighted, which justify this explicit consideration of digital responsibility as being distinct from the organisation's wider social responsibility. In the first place, technological developments have exponential growth, and innovations multiply and combine in such a way as to offer innumerable alternative uses. For Brynjolfsson and McAfee, it is particularly this growth through the recombining among innovations that require corporations to face up to what digital transformation really means [22]. Examples of such growth include *big data and analytics*, which have been around for years, but today work together with new systems of Artificial Intelligence (AI), Cloud Technologies, and High-Performance Computing. Combining these digital technologies allows greater volumes of already-collected data to be used in ways that could not have been foreseen only a few years ago but that have a great impact on the environment. This is exactly what is happening in the agricultural sector, for example, especially in the context of precision agriculture and livestock farming applications [23]. Secondly, ethical and social preoccupations have to respect the malleability of digital technologies [24,25]. Social media was not created intentionally to spread fake news, but its algorithms, projected to maximise people's involvement, have contributed to this growing tendency [26]. From a firm's perspective, digital responsibility entails a wide, complex, and highly dynamic set of moral challenges that are not all foreseeable at the time a technology is planned or data is acquired but only emerge as they are used over time. Authors who have looked at these problems have shown how, for example, a firm might acquire digital technologies with the best of intentions, but, as a consequence of the extremely "malleable" nature of this technology, there is a high risk of its being exploited in unanticipated ways [24,27]. Thirdly, the arguments that say that specific company rules have to deal with digital responsibility also derive from the pervasive nature of digital technologies. It has become almost impossible to perform daily activities without using digital technology (e.g., apps). These three aspects—the exponential growth of technological development, the malleability of technology and data, and the pervasive nature of technology—lead to specific challenges beyond the generally understood idea of CSR. The assessments and choices that firms make in order to deal with these challenges are conditioned by the system of values and rules that underlie their CDR.

The absence of regulations in industry 4.0 and the unpredictability of the advance of technologies are not a limitation to creating a scenario of corporate digital responsibility. The

development of social responsibility in digital contexts is possible and necessary [17]. For Wagener, CDR is revealed in the voluntary effort to manage digital resources responsibly with reference to the following arguments of interest [28]:

- Conservation of resources in the use and creation of digital services and products;
- Social compatibility and the possibility of creating a “human” work environment in the use of digital technology;
- The “democratisation of digitalisation”: assisting access by developing individuals’ competence and promoting a generally accessible digital infrastructure;
- Data security and prevention of the abuse of digital power due to acquired “data power”.

We focus on ERP systems, which make further digital options possible and available to firms, as well as being a good *proxy* for the intensity of the use of digital technologies in general [29]. Over the last three decades, the use of packaged application software for ERP has emerged. Indeed, today it is widely used in large firms and, thanks to the modularity of software solutions, has been adopted by many small and medium enterprises. The ERP industry includes the world’s fourth largest software vendor (SAP, a German firm that is the largest producer of ERP software in the world) and several others from the largest software firms (such as Microsoft, IBM, and Oracle which are, respectively, the second, third, and fourth largest vendors of ERP systems). Since ERP systems aim to computerise and integrate core business processes, the implementation by the firm of ERP technological systems precedes or accompanies investments in other digital technologies such as automation, data analytics, artificial intelligence (AI), and machine learning. It is precisely because they are so widely found and able to integrate and combine with other more recent digital technologies that ERP technologies are such a good *proxy* for the digitalisation of a firm.

2.1. Monitoring and Strategic Functions of the Board

The board participates in the various phases of the strategic decision-making process through interaction with the firm’s TMT (Top Management Team) [30–33] and, therefore, is able to direct the use of digital technologies toward goals that stakeholders perceive as socially, economically, and environmentally responsible. Moreover, the board is an internal control mechanism that, depending upon the extent to which it is composed of independent directors, can mitigate moral hazard problems between insiders and stakeholders [34,35]. From this perspective, independent directors represent an effective monitor of the risk that those digital technologies, which were acquired with the best of intentions, might be put to use in unforeseen ways.

Due to the increased attention that environmental issues, and their concomitant strategic opportunities, receive nowadays, managing environmental strategy has become one of the activities which are required of a board of directors [14,15]. Therefore, we look at the aspects of the board that relate to its function as a monitor (i.e., the level of independence it enjoys) as a *proxy* for how it performs environmentally. Agency theory indicates that strategies are initiated and executed by managers, whereas the process is monitored by the directors [36]. From this viewpoint, the greater independence directors have (i.e., the less financial involvement non-executive directors have with the firm), the more rigorous the monitoring will likely be. There is strong evidence in the literature of the existence of a close relationship between the board’s monitoring of managerial behaviour and corporate strategic decisions [36,37]. There is, however, still little understanding of exactly how an active board can influence environmental strategies. Although it is recognised that an appropriate, acceptable level of environmental performance is of importance strategically, it seems that management does not always consider it a priority. Any new environmental initiatives might require a significant degree of investment (in such areas as production processes or new technologies), and the re-coordination of employees from different areas of the production process may be necessary for new strategies [38]. What is more, as it might well take some time for a responsible environmental strategy to produce any

clear benefit [39], there is no great appeal for risk-averse managers in such responsible environmental initiatives [34].

Instead of dealing with issues that offer little to their own personal short-term interests, managers often prefer to follow conventional strategies which provide them with immediate financial and reputational benefit [40,41].

Managers and shareholders have diverse utility functions [42,43]. The increase in effort required to plan and follow innovative environmental strategies diminishes managers' utility, but this is not necessarily the case for shareholders. For example, shareholders will not experience any adverse consequences due to managers' dedicating their valuable time to finding a remedy for the company's high pollution levels through a reorganisation of its internal practices. It has been shown that managers need to make a great extra effort when reorganising their production procedures and obtaining environmental knowledge and experience so as to reduce or avoid producing waste emissions [44]. As a consequence, the firm faces higher costs due to its new procedures and increased managerial effort in its attempt to render its operations more environmentally responsible. As a counterbalance, though, as shareholders might well see that the costs of this increase in effort on the part of managers are justified by the problems involved in the designing and applying of better environmental strategies, it may be assumed that they will accept the higher costs involved. However, the fact that this greater managerial effort is subjective renders its monitoring and verification very difficult [38].

Given that the main activities of the board should include the observation and checking of a firm's operations and the behaviour of its managers, together with evaluating any change in expenditure due to new green practices, the environmental strategies adopted by top management should also be the subject of close scrutiny by the board [15]. Indeed, agency theory-based studies highlight how a higher level of a board's independence within a firm can be linked to a more methodical approach to the performing of its monitoring duties [45]. It is generally accepted that a more independent board of directors will fulfil its role as a monitor of the CEO's activities better because observation and evaluation of the firm's achievements will be carried out with greater objectivity [46,47]. Furthermore, the degree to which a firm practices socially responsible corporate behaviour tends to be more highly valued by independent boards [48]. According to McKendall et al., an independent board of directors is more likely to recognise the potential green investments may have in the long term and, therefore, resist managerial pressure to adopt a different investment strategy [15]. Consequently, there is a greater inclination on the part of independent boards to adopt environmentally-friendly policies, even when they are expensive. Therefore, logic suggests that a more objective application of the board's experience and knowledge to how it monitors the firm's green behaviour will occur if the proportion of independent directors is increased. If independent board members wish to continue in their positions on boards of directors, they have an incentive to safeguard the directors' good reputations, and, to this end, their task will be easier if they work on the boards of firms with a reputation for environmental responsibility. Consequently, we adopt the following as our first hypothesis:

H1. *Board independence has a positive influence on a firm's environmental performance.*

2.2. The Role of ERP Technologies and the Perspective of the CDR

Digital transformation generates both opportunities and threats, and these effects are closely connected with problems dealt with in this paper, including the fact that new technologies can impede as well as enhance energy efficiency and environmental impact [49]. An example of opportunity is that digital transformation can theoretically lead to the inclusion of many disadvantaged societal groups [50], but the COVID-19 pandemic has shown that unequal access to the digital world is already a reality [51]. In synthesis, innovative technology brings with it new social issues and heightened responsibilities, especially for corporations [52]. These new responsibilities have recently been termed CDR [19–21]. In 2021, academics and professionals collaborated in setting out the manifesto on CDR, defining it as “a set of practices and behaviours that help an organisation use

data and digital technologies in ways that are perceived as socially, economically, and environmentally responsible” (<https://corporatedigitalresponsibility.net/cdr-manifesto>) (accessed on 29 September 2022). CDR will likely become a differentiator for organisations, allowing them to gain and maintain stakeholder trust and competitive advantage, and, therefore, firms will begin to formulate practices for developing and implementing a CDR strategy [53]. The goal of such a strategy should not only be to prevent the potential negative consequences but also to leverage the advantages of information communication technologies (ICTs) for the common good [54,55].

The ERP system is an integrated set of programs that provides support for core organisational activities such as manufacturing and logistics, finance and accounting, sales and marketing, and human resources. An ERP system helps the different parts of the organisation share data and knowledge, reduce costs, and improve the management of business processes [56]. However, the implementation of ERP is not only a technological challenge. It is a socio-technological endeavour that demands the modification of existing applications and the redesigning of critical business processes to facilitate ERP implementation. Research has indicated the necessity of realising effective changes in management strategies so that firms can implement ERP systems successfully [56,57]. The characteristic ability of ERP to redesign, automate, and integrate business processes and operations performs an important role from a CDR perspective, as it paves the way for organisations to have a business process, especially in terms of the supply chain, that is environmentally friendly. Al-Mashari et al. point out that a supply chain system can be re-engineered within, and, indeed, go beyond, the firm’s organisational scope by applying the ERP scheme to the existing system [58]. Hervani et al. created a framework for studying, designing, and evaluating a green supply chain [59]. Their studies were based on experience, case studies, and literature reviews. The integration of supply chain management and ERP is illustrated in research work by Koh et al. since these two approaches were known to render one another more complete [60]. This study indicates that a close relationship between suppliers and the centralised system will lead to successful integration. Manufacturers should establish green supply chain systems which are able to document all of the environmental information at each stage of a supply chain. In order to fulfil this objective, an integrated information system is required to track every detail due to the environmental impact of the supply chain system. To achieve this, one possible strategy is the implementation of an ERP system since ERP integrates every aspect of the production system. ERP systems might also be useful as support for environmental accounting instruments, and according to the European Commission ([61], p. 53), environmental management holds a key role within the concept of CSR in the manufacturing sector. Environmental improvement measures have to be identified, analysed, managed, and controlled with respect to financial and environmental effects. New targets have to be set on a regular basis within a management cycle in order to achieve continuous improvement. Within such a management cycle, information from different company units has to be gathered and consolidated. These are typical controlling tasks, but they all focus on environmental data, so they are usually carried out by the environmental management unit. The environmental manager edits environmental information and makes it available to a variety of company officers as a basis for decision-making. New interfaces for environmental information flows emerge, which require systematisation and integration into the organisational structure of the company [62]. A prerequisite to ensure these functions is the availability of relevant information on the environmental performance and environmental aspects of the enterprise. Nowadays, such an information system can be implemented by means of software, and this facilitates the consolidation and aggregation of environmental information such as indicators of resource and energy consumption, waste disposed and emitted wastewater, and air pollution. The literature shows that today’s ERP systems provide functionalities that can be used relatively easily to implement IT-based Environmental Accounting Instruments [63,64]. Given that the use of ERP may help a firm to achieve better environmental performance, we hypothesise that:

H2. *Firms generally have better environmental outcomes when they make more use of ERP systems.*

Finally, we consider the combined effects that may derive from a higher quota of independent board members and from simultaneous increased use of ERP systems in the context of the firm. These effects are considered to be added to those already hypothesised because of the characteristics of board independence in itself (as in Hypothesis 1). Therefore, we suppose that:

H3. *The positive effect of board independence on the environmental performance of a firm increases when the use of ERP systems by that firm also increases.*

3. Method

3.1. Sample Selection

We analysed data from the Sustainability Reports of all the companies listed on the Italian Stock Market in Milan for the 2014–2018 period. There were 339 companies, but only 83 of them reported detailed environmental data relevant to the subsequent analyses for each of the 5 years. We particularly needed each firm’s yearly detailed data on its greenhouse gas emissions. Since 2017, Italian law (254/2016 legislative decree) has made it obligatory for certain types of companies to deposit a non-financial declaration which includes the information that listed companies already communicated in their Sustainability Reports. However, listed companies enjoy wide margins of autonomy when deciding what information and which indicators of non-financial performance to include in their Sustainability Reports, and consequently, disclosure of information on greenhouse gas emissions is still only voluntary. The fact that complete information on emissions of greenhouse gasses for the 2014–2018 period was only available for 83 firms forced us to continue with the empirical analysis for just these firms and exclude other listed firms. These 83 companies mostly belonged to the sectors indicated in the literature as having a great environmental impact (49 cases out of 83, corresponding to 59%) [9]. These sectors include Electricity, Gas, and Waste Water (SIC codes 4900–4999), Iron and Steel Manufacturing (Iron and Steel Manufacturing SIC codes 3300–3399), Chemicals, Pharmaceutical, and Plastics Manufacturing (SIC codes 2800–3099), Coal Mining and Oil and Gas Exploration (SIC codes 1200–1399) and Metal Mining (SIC codes 1000–1099). A short questionnaire was sent to each of the 83 firms identified, asking them to indicate, for each year of the 2013–2017 period, the sum of their expenditure on ERP technologies, both in terms of their acquisition and their implementation within the firm. Only 53 firms returned the completed questionnaires, and therefore, they constituted the final sample of firms we analysed. Most of the firms (37 out of 53) belonged to sectors with great environmental impact, and they showed a greater willingness than the others to compile and return the questionnaire, demonstrating that firms in environmentally sensitive industries disclose more environmental information than others [65–67].

3.2. Dependent Variables

A variety of proxy variables are used in the literature in order to evaluate corporate environmental performance. For instance, some research undertaken in the United States exploits the Environmental Protection Agency (EPA) information on the toxic emissions the companies have to communicate. With regard to this information, certain authors [38,68,69] adopt the emissions of toluene and benzene, both toxic, as a negative indication of a company’s environmental performance. On the other hand, authors such as King and Lenox or Kock et al. utilise EPA data to elaborate a calculation of waste on the basis of toxicity [8,48]. This waste is calculated as the number of chemicals (measured in kilogrammes) the firm emits while considering the toxicity coefficient of those chemicals, which is the opposite of the ‘reportable quantities’ (RQ). EPA uses the idea of RQ to explain how an accidental spill of chemicals has to be reported if it exceeds a set level for that given substance. For instance, a spill of methanol, among the substances considered relatively innocuous, has to be reported if it exceeds 5000 pounds (2268 kg), whereas a spill of as little as a pound (454 g) of the highly dangerous chemical warfare agent Heptachlor has to be reported. The United States has not ratified the Kyoto Protocol,

the international treaty aimed at achieving a reduction in greenhouse gas emissions, whereas Italy has; therefore, Italian businesses are encouraged to disclose their emissions. Consequently, as a negative proxy of a firm's green performance, we used the data on how much greenhouse gas it emits. Indeed, the *environmental performance* variable is measured as the natural logarithm of the quantity (Kg) of the emissions of CO_{2eq} (CO₂ equivalent) multiplied by -1 . This means that a good environmental performance will be indicated by higher values of the variable. For instance, in 2018, Enel S.p.A. released a total of 104.29 million tonnes of CO_{2eq} into the atmosphere, meaning that its *environmental performance* was $-25,370$ ($= -\ln 104,290,000,000$). CO_{2eq} levels are often used in environmental studies as an indication of pollution, as well as being a point of reference that our sampled firms had to declare in their annual reports. This level was calculated as the weighted sum of the capacity of six different gases (carbon dioxide, sulphur hexafluoride, nitrous oxide, methane, hydrofluorocarbons, and perfluorocarbons) known to cause climate change according to the Kyoto Protocol (effective since 2005).

3.3. Independent Variables

It is necessary for independent variables to have the capacity to measure the values referred to by the framework predictions. Hypothesis 1 refers to board independence. In studies on Italian listed companies and studies conducted on other stock markets, board independence is measured as the proportion of independent directors on the board [2,70]. Therefore, for the conclusion of every observed year, the number of independent members on each firm's board divided by the sum of people on the board was measured as the variable board independence. The profile of the board members at our sampled firms was evaluated by referring to the companies' internet sites and their 'Relazione sulla corporate governance' (Report on Corporate Governance: something every listed company renders public on its internet site). Hypotheses 2 and 3 refer to the use of ERP digital technology. For this aim, we used the variable proxy ERP spending, which we measured as the expenditure for the use of ERP technologies for every one of our sampled firms at the conclusion of each observed year divided by total assets. This variable was measured as a percentage. Data on expenditures made were obtained by asking each firm in the sample to complete a brief questionnaire regarding their expenditure on the acquisition and implementation of ERP technologies over the years.

3.4. Control Variables

In order to check for a range of factors that might have an impact on a firm's environmental performance, a series of variables at the firm level were looked at. In particular, by using the AIDA databases (Bureau van Dijk) and Datastream databases (Thomson Financial), we obtained the financial and market data we needed to be able to control for:

- **Firm size.** Calculated as the natural log of total assets. Clarkson et al. hypothesised that larger firms would have a greater propensity to prioritise the effective management of environmental issues [71];
- **Firm age.** Calculated as the number of years from the foundation of the firm up until the last fiscal year for which we have data. According to Berrone et al., older firms will quite possibly have sunk costs in the shape of more primitive, older, and more polluting plants and equipment, which they will, therefore, find expedient to continue using [68];
- **Financial performance.** Evaluated by referring to returns on assets (ROA). McKendall et al. suggest that firms that are profitable will probably have a better green performance because of their ability to deal with the high costs of certain green strategies [15];
- **Tobin's Q.** Calculated by using the price-to-book relationship. It has been found that usually, the better a firm's performance is in the market, the better it will perform environmentally [8,14];

- **Leverage.** Calculated as total debt divided by total assets. Those firms which enjoy higher leverage tend to perform better environmentally [71];
- **Polluting industry.** The way a firm performs environmentally may be influenced by the industrial sector to which it belongs [68]. In particular, firms in environmentally sensitive industries are likely to manage their environmental impacts more effectively [65–67]. A dummy variable is used to control whether a firm belongs to those sectors which are considered to have a great impact on the environment: Electricity, Gas, and Waste Water (SIC codes 4900–4999), Iron and Steel Manufacturing (Iron and Steel Manufacturing SIC codes 3300–3399), Chemicals, Pharmaceutical, and Plastics Manufacturing (SIC codes 2800–3099), Paper and Pulp Mills (SIC codes 2600–2699), Coal Mining and Oil and Gas Exploration (SIC codes 1200–1399), Metal Mining (SIC codes 1000–1099), and Forestry (SIC codes 800–899). Therefore, this variable has a value of “1” whenever the firm belongs to one or another of the above-listed sectors and a value of “0” otherwise.

4. Results

In our study, the values of the dependent variable were measured a year after those of the independent variables. Consequently, our dependent variable (environmental performance) was measured from 2014 to 2018, while the control and independent variables were measured from 2013 to 2017. This time-lapse of one year between when the dependent and independent variables were measured served to reduce the risks which derive from inverse causality. In fact, strategic change sometimes leads to better green performance. Pettigrew and Whipp suggest that such a time lapse between the disclosure of independent and dependent variables would seem appropriate because the positive consequences of changes in strategy may not become evident for some time [72]. The five years of measuring variables resulted in data for a panel with 265 different combinations of the values of our variables (*environmental performance_t*, *board independence_{t-1}*, *erp spending_{t-1}*, *financial performance_{t-1}*, *firm size_{t-1}*, *firm age_{t-1}*, *Leverage_{t-1}*, *Tobin's Q_{t-1}*, *polluting industry_{t-1}*, where *t* is the conclusion of a generic year from between 2014 and 2018), a combination for each of the firm-year observations that make up the sample (5 years × 53 firms). The standard deviations, the average values and the values of the Pearson correlation coefficient relative to the variables used in our analysis are presented in Table 1, which also shows some meaningful correlations between the variables when considered as pairs.

Table 1. Mean averages, standard deviations, and correlation matrix.

	Means	Standard Deviations	8	7	6	5	4	3	2	1
1. Environmental performance	−14.001	21.009								1
2. Board independence	0.503	0.104						1	0.178 **	
3. ERP spending	0.2154	0.2971					1	0.112	0.091	
4. Firm size	19.998	5.303				1	0.121 *	0.063	0.159 **	
5. Firm age	63.167	29.171			1	0.183 **	0.109	0.393 **	−0.061	
6. Financial performance	6.113	7.131		1	0.129 *	0.129 *	0.099	0.031	0.023	
7. Tobin's Q	3.974	9.982	1	0.171 **	−0.009	−0.031	0.081	−0.029	0.047	
8. Leverage	0.557	0.156	1	−0.183 **	−0.165 **	0.041	0.183 **	0.043	0.081	0.131 *
9. Polluting industry	0.698	0.454	−0.159 **	−0.055	−0.035	0.179 **	0.145 *	0.057	0.171 **	−0.601 **

N = 265; 1-tailed: * $p < 0.05$; ** $p < 0.01$.

A hierarchical regression model was run so that our hypothesis could be tested, and the results are presented in Table 2. Initially, the variance inflation factor (VIF) for every one of the independent variables within the regression models was calculated in order to

guarantee that no potential multicollinearity problems existed with the variables. However, as the VIF values all lay within a range of between 1.1 and 1.7, it was clear that they had no influence on the validity of our three models [73].

Table 2. Hierarchical regression analysis of environmental performance (N = 265).

Variable	Model A		Model B		Model C	
	Parameter Estimate	p Value	Parameter Estimate	p Value	Parameter Estimate	p Value
<i>Intercept</i>	−39.3	0.21	−31.1	0.04 *	−32.5	0.02 *
<i>Controls</i>						
<i>Firm size</i>	0.15	0.002 **	0.09	0.001 **	0.08	0.021 *
<i>Firm age</i>	−0.07	0.031 *	0.08	0.029 *	0.09	0.033 *
<i>Financial performance</i>	0.05	0.049 *	0.04	0.035 *	0.01	0.009 **
<i>Tobin's Q</i>	0.13	0.171	0.43	0.231	0.22	0.319
<i>Leverage</i>	0.74	0.217	0.65	0.094 †	0.70	0.047 †
<i>Polluting industry</i>	−1.19	0.009 **	−1.23	0.004 **	−0.92	0.002 **
<i>Main effect</i>						
<i>Board independence</i>			1.23	0.008 **	0.829	0.004 **
<i>ERP spending</i>			0.961	0.239	3.641	0.549
<i>Interaction</i>						
<i>Board independence x erp spending</i>					0.141	0.009 **
<i>ANOVA</i>						
<i>F sign</i>	7.921 **		6.573 **		6.723 **	
<i>R2</i>	0.156		0.170		0.192	
<i>Adj R2</i>	0.136		0.144		0.163	
<i>ΔR2</i>	0.156		0.015		0.021	
<i>F change</i>	7921 **		3415 **		4211 **	

N = 265; 1-tailed: † $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

We hypothesised that variables for board independence and ERP spending were, on the one hand, individually capable of producing positive effects on corporate environmental performances (H1 and H2) and, on the other, able to improve these positive effects further together (H3). Therefore, we started by placing only the Model A control variables in Table 2. We then carried out ordinary least squares (OLS) regression analysis and presented the results in the first two columns of Table 2. Next, we also added the independent variables from the testing of our hypotheses to the control variables so as to carry out another ordinary least squares (OLS) regression analysis in Model B, the results of which are reported in the third and fourth columns of Table 2. The results for the variable of board independence show that a firm's green performance is positively influenced by its having a large proportion of its board constituted by independent directors. This is a statistically significant result ($\beta = 1.23$, $p = 0.008$) and is in line with Hypothesis 1, which was formulated according to agency theory predictions. Hypothesis 2 focuses on how ERP technologies are put to use, and the prediction was that they would affect the way our sampled firms perform environmentally. However, this hypothesis is not supported by our results ($\beta = 0.961$, $p = 0.239$). Finally, in columns 5 and 6 of Table 2, the results of the addition of the term for the interaction between the use of ERP technologies and the share

of independent directors on boards are reported. The interaction is statistically significant ($\beta = 0.141, p = 0.009$). The addition of this interaction term to Model 3 gives an explanatory contribution above and beyond effects-only Model 2. Explained variance increases by 2.1%, and this increase is statistically significant ($F_{\text{change}} = 4.211, p < 0.01$). Therefore, this empirical analysis provides support for Hypothesis 3. The results found in the three steps (Model A, Model B, and Model C) are significant and robust. As is evident from Table 2, all models are significant (at $p < 0.01$), with R^2 ranging from 0.156 for the base model to 0.192 for the full model. In particular, the full model (Model C) is fit and explains about 19.2% of the variance, with $F_{\text{sign}} = 6.723$ and significance at the 0.01 level.

Robustness Checks

The Breusch and Pagan heteroscedasticity test was applied to the outcome of the multiple OLS regression analysis (Models A, B, and C, Table 2) so as to test whether our model is robust [74]. Table 3 presents the results from an auxiliary regression of the Breusch–Pagan test.

Table 3. Heteroskedasticity Test.

	Model A	Model B	Model C
<i>F</i> -statistic	3.344	3.001	2.991
Prob. <i>F</i>	0.003	0.003	0.002
N*R-squared	18.550	21.995	24.115
Prob. <i>Chi-Square</i>	0.005	0.005	0.004

Note: N = 265.

5. Discussion and Conclusions

The aim of this paper was to establish whether the corporate governance structure and digital technologies a firm adopted could have an impact on its environmental performance. We began our analysis by looking at the composition of the board of directors. From an agency point of view, the more independent the members of a board of directors are, the more effectively the board will perform its internal control function of offsetting any agency problems the firm might have. Consequently, we formulated Hypothesis 1 because we expected greater involvement of independent directors in the board's activities to increase the firm's likelihood of achieving good environmental performance. ERP-type digital technologies provide functionalities that can be used relatively easily to implement practices and provide functionalities that can help manufacturers to establish their green supply chain. ERP systems might also be useful as support for environmental accounting instruments. Consequently, we formulated Hypothesis 2, according to which increased use of ERP systems can bring about better environmental performance. Finally, we formulated Hypothesis 3 to check the environmental effects of board independence and ERP technologies considered in combination and no longer individually.

Our predictions were tested by taking a sample of 53 firms that were quoted on the Italian stock exchange in Milan and looking at their end-of-year reports (Sustainability Reports/non-financial declaration) for a period of 5 years, for a total of 265 firm-year observations. Sampled firms were also asked for data on the costs they faced in implementing ERP digital technologies. The results of our analysis:

- Support Hypothesis 1, meaning that firms that increase the independence of their boards present a better environmental performance;
- Do not support Hypothesis 2, meaning no direct and positive relationship exists between the use of ERP systems and the firm's green performance;
- Support Hypothesis 3, according to which the growing use of ERP systems is only linked to an improvement in environmental performance in those firms where the presence of independent directors on the board is also growing. This improvement in

environmental performance is in addition to the impact brought about by the board's greater independence (considered alone as in for the verification of Hypothesis 1).

The verification of Hypothesis 1 and the non-verification of Hypothesis 2 may be considered due to the differing behaviour that independent directors and managers have toward the pursuit of green strategies. Hill and Jones point out that managerial behaviour is influenced by particular utility functions, which means that the managers might not consider it convenient to invest a lot of their high-quality time in redesigning the company's internal procedures simply to reduce the causes of the firm's polluting in the future [42]. This circumstance may negatively influence results which, from an environmental point of view, might be achieved by a firm's implementation of an ERP system. For such a system to be successful, the aims and expected results of its implementation should first be clearly defined and shared within the organisation, and then the efforts necessary to change management and reproject the firm's processes and operations should be undertaken [56,57]. Managers' utility functions, which are in contrast with the attribution of pollution control aims to ERP systems, could provide an explanation for the failure to test Hypothesis 2. Nevertheless, from an Agency Theory point of view, the powers that managers have to control firm activity are counterbalanced by board independence. Through the board, independent directors compensate for the behaviour of managers who are only interested in short-term interests by forcing them to consider the long-term interests of shareholders and stakeholders [34,35]. Literature on agency theory indicates how an independent board of directors is more likely to recognise the potential that green investments may have in the long term and, therefore, resist managerial pressure to adopt a different investment strategy. Consequently, there is a greater inclination on the part of independent boards to adopt environmentally-friendly policies, even where they are expensive [15]. These aspects might provide an explanatory verification of Hypothesis 1. Today, many stakeholders require disclosures of corporate responsibility and environmental performance in particular [14,75]. Society expects firms to take greater environmental responsibility for their activities. These expectations correspond to, on the one hand, new opportunities that are emerging for those firms which are most attentive to environmental performance and, on the other, more severe sanctions and fines for those firms that commit environmental crimes [76]. The Exxon Valdez and BP oil spills (of 1989 and 2010, respectively) are two examples of how environmental disasters may lead to harsh financial consequences for a firm that does not pay attention to environmental problems. Adopting environmentally responsible business practices ought to be a primary consideration for a firm's board of directors and owners. One explanation for the verification of Hypothesis 3 is that reinforcing a board's independence releases the potential that ERP digital technology has to improve environmental performance. A more independent board of directors will be more effective in blocking and overcoming management resistance to making the efforts necessary to redesign company processes and adequately configure ERP systems so as to obtain maximum advantage for the environment, too. Some boards know how to shape behaviour that helps an organisation use data and digital technologies in ways that are perceived as socially, economically, and environmentally responsible. In this sense, a board may constitute an antecedent with respect to CDR.

Our study is not without its limitations. We opted for a sample and a hierarchical regression model that were capable of explaining a part of the complexity of the entire phenomenon. However, a firm's green performance and control of pollution are complex phenomena, while governance mechanisms and ERP digital technology only represent a limited part of the variables affecting a firm's environmental achievements. Finally, the data for this study were gathered in Italy. Therefore, special attention should be given when generalising with regard to other national contexts on the basis of these discoveries. In Italy, firm ownership is generally rather concentrated, and family firms make up the most sizeable set of blockholders on the stock market, while the next largest set consists of the state or other public bodies [76].

Our conceptualisation paves the way for further future research, especially regarding antecedents to CDR and their relationship to corporate governance. It would also be advantageous to extend the empirical research to include other countries, and analysis should be made of further possible relationships between CDR and other characteristics of board composition, such as CEO duality or interlocking directorates. Further food for thought might emerge from the drawing up of environment, social, and governance (ESG) parameters that take account of CDR problems. With regard to these, particular attention ought to be given to the malleability of the technology and data, which, as this paper has shown, may be positively influenced by effective governance mechanisms.

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References

1. Kaplan, R.S. Strategic performance measurement and management in nonprofit organizations. *Nonprofit Manag. Leadersh.* **2001**, *11*, 353–370. [[CrossRef](#)]
2. Anderson, R.C.; Reeb, D.M. Board composition: Balancing family influence in S&P 500 firms. *Adm. Sci. Q.* **2004**, *49*, 209–237.
3. Jensen, M.C.; Meckling, W.H. Theory of the firm: Managerial behaviour, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [[CrossRef](#)]
4. Shleifer, A.; Vishny, R.W. A survey of corporate governance. *J. Financ.* **1997**, *52*, 737–783. [[CrossRef](#)]
5. Gill, A. Corporate governance as social responsibility: A research agenda. *Berkeley J. Int. Law* **2008**, *26*, 452–478.
6. McWilliams, A.; Siegel, D. Corporate social responsibility: A theory of the firm perspective. *Acad. Manag. Rev.* **2001**, *26*, 117–127. [[CrossRef](#)]
7. Luoma, P.; Goodstein, J. Stakeholders and corporate boards: Institutional influences on board composition and structure. *Acad. Manag. J.* **1999**, *42*, 553–563. [[CrossRef](#)]
8. Kock, C.J.; Santaló, J.; Diestre, L. Corporate Governance and the Environment: What Type of Governance Creates Greener Companies? *J. Manag. Stud.* **2012**, *49*, 3. [[CrossRef](#)]
9. De Villiers, C.; Naiker, V.; van Staden, C.J. The effect of board characteristics on firm environmental performance. *J. Manag.* **2011**, *37*, 1636–1663. [[CrossRef](#)]
10. Fligstein, N. The structural transformation of American industry: An institutional account of the causes of diversification in the largest firms, 1919–1979. In *The New Institutionalism in Organizational Analysis*; Powell, W.W., DiMaggio, P.J., Eds.; University of Chicago Press: Chicago, IL, USA, 1991.
11. Hysřlová, J.; Hájek, M. Environmental management accounting in the framework of EMAS II in the Czech Republic. In *Implementing Environmental Management Accounting: Status and Challenges*; Springer: Dordrecht, The Netherlands, 2005; pp. 279–295.
12. Kandanand, K. A Roadmap to Green Supply Chain System Through Enterprise Resource Planning (ERP) Implementation. *Procedia Eng.* **2014**, *69*, 377–382. [[CrossRef](#)]
13. Sehen Issa, J.; Abbaszadeh, M.R.; Salehi, M. The Impact of Islamic Banking Corporate Governance on Green Banking. *Adm. Sci.* **2022**, *12*, 190. [[CrossRef](#)]
14. Kassinis, G.; Vafeas, N. Corporate boards and outside stakeholders as determinants of environmental litigation. *Strateg. Manag. J.* **2002**, *23*, 399–415. [[CrossRef](#)]
15. McKendall, M.; Sánchez, C.; Sicilian, P. Corporate governance and corporate illegality: The effects of board structure on environmental violations. *Int. J. Organ. Anal.* **1999**, *7*, 201–223. [[CrossRef](#)]
16. Rubino, F.; Napoli, F. What impact does corporate governance have on corporate environmental performances? An empirical study of Italian listed firms. *Sustainability* **2020**, *12*, 5742. [[CrossRef](#)]
17. Londoño-Cardozo, J.; Pérez de Paz, M. Corporate digital responsibility: Foundations and considerations for its development. *Rev. Adm. Mackenzie* **2021**, *22*, 1–31. [[CrossRef](#)]
18. Treviño, L.K.; Weaver, G.R.; Reynolds, S.J. Behavioral ethics in organizations: A review. *J. Manag.* **2006**, *32*, 951–990. [[CrossRef](#)]
19. Lobschat, L.; Mueller, B.; Eggers, F.; Brandimarte, L.; Diefenbach, S.; Kroschke, M.; Wirtz, J. Corporate digital responsibility. *J. Bus. Res.* **2021**, *122*, 875–888. [[CrossRef](#)]

20. Herden, C.J.; Alliu, E.; Cakici, A.; Cormier, T.; Deguelle, C.; Gambhir, S.; Gupta, S.; Kamani, S.R.; Kiratli, Y.S.; Kispataki, M.; et al. Corporate Digital Responsibility: New corporate responsibilities in the digital age. *Sustain. Manag. Forum* **2021**, *29*, 13–29. [[CrossRef](#)]
21. Mueller, B. Corporate digital responsibility. *Bus. Inf. Syst. Eng.* **2022**, *122*, 875–888. [[CrossRef](#)]
22. Brynjolfsson, E.; McAfee, A. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, 1st ed.; W.W. Norton & Company: New York, NY, USA, 2014.
23. Georgiou, Y.; Zhou, N.; Zhong, L.; Hoppe, D.; Pospieszny, M.; Papadopoulou, N.; Nikas, K.; Nikolos, O.L.; Kranas, P.; Karagiorgou, S.; et al. Converging HPC, Big Data and Cloud Technologies for Precision Agriculture Data Analytics on Supercomputers. In *Proceedings of the ISC High Performance 2020: High Performance Computing, Frankfurt, Germany, 21–25 June 2020*; Jagode, H., Anzt, H., Juckeland, G., Ltaief, H., Eds.; Springer International Publishing: Cham, Switzerland, 2020.
24. Richter, A.; Riemer, K. Malleable end-user software. *Bus. Inf. Syst. Eng.* **2013**, *5*, 195–197. [[CrossRef](#)]
25. Soltani, A. Abusability testing: Considering the ways your technology might be used for harm. In *Enigma 2019*; Enigma: Burlingame, CA, USA, 2019.
26. Vosoughi, S.; Roy, D.; Aral, S. The spread of true and false news online. *Science* **2018**, *359*, 1146–1151. [[CrossRef](#)] [[PubMed](#)]
27. Nambisan, S.; Lyytinen, K.; Majchrzak, A.; Song, M. Digital innovation management: Reinventing innovation management research in a digital world. *MIS Q.* **2017**, *41*, 223–238. [[CrossRef](#)]
28. Wager, A. *Innovation von Medienprodukten: Corporate Digital Responsibility und KI-Bias, Hofer Beiträge zur Digitalen Transformation*; University of Applied Sciences Hof: Hof, Germany, 2022. [[CrossRef](#)]
29. Karimi, J.; Somers, T.M.; Bhattacharjee, A. The role of ERP implementation in enabling digital options: A theoretical and empirical analysis. *Int. J. Electron. Commer.* **2009**, *13*, 7–42. [[CrossRef](#)]
30. Judge, W.Q.; Dobbins, G.H. Antecedents and effects of outside director’s awareness of CEO decision style. *J. Manag.* **1995**, *21*, 43–64. [[CrossRef](#)]
31. Forbes, D.; Milliken, F.J. Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Acad. Manag. Rev.* **1999**, *24*, 489–505. [[CrossRef](#)]
32. Rindova, V. What corporate boards have to do with strategy: A cognitive perspective. *J. Manag. Stud.* **1999**, *36*, 953–975. [[CrossRef](#)]
33. Taylor, B.; Dulewicz, V.; Gay, K. How part-time directors create exceptional value: New evidence from the non-executive director awards. *J. Gen. Manag.* **2008**, *33*, 53–70. [[CrossRef](#)]
34. Eisenhardt, M. Agency theory: An assessment and review. *Acad. Manag. Rev.* **1989**, *14*, 57–74. [[CrossRef](#)]
35. Fama, E.F.; Jensen, M. The separation of ownership and control. *J. Law Econ.* **1983**, *26*, 301–325. [[CrossRef](#)]
36. Minichilli, A.; Zattoni, A.; Zona, F. Making Boards Effective: An Empirical Examination of Board Task Performance. *Br. J. Manag.* **2009**, *20*, 55–74. [[CrossRef](#)]
37. Hoskisson, R.E.; Johnson, R.A.; Moesel, D.D. Corporate divestiture intensity in restructuring firms: Effects of governance, strategy, and performance. *Acad. Manag. J.* **1994**, *37*, 1207–1251. [[CrossRef](#)]
38. Berrone, P.; Gomez-Mejia, L.R. Environmental performance and executive compensation: An integrated agency–institutional perspective. *Acad. Manag. J.* **2009**, *52*, 103–126. [[CrossRef](#)]
39. Aragón-Correa, J.A.; Sharma, S. A contingent resource-based view of proactive corporate environmental strategy. *Acad. Manag. Rev.* **2003**, *28*, 71–88. [[CrossRef](#)]
40. Lewellen, W.; Loderer, C.; Martin, K. Executive compensation contracts and executive incentive problems: An empirical analysis. *J. Account. Econ.* **1987**, *9*, 287–310. [[CrossRef](#)]
41. Zimon, G.; Arianpoor, A.; Salehi, M. Sustainability Reporting and Corporate Reputation: The Moderating Effect of CEO Opportunistic Behavior. *Sustainability* **2022**, *14*, 1257. [[CrossRef](#)]
42. Hill, C.W.L.; Jones, T.M. Stakeholder-agency theory. *J. Manag. Stud.* **1992**, *29*, 131–154. [[CrossRef](#)]
43. Salehi, M.; Alkhyoon, H. The relationship between managerial entrenchment, social responsibility, and firm’s risk-taking and shareholders’ activity. *Soc. Responsib. J.* **2022**, *18*, 1035–1049. [[CrossRef](#)]
44. King, A.A.; Lenox, M.J. Exploring the locus of profitable pollution reduction. *Manag. Sci.* **2002**, *48*, 289–299. [[CrossRef](#)]
45. Hillman, A.J.; Dalziel, T. Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Acad. Manag. Rev.* **2003**, *28*, 383–396. [[CrossRef](#)]
46. Kesner, I.F.; Johnson, R.B. An investigation of the relationship between board composition and stockholder suits. *Strateg. Manag. J.* **1990**, *11*, 327–336. [[CrossRef](#)]
47. Kosnik, R.D. Greenmail: A study of board performance in corporate governance. *Adm. Sci. Q.* **1987**, *32*, 163–185. [[CrossRef](#)]
48. Ibrahim, N.A.; Angelidis, J.P. The corporate social responsiveness orientation of board members: Are there differences between inside and outside directors? *J. Bus. Ethics* **1995**, *14*, 405–410. [[CrossRef](#)]
49. Herring, H.; Roy, R. Technological innovation, energy efficient design and the rebound effect. *Technovation* **2007**, *27*, 194–203. [[CrossRef](#)]
50. Elliott, K.; Price, R.; Shaw, P.; Spiliotopoulos, T.; Coopamootoo, K.; van Moorsel, A. Towards an equitable digital society: Artificial intelligence (AI) and corporate digital responsibility (CDR). *Society* **2021**, *58*, 179–188. [[CrossRef](#)]
51. Watts, G. COVID-19 and the digital divide in the UK. *Lancet. Digit. Health* **2020**, *2*, 395–396. [[CrossRef](#)]
52. Vial, G. Understanding digital transformation: A review and a research agenda. *J. Strateg. Inf. Syst.* **2019**, *28*, 118–144. [[CrossRef](#)]

53. Koch, T.; Windsperger, J. Seeing through the network: Competitive advantage in the digital economy. *J. Organ. Des.* **2017**, *6*, 6. [[CrossRef](#)]
54. Cardinali, P.G.; De Giovanni, P. Responsible digitalization through digital technologies and green practices. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 984–995. [[CrossRef](#)]
55. Dwivedi, Y.K.; Hughes, L.; Kar, A.K.; Baabdullah, A.M.; Grover, P.; Abbas, R.; Andreini, D.; Abumoghli, I.; Barlette, Y.; Bunker, D.; et al. Climate change and COP26: Are digital technologies and information management part of the problem or the solution? An editorial reflection and call to action. *Int. J. Inf. Manag.* **2022**, *63*, 102456. [[CrossRef](#)]
56. Aladwani, A.M. Change management strategies for successful ERP implementation. *Bus. Process Manag. J.* **2001**, *7*, 266–275. [[CrossRef](#)]
57. Al-Shamlan, H.M.; Al-Mudimigh, A.S. The Change Management Strategies and Processes for Successful ERP Implementation: A Case Study of MADAR. *Int. J. Comput. Sci. Issues* **2011**, *8*, 399.
58. Al-Mashari, M.; Zairi, M.J. Supply-chain re-engineering using enterprise resource planning (ERP) systems: An analysis of SAP R/3 implementation case. *Int. J. Phys. Distrib. Logist. Manag.* **2000**, *30*, 296–313. [[CrossRef](#)]
59. Hervani, A.A.; Helms, M.M.; Sarkis, J. Performance measurement for green supply chain management. *Benchmarking Int. J.* **2005**, *12*, 330–353. [[CrossRef](#)]
60. Koh, S.C.L.; Saad, S.; Arunachalam, S. Competing in the 21st century supply chain through supply chain management and enterprise resource planning integration. *Int. J. Phys. Distrib. Logist. Manag.* **2006**, *36*, 455–465.
61. European Commission. *Communication from the Commission Concerning Corporate Social Responsibility: A Business Contribution to Sustainable Development*; European Commission: Brussels, Belgium, 2002.
62. Müller-Christ, G. *Umweltmanagement*; Verlag Vahlen: München, Germany, 2001.
63. Lang-Koetz, C.; Heubach, D.; Loew, T. Using software systems to support environmental accounting instruments. In *Implementing Environmental Management Accounting*; Rikhardsson, P.M., Bennett, M., Bouma, J.J., Schaltegger, S., Eds.; Springer: Dordrecht, The Netherlands, 2005; p. 1.
64. May, N.; Günther, E. Shared benefit by Material Flow Cost Accounting in the food supply chain—The case of berry pomace as upcycled by-product of a black currant juice production. *J. Clean. Prod.* **2020**, *245*, 118946. [[CrossRef](#)]
65. Cho, C.H.; Patten, D.M. The role of environmental disclosures as tools of legitimacy: A research note. *Account. Organ. Soc.* **2007**, *32*, 639–647. [[CrossRef](#)]
66. Halme, M.; Huse, M. The influence of corporate governance, industry and country factors on environmental reporting. *Scand. J. Manag.* **1997**, *13*, 137–157. [[CrossRef](#)]
67. Patten, D.M. The relation between environmental performance and environmental disclosure: A research note. *Account. Organ. Soc.* **2002**, *27*, 763–773. [[CrossRef](#)]
68. Berrone, P.; Cruz, C.; Gomez-Mejia, L.R.; Larraza-Kintana, M. Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less? *Adm. Sci. Q.* **2010**, *55*, 82–113. [[CrossRef](#)]
69. Hertwich, E.G.; Mateles, S.F.; Pease, W.S.; McKone, T.E. Human toxicity potentials for life-cycle assessment and toxics release inventory risk screening. *Environ. Toxicol. Chem.* **2001**, *20*, 928–939. [[CrossRef](#)]
70. Prencipe, A.; Markarian, G.; Pozza, L. Earnings Management in Family Firms: Evidence From RandD Cost Capitalization in Italy. *Fam. Bus. Rev.* **2008**, *21*, 71–88. [[CrossRef](#)]
71. Clarkson, P.M.; Li, Y.; Richardson, G.D.; Vasvari, F.P. Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Account. Organ. Soc.* **2008**, *33*, 303–327. [[CrossRef](#)]
72. Pettigrew, A.; Whipp, R. *Managing Change for Competitive Success*; Blackwell: London, UK, 1991.
73. Pelled, L.H.; Eisenhardt, K.M.; Xin, K.R. Exploring the black box: An analysis of work group diversity, conflict and performance. *Adm. Sci. Q.* **1999**, *44*, 1–28. [[CrossRef](#)]
74. Breusch, T.S.; Pagan, A.R. A Simple Test for Heteroscedasticity and Random Coefficient Variation. *Econometrica* **1979**, *47*, 1287–1294. [[CrossRef](#)]
75. Hart, S.L. A natural-resource-based view of the firm. *Acad. Manag. Rev.* **1995**, *20*, 986–1014. [[CrossRef](#)]
76. Scafarto, V.; Ricci, F.; Della Corte, G.; De Luca, P. Board structure, ownership concentration and corporate performance: Italian evidence. *Corp. Ownersh. Control* **2017**, *15*, 347–359. [[CrossRef](#)]

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Article

Bonding or Indulgence? The Role of Overborrowing on Firms' Innovation: Evidence from China

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Abstract: This paper examines the innovation spending gap associated with overborrowing in China's state-owned enterprises (SOEs). Based on the double agency problem of the banking sector, the authors hypothesize that SOEs are more inclined to a higher level of overborrowing and therefore worsen firms' debt governance system for innovation. We argue that obtaining excessive bank loans has an indulgence effect and is used by firms' managers as an entrenchment strategy for underinvestment in innovation. We test our theoretical model under the unique institutional setting of China's banks, in particular the administrative-economic governance. Using a longitudinal panel dataset that contains a cross section of Chinese listed companies from 2012 to 2018, we confirm overborrowing's mediating role between state ownership and firm innovation expenditure, implying that enhancing the delegated monitoring of banks is also essential to firm innovativeness in transition economies. Additionally, we further test the role of political connections and managers' R&D functional experience to leverage the benefits of SOEs' innovation resource endowment. Our study demonstrates another debt governance channel through which government intervention has a negative impact on firm innovation resource allocation. It expands the understanding of the debt governance role for innovation in transition economies.

Keywords: bank debt; corporate governance; innovation; overborrowing; state ownership

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1. Introduction

To compete effectively, a country's enterprises must continuously innovate their competitive advantages [1]. Innovation comes from sustained investment in physical as well as intangible assets [2,3]. China has the largest number of state-owned enterprises (SOEs) in the world, which have played a pivotal role in the economy, though the innovation profile of these firms is as appealing as their corporate governance. On the one hand, many high-tech entities in China are created and managed in the form of SOEs. On the other hand, previous studies show that the expenditure and performance of R&D in SOEs remain significantly lower than that in non-SOEs [4]. It is generally acknowledged that under state dominance, the control rights rest with bureaucrats who have only an indirect interest in profit, which leads to inefficiencies [5]. Latter theoretical work by Huang and Xu (1999) and Zhang et al. (2003) also show that the state sector has significantly lower R&D efficiency than the non-state sector, which may be attributed to their differences in ownership structure and associated agency problems [6,7]. Similarly, Le and O'Brien (2010) found that SOEs were inefficient in R&D activities because of the conflict of interest between shareholders and governments, with a higher likelihood for the latter to pursue social objectives and political objectives rather than profit maximization [8]. If this is the case, we can reasonably expect a decrease in R&D expenditure or efficiency with the increase in state ownership of firms. However, there exists evidence showing that the introduction of state-owned shareholders to financing-constrained non-SOEs also helps increase their R&D expenditure [9,10]. Regarding the financing constraints, state-owned

shareholders not only contribute to expanding the equity capital but also facilitate firms' access to finance, which is called the certification effect.

A consensus has yet to be reached on the way to finance corporate innovation efficiently in transition economies, which is very different from motivating routine tasks [11]. Although direct financing has been verified to have significant positive impacts on a firm's innovation [12], firms' proportion of direct financing in China is still lower than in many emerging markets. Indeed, debt financing, especially bank loans, is still the manifest financing source of SOEs, even if most have already been significantly deleveraged. While there is some empirical evidence regarding the relationship between bank loans and firm innovation, they produce mixed results. Some studies have shown that bank loans can theoretically bring tax benefits [13,14], thereby encouraging firms to increase R&D expenditure. However, the Chinese banking sector features poor corporate governance and government-oriented financial allocation, under which the government tends to transfer funds from productive sectors and regions to less productive sectors and regions [15,16]. In addition, in the process of promoting economic transition, the government could legally exert their formal shareholder's rights or supervision authority on local banks to intervene in their decision of loan granting.

Some observers argue that capital misallocation or financing frictions would worsen a firm's productivity and innovation [17,18]. Scholars including Huang and Xu (1999), Demetriades and Fattouh (2006), and Mian et al. (2017) have analyzed the negative effect of debt overhang to investment [6,19,20], whereas the relationship between firm-level overborrowing and innovation has not been investigated in detail. Previous studies on state ownership have paid much attention to various external governance determinants on firms' economic performance, such as market structure [21], soft budgets [22], or credit discrimination [23]; however, there is an ongoing debate and a lack of convincing evidence regarding whether and how banks' credit discrimination is driven by state ownership and its exact negative effect on firms' R&D expenditure, and to the best of our knowledge, there has to date been no empirical investigation of it in emerging economies in general, and in China in particular where the institutional environment is significantly different.

In this context, we shall refer to the measurement of overinvestment [24,25] to capture a firm's overborrowing as the statistical discrepancy between the actual bank loan the firm obtains and the forecasted value the firm demands from an econometric model. Focusing on the interplay of internal and external governance, we analyze the firm-level conditions through which overborrowing would manifest its negative impact, shedding light on potential ways to reduce the adverse impact of overborrowing and facilitate the innovation capability of SOEs. What makes our study more interesting is that a significant variation of governance profile exists between different-level SOEs in China [26]. Even if under the control of the same governmental agency, different management mechanisms in SOEs of different administrative levels matters in China. Therefore, China's unique institutional settings provide a good opportunity to test whether the overborrowing associated with state ownership would polarize the innovation ability of SOEs.

The remainder of this study is organized as follows. In the second section, we provide an overview of the relevant literature on banks' monitoring and corporate innovation and present the research hypotheses. The next section outlines our samples, measures, and analytical techniques. Section four further discusses the empirical results and provides further analysis of the moderating effect of a firm's political connection level and top managers' R&D functional experience, while section five concludes this study.

2. Theory and Hypotheses

2.1. Overborrowing and Firms' Innovation Behaviour: Bonding or Indulgence?

The development of the banking system benefits corporate governance and innovation [27,28]. From the perspective of agency, bank debt is generally acknowledged to be an alternative governance mechanism for firms [29–34]. In the general context of corporate governance, the monitoring for corporate governance provided by banks helps alleviate the

agency costs of asset substitution or underinvestment in the focal firms [35,36]. Specifically, the cash disbursement of debt would limit the manager's discretionary cash flow and inappropriate decisions about capital expenditure [30]. Therefore, Grossman and Hart (1982) described the issuing of risky debt by the entrepreneur or manager as a means of "bonding" his or her behavior [29]. Regarding R&D activities with high technology risks and information asymmetry, the monitoring benefits are more likely to exceed the cost of the debt itself, which will facilitate promoting firms' innovation [37]. Bank loans thus can be viewed as "insider" debt—that is, compared with bonds and equity, bank loans provide inside information about the firms [38,39]. Along this line of thinking, Friend and Lang (1988) found that debt financing decisions were consistent with the decline of focal firms' agency costs [40]. In addition, the threat of bankruptcy and compulsory interest payment obligations based on debt covenants would help jointly activate a firm's innovation behavior [41]. Shahzad et al. (2021) found evidence of an inverted U-shaped relationship between debt financing and corporate innovation, which implies that firms undertake external debts at the start and decline their debt financing in the long run [42].

While banks may possess capacities to control agency conflicts within the focal firms, they are subject to an agency dilemma themselves. Thus, the delegated monitoring of banks is a double-agency problem in itself [43]. One agency problem of the banks' administrative-economic governance lies in the administrative appointment of its top managers [44]. Government owners can send bureaucrats to banks as top managers or directors through which government policies about firms are executed. With the nature of "quasi-bureaucrats", these top managers of state-owned banks are usually restricted in executive compensation and more inclined to pursue political promotion [45,46]. More generally, the relationship between the government and banks can lead to harmful dependencies and interactions. In particular, there is the danger of regulatory capture [47]. Research on bank loan granting decision also proves that state-owned banks not only charge lower interest rates than privately owned banks, but also inflate credit in the political election cycle [48]. Allen et al. (2005) and Fan et al. (2008) have reported evidence on the rent-seeking hypothesis in emerging markets [16,49]. As a result, the incentives and intervention effects of administrative governance would accrue excess debt in focal firms.

Another agency dilemma exists when state-owned banks' monitoring is not transparent to outside investors. Governmental owned banks are usually accountable only to the government, and the disclosure requirements are minimal. As a result, the moral hazard in focal firms will arise. With a long duration of technological innovation and high risks, top managers in focal firms are generally reluctant to take risks in long-term R&D projects, because such investment often means a higher failure rate and occupational risks [50,51]. To protect themselves against such "expropriation", top managers tend to invest less in innovative projects that are difficult for outside investors to understand, and more in routine projects with quicker and more certain returns [52]. Empirical evidence also verifies that SOEs tend to have easier access to bank credit funds in a state-controlled banking system [53]. Overborrowing, as one form of resources redundancy which defends top managers of SOEs from competition in the market, would in turn urge them to give up valuable R&D investment opportunities and choose a relatively "safe" policy [54]. Given the higher agency costs associated with overborrowing, SOEs are not likely to devote a large amount of capital to R&D projects. Thus, we hypothesize the following:

H1: *SOEs are more inclined to a higher level of overborrowing, which leads to decrease in firms' R&D spending.*

2.2. Political Connection and the Impact of Overborrowing on Firms' R&D

One prominent feature of China's banking system is that state ownership is pervasive. This is particularly true for the state-owned commercial banks. State-owned banks, as a worldwide phenomenon, are inevitably accompanied by government intervention and influence [5]. De Haan and Vlahu (2016) and Hopt (2021) provide evidence that the significant influence exercised by the government is accompanied by a negative impact on

the quality of corporate governance in banks as well as on their performance [55,56]. More importantly, it is worth mentioning that firms controlled by the state do not necessarily incur a connection relationship, simply because their shares are controlled by the state according to the Company Law of China (Article 126/2018). There thus exist potential transactions that lead to the transfer of the interest of firms and can be exempted from monitoring and information disclosure. In this context, SOEs have strong incentives to participate in building political connections in order to acquire easier access to bank loans.

The existing viewpoints of a firm's political connections impacting bank governance can be roughly divided into the "signal effect" and "resource effect". From the perspective of the signal effect, access to political connections provides a positive signal about the quality and creditworthiness of focal firms and reduces information asymmetry for private investors [57]. It can reduce a bank's dependence on a focal firm's financial statements and facilitate its access to bank loans [58]. Houston et al. (2014) names it the implicit insurance effect of political connections [59]. From the perspective of the resource effect, having political connections can also enable firms to obtain credit resources, acquire contracts, avoid coercive treatment as well as fines from regulators, acquire fiscal assistance, and enjoy other advantages since the loan granting decisions of state-owned banks will be led by political consideration [60–62]. Many studies have shown that politically connected firms can obtain more bank loans and reduce their financing constraints [63,64]. It is also easier for local bureaucrats to channel funds in the form of loans to firms with which they have connections through banks they control [65].

The promotion tournament is an important incentive mechanism for top management of SOEs in transition economies. Taking further analysis, the role of political connections may be contingent due to different administrative levels. Top managers' cash compensation, equity ownership, and perquisites are usually linked to job titles and position ranks. Lazear and Rosen (1981) show that the pay gap between the CEO and other executives is a reward for the promotion tournament, which stimulates these executives to compete intensively with each other [66]. Moreover, there is a strand of literature on the positive impact of pay dispersion for innovation in China. Jia et al. (2016) find that higher pay gap between CEOs and other executives can promote corporate innovation by attracting talent and reducing excessive board intervention [67]. Xu et al. (2017) examine the pay dispersion between executives and ordinary employees, and find a positive impact on corporate innovation of Chinese listed firms [68]. More importantly, the supervision intensity for bureaucrats or SOEs' "quasi-bureaucrats" managers is closely proportional to their administrative level, too. The lower the level of managers' political connection, the less supervision they are subject to. In the case of strong motives and weak supervision, managers with political connections below the provincial level in SOEs are more inclined to exert their political intervention on loan acquisition. As a result, firms become easily overborrowed. Thus, hypothesis 2 is proposed:

H2: *The lower the political connection level of focal firms' top managers, the more significant the mediating effect of overborrowing.*

2.3. R&D Background of Managers and the Impact of Overborrowing on Firms' R&D

There are already a handful of studies that have examined the association of various top managers' characteristics with innovation [69,70]. Much of this research started with a study by Dearborn and Simon (1958), who argued that experience with the goals, rewards, and methods of a particular functional area causes managers to perceive and interpret information in ways that suit and reinforce their functional training [71]. Top managers' biases and dispositions do have their greatest influence on organizational outcomes in complex and uncertain conditions, whereas these unobservable psychological traits of top managers are inherently related to their personal characteristics [72,73]. As key firm capability for innovation, R&D capability is particularly influenced by top management experience because it depends on perceptions of organizational and industry environments [74]. R&D functional experience will provide managers with expertise knowledge,

increase team heterogeneity, and reduce short-sightedness, thus promoting the firm's innovation [75]. More importantly, top managers with functional experience in R&D often possess more private information in specified R&D projects, which would enable them to make innovation-related financing decisions prudentially and appropriately as well.

In innovation activities it is often impossible to accurately measure inputs into the innovation process [51], and one can hardly write complete contracts when one does not even know what the output might be [76–78]. In such cases, when making an innovation decision, top managers are generally more risk-averse than investors, since they cannot diversify the risk of their specified investment across different companies [50,51,79]. Notwithstanding the foregoing problems, some researchers argue that managers with R&D experience would contribute to increasing firms' R&D expenditure. Several studies support this line of reasoning. Special purpose investments entail asset specificity, such as the R&D expenditures considered here [80,81]. Research has shown firms engaged in innovation have a high percentage of intangible assets, where knowledge is embedded in the human capital of the firms' managers. This key resource is lost if managers leave or are laid off [82]. Managers therefore tend to smooth R&D spending over time to avoid being laid off, leading R&D spending at the firm level to behave as if it has high adjustment costs. In addition, the innovation process contains knowledge management at various levels; such a process would also lead to dynamic changes in firms' asset specificity [83,84]. Andreou and Bontis (2007) argue that knowledge management affects the components and structure of human capital [85]. If the top managers have a higher degree of knowledge specificity, such as more specialized knowledge of R&D, the firms can achieve greater specific human capital [86]. These conditions allow for chances that agency costs in financing innovation be significantly weakened when top managers have R&D functional experience. Therefore, we propose that top managers with R&D functional experience have greater incentives in R&D spending that may help mitigate the impact of overborrowing.

H3: *Top managers with R&D functional experience contribute to weakening the mediating effect of overborrowing.*

3. Methods

3.1. Data and Sampling Approach

This study uses samples that are Chinese listed A-share firms on the Shanghai and Shenzhen stock exchanges from 2012 to 2018. The sample period was set between 2012 and 2018. The sample period starts from 2012 to avoid influence of easing monetary measures during the financial crisis from 2008 to 2011. The central bank of China lowered the required reserve and interest rate since 2008, which led to rapid growth of bank credit. In September 2018, the General Office of the State Council announced the "Guidance on Strengthening the Asset-Liability Constraints of SOEs", requiring SOEs to reduce leverage ratio by about two percentage points by the end of 2020. As a result, SOEs have been set annual leverage debt limits by the government, which disrupted the usual debt increment mechanism. Therefore, we exclude samples after 2019. Compared with financial firms, non-financial firms are different in governance and technology features. Following general studies, we first exclude financial firms from our samples. The second sampling stage is intended to exclude special treatment firms (which have made losses for two or three consecutive years) as well as firms with data outliers to avoid any biased estimation. After data screening, a total panel date of 19,822 "firm-year" observations are obtained. All the financial data come from the China Stock Market & Accounting Research (CSMAR) Database and the Chinese Research Data Services (CNRDS) database. The data for this study are processed by Stata15.

3.2. A Framework to Measure the Construct of Overborrowing

According to the theory of corporate finance, firm's financing choice depends on a tradeoff between different financing alternatives. Without loss of generality, we assume that the firm faces a project with positive net present value, and the financing alternatives

comprises two ways, namely, the bank loans and retained earnings. Bank loans represents debt financing, while retained earnings are a proxy of direct financing. If the cost of bank loans is greater than that of retained earnings, the firm tends to adopt retained earnings instead of bank loans. Otherwise, the firm will increase bank loans. When the financing demand is fixed, firm's bank loans would depend on the expected weighted average capital cost (WACC) for the project. Bank loans (BL) thus can be expressed as follows:

$$BL = \mathcal{F}(WACC)$$

Theoretically, there is an optimal point of borrowing level, at which the weighted average capital cost for the project is the lowest. We mark the ideally optimal borrowing level as $\mathcal{F}(WACC^*)$, where $WACC^*$ corresponds to the optimal capital structure. When there is overborrowing or underborrowing, the actual bank loans will inevitably deviate from the optimal level, leading the weighted average capital cost away from the optimal point $WACC^*$. Real bank loans can then be split into two main components:

$$RBL = \mathcal{F}(WACC^*) + \Delta BL$$

The deviation from the ideal value (ΔBL) can be negative or positive. Negative (positive) values corresponds to under (over)borrowing. The focus of the empirical analysis in this study is on the overborrowing. Hence, the analysis will focus on the firms with positive values. There is an extensive literature in economics and finance that have examined firm level borrowing decisions [36,86,87]. The overborrowing will eventually lead to increment in firm's risk but without extra net cash inflow, and thus impairs the firm's value. It could reflect management engaging in additional investment on self-serving projects rather than distributing the cash to shareholders [25].

From the perspective of equilibrium in credit market, the ideal bank loans (BL) firm demands is always the same as the optimal lending volume bank approves. By examining the bank loans-setting mechanism we can obtain the empirical estimation of overborrowing described in this framework.

3.3. Analysis Model and Variables

Based on the above theoretical analysis, this study first constructs a model to calculate the ideal bank loans (BL). The bank loans estimation model is mainly inspired by Berger and Udell (2006) [88]. The authors propose a complete conceptual framework for bank credit determination. In that framework, the main factors affecting credit availability are divided into eight lending technologies: financial statement lending, small business credit scoring, asset-based lending, factoring, fixed-asset lending, leasing, relationship lending, and trade credit. Among these technologies, some are suitable for banks' general lending decisions. As for financial statement lending, bank's lending decision is based on a firm's financial ratios reflecting its financial condition in financial statements. Credit scoring is a transaction technology based primarily on hard information about the firm's owner as well as the firm. Asset-based lending is a lending technology which banks make lending decisions with by focusing on a subset of the firm's assets. This technology provides working capital financing secured primarily by accounts receivable and inventory. Fixed-asset lending technologies involve lending against assets that are long-lived and are not sold in the normal course of business. Accordingly, firm's liquidity, profitability, growth, ownership, are common determinants in bank lending. These indicators are closely associated with firm's short-term or long-term ability of repayment [89,90].

The bank loan estimation model is as follows:

$$\text{Loan}_{it} = \alpha_0 + \alpha_1 \text{Cash}_{it-1} + \alpha_2 \text{Size}_{it-1} + \alpha_3 \text{Lev}_{it-1} + \alpha_4 \text{Liquid}_{it-1} + \alpha_5 \text{ZJ}_{it-1} + \alpha_6 \text{Roe}_{it-1} + \alpha_7 \text{Growth}_{it-1} + \alpha_8 \text{Top1}_{it-1} + \alpha_9 \text{Herfindahl}_3_{it-1} + \sum \text{Ind} + \sum \text{Year} + \varepsilon_{it} \quad (1)$$

As described above, overborrowing (ΔBL) corresponds to extra bank loans the firm actually obtains that exceeds the estimation value. Referring to the measurement of over-investment [24,25], we measure firm-level overborrowing as the statistically significant discrepancy between the actual bank loan the firm obtains and the estimated bank loan calculated by the model (1).

Secondly, we employ the following model to test the factors affecting overborrowing:

$$\text{Overloan}_{it} = \eta_0 + \eta_1 \text{State}_{it} + \eta_2 \text{Politic}_{it} + \eta_3 \text{Occup}_y_{it} + \eta_4 \text{Market}_{it} + \eta_5 \text{Financeback}_{it} + \sum \text{Ind} + \sum \text{Year} + \varepsilon_{it} \quad (2)$$

Thirdly, to verify the mediating effect of overborrowing on ownership type and R&D expenditure, this study sets up the following regression model:

$$\text{R\&D_ratio}_{it} = \sigma_0 + \sigma_1 \text{State}_{it} + \sigma_2 \text{Overloan}_{it} + \sigma_3 \text{Governsci}_{it} + \sigma_4 \text{Stock_incentive}_{it} + \sigma_5 \text{Independent}_{it} + \sigma_6 \text{Assign}_{it} + \sigma_7 \text{Herfindahl_3}_{it} + \sum \text{Ind} + \sum \text{year} + \varepsilon_{it} \quad (3)$$

Here, R&D_ratio denotes the R&D spending intensity. A number of researchers have used R&D spending divided by firm sales as a measure of R&D intensity [91,92]. The innovation intensity indicator has advantages in the consistency of dimensions and is directly related to a firm's financing, so it is suitable to reflect a firm's innovation performance. To ensure the stability of this indicator, we also use R&D expenditure scaled by the total assets as an alternative measure for a firm's innovation performance in the robustness test section. All missing values for R&D intensity are replaced with zero, and the upper bound for R&D intensity is set at 1.

From the standpoint of corporate governance, Li et al. (2019) pointed out that the key feature of current Chinese SOEs governance is the coexistence of administrative governance and economic governance [93]. The administrative governance factors, such as implicit as well as explicit guarantees for SOEs' financial crisis and the prevalence of soft-budget, are thought to be the main causes of firms' misconduct in investment [24,94]. Therefore, many state-owned banks can hardly treat firms equally in loan granting, but show some degree of discrimination. Previous studies have shown that SOEs generally obtain more loans than non-SOEs, and the gap increases significantly during periods of austerity and recession [95]. The state ownership type (State) is a dummy variable where one represents those firms ultimately owned by the government, and zero represents those not. Following Petersen and Rajan (1994), La Porta et al. (1999), Faccio and Lang (2002), Anderson et al. (2004), Bigelli and Mengoli (2004), Armstrong and Vashishtha (2012), Ben-Nasr et al. (2015), and Grosman et al. (2016) [96–103], we control for main financial and governance variables in our analysis. The main variables involved in the above models are defined in Table 1.

Table 1. Variables and Definitions in Models (1) to (3).

Models	Variables	Definition
(1)	Loan	Long-term bank loans/total assets
	Cash	Cash balance scaled by total assets
	Size	Logarithm of total assets
	Lev	Debt to total assets ratio
	Roe	Ratio of return on equity
	Growth	Revenue growth rate
	Liquid	The net value of fixed assets scaled by total assets
	ZJ	Net value of construction in process scaled by assets
	Top1	The proportion of shares held by the firm's largest shareholder

Table 1. Cont.

Models	Variables	Definition
(1),(3)	Herfindahl_3	Degree of share concentration, measured by the sum of the squares of the shareholding ratio held by the firm's top three shareholders
(2),(3)	Overloan	The positive residual of model (1) regression
	State	Type of ownership, equal to 1 when the firm is state-owned, otherwise equal to 0
(2)	Politic	Political background, equal to 1 when the chairman of the board of directors or the general manager has administrative levels, otherwise 0
	Occupy	The large shareholders' expropriation, measured by percentage of other receivables to total assets
	Market	The marketization of credit allocation, measured by the natural logarithm of the year-end loan balance of local small loan firms
	Financeback	The financial background of top managers, equal to 1 if the chairman of the board of directors or general manager has a financial background, otherwise equal to 0
(3)	R&D_ratio	The proportion of R&D investment to revenues
	Governsci	Basic research expenditure, measured by the government's scientific and technological expenditure scaled by the total fiscal expenditure budget
	Stock_incentive	The proportion of the firm's stock owned by the managers
	Independent	The proportion of independent directors on the board
(1), (2), (3)	Assign	Equal to 1 if the chairman and general manager are one person, otherwise equal to 0
	Ind *	Dummy variable for industry
	Year	Dummy variable for year

* According to the China Securities Regulatory Commission "China-listed companies Industry Classification guidelines (2012)", we exclude the financial industry and divide the manufacturing industry into two-digit industry categories. In addition, other industries are subdivided into single-digit industry categories.

4. Results

4.1. Descriptive Statistics

Table A1 shows the descriptive statistics of the main variables. All continuous variables are winsorized by 1% to mitigate the impact of outliers. Before examining the overborrowing of the sample firms, it would be useful to generally discuss the financial structure of firms in China. The leverage ratio of Chinese firms is higher than reported by Fan et al. (2008) [49], which indicates there is no fundamental change in the financial structure during the past decade. Moreover, the average percentage of long-term bank loans to total assets of listed companies is 0.04 and its standard deviation is 0.08. The average proportion of long-term loans to total assets for SOEs is 0.07, whereas the proportion for non-SOEs is only 0.03, significantly lower than SOEs. The average overborrowing for listed companies is 0.05, accounting for 56% of the average loan for the same firms with overborrowing (whose average bank loan of total assets is 0.09), indicating that the overborrowing for listed companies in China is significant. In the table, about 19% of all firms have political connections. This indicator is lower in SOEs, thus showing that non-SOEs in China are more inclined to seek political connections, giving evidence that more efficient firms are more likely to build connections to secure their access to finance. The average administrative level of the chairman or general manager is 76.6. Furthermore, the average administrative level for SOEs is much higher. In summary, it provides consistent evidence that the ban on officials' holding concurrent posts in firms issued by the government in 2014 has not been strictly enforced with lower administrative level officials. Table A2 shows that the average overborrowing levels from 2012 to 2018 are 0.0547, 0.0547, 0.0497, 0.0481, 0.0475, 0.0463 and 0.0441, respectively, which means that the overall overborrowing for Chinese listed companies shows a gradual downward trend. In addition, the average percentage of overborrowing for SOEs is 0.07, while it is 0.04 for non-SOEs, which indicates

that SOEs' overborrowing is significantly higher than that of non-SOEs. These results lend additional support to our conjecture that overborrowing is associated with ownership attributes and closer with lower political connections relative to firms' economic factors. Moreover, multicollinearity was diagnosed by examining the variance inflation factors (VIFs) for the predictors (See Table A3). The VIF values for the predictors, all substantially lower than the rule-of-thumb cutoff of 10 [104], revealed that multicollinearity is not a problem in this study.

4.2. Regression Analysis

The empirical test of this study comprises three steps. The first step is to calculate the annual overborrowing level for each firm by the residual of Model (1). The result of the regression analyses regarding the bank loans is shown in Table 2. Regarding the explanatory capability of model (1), the chi-squared test of fitting degree is 0.402, which indicates a suitable model specification. In terms of the impact of independent variables, the level of share concentration (Herfindahl_3) is positively related to a firm's long-term bank loan (Loan). In other words, instead of a diversified ownership structure, high ownership concentration works for firms to obtain bank loans under the administrative-economic governance mode. Of course, this does not necessarily mean that the mixed ownership reform associated with ownership decentralization is ineffective.

Table 2. Regression results of Model (1).

Variable	Expected Symbol	(1) Loan
Cash _{it-1}	–	–0.009 ** (0.004)
Size _{it-1}	+	0.008 *** (0.001)
Lev _{it-1}	+	0.104 *** (0.004)
Liquid _{it-1}	+	0.060 *** (0.005)
ZJ _{it-1}	+	0.237 *** (0.013)
Roe _{it-1}	+	0.002 (0.002)
Growth _{it-1}	+	–0.000 *** (0.000)
Top1 _{it-1}	–	–0.046 *** (0.013)
Herfindahl_3 _{it-1}	–	0.048 *** (0.017)
Constant	?	–0.180 *** (0.013)
Year		yes
Ind		yes
Obs.		17,948
R-squared		0.402

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$.

The long-term trend (Figure 1) suggests that Chinese firms gradually improve the degree of diversification in ownership structure over the period of 2012–2018. Evidence also indicates that ownership decentralization does contribute to mitigating the potential expropriation by large investors of other investors and stakeholders in the firm [102]. However, existing large investors of SOEs can still expropriate substantial gains from the firms, resulting in severe agency costs. In addition, the coefficient for profitability and a firm's long-term bank loan is positive but not significantly (coefficient = 0.002); the growth capability is negatively related to the long-term bank loans of firms also. We can thus

deduce that banks have not fully considered the profitability and growth of firms in their loan-granting decisions.

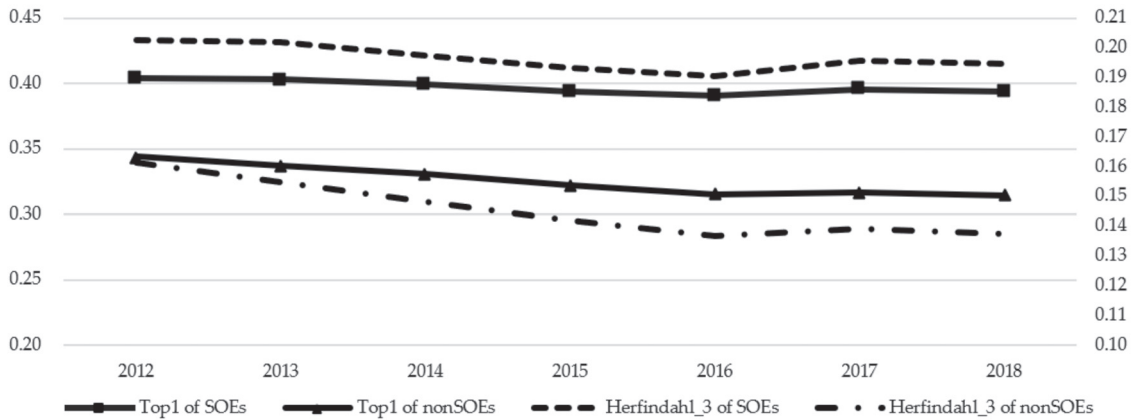


Figure 1. Ownership Structure of SOEs and non-SOEs (China, 2012–2018).

Secondly, according to econometric theory, the residual in Model (1) represents the long-term bank loan a firm obtains that cannot be explained by common economic factors. Therefore, it can be regarded as a measure of a firm's overborrowing. Considering the nature of overborrowing, only when the residual is greater than zero does firm overborrowing exist. Otherwise there is no overborrowing and Overloan is converted to zero correspondingly. Thirdly, the causal steps approach [105] is adopted to verify the mediating effect of overborrowing.

In the context of the current administrative-economic governance of state-owned commercial banks, firms may easily obtain access to a higher level of overborrowing owing to connections arising from being controlled by the same governmental stockholder, thus shrinking their innovation expenditure. If these four conditions described by Baron and Kenny (1986) are met, we can conclude that a mediation effect occurs. Additionally, we use the Sobel (1982) test to test the indirect effects of overborrowing on firm R&D intensity [106]. The Sobel test of significance assumes that the indirect effect of the independent variable is normally distributed, an assumption that may make this a conservative test [107]. The indirect effect is signified to be significant when the Sobel test Z value is significant (>1.96 or <-1.96) [108].

Hypothesis 1 suggests overborrowing mediates the relationship between state ownership and firm R&D expenditure. For the specification of the mediation link, we follow Baron and Kenny's (1986) procedure and find that all four steps are fulfilled (Table 3). A mediation effect exists if the coefficient of the direct path between the independent variable (state ownership) and the dependent variable (firm R&D intensity) is reduced when the indirect path via the mediator (overborrowing) is introduced in the model. In Step 4, the coefficient of state ownership is reduced and still significantly negative at the 1% level, suggesting a partial mediation role of overborrowing on the firm R&D intensity. The indirect effect ($\eta_1 \cdot \sigma_2$) the mediating variable overborrowing assumes approximately accounts for 5.12% of the inherent innovation efficiency loss. It means overborrowing essentially weakens the innovation capability of Chinese SOEs and would eventually defer their sustainable innovation. The results of the Sobel test in Table 3 also provide significant evidence of the existence of an indirect effect (as the Sobel Z values are significant: $Z < -1.96$) for the above model.

Table 3. The causal steps approach of overborrowing’s mediating effect.

Variable	Step 1 R&D_ratio	Step 2 Overloan	Step 3 R&D_ratio	Step 4 R&D_ratio
State	−0.620 *** (0.098)	0.009 *** (0.002)		−0.489 *** (0.109)
Governsci	23.921 *** (3.567)		20.248 *** (4.039)	20.291 *** (4.030)
Stock_incentive	1.492 *** (0.244)		2.806 *** (0.371)	2.417 *** (0.390)
Independent	1.058 (0.765)		1.234 (0.874)	1.131 (0.871)
Assign	0.281 *** (0.098)		0.401 *** (0.122)	0.335 *** (0.123)
Herfindahl_3	−1.550 *** (0.304)		−1.358 *** (0.353)	−1.243 *** (0.350)
Politic		0.003 (0.002)		
Occupy		0.060 (0.039)		
Market		−0.004 *** (0.001)		
Financeback		0.010 *** (0.003)		
Overloan			−3.637 *** (0.644)	−3.528 *** (0.642)
Constant	−3.163 *** (0.208)	0.030 *** (0.011)	−2.828 *** (0.238)	−2.748 *** (0.243)
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	7638	5658	5628	5619
R-squared	0.452	0.219	0.481	0.483
Sobel Test	Coef.	Std Err	Z	$p > Z $
Sobel	−0.3000	0.0368	−8.153	<0.001

Notes: Standard errors are in parentheses. *** $p < 0.01$.

4.3. Political Connections Moderating Mechanism

The specific empirical proxy for the political connection level is the administrative order of politically connected managers in the firm. By referring to past studies on firm political connections and based on Chinese administrative-economic governance characteristics [60,109], the chairman or CEO in listed companies is usually nominated by the larger shareholders and thus has relatively bigger decision-making power on the board, making their position suitable for testing the speculation of firm political connections. The information related to this variable was collected from the CSMAR database. The administrative order divides into eighteen categories according to the administrative level classification standard of CSMAR (See Appendix B).

The political connections mechanism test is carried out in the form of group regression. First, the samples are encoded into two groups according to the administrative level of the firm’s political connection. If a firm’s chairman or general manager has a political connection at or above the provincial level, it is classified as a “high” administrative level firm; otherwise, it is classified as a “low” level one. Then, the above causal steps approach regression is repeated for each group, respectively. From the regression results in Table 4, overborrowing only passes the mediating effect test in the low political connection level group. In other words, while the firm is at a lower political level, which corresponds to much stronger promotion incentives and weaker administrative supervision, the local government is more inclined to intervene in the firm’s access to bank loans through its impact on local commercial banks.

Table 4. Group test of moderating mechanisms.

Variable	Group Regressions Results of Political Connection Mechanism				Group Regressions Results of R&D Experience Mechanism						
	Low R&D_ratio	High R&D_ratio	Low Overloan	High Overloan	Low R&D_ratio	High R&D_ratio	Without R&D_ratio	With R&D_ratio	Without R&D_ratio	With R&D_ratio	
State	-0.636 (0.101)	-0.381 (0.729)	0.009 *** (0.002)	0.008 (0.008)	-0.513 *** (0.113)	-0.171 (0.814)	-0.664 ** (0.301)	0.027 *** (0.010)	-0.558 (1.004)	-0.260 (0.371)	-129,612 (403,319)
Overloan					-3.475 *** (6.342)	-13.565 ** (6.223)	-13.489 ** (6.223)			224.234 ** (80.847)	219,033 ** (84,098)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Obs.	7461	177	5500	158	5464	155	7589	5627	40	5588	40
R ² squared	0.451	0.658	0.218	0.611	0.479	0.687	0.448	0.217	0.943	0.477	0.821

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$.

To further test the equality of coefficients between two linear regressions across groups, the Chow Test [110] is performed. The Chow Test is to determine whether changes occurred between two regressions. More specifically, step 1 and step 2 are re-regressed with an inclusion of the interaction of independent variable State and moderating variable Dummy_pc (Dummy_pc equals to one if a firm's chairman or general manager has a political connection at or above the provincial level; otherwise, it equals to zero). Step 3 is re-regressed with an inclusion of the interaction of mediating variable Overloan and moderating variable Dummy_pc. Step 4 is re-regressed with an inclusion of the above two interactions. If the test determines that the coefficients of the interaction terms are significantly not equal to zero, this means there is significant evidence that a heterogeneous effect exists above and below that administrative break point. Observably, based on the interaction model, Table 5 Step 2 shows a significant effect of Dummy_pc on the relationship between State and Overloan (the coefficient of interaction Dummy_pc * State is negative and statistically significant at the 1% level). Thus, SOEs with a higher level of political connections tend to restrain the overall level of overborrowing. In particular, Table 5 Step 3 shows a higher level of political connection inversely moderates the negative effect of overborrowing on R&D expenditure. In other words, a positive political connection's moderating role is mainly reflected in the path of state ownership (X) to firm overborrowing (M).

Table 5. Chow test of political connections' moderating role.

Variable	Step 1 R&D_ratio	Step 2 Overloan	Step 3 R&D_ratio	Step 4 R&D_ratio
State	−0.012 (0.140)	0.012 *** (0.002)		−0.032 (0.155)
Overloan			−2.731 ** (1.127)	−2.661 ** (1.134)
Dummy_pc	0.365 *** (0.083)	−0.017 *** (0.001)	0.049 (0.096)	0.065 (0.098)
Dummy_pc * State	−0.720 *** (0.182)	−0.006 ** (0.003)		−0.508 ** (0.203)
Dummy_pc * Overloan			−9.424 *** (1.750)	−9.557 *** (1.782)
Other variables	yes	yes	yes	yes
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	7638	5658	5628	5619
Adjusted R-squared	0.528	0.388	0.555	0.556
Chow Test <i>p</i> value	0.000	0.000	0.000	0.000

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$.

4.4. Top Managers' R&D Functional Experience Moderating Mechanism

The top managers lead the company and have a significant impact on the company's financing decisions. As proposed above, the functional experience associated with R&D is closely related to the innovation decision of managers. R&D functional experience will provide the directors and top managers with expertise knowledge, increase team heterogeneity, and reduce shortsightedness, thus promoting the firm's innovation [69,75]. Therefore, we use the proxy whether the firm's chairman or general manager has an R&D background to signify its internal innovation profile. Top managers' functional background derives from the management resumes disclosed in the firm's annual report.

Similarly to the political connection level mechanism, in the examination of hypothesis 3, the samples are firstly encoded into two groups according to the functional background of the chairman or general manager. If a firm's chairman or general manager has a background in R&D in the past, it is classified as a sample with an R&D background and marked as "with". Otherwise, it is classified as a sample without an R&D background and marked as "without". Secondly, the causal steps approach regression is repeated for each

group, respectively. The results (Table 4) preliminarily show that overborrowing only has a mediating effect between state ownership and R&D expenditure in the group without R&D backgrounds. It suggests an R&D background helps mitigate the negative impact of SOEs' overborrowing on R&D investment intensity. This finding reinforces our contention that top managers' R&D functional experience plays an important governance role in reducing the innovation expenditure deficit in SOEs. However, the specific moderating path on which an R&D background acts needs to be further examined. Similarly, we further run the Chow test on the above causal regression. Step 1 and step 2 are re-regressed with an inclusion of the interaction of independent variable State and moderating variable Dummy_rdback (Dummy_rdback equals to one if a firm's chairman or general manager has a background in R&D; otherwise, it equals to zero). Step 3 is re-regressed with an inclusion of the interaction of mediating variable Overloan and moderating variable Dummy_rdback. Step 4 is re-regressed with an inclusion of both interactions. Table 6 Step 3 shows a significant effect of Dummy_rdback on the relationship between Overloan and R&D_ratio (the coefficient of interaction Dummy_rdback * Overloan is positive and statistically significant at the 1% level). This suggests that Dummy_rdback moderates the relationship between overborrowing (M) and firm R&D expenditure (Y). In other words, managers with R&D functional experience engage less in moral hazards such as abandoning innovative opportunities beneficial to firms. Our results, therefore, confirm the role of director human capital in promoting innovation. This result suggests that Hypothesis 3 is empirically supported.

Table 6. Chow test of R&D experience moderating role.

Variable	Step 1 R&D_ratio	Step 2 Overloan	Step 3 R&D_ratio	Step 4 R&D_ratio
State	−0.312 ** (0.144)	0.030 *** (0.008)		−0.101 (0.643)
Overloan			−2.499 ** (1.138)	−2.425 ** (1.139)
Dummy_rdback	4.247 *** (0.158)	−0.007 * (0.003)	2.229 *** (0.139)	2.829 *** (0.345)
Dummy_rdback * State	8.492 *** (0.509)	−0.149 (0.099)		19.370 * (10.179)
Dummy_rdback * Overloan			8.183 *** (3.095)	8.522 *** (3.102)
Other variables	yes	yes	yes	yes
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	7638	5658	5628	5628
Adjusted R-squared	0.589	0.535	0.662	0.662
Chow Test <i>p</i> value	0.000	0.112	0.000	0.000

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.5. Robustness Tests

To further validate the results and test their consistency, several robustness checks were performed. Our robustness test mainly relates to three concerns. Firstly, one concern exists about the appropriateness of a proxy for R&D investment intensity. Referring to the method of Kao and Chen (2020) [111], we firstly substitute the R&D investment intensity with the proportion of R&D expenses in total assets (See Table 7). Secondly, another concern involves how existing extreme observations may influence the accuracy of our estimations. Therefore, all continuous variables are once again winsorized by 5% instead of 1% (See Table 8). Thirdly, the last concern relates to improper designation for the omitted dependent variable. Considering the incompleteness of data, some firms' R&D investments maybe not be disclosed and are treated as omitted observations. For a large number of omitted observations, we cannot distinguish between zeros that represent a true zero level of R&D activity and zeros that were created by the statistical authorities because

no figures were recorded in the database. During the previous empirical process, these omitted observations are made to be zero. However, this designation may lead to an underestimation of coefficients. Therefore, we exclude these samples and carry out the regressions again (See Table 9). Overall the results were highly robust to these changes in specification.

Table 7. Variable Replacement test.

Variable	Step 1 R&D/Assets	Step 2 Overloan	Step 3 R&D/Assets	Step 4 R&D/Assets
State	−0.001 ** (0.001)	0.009 *** (0.002)		0.0002 (0.001)
Governsci	0.174 *** (0.016)		0.151 *** (0.018)	0.151 *** (0.018)
Stock_incentive	0.006 *** (0.001)		0.004 *** (0.001)	0.004 *** (0.001)
Independent	−0.007 * (0.004)		−0.001 (0.004)	−0.002 (0.004)
Assign	0.001 (0.000)		0.000 (0.001)	0.000 (0.001)
Herfindahl_3	−0.002 (0.002)		−0.003 (0.002)	−0.003 (0.002)
Politic		0.003 (0.002)		
Occupy		0.060 (0.039)		
Market		−0.004 *** (0.001)		
Financeback		0.010 *** (0.003)		
Overloan			−0.038 *** (0.004)	−0.039 *** (0.004)
Constant	−0.016 *** (0.001)	0.030 *** (0.011)	−0.013 *** (0.001)	−0.013 *** (0.001)
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	6252	5658	4444	4439
R-squared	0.344	0.219	0.367	0.368

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Additionally, we address endogeneity issues in our analysis by applying an instrumental variable approach. Specifically, we analyze whether our mediator variable is exogenous in model (3). A recent contribution proposes that firm innovation inversely increases the firm information environment overall, subsequently stimulating firms' access to financing [112]. There may exist a problem of mutual cause and effect between firm overborrowing and the R&D investment intensity. In addition, the Hausman test [113] for endogeneity also shows that there exists endogeneity in overborrowing. To alleviate the endogeneity problem, we carry out the 2SLS regression test [114]. We take the mean of industrial overborrowing as the instrument variable of a firm's overborrowing. It is correlated with the firm's overborrowing, whereas it is unlikely to be affected by the firm's R&D investment intensity, thus meeting the basic requirements of correlation and exogeneity of instrument variables. The under-identification test (Anderson LM statistic is 903.83, p value is 0.00) also reflects that the instrument variable is correlated with the endogenous variable. The weak ID test statistics (Cragg–Donald Wald F is 1075.54) are far beyond the 10% Stock–Yogo weak critical values of 16.38, further rejecting that the instrument is weak. Our results in Table 10 show that the mediator—overborrowing—does cause firm's R&D intensity to drop down significantly.

Table 8. Winsorize Test (5%).

Variable	Step 1 R&D_ratio	Step 2 Overloan	Step 3 R&D_ratio	Step 4 R&D_ratio
State	−0.530 *** (0.075)	0.009 *** (0.002)		−0.408 *** (0.082)
Governsci	18.994 *** (2.612)		15.418 *** (2.931)	15.373 *** (2.922)
Stock_incentive	1.561 *** (0.184)		2.672 *** (0.263)	2.340 *** (0.275)
Independent	0.811 (0.698)		1.370 * (0.812)	1.203 (0.810)
Assign	0.266 *** (0.071)		0.348 *** (0.086)	0.293 *** (0.087)
Herfindahl_3	−0.904 *** (0.279)		−0.799 ** (0.316)	−0.666 ** (0.316)
Politic		0.003 (0.002)		
Occupy		0.086 * (0.050)		
Market		−0.003 *** (0.001)		
Financeback		0.009 *** (0.002)		
Overloan			−4.315 *** (0.625)	−4.183 *** (0.624)
Constant	−2.928 *** (0.191)	0.023 *** (0.008)	−2.664 *** (0.217)	−2.598 *** (0.220)
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	7638	5658	5628	5619
R-squared	0.527	0.226	0.558	0.560

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9. Eliminating the default sample of R&D investment intensity.

Variable	Step 1 R&D_ratio	Step 2 Overloan	Step 3 R&D_ratio	Step 4 R&D_ratio
State	−0.722 *** (0.132)	0.015 *** (0.002)		−0.535 *** (0.151)
Governsci	23.708 *** (4.480)		22.581 *** (5.268)	22.369 *** (5.251)
Stock_incentive	1.041 *** (0.267)		2.303 *** (0.396)	1.899 *** (0.422)
Independent	1.808 * (0.944)		1.786 (1.122)	1.797 (1.120)
Assign	0.273 ** (0.113)		0.417 *** (0.146)	0.354 ** (0.146)
Herfindahl_3	−2.793 *** (0.412)		−2.798 *** (0.505)	−2.660 *** (0.500)
Politic		0.002 (0.002)		
Occupy		0.054 (0.044)		
Market		−0.002 * (0.001)		
Financeback		0.006 ** (0.003)		
Overloan			−3.763 *** (1.050)	−3.382 *** (1.053)
Constant	−3.633 *** (0.269)	0.039 *** (0.011)	−3.222 *** (0.304)	−3.167 *** (0.314)
Year	yes	yes	yes	yes
Ind	yes	yes	yes	yes
Obs.	6184	4416	4396	4391
R-squared	0.383	0.156	0.405	0.408

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10. 2 SLS Regression Results.

Variables	2SLS-Stage1		2SLS-Stage2	
	Overloan		R&D_ratio	
	Step 3	Step 4	Step 3	Step 4
State		0.00312 * (0.00178)		−0.500 *** (0.172)
Governsci	−0.299 *** (0.0528)	−0.296 *** (0.0528)	26.71 *** (5.177)	26.58 *** (5.105)
Stock_incentive	−0.0286 *** (0.00443)	−0.0258 *** (0.00469)	4.018 *** (0.456)	3.655 *** (0.464)
Independent	0.0359 *** (0.0133)	0.0365 *** (0.0133)	6.045 *** (1.284)	5.842 *** (1.267)
Assign	−0.00259 (0.00166)	−0.00196 (0.00169)	0.505 *** (0.161)	0.433 *** (0.161)
Herfindahl_3	0.00529 (0.00640)	0.00391 (0.00644)	−2.609 *** (0.621)	−2.434 *** (0.615)
IV2	0.965 *** (0.0280)	0.952 *** (0.0290)		
Overloan			−60.30 *** (2.796)	−58.00 *** (2.902)
Constant	−0.00423 *** (0.000741)	−0.00425 *** (0.000741)	−0.0377 (0.0719)	−0.0215 (0.0710)
Observations	5628	5619	5628	5619
R-squared	0.232	0.233		
IV F-stat			1192	1076
Durbin p			0.000	0.000
Under-identification test	Anderson LM statistic			903.83
	$\lambda^2(1)$ p value			0.00
Weak identification test	Cragg-Donald Wald F statistic			1075.55
	Stock-Yogo weak ID test critical value (10%)			16.38

Notes: Standard errors in parentheses. *** $p < 0.01$, * $p < 0.1$.

5. Discussion

The relationship between bank credit and firm innovation has perplexed scholars for a long time. Shahzad et al. (2021) found evidence of an inverted U-shaped relationship between debt financing and corporate innovation, which implies that firms undertaking excessive debts over an optimum debt point may be detrimental to firm innovation [42]. In this study, we refine Shahzad et al. (2021)'s work by identifying and measuring the amount of SOEs overborrowing under China's administrative-economic governance mode. We provide an explanation for SOEs insufficient R&D expenditure, taking into account the corporate governance in transition economies.

More specifically, the indulgence effect of overborrowing urges top managers in SOEs to give up valuable R&D investment opportunities and choose a relatively "safe" policy, lowering R&D expenditure. According to our estimates, SOEs' indulgence effect reduces firm R&D investment intensity by about 3.18 percentage points. Despite the indulgence effect in SOEs, we find higher level political connections and R&D functional experience help mitigate the risk aversion of managers. As shown in the moderating analysis, the improvement in monitoring associated with a higher level of political connections can efficiently reduce the overall overborrowing and alleviate the adverse effects of overborrowing. In addition, managers with relevant R&D functional experience can also make up for the disadvantages of SOEs' overborrowing, highlighting that managers' specific intellectual capital might be a priority in the corporate governance reform of SOEs.

Our findings contribute to a growing empirical literature on a firm's corporate governance in the following ways. Firstly, they expand the understanding of the debt governance

role for innovation in transition economies. Existing studies draw inconsistent conclusions about debt's role in firms' innovation [42,115]. Focusing on the interplay of internal and external governance under administrative-economic governance, we reveal and examine the potential governance mechanism of overborrowing between a firm's state ownership and R&D expenditure. Our research further provides one possible explanation of a firm's innovation investment insufficiency. Secondly, it contributes to the present studies on government intervention and its economic consequences. In addition to the problem of overinvestment documented within the extant literature [116,117], our study demonstrates an excessive debt channel through which government intervention has a significantly negative impact on firm innovation.

Our research, therefore, has some practical implications for SOEs to improve innovation by increasing the proportion of technological managers or directors and giving them more power on technical strategy and discretion on R&D spending. For example, SOEs can set a technology committee at the board level. As a counterpart, local firms need to further improve internal monitoring on the politically connected directors to better reduce the agency costs. The promotion assessment for local SOEs' officials should be comprehensive and sustainability-oriented. In addition, during promoting the innovation of SOEs, the reform of external governance (such as the board diversity and ownership diversification of banks) is also indispensable. In other words, restricting ineffectual intervention in financial institutions can help optimize R&D resource allocation, thereby improving firm innovation capacity.

This study could be viewed as a preliminary step in a comprehensive evaluation of how overborrowing affects the innovation of SOEs. It is indeed a preliminary research because our methodology directly estimates the firm's overborrowing by the residual of the OLS regression model. Alternative strategies of estimating the overborrowing of firms, either by focusing on the counter-cyclical character of discretionary fiscal policy made by the government, or by directly calculating the firm's position changes in commercial banks, would be highly complementary to this approach. In addition, except for overborrowing between SOEs and non-SOEs, whether and to what extent the overborrowing among SOEs and other types of firms (Privately Owned Enterprises, Collectively Owned Enterprises and Foreign-Invested Enterprises) influences firms' innovation still needs careful investigation and examination, which will allow a more efficient use of the available innovation resources across different types of firms.

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Appendix A

Table A1. Descriptive statistics of variables.

Variable	Total Sample			SOEs			Non-SOEs			t-Test Diff = Mean (SOEs)-Mean (Non-SOEs)
	N	Mean	St. Dev	N	Mean	St. Dev	N	Mean	St. Dev	
Loan	18,822	0.04	0.08	6511	0.07	0.10	12,311	0.03	0.06	34.31
Overloan	6907	0.05	0.06	2335	0.07	0.08	4572	0.04	0.05	18.98
State	18,822	0.35	0.48	-	-	-	-	-	-	-
Cash	18,822	0.18	0.13	6511	0.16	0.12	12,311	0.19	0.14	-15.71
Size	18,822	22.1	1.33	6511	22.81	1.43	12,311	21.75	1.11	56.36
Lev	18,822	0.42	0.27	6511	0.51	0.20	12,311	0.37	0.20	45.07
Liquid	18,822	0.22	0.17	6511	0.26	0.20	12,311	0.19	0.14	30.71
ZJ	18,822	0.04	0.06	6511	0.05	0.07	12,311	0.04	0.06	8.72
Roe	18,762	0.06	0.37	6481	0.05	0.24	12,281	0.07	0.42	-2.65
Growth	17,865	8.08	1007.21	6429	21.34	1678.81	11,436	0.63	18.66	1.32
Top1	18,822	0.35	0.15	6511	0.40	0.15	12,311	0.32	0.14	33.03
Herfindahl_3	18,822	0.16	0.12	6511	0.20	0.13	12,311	0.14	0.10	30.19
R&D_ratio	18,822	3.56	4.20	6511	1.99	3.02	12,311	4.39	4.49	-25.70
Governsci	15,553	0.03	0.01	-	-	-	-	-	-	-
Independent	18,820	0.38	0.05	6510	0.37	0.05	12,310	0.38	0.05	-7.11
Assign	18,609	0.28	0.45	6383	0.10	0.30	12,226	0.37	0.48	-41.51
Stock_incentive	18,822	0.11	0.18	6511	0.0038	0.02	12,311	0.17	0.20	-66.62
Politic	15,590	0.19	0.40	5553	0.16	0.36	10,037	0.21	0.41	-8.38
Layer *	4588	5.62	3.24	1372	5.90	3.21	3137	5.46	3.22	4.22
Occupy	18,822	0.02	0.02	6511	0.02	0.02	12,311	0.02	0.02	1.95
Market	15,553	5.80	0.84	5551	5.53	0.81	10,002	5.95	0.82	-30.88
Financeback	12,311	0.10	0.30	6511	0.08	0.27	12,311	0.10	0.30	-3.42

* Here, we only count the companies whose chairman of the board or general manager has political connection and its administrative level can be identified.

Table A2. Yearly descriptive statistics of overborrowing.

Year	N	Mean	St. Dev	P1	P99
2012	780	0.0547	0.0718	0.0003	0.3373
2013	857	0.0547	0.0715	0.0006	0.3453
2014	936	0.0497	0.0657	0.0006	0.3011
2015	970	0.0481	0.0615	0.0005	0.2754
2016	1021	0.0475	0.0640	0.0004	0.3064
2017	1103	0.0463	0.0595	0.0006	0.2959
2018	1240	0.0441	0.0578	0.0004	0.2784

Table A3. Variance inflation factors of variables.

Mode 1		Model 2		Model 3	
Variable	VIF	Variable	VIF	Variable	VIF
Cash _{it-1}	1.49	State	1.44	State	1.61
Size _{it-1}	1.71	Politic	1.04	Overloan	1.30
Lev _{it-1}	1.83	Occupy	1.12	Governsci	1.17
Liquid _{it-1}	1.82	Market	1.21	Stock_incentive	1.42
ZJ _{it-1}	1.15	Financeback	1.05	Independent	1.05
Roe _{it-1}	1.04			Assign	1.14
Growth _{it-1}	1.01			Herfindahl_3	1.15
Top1 _{it-1}	13.13				
Herfindahl_3 _{it-1}	13.62				
Mean VIF	2.60	Mean VIF	2.56	Mean VIF	2.54

Appendix B

According to the administrative level classification standard of CSMAR database, the political connections order of top managers is encoded into eighteen categories from top level to the lowest level. If the board chair or general manager currently or previously is a member of the government and the Chinese People's Political Consultative Conference (CPPCC), his or her political connection order is marked as follows: 01 indicates national leader, 02 indicates sub-national leader, 03 indicates provincial-ministerial level, 04 indicates sub-provincial level, 05 indicates bureau-director level, 06 indicates deputy-bureau-director level, 07 indicates division-head level, 08 indicates deputy-division-head level, 09 indicates section-head level, 10 indicates deputy-section-head level, 11 indicates inspector level, 12 indicates deputy-inspector level, 13 indicates investigator level, 14 indicates deputy-investigator level, 15 indicates section-chief level, 16 indicates deputy-section-chief level, 17 indicates staff member level, 18 indicates clerk level, and 98 means unable to identify the administrative level. In addition, if the board chair or general manager is a representative of the National People's Congress or the Party, 01 indicates the country level, 03 indicates the provincial level, 05 represents the municipal level, 07 indicates the county level, and 09 indicates the town level.

References

- Porter, M. Capital Disadvantage: America's Failing Capital Investment System. *Harv. Bus. Rev.* **1992**, *70*, 65–82. [[PubMed](#)]
- Aghaee, A.; Aghaee, M.; Fathi, M.R.; Shoa'Bin, S.; Sobhani, S.M. A novel fuzzy hybrid multi-criteria decision-making approach for evaluating maintenance strategies in petrochemical industry. *J. Qual. Maint. Eng.* **2021**, *27*, 351–365. [[CrossRef](#)]
- Safari, H.; Etezadi, S.; Moradi-Moghadam, M.; Fathi, M.R. Maturity evaluation of supply chain procedures by combining SCOR and PST models. *Int. J. Process. Manag. Benchmarking* **2021**, *11*, 707–724. [[CrossRef](#)]
- Jefferson, G.; Hu, G.Z.; Guan, X.J.; Yu, X.Y. Ownership, performance, and innovation in China's large- and medium-size industrial enterprise sector. *CER* **2003**, *14*, 89–113. [[CrossRef](#)]
- Shleifer, A.; Vishny, R. Politicians and Firms. *Q J. Econ.* **1994**, *109*, 995–1025. [[CrossRef](#)]
- Huang, H.Z.; Xu, C.G. Financial Institutions and the Financial Crisis in East Asia. *Eur Econ. Rev.* **1999**, *43*, 903–914. [[CrossRef](#)]
- Zhang, A.; Zhang, Y.; Zhao, R. A study of the R&D efficiency and productivity of Chinese firms. *J. Comp. Econ.* **2003**, *31*, 444–464.
- Le, T.V.; O'Brien, J.P. Can two wrongs make a right? State ownership and debt in a transition economy. *J. Manag. Stud.* **2010**, *47*, 1297–1316. [[CrossRef](#)]
- Chen, R.; El Ghoul, S.; Guedhami, O.; Nash, R. State Ownership and Corporate Cash Holdings. *J. Financ. Quant. Anal.* **2018**, *53*, 2293–2334. [[CrossRef](#)]
- Zhang, X.; Yu, M.; Chen, G. Does mixed-ownership reform improve SOEs' innovation? Evidence from state ownership. *CER* **2020**, *61*, 101450. [[CrossRef](#)]
- He, J.; Tian, X. Finance and Corporate Innovation: A Survey. *Asia-Pac. J. Financ. Stud.* **2018**, *47*, 165–212. [[CrossRef](#)]
- Wang, L.; Zhou, F.Z.; An, Y.B.; Yang, J. Corporate venture capital: Technological innovation or value creation? A comparative study of CVC- and IVC-invested Chinese listed companies. *Asian J. Technol. Innov.* **2019**, *27*, 257–279. [[CrossRef](#)]
- Blackwell, D.; Kidwell, D. An Investigation of Cost Differences Between Public Sales and Private Placements of Debt. *J. Financ. Econ.* **1988**, *22*, 253–278. [[CrossRef](#)]
- Krishnaswami, S.; Spindt, P.; Subramaniam, V. Information Asymmetry, Monitoring, and the Placement Structure of Corporate Debt. *J. Financ. Econ.* **1998**, *5*, 407–434. [[CrossRef](#)]
- Cull, R.; Xu, L.C. Who gets credit? The behavior of bureaucrats and state banks in allocating credit to Chinese state-owned enterprises. *J. Dev. Econ.* **2003**, *71*, 533–559. [[CrossRef](#)]
- Allen, F.; Qian, J.; Qian, M. Law, finance, and economic growth in China. *J. Financ. Econ.* **2005**, *77*, 57–116. [[CrossRef](#)]
- Hsieh, C.; Klenow, P.J. Misallocation and Manufacturing TFP in China and India. *Q J. Econ.* **2009**, *124*, 1403–1448. [[CrossRef](#)]
- Midrigan, V.; Xu, D.Y. Finance and Misallocation: Evidence from Plant Level Data. *Am. Econ. Rev.* **2014**, *104*, 422–458. [[CrossRef](#)]
- Demetriades, P.O.; Fattouh, B.A. Excess credit and the South Korean crisis. In *Domestic Resource Mobilization and Financial Development*; Mavrotas, G., Ed.; Palgrave Macmillan: London, UK, 2006; pp. 70–88.
- Mian, A.; Sufi, A.; Verner, E. Household Debt and Business Cycles Worldwide. *Q J. Econ.* **2017**, *132*, 1755–1817. [[CrossRef](#)]
- Goldeng, E.; Grünfeld, L.A.; Benito, G. The Performance Differential between Private and State-owned Enterprises: The Roles of Ownership, Management and Market Structure. *J. Manag. Stud.* **2008**, *45*, 1244–1273. [[CrossRef](#)]
- Netter, J.M.; Megginson, W.L. From state to market: A survey of empirical studies on privatization. *J. Econ. Lit.* **2001**, *39*, 321–389.
- Ge, Y.; Qiu, J. Financial development, bank discrimination and trade credit. *J. Bank Financ.* **2007**, *31*, 513–530. [[CrossRef](#)]
- Ryou, J.W.; Kim, T.J. Overborrowing and Overinvestment in East Asia: The Case of the Korean Firms. *Korean Econ. Rev.* **2003**, *19*, 327–346.
- Richardson, S. Over-Investment of Free Cash Flow. *Rev. Account. Stud.* **2006**, *11*, 159–189. [[CrossRef](#)]

26. Fan, J.P.H.; Wong, T.J.; Zhang, T. Institutions and Organizational Structure: The Case of State-Owned Corporate Pyramids. *J. Law Econ. Organ.* **2012**, *29*, 1217–1252. [CrossRef]
27. Amore, M.D.; Schneider, C.; Žaldokas, A. Credit Supply and Corporate Innovation. *J. Financ. Econ.* **2013**, *109*, 835–855. [CrossRef]
28. Zhou, B.; Huang, X.; Wu, X. Financial reform and innovation: Evidence from China's Financial Reform Pilot Zones. *Asian J. Technol. Innov.* **2022**, *30*, 1–19. [CrossRef]
29. Grossman, S.; Hart, O. Corporate Financial Structure and Managerial Incentives. In *The Economics of Information and Uncertainty*; McCall, J.J., Ed.; University of Chicago Press: Chicago, IL, USA, 1982; pp. 107–140.
30. Jensen, M.C. Agency Costs of the Free Cash Flow. *Am. Econ. Rev.* **1986**, *76*, 323–329.
31. Jensen, M.C. The Modern Industrial Revolution, Exit, and The Failure of Internal Control Systems. *J. Financ.* **1993**, *48*, 831–880. [CrossRef]
32. Hart, O.; Moore, J. Debt and seniority: An Analysis of The Role of Hard Claims in Constraining Management. *Am. Econ. Rev.* **1995**, *85*, 567–585.
33. Shleifer, A.; Vishny, R. A Survey of Corporate Governance. *J. Financ.* **1997**, *52*, 737–783. [CrossRef]
34. Armstrong, C.S.; Guay, W.R.; Weber, J.P. The Role of Information and Financial Reporting in Corporate Governance and Contracting. *J. Account. Econ.* **2010**, *50*, 179–234. [CrossRef]
35. Jensen, M.C.; Meckling, W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [CrossRef]
36. Myers, S.C. Determinants of corporate borrowing. *J. Financ. Econ.* **1977**, *5*, 147–175. [CrossRef]
37. Myers, S.C.; Majluf, N.S. Corporate financing and investment decisions when firms have information that investors do not have. *J. Financ. Econ.* **1984**, *13*, 187–221. [CrossRef]
38. Hoshi, T.; Kashyap, A.; Scharfstein, D. Corporate Structure, Liquidity, and Investment: Evidence From Japanese Industrial Groups. *Q. J. Econ.* **1991**, *106*, 33–60. [CrossRef]
39. Lee, N.; Lee, J. External Financing, R&D Intensity, and Firm Value in Biotechnology Companies. *Sustainability* **2019**, *11*, 4141.
40. Friend, I.; Lang, L. An Empirical Test of the Impact of Managerial Self-Interest on Corporate Capital Structure. *J. Financ.* **1988**, *43*, 271–281. [CrossRef]
41. Choi, B.; Kumar, M.V.S.; Zambuto, F. Capital Structure and Innovation Trajectory: The Role of Debt in Balancing Exploration and Exploitation. *Organ. Sci.* **2016**, *27*, 1183–1201. [CrossRef]
42. Shahzad, U.; Luo, F.; Liu, J. Debt financing and technology investment Kuznets curve: Evidence from China. *Int. J. Financ. Econ.* **2021**, *26*, 1–15. [CrossRef]
43. Gryglewicz, S.; Mayer, S. Delegated Monitoring and Contracting. *SSRN Electron. J.* **2018**. Available online: <https://ssrn.com/abstract=3175528> (accessed on 6 October 2022). [CrossRef]
44. Fan, J.P.H.; Wei, K.C.J.; Xu, X. Corporate finance and governance in emerging markets: A selective review and an agenda for future research. *J. Corp. Financ.* **2011**, *17*, 207–214. [CrossRef]
45. Piotroski, J.D.; Zhang, T. Politicians and the IPO decision: The impact of impending political promotions on IPO activity in China. *J. Financ. Econ.* **2014**, *111*, 111–136. [CrossRef]
46. Wong, T.J. Corporate Governance Research on Listed Firms in China: Institutions, Governance and Accountability. *Found. Trends Account.* **2016**, *9*, 259–326. [CrossRef]
47. Baxter, L.G. Capture in Financial Regulation: Can We Channel it Toward the Common Good? *Cornell. J. Law Public Policy* **2011**, *21*, 175–200.
48. Dinc, S. Politicians and Banks: Political Influences on Government-Owned Banks in Emerging Markets. *J. Financ. Econ.* **2005**, *77*, 453–479. [CrossRef]
49. Fan, J.P.H.; Rui, O.M.; Zhao, M. Public governance and corporate finance: Evidence from corruption cases. *J. Comp. Econ.* **2008**, *36*, 343–364. [CrossRef]
50. Alchian, A.A.; Demsetz, H. Production, Information Costs, and Economic Organization. *Am. Econ. Rev.* **1972**, *62*, 777–795.
51. Holmstrom, B. Agency Costs and Innovation. *J. Econ. Behav. Organ.* **1989**, *12*, 305–327. [CrossRef]
52. Kerr, W.R.; Nanda, R. Financing Innovation. *Annu. Rev. Financ. Econ.* **2015**, *7*, 445–462. [CrossRef]
53. La Porta, R.; Lopez-De-Silanes, F.; Shleifer, A.; Vishny, R. Investor Protection and Corporate Valuation. *J. Financ.* **2002**, *LVII*, 1147–1170. [CrossRef]
54. Malitz, I. On Financial Contracting: The Determinants of Bond Covenants. *Financ. Manag.* **1986**, *15*, 18–25. [CrossRef]
55. De Haan, J.; Vlahu, R. Corporate governance of banks: A survey. *J. Econ. Surv.* **2016**, *30*, 228–277. [CrossRef]
56. Hopt, K.J. Corporate Governance of Banks and Financial Institutions: Economic Theory, Supervisory Practice, Evidence and Policy. *Eur. Bus. Organ. Law Rev.* **2021**, *22*, 13–37. [CrossRef]
57. He, L.; Wan, H.; Zhou, X. How Are Political Connections Valued in China? Evidence from Market Reaction to CEO Succession. *Int. Rev. Financ. Anal.* **2014**, *36*, 141–152. [CrossRef]
58. Degl'Innocenti, M.; Frigerio, M.; Zhou, S. Development banks and the syndicate structure: Evidence from a world sample. *J. Empir. Financ.* **2021**, *66*, 99–120. [CrossRef]
59. Houston, J.F.; Jiang, L.; Chen, L.; Ma, Y. Political Connections and the Cost of Bank Loans. *J. Account. Res.* **2014**, *52*, 193–243. [CrossRef]
60. Faccio, M. Politically Connected Firms. *Am. Econ. Rev.* **2006**, *96*, 369–386. [CrossRef]

61. Goldman, E.; Rocholl, J.; So, J. Politically Connected Boards of Directors and The Allocation of Procurement Contracts. *Rev. Financ.* **2013**, *17*, 1617–1648. [[CrossRef](#)]
62. Correia, M.M. Political Connections and SEC Enforcement. *J. Account. Econ.* **2014**, *57*, 241–262. [[CrossRef](#)]
63. Claessens, S.; Laeven, L.; Feijen, E. Political Connections and Preferential Access to Finance: The Role of Campaign Contributions. *J. Financ. Econ.* **2008**, *88*, 554–580. [[CrossRef](#)]
64. Bliss, M.; Gul, F. Political connection and cost of debt: Some Malaysian evidence. *J. Bank. Financ.* **2012**, *36*, 1520–1527. [[CrossRef](#)]
65. La Porta, R.; Lopez-De-Silanes, F.; Shleifer, A. Government Ownership of Banks. *J. Financ.* **2002**, *57*, 265–301. [[CrossRef](#)]
66. Lazear, E.P.; Rosen, S. Rank order tournaments as an optimum labor contract. *J. Polit. Econ.* **1981**, *89*, 841–864. [[CrossRef](#)]
67. Jia, N.; Tian, X.; Zhang, W. The Real Effects of Tournament Incentives: The Case of Firm Innovation. Kelley School of Business Research Paper No. 16–21. 2016. Available online: <https://ssrn.com/abstract=2732911> (accessed on 6 May 2022).
68. Xu, M.; Kong, G.; Kong, D. Does wage justice hamper creativity? Pay gap and firm innovation in China. *China Econ. Rev.* **2017**, *44*, 186–202. [[CrossRef](#)]
69. Barker, V.L.; Mueller, G.C. CEO Characteristics and Firm R&D Spending. *Manag. Sci.* **2002**, *48*, 782–801.
70. Hamza, F.; Gamra, S.; Dawood, A. The impact of CEO characteristics on firm innovation: Evidence from Saudi Arabia. *Uncertain Supply Chain Manag.* **2020**, *8*, 911–921.
71. Dearborn, D.C.; Simon, H.A. Selective Perception: A Note on the Departmental Identifications of Executives. *Sociometry* **1958**, *21*, 140–144. [[CrossRef](#)]
72. Hambrick, D.C.; Mason, P.A. Upper Echelons: The Organization as a Reflection of its Top Managers. *Acad. Manag. Rev.* **1984**, *9*, 193–206. [[CrossRef](#)]
73. Bantel, K.A.; Jackson, S.E. Top Management and Innovations in Banking: Does The Composition of The Top Team Make A Difference? *Strateg. Manag. J.* **1989**, *10*, 107–124. [[CrossRef](#)]
74. Cohen, W.; Levinthal, D.A. Absorptive capacity: A new perspective on learning and innovation. *Adm. Sci. Q.* **1990**, *35*, 128–152. [[CrossRef](#)]
75. Zhou, J.; Qin, R.; Wang, X.; Wang, S. Does directors' innovation experience promote firm innovation? Evidence from China. *Knowl. Manag. Res. Pract.* **2021**, *19*, 1–14. [[CrossRef](#)]
76. Grossman, S.; Hart, O. The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *J. Polit. Econ.* **1986**, *94*, 691–719. [[CrossRef](#)]
77. Hart, O.; Moore, J. Property Rights and the Nature of the Firm. *J. Polit. Econ.* **1990**, *98*, 1119–1158. [[CrossRef](#)]
78. Aghion, P.; Tirole, J. The Management of Innovation. *Q. J. Econ.* **1994**, *109*, 1185–1209. [[CrossRef](#)]
79. Canarella, G.; Miller, S.M. Firm Size, Corporate Debt, R&D Activity, and Agency Costs: Exploring Dynamic and Non-Linear Effects. *J. Econ. Asymmetries* **2022**, *25*, e00233.
80. Williamson, O.E. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*; The Free Press: New York, NY, USA, 1985.
81. Santarelli, E. Asset Specificity, R&D Financing, and The Signalling Properties of The Firm's Financial Structure. *Econ. Innov. New Tech.* **1991**, *1*, 279–294.
82. Hall, B.; Lerner, J. The financing of R&D and innovation. In *Handbook of the Economics of Innovation*; Hall, B., Rosenberg, N., Eds.; North-Holland: Amsterdam, The Netherlands, 2010; pp. 609–639.
83. Zheng, F.; Jiao, H.; Gu, J.; Moon, H.-C.; Yin, W. The impact of knowledge flows on asset specificity from the perspective of open innovation. *J. Knowl. Manag.* **2021**, *26*, 548–573. [[CrossRef](#)]
84. Rajabpour, E.; Fathi, M.R.; Torabi, M. Analysis of factors affecting the implementation of green human resource management using a hybrid fuzzy AHP and type-2 fuzzy DEMATEL approach. *Environ. Sci. Pollut. Res.* **2022**, *29*, 48720–48735. [[CrossRef](#)]
85. Andreou, A.N.; Bontis, N. A model for resource allocation using operational knowledge assets. *Learn. Organ.* **2007**, *14*, 345–374. [[CrossRef](#)]
86. Hackbarth, D. Determinants of corporate borrowing: A behavioral perspective. *J. Corp. Financ.* **2009**, *15*, 389–411. [[CrossRef](#)]
87. Ghouma, H.; Ben-Nasr, H.; Yan, R. Corporate governance and cost of debt financing: Empirical evidence from Canada. *Q. Rev. Econ. Financ.* **2018**, *67*, 138–148. [[CrossRef](#)]
88. Berger, A.; Udell, G. A more complete conceptual framework for SME finance. *J. Bank Financ.* **2006**, *30*, 2945–2966. [[CrossRef](#)]
89. Flannery, M.J.; Rangan, K.P. Partial Adjustment toward Target Capital Structure. *J. Financ. Econ.* **2006**, *79*, 469–506. [[CrossRef](#)]
90. Ghosh, A.; Moon, D. Corporate Debt Financing and Earnings Quality. *J. Bus. Financ. Account.* **2009**, *37*, 538–559. [[CrossRef](#)]
91. Baysinger, B.; Hoskisson, R.E. Diversification Strategy and R&D Intensity in Multiproduct Firms. *Acad. Manag. J.* **1989**, *32*, 310–332.
92. Jelinek, K.; Stuerke, P.S. The Nonlinear Relation Between Agency Costs and Managerial Equity Ownership: Evidence of Decreasing Benefits of Increasing Ownership. *Int. J. Manag. Financ.* **2009**, *5*, 156–178. [[CrossRef](#)]
93. Li, W.; Wang, L.; Meng, Q. Chinese state-owned enterprise administrative-economic governance: Mode and agenda. *Financ. Manag. Res.* **2019**, *1*, 7–12.
94. Li, W. Corporate governance evaluation of Chinese listed companies. *Nankai Bus. Rev. Int.* **2018**, *9*, 437–456. [[CrossRef](#)]
95. Andrianova, S.; Demetriades, P.; Shortland, A. Government Ownership of Banks, Institutions, and Financial Development. *J. Dev. Econ.* **2008**, *85*, 218–252. [[CrossRef](#)]
96. Petersen, M.A.; Rajan, R.G. The Benefits of Lending Relationships: Evidence From Small Business Data. *J. Financ.* **1994**, *49*, 3–37. [[CrossRef](#)]

97. La Porta, R.; Lopez-De-Silanes, F.; Shleifer, A. Corporate Ownership Around the World. *J. Financ.* **1999**, *54*, 471–517. [[CrossRef](#)]
98. Faccio, M.; Lang, L.H.P. The ultimate ownership of Western European corporations. *J. Financ. Econ.* **2002**, *65*, 365–395. [[CrossRef](#)]
99. Anderson, R.C.; Mansi, S.A.; Reeb, D.M. Board characteristics, accounting report integrity, and the cost of debt. *J. Account. Econ.* **2004**, *37*, 315–342. [[CrossRef](#)]
100. Bigelli, M.; Mengoli, S. Sub-Optimal Acquisition Decisions under a Majority Shareholder System. *J. Manag. Gov.* **2004**, *8*, 373–405. [[CrossRef](#)]
101. Armstrong, C.S.; Vashishtha, R. Executive Stock Options, Differential Risk-taking Incentives, and Firm Value. *J. Financ. Econ.* **2012**, *104*, 70–88. [[CrossRef](#)]
102. Ben-Nasr, H.; Boubaker, S.; Rouatbi, W. Ownership structure, control contestability, and corporate debt maturity. *J. Corp. Financ.* **2015**, *35*, 265–285. [[CrossRef](#)]
103. Grosman, A.; Okhmatovskiy, I.; Wright, M. State Control and Corporate Governance in Transition Economies: 25 Years on from 1989. *Corp. Gov. Int. Rev.* **2016**, *24*, 200–221. [[CrossRef](#)]
104. Kutner, M.H.; Nachtsheim, C.J.; Neter, J.; Li, W. *Applied Linear Statistical Models*; McGraw-Hill: Irwin, PA, USA, 1991.
105. Baron, R.M.; Kenny, D.A. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* **1986**, *51*, 1173–1182. [[CrossRef](#)]
106. Sobel, M.E. Asymptotic confidence intervals for indirect effects in structural equation models. *Sociol. Methodol.* **1982**, *13*, 290–312. [[CrossRef](#)]
107. MacKinnon, D.P.; Warsi, G.; Dwyer, J.H. A simulation study of mediated effect measures. *Multivar. Behav. Res.* **1995**, *30*, 41. [[CrossRef](#)] [[PubMed](#)]
108. Rodriguez, A.; Nieto, M.J. Does R&D offshoring lead to SME growth? Different governance modes and the mediating role of innovation. *Strat. Manag. J.* **2016**, *37*, 1734–1753.
109. Chen, C.J.P.; Li, Z.Q.; Su, X.J.; Sun, Z. Rent-seeking incentives, corporate political connections, and the control structure of private firms: Chinese evidence. *J. Corp. Financ.* **2011**, *17*, 229–243. [[CrossRef](#)]
110. Chow, G. Tests of Equality Between Two Sets of Coefficients in Two Linear Regressions. *Econometrica* **1960**, *28*, 591–605. [[CrossRef](#)]
111. Kao, L.; Chen, A. CEO characteristics and R&D expenditure of IPOs in emerging markets: Evidence from Taiwan. *Asia Pac. Manag. Rev.* **2020**, *25*, 189–197.
112. Saidi, F.; Žaldokas, A. How Does Firms' Innovation Disclosure Affect Their Banking Relationships? *Manag. Sci.* **2020**, *67*, 742–768. [[CrossRef](#)]
113. Hausman, J.A. Specification Tests in Econometrics. *Econometrica* **1978**, *46*, 1251–1271. [[CrossRef](#)]
114. Romer, P.M. Endogenous Technological Change. *J. Political. Econ.* **1990**, *98*, S71–S102. [[CrossRef](#)]
115. Czarnitzki, D.; Kraft, K. Capital Control, Debt Financing and Innovative Activity. *J. Econ. Behav. Organ.* **2009**, *71*, 372–383. [[CrossRef](#)]
116. Firth, M.; Malatesta, P.H.; Xin, Q.; Xu, L. Corporate Investment, Government Control, and Financing Channels: Evidence from China's Listed Companies. *J. Corp. Financ.* **2012**, *18*, 433–450. [[CrossRef](#)]
117. Hao, Y.; Lu, J. The Impact of Government Intervention on Corporate Investment Allocations and Efficiency: Evidence from China. *Financ. Manag.* **2018**, *47*, 383–419. [[CrossRef](#)]

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Article

Corporate Social Responsibility and Innovation Input: An Empirical Study Based on Propensity Score-Matching and Quantile Models

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Abstract: Social responsibility performance and innovation investment are two important aspects of corporate strategy, and there is no consensus as to whether they are competing or complementary goals in an enterprise. Using propensity score-matching, ordinary least squares, and quantile regression, the study shows that the voluntary disclosure of social responsibility by enterprises will increase innovation investment. In other words, corporate social responsibility has a significant positive impact on innovation and investment; however, with the increase in enterprise innovation investment, this impact gradually weakens.

Keywords: corporate social responsibility; innovation input; tendency score-matching; quantile regression

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1. Introduction

Innovation-driven development strategies have become the guiding principle of business enterprises in many areas of China. For the business community, striving to turn technological innovation into a new driver for sustainable development is an important strategic option for firms wishing to gain a competitive advantage [1,2]. At the same time, the academic community has also conducted in-depth discussions on enterprise innovation investment. In general, such research mainly revolves around two main lines: one is the relationship between innovation investment and firm performance, and most existing studies have reached a relatively consistent conclusion on this, believing that the two have a positive relationship [3]; the second concerns the influencing factors of enterprise innovation investment [4], regarding which scholars have carried out exploratory analyses from different perspectives. For example, Paik and Woo (2017) [5] focused on the impact of a company's venture capital, founder's responsibilities, etc. on R&D investment strategies, while Pan et al. (2021) [6] discussed the heterogeneous impacts of carbon dioxide emission reduction policies on innovation investment, from the perspective of corporate ownership.

Meanwhile, corporate social responsibility (CSR) and corporate performance also garnered significant attention. In their seminal work on CSR, McWilliams and Siegel (2000) [7] found that the omission of innovation input variables was an important reason for the inconsistencies between CSR and corporate performance in the existing literature; they revealed a possible positive relationship between CSR and innovation investment, from the perspective of corporate strategy theory. Since then, some scholars have emphasized the potentially positive role of CSR in stimulating corporate product innovation [8], but they have yet to conduct an empirical analysis of the relationship between the two. In

recent years, some empirical studies have emerged, but there is still no consensus on the relationship between corporate social responsibility and innovation investment [9–12].

For example, Gallego-Álvarez et al. (2011) [13] conducted a two-way discussion on CSR and innovation investment, based on the resource-based theory, and found that these two types of corporate decision-making showed a negative relationship. Subsequently, Bocquet et al. (2013) [14] used a questionnaire method to investigate Luxembourg companies; they divided CSR into its strategic and responsive dimensions to test their respective relationships with research and development (R&D) innovation. The results show that the performance of corporate strategic social responsibility has a positive impact on the innovation of products and processes, while responsive social responsibility hinders the R&D of enterprises. Bocquet et al. (2019) [14] further showed that implementing strategic CSR via nationality diversity led to technological innovations among small- and medium-sized enterprises. Luo and Du (2015) [15] enabled an enterprise to enhance its relationship with its stakeholders; this relationship helped facilitate the exchange of knowledge between the two parties, which led to further R&D investment and stronger innovation.

The inconsistent findings in past empirical research studies may be due to the macroeconomic conditions and other factors of the countries of the enterprises studied, as well as model selection. Most studies have been conducted on enterprises outside China [13,16,17]. In contrast, the empirical literature on the direct role of CSR regarding innovation investment in China is relatively rare, and most of the CSR indicators in similar studies use individually selected financial indicators, which lack the necessary persuasiveness and universality. On the other hand, from a practical point of view, enterprises need to obtain various factors of production from society; therefore, establishing explicit or implicit contracts with resource providers (stakeholders) is inevitable, besides meeting the consumers' expectations [18–20]. In order to obtain continuous support from stakeholders and consumers, enterprises must strive to meet their demands for product and service quality and for corporate engagement in social and environmental causes [21–23]. At the same time, increasing the intensity of innovation investment, enhancing the product or service quality, improving enterprise competitiveness, and obtaining the recognition of consumers are the ultimate goals for the existence and growth of enterprises [24,25]. Therefore, social responsibility and innovation investment are important parts of the strategic framework of enterprises [26]; in light of their limited resources and financial constraints, enterprises must balance their decisions between pursuing CSR, to foster good will and attract external support, and focusing on research and development to enhance the enterprise's competitiveness. Should an enterprise rely on a social responsibility strategy via the active fulfillment of social responsibility, in exchange for stakeholders' support, and then create a harmonious environment for enterprise development? Alternatively, should an enterprise rely on a high-risk, high-reward innovation-driven strategy to foster product competitiveness? Should it pursue both social responsibility and innovation?

In view of the current theoretical research background and the empirical questions of current enterprise practice, this paper first uses the propensity score-matching method to test the impact of the voluntary disclosure of social responsibility information on innovation investment because "voluntary disclosure" is a decision-making arrangement of enterprises that is based on certain factors, rather than the result of random behavior. The use of ordinary regression methods is prone to a resulting bias, while the propensity score-matching method can be solved effectively, based on the "counterfactual" research framework. In addition, regarding the sample of "voluntary disclosure" and taking the relatively authoritative Runling Social Responsibility Rating index as the proxy variable of corporate social responsibility, this paper uses the ordinary least squares (OLS) method and the quantile regression model to explore the impact of social responsibility performance on innovation investment. The OLS model is limited to examining the impact of CSR performance on the mean value of innovation input, while the quantile model can further analyze the marginal effect of social responsibility performance at the main quantiles of innovation input. In summary, the improvement of research methods may be beneficial

for discussion of the relationship between CSR and innovation input so as to facilitate the conclusion of more accurate and reliable research conclusions, in order to bring useful enlightenment to strategic decisions on topics such as corporate social responsibility and innovation investment.

2. Theoretical Analysis and Hypothesis

2.1. Voluntary Release of a Social Responsibility Report and Corporate Social Responsibility

Since the middle and late 1970s, Western enterprises have reported information such as employee development and corporate environmental initiatives, in addition to disclosing their financial situation, showing the rudiments of enterprises publishing social responsibility information. Guthrie and Parker (1989) [27] wrote that in the early 1980s, the Australian Broken Hill Proprietary Company not only disclosed its financial data but also information on employee development and community involvement in its annual report; it began to pay attention to the performance of corporate social responsibility. Due to the sluggish development of China's capital market, an imperfect market mechanism, the non-standard supervision system during the economic transition period, and the general lack of public awareness of CSR, all sectors of society had mostly ignored the disclosure of social responsibility information for many years [28,29]. At the turn of the century, however, China's business and academic circles began to pay attention to this issue. The Shenzhen Stock Exchange, Shanghai Stock Exchange, state-owned Assets Supervision and Administration Commission of the State Council (SASAC), and other government departments have successively given more specific guidance and suggestions on the disclosure content, form, and mechanism of CSR reports. Since then, increasingly more publicly listed companies have begun to pay attention to the disclosure of social responsibility information.

At present, social responsibility reports have become a link between enterprises and stakeholders and are also a comprehensive embodiment of CSR [30]. The releases of social responsibility, especially voluntary releases, can show the outside world the efforts made by enterprises in social causes, and highlight to stakeholders the responsibility of enterprises and the enterprise's intent to contribute to societal goals. At the same time, studies have shown that the disclosure of information such as social responsibility (environmental responsibility) represents the degree of fulfillment of the corresponding responsibilities of enterprises [31].

2.2. CSR and Innovation Input, according to the Viewpoint of Stakeholder Theory

According to stakeholder theory, enterprises must not only assume responsibility to internal stakeholders such as shareholders and employees but also fulfill their responsibilities to external stakeholders, such as consumers, suppliers, creditors, governments, communities, and the general public. The demand for responsibility from internal and external stakeholders constitutes internal pressure for enterprises to increase their investment in innovation. Specifically, this includes the care taken by enterprises to support their employees by creating a safe and tidy working environment and a comfortable working atmosphere [32,33]; however, taking responsibility for shareholders, creditors, and suppliers means that enterprises must continue to enhance their competitiveness and profitability as a necessary assurance of stakeholders' interests. This responsibility to the government, the community, and the general public requires enterprises to adopt new, environmentally friendly, and cleaner production operations, and to continuously improve in terms of reducing pollution emissions and strengthening waste recycling. In a market with intense competition, this is necessary in order to avoid consumers "voting with their feet" [34].

In other words, CSR is instrumental in fostering and strengthening the relationships between firms and their stakeholders, and such strong relationships, in turn, enable firms to leverage the pool of external knowledge among their stakeholder networks, including their customers. In fact, consumers are the direct audience of enterprise products or services; their perceptions and expectations of products could influence the outcomes of a firm's performance [35]. For example, a consumer's "warmth and perceptions" about a firm are

influenced by the firm's CSR efforts and initiatives [35]. A firm's CSR efforts help personify the image of the firm, draw consumers toward the products or services, and even identify with the firm's CSR positions [35,36]. Consumer feedback and insights are conducive to enterprise innovation as they convey information on market preferences, trends, and potential needs [37]. Possessing external market knowledge and information is key to broadening the firm's knowledge base and supporting new product development [15].

In addition, they will also actively explore the development and supply of new materials, such as for energy conservation and environmental protection, and even participate in early product design in enterprises. The government and the public can express their own demands to the enterprise before a product is launched, to avoid an embarrassing situation regarding complaints after the product has been launched. The biggest reward to the employees of an enterprise is mainly reflected in the sense of ownership [32,33] and high enthusiasm for participating in product development and process updates. The above favorable conditions will induce enterprises to carry out and strengthen their innovation activities. Furthermore, the network of shareholders and creditors may not only help enterprises via knowledge and information-sharing but also provide necessary financial support for enterprises to develop and innovate [15,35].

Additionally, the fulfillment of social responsibility can help enterprises to burnish their images and generate goodwill. As an important intangible asset of an enterprise, reputation takes a long time to build, but it is very easily ruined and can be lost in a short time due to "careless moves" [38]. Based on this finding, companies with excellent social responsibility performance can send a positive message to the market and are more likely to attract potential consumers. The favor of the market has become an inexhaustible driving force for enterprises wishing to maintain this virtuous circle and competitive advantage, which is conducive to encouraging enterprises to continue to innovate and produce more high-quality and inexpensive products. The promotion of the R&D innovation of enterprises has also become an important path for CSR to create business value [39]. Based on the above analysis, this study examines the following hypotheses:

H1: *Compared with enterprises that do not publish social responsibility reports, enterprises that voluntarily publish them make a greater investment in innovation.*

H2: *For companies that voluntarily disclose their social responsibility reports, the more active the social responsibility performance, the higher the investment in innovation.*

The resource-based theory points out that fulfilling social responsibilities and implementing innovative activities are the key options for enterprises to achieve differentiated operations. Companies can focus their limited resources on social responsibility, or they can focus on R&D innovation or other channels. For enterprises with high investment in innovation and more successful R&D activities, the high-quality products (services) that they provide to the market give them a competitive edge over their competitors in the same industry. According to the empirical evidence presented by Hull and Rothenburg (2007) [27], the impact of social responsibility performance on the performance of innovation-active enterprises is weaker than on those with low innovation levels. Following the resource-based theory, the following hypothesis is formulated:

H3a: *Based on the resource-based view, with the increase in innovation investment, the impact of social responsibility performance on an enterprise's innovation investment gradually weakens.*

That means that if H3a were true, one would expect the effect of social responsibility performance on innovation investment to be smaller for enterprises with low innovation investments, and larger for those enterprises with high innovation investments.

Conversely, the knowledge-based theory and organizational learning theory give a diametrically opposite view. From the perspective of knowledge-learning processes, such as enterprise knowledge acquisition, identification, absorption, and transformation, we can

explain the driving effect of innovation investment intensity on enterprise learning ability. Because of investment activity that promotes technological progress [40], enterprises will accumulate successful experience and cultivate the necessary R&D skills and innovation awareness via this kind of practice. Even if the innovative project fails, companies can learn from it to avoid similar mistakes in subsequent R&D innovations. This means that innovation activities improve the learning ability of enterprises. Cohen and Levinthal (1990) [41] pointed out that enterprises with high R&D investment are more likely to absorb and utilize external knowledge because they have certain technical reserves and knowledge reserves. Social responsibility provides opportunities for companies to carry out innovative activities [42]. High-innovation enterprises are more capable of acquiring and identifying constructive ideas from stakeholders and putting them into practice in research and development than those with low innovation inputs. Based on the above analysis, the following hypothesis is proposed:

H3b: *According to the knowledge-based view, the impact of social responsibility performance on an enterprise's innovation investment increases with the level of innovation investment.*

That means that the higher the level of innovation investment, the larger the effect is of social responsibility performance on innovation investment. The knowledge-based hypothesis is the opposite of the resourced-based hypothesis, H3a.

3. Research Design

3.1. Propensity Score-Matching Model

In order to test the impact of CSR information disclosure on innovation input, traditional regression methods usually face two limitations in solving this problem. First, they can only show that information disclosure is correlated with innovation input, but there is not sufficient reason to prove that the former has a leading effect on the intensity change of the latter. More importantly, the decision of enterprises to voluntarily disclose social responsibility information is affected by many factors, such as enterprise size, the asset–liability ratio, and organizational redundancy, which means that whether enterprises voluntarily disclose social responsibility information is not a random event. Under such circumstances, traditional methods may lead to biased estimation results due to sample selection bias and may even confound the evaluation of the information disclosure effect.

Propensity score matching (PSM), proposed by Rosenbaum and Rubin (1985) [43], is a classic counterfactual research model that is often used to measure the consequences of a given policy or event. The PSM model can transform multiple variables that affect CSR information disclosure and innovation input into one-dimensional conditional probability values that are treated, in short, this model can combine multiple dimensions to form a score; it can then match each voluntary disclosure enterprise (treatment group) with the closest probability score of the non-disclosure sample (control group). Therefore, except for the difference in the disclosure of responsible information, the two groups of samples have similar characteristics in other aspects, so the difference in innovation input between the samples can be attributed to the disclosure of responsible information. Therefore, PSM is a causality measurement method that can mitigate the effect of the non-random distribution of samples and is suitable for measuring the impact of voluntary CSR announcements on innovation input. Following the relevant studies [44,45], the PSM model is divided into the following main steps:

(1) The main factors affecting the voluntary posting of social responsibility announcements are selected as the covariates of sample-matching between the voluntary group and the unpublished group.

(2) A Logit model was used to reduce the selected multidimensional covariates into one dimension, that is, the probability value of “voluntary release of social responsibility report (volun)”, depicted as:

$$Pscore(Z) = P(Z) = \Pr[volun = 1|Z] = E[volun|Z]. \quad (1)$$

In Formula (1), Z represents the covariates affecting whether the enterprise releases its social responsibility report voluntarily, and $Pscore(Z)$ represents the tendency score value if the enterprise releases the social responsibility report voluntarily.

(3) We calculate the probability value of the social responsibility report being released voluntarily by each enterprise, select an appropriate matching method for the samples of the treatment group, and form a new control group with successfully matched samples from the original control group.

(4) After passing the common support test and the balance test, the average processing effect of releasing a social responsibility report on innovation input was calculated (the average effect of treatment on the treated ATT):

$$\begin{aligned} ATT &= E[RD_{1i} - RD_{0i} | volun_i = 1] \\ &= E\{E[RD_{1i} - RD_{0i} | volun_i = 1, P(Z_i)]\} \\ &= E\{E[RD_{1i} | volun_i = 1, P(Z_i)] - E[RD_{0i} | volun_i = 0, P(Z_i)] | volun_i = 1\} \end{aligned} \quad (2)$$

where RD_{1i} and RD_{0i} , respectively, refer to the innovation input level of enterprises that voluntarily release a social responsibility announcement and those that do not release a social responsibility announcement.

3.2. Quantile Regression Model

In order to explore the impact of CSR performance on innovation input, and to further examine the change in the effect intensity of this relationship at the different levels of the dependent variable, quantile regression is necessary because the traditional ordinary least squares (OLS) method analyzes only the influence of independent variables on the conditional expectation of the dependent variable. When facing more complex relational measures, the mean regression method shows obvious deficiencies. In addition, given the data distribution of the dependent variable, the estimation results of ordinary least squares will be meaningless if thick tails and heteroscedasticity violate the basic OLS assumptions. Conversely, quantile regression (QR) combines the traditional regression method with the conditional quantile. This model is an extension and expansion of traditional regression. It selects different quantiles between (0,1) to fit the specific linear relationship of the explanatory variables. Used to measure the marginal effect of the explanatory variable on a particular quantile of the dependent variable, quantile regression thus helps to estimate the underlying relationship between the two variables more fully. Moreover, unlike OLS regression, quantile regression does not need to satisfy the normal distribution assumption of the residual in the conditional quantiles. Quantile regression allows the use of local information to explore the entire distribution of the dependent variable function [46,47], thereby allowing us to observe the varying effects of corporate social responsibility on innovation input at different sub-points.

The basic model of quantile regression is as follows:

$$Quantile_p(Y|X) = X' \beta(p), \quad (3)$$

where Y and X represent the dependent variable and a vector of explanatory variables, respectively, p represents the quantile level, β represents the vector of regression coefficients. The regression coefficients at different quantiles can be estimated by minimizing the absolute deviation [48].

3.3. Sample Selection

In view of the fact that manufacturing enterprises and information transmission, software, and information technology service enterprises (referred to as the information industry) belong to technology-intensive industries that tend to place high importance on R&D activities, this paper takes the manufacturing and information listed by companies in Shanghai and Shenzhen A-share markets in 2014 as the primary sample. To mitigate

the lag of the effect of independent variables on R&D investment, this paper defines the measurement of the independent variable as 2013.

The enterprises in these two industries that voluntarily release their social responsibility reports are defined as the voluntary group (processing group), while the enterprises that do not release their social responsibility reports are classified as the non-release group (control group). ST stocks are the “specially treated” stocks of companies with abnormal financial or other conditions. On 22 April 1998, the Shanghai and Shenzhen Stock Exchanges announced that they would carry out special treatment on the stock trading of these companies. After deleting the ST stock class and missing data, a total of 1912 sample observations were obtained, including 186 observations of the voluntary group and 1726 observations of the control group.

3.4. Description of Variables

Following Chen and Tang (2012) [4], the natural logarithm of enterprise innovation expenditure is used to represent the dependent variable innovation input.

The voluntary release of social responsibility reports is a dummy variable, where CSR = 1 for enterprises that voluntarily release social responsibility reports and CSR = 0 for enterprises that do not release social responsibility reports. The CSR score of the Runling Global Rating Agency was used as a proxy variable for the CSR performance of enterprises that voluntarily issued CSR reports.

Using the method of Caliendo and Kopeinig (2008) [44], this paper selects those variables that simultaneously affect the voluntary release of CSR reports, along with the innovation input of enterprises for matching. Referring to similar studies [49,50], variables such as financial leverage, enterprise size, enterprise age, ownership attributes, operating performance, enterprise growth, organizational redundancy, ownership concentration, free-cash-flow level, and industry were selected as the screening basis. Following the example of Lian et al. (2011) [51], “voluntary release of social responsibility report” is taken as the dependent variable of the logit model, and the combination of variables with the highest quasi- R^2 and the area under the receiver operating characteristic (ROC) curve, or the area under the ROC, is selected as the covariate of the propensity score-matching model. See Table 1 for details of the covariates, outcome variables, and explanatory variables.

Table 1. Variable descriptions.

Variable Type	Variables	Variable Description	Incorporated into the Model
Outcome Variable	Innovation Input	Natural logarithm of innovation expenditure	
Research Variable	Voluntary social responsibility announcement	Enterprises that voluntarily disclose social responsibility are assigned a value of 1, while those that do not disclose social responsibility are assigned a value of 0	
Covariates	Social Responsibility Performance	Runling Global Social Responsibility Rating Index	
	Financial Leverage	Asset-liability ratio	Yes
	Enterprise Scale	Natural log of the number of employees	Yes
	Enterprise Age	Difference between the current year and the establishment year of the enterprise	Yes
	State-owned	If the enterprise is a state-owned enterprise, the value is set to 1; otherwise, the value is 0	Yes

Table 1. Cont.

Variable Type	Variables	Variable Description	Incorporated into the Model
	Operating Performance	Rate of return on total assets	Yes
	Enterprise Growth	The growth rate of enterprise operating income	Yes
	Organizational Redundancy	Ratio of current assets to current liabilities	Yes
	Shareholding Concentration	The largest shareholder shareholding ratio	No
	Free Cash Flow	Ratio of free cash flow to operating income	No
	Sector Type	The value is 1 for the manufacturing enterprise and 0 for the information enterprise	No

4. Empirical Results

4.1. Propensity Score-Matching Hypothesis Test and Empirical Results

4.1.1. Matching Effect Test of the Voluntary Group and Control Group

Two preconditions must be satisfied for the empirical test when using the propensity value-matching method: the common support hypothesis and the balance hypothesis. In this paper, the nonparametric K-density distribution method was used to describe the propensity distribution of the voluntary group and the control group. Figure 1 shows the kernel density distributions of the propensity scores of the matching voluntary group and control group before and after the match. Before matching, the control group (dashed line) has the highest frequency, around a propensity score of 0.06, and the mode of the voluntary groups' propensity score (solid line) is about 0.12. The gap between the two density curves suggests a significant difference between the groups. After matching, in Figure 1, the two density distributions moved significantly closer to each other, indicating that the matching process to alleviate the differences in the two groups has relatively ideal match results.

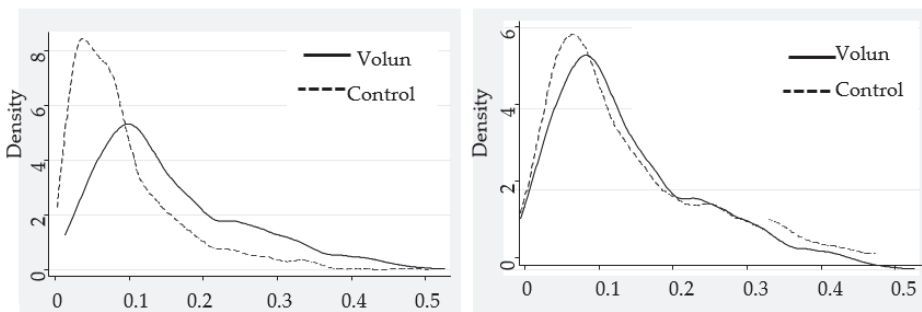


Figure 1. Propensity score before and after matching.

In addition, after calculating the propensity scores of enterprises to release social responsibility reports voluntarily, it is necessary to further examine the post-matching distribution of each covariate of the two groups of samples. Only when the propensity distribution of the voluntary group and the control group is balanced and there is no systematic difference can the externality of “voluntary release of social responsibility” be addressed. The statistical method of a T-distribution test (bilateral) was used to compare the inter-group differences of sample covariates between the two groups, before and after matching, so as to evaluate the balance effect of matching. Table 2 shows the results of the balance test; the absolute deviation of financial leverage, enterprise age, business

performance, enterprise growth, organizational redundancy, and other variables after matching is less than 5%, and there is no statistical significance between the voluntary group and the control group. There were significant differences between the voluntary group and the control group before pairing, and the deviations were reduced to 8.8% and 10.7%, respectively, after treatment; there were no significant differences between the two groups. According to Rosenbaum and Rubin (1985) [43], matching can be considered effective if the absolute deviation is less than 20%.

Table 2. The covariate balance test.

Variable	Matching	Voluntary Mean	Control Mean	Bias %	T Value	p-Value
Financial Leverage	Before	0.393	0.385	3.7	0.49	0.623
	After	0.393	0.388	1.9	0.18	0.855
Enterprise Scale	Before	7.873	7.192	67.1	8.45	0.000
	After	7.859	7.769	8.8	0.84	0.400
Enterprise Age	Before	16.720	15.131	34.9	4.24	0.000
	After	16.719	16.491	5.0	0.48	0.632
State-owned	Before	0.376	0.148	53.6	7.98	0.000
	After	0.373	0.327	10.7	0.92	0.359
Operating Performance	Before	4.815	7.403	−33.8	−3.67	0.000
	After	4.837	4.917	−1.1	−0.12	0.905
Enterprise Growth	Before	0.159	0.158	0.1	0.02	0.987
	After	0.160	0.163	−0.6	−0.04	0.967
Organizational Redundancy	Before	3.415	3.111	4.5	0.72	0.471
	After	3.429	3.283	2.1	0.18	0.857

4.1.2. Matching Results Analysis of the Voluntary Group and the Control Group

In this paper, the kernel matching method is used to explore the average processing effect of voluntary CSR reporting; the corresponding T value is reported in Table 3. The pre-matching effect is about 0.624, which decreases to 0.237 after matching, indicating that the OLS model may lead to a high estimation coefficient due to endogeneity, while the PSM method makes the results more accurate because it addresses the problem of sample self-selection. In addition, the ATT values of a pair of two-nearest-neighbor matching and radius (caliper) matching robustness test change slightly.

Table 3. The treatment effect of a voluntary social responsibility announcement.

Matching Method	Matching	Voluntary Group	Treatment Group	ATT	T Value
Nuclear Match	Before	17.889	17.265	0.624 ***	6.20
	After	17.869	17.633	0.237 **	2.23
A Pair of Two Nearest Neighbors	Before	17.889	17.265	0.624 ***	6.20
	After	17.869	17.640	0.230 *	1.78
Radius (caliper) Matching	Before	17.889	17.265	0.624 ***	6.20
	After	17.869	17.621	0.248 **	2.34

Note: *** represents $p < 0.01$; ** represents $p < 0.05$; * represents $p < 0.1$.

4.2. The Empirical Test of Social Responsibility Performance and Innovation Investment

Table 4 reports the mean value, standard deviation, and correlation coefficient of each variable. In the correlation between the two variables, CSR performance is significantly positively correlated with innovation input ($\rho = 0.312$, $p < 0.01$), which preliminarily conforms to the presented hypothesis. In addition, financial leverage, firm size, firm attributes, organizational redundancy, and other control variables are significantly correlated with the dependent variable of innovation input, and there is not a high correlation between the two variables. Innovation input is reported in logarithmic terms; investment in innovation averaged about CNY 43.1 million per enterprise. Note that the average performance of

CSR is about 37.580 (full marks is 100), indicating that the social responsibility of listed companies in China is at a low average development stage.

Table 4. Description statistics and correlation coefficient matrix ($N = 186$).

	1	2	3	4	5	6	7	8	9
Innovation Input (1)	1								
CSR Performance (2)	0.312 ***	1							
Financial Leverage (3)	0.273 ***	0.136 *	1						
Enterprise Scale (4)	0.537 ***	0.250 ***	0.483 ***	1					
Enterprise Age (5)	0.064	0.142 *	0.125 *	0.201 ***	1				
State-owned (6)	0.152 **	0.131 *	0.452 ***	0.392 ***	0.205 ***	1			
Operating Performance (7)	0.047	−0.015	−0.507 ***	−0.123 *	−0.087	−0.318 ***	1		
Enterprise Growth (8)	0.043	0.077	−0.126 *	−0.088	−0.092	−0.176 **	0.126 *	1	
Organizational Redundancy (9)	−0.123 *	0.016	−0.372 ***	−0.228 ***	0.100	−0.169 **	0.145 **	0.015	1
Mean	17.890	37.580	0.393	7.872	16.720	0.376	4.815	0.159	3.415
Std. Dev.	1.351	7.631	0.207	0.979	4.152	0.486	5.294	0.360	8.168

Note: *** represents $p < 0.01$; ** represents $p < 0.05$; * represents $p < 0.1$.

4.3. Analysis of the Regression Results

We took the enterprises that voluntarily issued CSR reports as samples and considered innovation input and CSR performance, respectively, as the dependent variable along with one of the independent variables in the OLS multiple linear regression and quantile regression models. The OLS regression results in column 1 of Table 5 show that the estimated coefficient of CSR performance is about 0.033 ($p < 0.01$), indicating that CSR has a significant positive impact on innovation input, and the innovation input is roughly 3.3 percentage points higher for every one-point increase in the social responsibility performance index. Thus, hypothesis H2 can be verified. Column 2 of Table 5 shows that the regression coefficients of independent variables at 20% of the innovation input are about 0.060 ($p < 0.01$); similarly, the estimated coefficients on social responsibility performance at the 40th, 50th, and 60th percentiles of the dependent variable are 0.032 ($p < 0.01$), 0.030 ($p < 0.01$) and 0.020 ($p < 0.05$), respectively. The results show that social responsibility performance at these percentiles had a positive effect on innovation investment and that the positive effect gradually decreased with the increase in innovation input percentiles. At the 80th percentile, the coefficient estimate of social responsibility performance fell to about 0.001, and the result is not significant. This is plausibly due to the product or service superiority of high-innovation enterprises, and these firms tend to focus more on innovation. Thus, the social responsibility performance of such enterprises does not result in a significant effect on innovation. Based on the discussion of quantile regression, the original hypothesis H3a can be verified, indicating that with the increase in innovation input, the positive effect of CSR performance on innovation input gradually weakens.

As a robustness check, this paper also employs Tobit regression, using the overall sample of enterprises that do not disclose social responsibility and those that voluntarily disclose social responsibility. We use the left-censored processing method; that is, the social responsibility performance of an enterprise that does not disclose responsibility information is regarded as 0. The results show that CSR performance has a significant positive impact on innovation investment ($p < 0.01$). Financial leverage and enterprise age have a significant weakening effect on innovation investment ($p < 0.01$). Variables such as growth and organizational redundancy still have a positive leading effect on the dependent variables (the p -value of the organizational redundancy variable is 0.03, and the regression coefficient p -value of other variables is less than 0.01). The model is also significant as a whole ($p < 0.01$) (see Table 6 for details). This result shows no substantial change compared to the OLS regression results above, implying that the conclusion for

hypothesis H2 is relatively robust; that is, the performance of CSR can have a positive impact on innovation investment.

Table 5. OLS and quantile regression results ($N = 186$).

Variable	OLS	Quantile				
		0.2	0.4	0.5	0.6	0.8
CSR Performance	0.033 *** (0.011)	0.060 *** (0.017)	0.032 *** (0.012)	0.030 *** (0.011)	0.020 ** (0.009)	0.001 (0.017)
Financial Leverage	0.820 (0.564)	1.060 (0.826)	0.905 (0.954)	1.034 (0.955)	1.640 * (0.907)	1.259 (0.935)
Enterprise Scale	0.668 *** (0.103)	0.239 (0.183)	0.580 *** (0.103)	0.599 *** (0.095)	0.721 *** (0.108)	0.841 *** (0.110)
Enterprise Age	−0.016 (0.021)	−0.058 (0.047)	0.010 (0.023)	0.013 (0.022)	0.005 (0.016)	0.019 (0.015)
State-owned	−0.146 (0.200)	0.040 (0.431)	−0.086 (0.229)	−0.153 (0.182)	−0.175 (0.179)	−0.152 (0.210)
Operating Performance	0.037 ** (0.018)	0.053 (0.038)	0.040 (0.027)	0.038 * (0.021)	0.034 ** (0.017)	0.031 (0.024)
Enterprise Growth	0.208 (0.234)	0.143 (0.385)	0.052 (0.240)	0.063 (0.180)	0.088 (0.184)	0.460 (0.386)
Organizational Redundancy	0.001 (0.011)	0.006 (0.030)	−0.006 (0.022)	−0.007 (0.017)	−0.005 (0.050)	−0.009 (0.070)
R ²	0.349	0.142	0.237	0.266	0.282	0.319

Note: Standard errors are reported in brackets below the coefficient estimates. *** represents $p < 0.01$; ** represents $p < 0.05$; * represents $p < 0.1$.

Table 6. Tobit regression result.

VARIABLES	(1) Innovation Input
CSR Performance	0.007 *** (0.00230)
Financial Leverage	−0.648 *** (0.159)
Enterprise Scale	0.717 *** (0.0277)
Enterprise Age	−0.0206 *** (0.00550)
State-owned	0.0491 (0.0745)
Operating Performance	0.0165 *** (0.00303)
Enterprise Growth	0.115 *** (0.0407)
Organizational Redundancy	0.0113 ** (0.00522)
Constant	12.48 *** (0.210)
Chi2	671.51 ***
Observations	1912

Note: *** represents $p < 0.01$; ** represents $p < 0.05$.

5. Conclusions

In this paper, manufacturing and IT-related publicly listed companies in the Shanghai and Shenzhen A-share markets were selected as the overall research samples, and the samples were divided into the voluntary group and control group, according to whether they voluntarily issued social responsibility reports. The propensity score-matching method is used to empirically test the impact of a voluntary social responsibility report on innovation input. The results show that in the voluntary group, it has a positive effect, and the innovation input of the voluntary group is significantly higher than that of the control group. This conclusion shows that the active release of social responsibility information by enterprises has a positive effect on innovation input, possibly due to the stakeholders' increased attention and recognition. Enterprises may use R&D and innovation as a response strategy to meet the demands of stakeholders. At the same time, trust and feedback from stakeholders will also offer effective incentives for enterprises to strengthen innovation investment. This conclusion is contrary to the research findings of Pan et al. (2021) [6], and this may be related to the choice of variables. Pan et al. (2021) [6] took one dimension of corporate social responsibility (carbon emissions) as a proxy variable and found that it has a weakening impact on R&D investment. Additionally, our findings also differ from those of Mithani (2016) [49], which suggest that enterprises' efforts in the ecological environment will weaken the positive effects on R&D. Mithani's sample is based on the Indian market, and the study focuses on the environmental dimension of CSR. Thus, the differing conclusions likely arise from the different institutional backgrounds and variable measurements. On the other hand, our finding is consistent with some of the existing literature [15,52], and our study further provides empirical evidence for the positive relationship between CSR and R&D intensity.

In addition, we discussed the relationship between CSR performance and innovation investment in the voluntary group; the OLS regression results showed that CSR performance contributed to the increase in average R&D investment. This conclusion is in contradiction to the research results of Pan et al. (2021) [6], although their study was also based on a sample of Chinese firms in the context of economic transition, which showed a significant weakening effect of corporate carbon dioxide emission reduction policies on the intensity of R&D investment as the policy may lead to higher cost effects, thus affecting the intensity of innovation investment. In contrast, the apparently opposite findings are not contradictory, as carbon dioxide reduction is only one aspect of corporate social responsibility, and there are many other dimensions of corporate social responsibility. After gaining positive responses from stakeholders through the implementation of comprehensive social responsibility, companies will have more motivation to sustain development in R&D and innovation. In addition, the study by Gallego-Álvarez et al. (2011) [13] also presents the opposite conclusion to this paper, selecting 500 European companies and 500 non-European companies for their study; the conclusion shows that CSR has a significant negative impact on R&D investment. On the one hand, this may be due to the global scope of the study sample and the large differences in the degree of marketization of firms across countries (regions). On the other hand, the study defines CSR as a dummy variable, compared to the CSR variables measured by the score rating method, which can provide a more accurate picture of CSR performance.

The findings of the study are more similar to those of Ho et al. (2016) [26], who chose the Kinder Lydenburg Domini (KLD) rating index as a proxy variable for CSR, which covers a more comprehensive and extensive content and has high credibility and reference value in Western capital markets [53], and found that the social responsibility performance of companies in European and American capital markets has an R&D investment intensity that has a significantly positive predictive effect. In addition, the findings of this paper are consistent with the view of Husted and Allen (2007) [42] that "CSR provides opportunities for innovation". The above discussion indicates that after more than a decade of development, the development of CSR in China is becoming more and more mature; favorable CSR performance is becoming a medium of interaction between enterprises

and their stakeholders, and it is gradually becoming an important driving force for R&D innovation and competitiveness.

At the same time, the quantile model was also used to explore the effect of CSR performance on the different quantiles of innovation input. We found that with an increase in innovation input, the effect of CSR performance on innovation input gradually diminishes. This result is in line with the expected assumption of the resource-based theory. Under the premise of limited resources, enterprises with high innovation investment tend to attract customers and other stakeholders through high-quality differentiated products, and such enterprises lack the pressure and motivation to “please” stakeholders through social responsibility. In contrast, enterprises with insufficient investment in innovation and low product differentiation tend to practice social responsibility, which is a prudent way to convey the message of “benevolence” to society.

Meanwhile, in the Tobit model of Table 6, we find that corporate financial leverage has a significant negative effect on innovation investment, which finding is similar to previous research [4], in which the asset-liability ratio indicates a firm’s external financing capacity. The lower the asset-liability ratio, the more funds a firm can borrow, and the more investment it will make in its innovation activities [4]; firms with a low asset-liability ratio usually have a large amount of potentially redundant resources, which can help enterprises in the process of selecting R&D projects, alleviate the urgency of pursuing immediate short-term results, and motivate enterprises to try high-risk strategies and innovation projects; in addition, the R&D innovation of enterprises is usually coherent and the projects are interrelated. The existence of redundant resources enables enterprises to invest in new projects when faced with environmental changes, thus ensuring the continuity of R&D. Moreover, the age of the firm has a significant negative effect on innovation investment, which is consistent with the random effects model of Ju et al. (2013) [54]. With the growth of enterprise survival time, enterprise knowledge and experience and organizational systems may become more and more solidified; all kinds of organizations face the problem of organizational inertia and this inertia will continue to increase over time, which is manifested in the organization’s operation of conformity and the old-fashioned over-reliance on the original resources, thus affecting positive enthusiasm for R&D and innovation investment [55].

Compared with the existing literature, the value of this paper may be reflected in the following aspects. First, the application of the propensity score-matching model alleviates the endogenous bias caused by the self-selection of samples in traditional regression methods and adds more convincing empirical evidence when discussing the relationship between CSR and innovation investment. Second, the use of a quantile regression model on innovation input helps shed light on the varying or unequal effects of CSR performance, given the level of innovation input. In particular, our results reject the knowledge-based view and conclude that higher social responsibility performance is not statistically associated with higher innovation investment.

At the same time, the practical implications of this study lie in the following areas. First, both CSR and innovation investment are welfare-enhancing strategies for an enterprise. Specifically, innovation investment may entail the development and application of energy-saving and environmentally friendly technologies that increase the consumer’s utility and improve the workers’ working conditions, as well as increase the efficiency of resource use. This is the indirect embodiment of CSR. Therefore, an enterprise’s innovation investment decision may be based on the specific needs and goals of the enterprise and its stakeholders, in order to optimize the overall effect of the two strategies. Second, because CSR and innovation investment have positive externalities, establishing common platforms to facilitate information-sharing in technology and management and helping enterprises to reduce the cost of social responsibility and the risk of failure in R&D and innovation. Such platforms could also help guide enterprises to develop complementary social responsibility and innovative investment strategies.

In spite of the aforementioned theoretical significance and practical enlightenment, however, there are still some imperfections in this paper. In future research, we will select multiple years to verify the above assumptions in this paper, using panel data samples. Meanwhile, we could also further explore the impact and mechanism of corporate R&D investment on corporate social responsibility, along with the boundary of contingency factors influencing the above two relationships.

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References

1. Qiu, L.; Jie, X.; Wang, Y.; Zhao, M. Green product innovation, green dynamic capability, and competitive advantage: Evidence from Chinese manufacturing enterprises. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *27*, 146–165. [CrossRef]
2. Schilke, O. On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strateg. Manag. J.* **2013**, *35*, 179–203. [CrossRef]
3. Bosworth, D.; Rogers, M. Market Value, R&D and Intellectual Property: An Empirical Analysis of Large Australian Firms. *Econ. Rec.* **2001**, *77*, 323–337. [CrossRef]
4. Chen, S.; Tang, B. Top manager cognition and innovation investment: The moderating role of managerial discretion. *Stud. Sci. Sci.* **2012**, *30*, 1723–1734.
5. Paik, Y.; Woo, H. The Effects of Corporate Venture Capital, Founder Incumbency, and Their Interaction on Entrepreneurial Firms' R&D Investment Strategies. *Organ. Sci.* **2017**, *28*, 670–689. [CrossRef]
6. Pan, X.; Pan, X.; Wu, X.; Jiang, L.; Guo, S.; Feng, X. Research on the heterogeneous impact of carbon emission reduction policy on R&D investment intensity: From the perspective of enterprise's ownership structure. *J. Clean. Prod.* **2021**, *328*, 129532. [CrossRef]
7. McWilliams, A.; Siegel, D. Corporate Social Responsibility and Financial Performance: Correlation or Misspecification. *Strateg. Manag. J.* **2000**, *21*, 603–609. [CrossRef]
8. Bansal, P. Evolving sustainably: A longitudinal study of corporate sustainable development. *Strateg. Manag. J.* **2004**, *26*, 197–218. [CrossRef]
9. Abbas, J.; Sağsan, M. Impact of knowledge management practices on green innovation and corporate sustainable development: A structural analysis. *J. Clean. Prod.* **2019**, *229*, 611–620. [CrossRef]
10. Anser, M.K.; Zhang, Z.; Kanwal, L. Moderating effect of innovation on corporate social responsibility and firm performance in realm of sustainable development. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 799–806. [CrossRef]
11. Bacinello, E.; Tontini, G.; Alberton, A. Influence of maturity on corporate social responsibility and sustainable innovation in business performance. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *27*, 749–759. [CrossRef]
12. Bocquet, R.; Le Bas, C.; Mothe, C.; Poussing, N. CSR, Innovation, and Firm Performance in Sluggish Growth Contexts: A Firm-Level Empirical Analysis. *J. Bus. Ethics* **2015**, *146*, 241–254. [CrossRef]
13. Gallego-Álvarez, I.; Prado-Lorenzo, J.M.; García-Sánchez, I.M. Corporate social responsibility and innovation: A resource-based theory. *Manag. Decis.* **2011**, *49*, 1709–1727. [CrossRef]
14. Bocquet, R.; Le Bas, C.; Mothe, C.; Poussing, N. Are firms with different CSR profiles equally innovative? Empirical analysis with survey data. *Eur. Manag. J.* **2013**, *31*, 642–654. [CrossRef]
15. Luo, X.; Du, S. Exploring the relationship between corporate social responsibility and firm innovation. *Mark. Lett.* **2014**, *26*, 703–714. [CrossRef]
16. Briones-Peñalver, A.-J.; Conesa, J.A.B.; Nieto, C.D.N. Analysis of Corporate Social Responsibility in Spanish Agribusiness and its Influence on Innovation and Performance. *Corp. Soc. Responsib. Environ. Manag.* **2017**, *25*, 182–193. [CrossRef]
17. García-Piqueres, G.; García-Ramos, R. Is the corporate social responsibility–innovation link homogeneous?: Looking for sustainable innovation in the Spanish context. *Corp. Soc. Responsib. Environ. Manag.* **2019**, *27*, 803–814. [CrossRef]
18. Brown, J.A.; Forster, W.R. CSR and Stakeholder Theory: A Tale of Adam Smith. *J. Bus. Ethics* **2012**, *112*, 301–312. [CrossRef]

19. Avetisyan, E.; Ferrary, M. Dynamics of Stakeholders' Implications in the Institutionalization of the CSR Field in France and in the United States. *J. Bus. Ethics* **2012**, *115*, 115–133. [[CrossRef](#)]
20. Lane, A.B.; Devin, B. Operationalizing Stakeholder Engagement in CSR: A Process Approach. *Corp. Soc. Responsib. Environ. Manag.* **2017**, *25*, 267–280. [[CrossRef](#)]
21. Yin, C.; Ma, H.; Gong, Y.; Chen, Q.; Zhang, Y. Environmental CSR and environmental citizenship behavior: The role of employees' environmental passion and empathy. *J. Clean. Prod.* **2021**, *320*, 128751. [[CrossRef](#)]
22. Kuzey, C.; Uyar, A.; Nizaeva, M.; Karaman, A.S. CSR performance and firm performance in the tourism, healthcare, and financial sectors: Do metrics and CSR committees matter? *J. Clean. Prod.* **2021**, *319*, 128802. [[CrossRef](#)]
23. Murcia, M.J. Progressive and Rational CSR as Catalysts of New Product Introductions. *J. Bus. Ethics* **2020**, *174*, 613–627. [[CrossRef](#)]
24. Brunk, K.H.; de Boer, C. How do Consumers Reconcile Positive and Negative CSR-Related Information to Form an Ethical Brand Perception? A Mixed Method Inquiry. *J. Bus. Ethics* **2018**, *161*, 443–458. [[CrossRef](#)]
25. Hur, W.; Moon, T.; Kim, H. When and how does customer engagement in CSR initiatives lead to greater CSR participation? The role of CSR credibility and customer–company identification. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1878–1891. [[CrossRef](#)]
26. Ho, S.S.; Li, A.Y.; Tam, K.; Tong, J.Y. Ethical image, corporate social responsibility, and R&D valuation. *Pac. Basin Financ. J.* **2016**, *40*, 335–348. [[CrossRef](#)]
27. Guthrie, J.; Parker, L.D. Corporate Social Reporting: A Rebuttal of Legitimacy Theory. *Account. Bus. Res.* **1989**, *19*, 343–352. [[CrossRef](#)]
28. Lu, Y.; Abeysekera, I. What Do Stakeholders Care About? Investigating Corporate Social and Environmental Disclosure in China. *J. Bus. Ethics* **2015**, *144*, 169–184. [[CrossRef](#)]
29. Gong, G.; Xu, S.; Gong, X. On the Value of Corporate Social Responsibility Disclosure: An Empirical Investigation of Corporate Bond Issues in China. *J. Bus. Ethics* **2016**, *150*, 227–258. [[CrossRef](#)]
30. Xu, S.; Qiao, M.; Che, B.; Tong, P. Regional Anti-Corruption and CSR Disclosure in a Transition Economy: The Contingent Effects of Ownership and Political Connection. *Sustainability* **2019**, *11*, 2499. [[CrossRef](#)]
31. Du, X.; Jian, W.; Zeng, Q.; Du, Y. Corporate Environmental Responsibility in Polluting Industries: Does Religion Matter? *J. Bus. Ethics* **2013**, *124*, 485–507. [[CrossRef](#)]
32. Raza, A.; Farrukh, M.; Iqbal, M.K.; Farhan, M.; Wu, Y. Corporate social responsibility and employees' voluntary pro-environmental behavior: The role of organizational pride and employee engagement. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 1104–1116. [[CrossRef](#)]
33. Zhao, H.; Zhou, Q.; He, P.; Jiang, C. How and When Does Socially Responsible HRM Affect Employees' Organizational Citizenship Behaviors Toward the Environment? *J. Bus. Ethics* **2019**, *169*, 371–385. [[CrossRef](#)]
34. Li, J.; He, H.; Liu, H.; Su, C. Consumer Responses to Corporate Environmental Actions in China: An Environmental Legitimacy Perspective. *J. Bus. Ethics* **2015**, *143*, 589–602. [[CrossRef](#)]
35. Du, S.; Bhattacharya, C.; Sen, S. Reaping relational rewards from corporate social responsibility: The role of competitive positioning. *Int. J. Res. Mark.* **2007**, *24*, 224–241. [[CrossRef](#)]
36. Bhattacharya, C.B.; Sen, S. Consumer—Company Identification: A Framework for Understanding Consumers' Relationships with Companies. *J. Mark.* **2003**, *67*, 76–88. [[CrossRef](#)]
37. Uzzi, B.; Lancaster, R. Relational Embeddedness and Learning: The Case of Bank Loan Managers and Their Clients. *Manag. Sci.* **2003**, *49*, 383–399. [[CrossRef](#)]
38. Lee, G.; Masulis, R.W. Do more reputable financial institutions reduce earnings management by IPO issuers? *J. Corp. Financ.* **2011**, *17*, 982–1000. [[CrossRef](#)]
39. Rexhepi, G.; Kurtishi, S.; Bexheti, G. Corporate Social Responsibility (CSR) and Innovation—The Drivers of Business Growth? *Procedia Soc. Behav. Sci.* **2013**, *75*, 532–541. [[CrossRef](#)]
40. Luo, X.; Bhattacharya, C. Corporate Social Responsibility, Customer Satisfaction, and Market Value. *J. Mark.* **2006**, *70*, 1–18. [[CrossRef](#)]
41. Cohen, W.M.; Levinthal, D.A. Absorptive capacity: A new perspective on learning and innovation. *Adm. Sci. Q.* **1990**, *35*, 128–152. [[CrossRef](#)]
42. Husted, B.W.; Allen, D.B. Strategic Corporate Social Responsibility and Value Creation among Large Firms: Lessons from the Spanish Experience. *Long Range Plan.* **2007**, *40*, 594–610. [[CrossRef](#)]
43. Rosenbaum, P.R.; Rubin, D.B. Constructing a Control Group Using Multivariate Matched Sampling Methods That Incorporate the Propensity Score. *Am. Stat.* **1985**, *39*, 33. [[CrossRef](#)]
44. Caliendo, M.; Kopeinig, S. Some Practical Guidance for the Implementation of Propensity Score Matching. *J. Econ. Surv.* **2008**, *22*, 31–72. [[CrossRef](#)]
45. Biswas, M. Are They Efficient in the Middle? Using Propensity Score Estimation for Modeling Middlemen in Indian Corporate Corruption. *J. Bus. Ethics* **2015**, *141*, 563–586. [[CrossRef](#)]
46. Chay, J.; Park, S.H.; Kim, S.; Suh, J. Financing hierarchy: Evidence from quantile regression. *J. Corp. Financ.* **2015**, *33*, 147–163. [[CrossRef](#)]
47. Krüger, S.; Rösch, D. Downturn LGD modeling using quantile regression. *J. Bank. Financ.* **2017**, *79*, 42–56. [[CrossRef](#)]

48. Kang, H.-H.; Liu, S.-B. Corporate social responsibility and corporate performance: A quantile regression approach. *Qual. Quant.* **2013**, *48*, 3311–3325. [[CrossRef](#)]
49. Mithani, M.A. Innovation and CSR—Do They Go Well Together? *Long Range Plan.* **2017**, *50*, 699–711. [[CrossRef](#)]
50. Szutowski, D.; Ratajczak, P. The Relation between CSR and Innovation. Model Approach. *J. Entrep. Manag. Innov.* **2016**, *12*, 77–94. [[CrossRef](#)]
51. Lian, Y.; Su, Z.; Gu, Y. Evaluating the effects of equity incentives using PSM: Evidence from China. *Front. Bus. Res. China* **2011**, *5*, 266–290. [[CrossRef](#)]
52. Kim, Y.; Brodhag, C.; Mebratu, D. Corporate social responsibility driven innovation. *Innov. Eur. J. Soc. Sci. Res.* **2014**, *27*, 175–196. [[CrossRef](#)]
53. Mattingly, J.E.; Berman, S. Measurement of Corporate Social Action. *Bus. Soc.* **2006**, *45*, 20–46. [[CrossRef](#)]
54. Ju, X.; Lo, D.; Yu, Y. Financing Constraints, Working Capital Management and the Persistence of Firm Innovation. *Econ. Res. J.* **2013**, *48*, 4–16.
55. Gilbert, C.G. Unbundling the Structure of Inertia: Resource Versus Routine Rigidity. *Acad. Manag. J.* **2005**, *48*, 741–763. [[CrossRef](#)]

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Article

Linking Environmental Corporate Social Responsibility with Green Innovation Performance: The Mediating Role of Shared Vision Capability and the Moderating Role of Resource Slack

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Abstract: Environmental corporate social responsibility is important for firms to achieve both economic benefits and the sustainable development of firms and the environment, which are of great concern to theorists and practitioners. However, the relationship between environmental corporate social responsibility and green innovation performance is still unclear. To address the research gap, we propose a research model that incorporates the mediating effect of shared vision capability, and the moderating effect of resource slack, to investigate whether and when environmental corporate social responsibility affects green innovation performance. Data were obtained from 351 respondents of Chinese firms through a questionnaire. The results confirmed that environmental corporate social responsibility is positively associated with green innovation performance. The results also confirmed that shared vision capability mediated the environmental corporate social responsibility–green innovation performance link. Resource slack statistically significantly moderated the relationship between environmental corporate social responsibility and green innovation performance. These findings offer novel insight for managers when formulating management policies about environmental corporate social responsibility, shared vision capability, and green innovation performance, which can help enterprises to achieve the goal of sustainable development and promote environmental friendliness in society at large.

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Keywords: environmental corporate social responsibility; shared vision capability; resource slack; green innovation performance; green development; resource-based theory

1. Introduction

As stated in a 2022 report, the Chinese central government will go on improving the environment and promoting green development, ensuring greater harmony between humanity and the natural environment. Moreover, the central government has taken appropriate steps to encourage firms to combine scientific and technological innovation with green development to promote high-quality development [1]. Thus, in recent years, implementing green innovation to eliminate negative impacts on the environment has been seen as a vital source of competitive advantage [2]. Thus, the concept has attracted extensive attention from academic and practical circles [3]. Over the past several years, the public, employees, consumers, and other stakeholders have realized the importance of green innovation to society and the effects of firms' activities on the environment, which has driven more firms to engage in green innovation practices. Green innovation performance is the combination of green process innovation performance and green product innovation performance [4]. Different from traditional innovation performance, green innovation performance includes the twofold externalities of beneficial research and development overflow and environmental protection and may strengthen firms' competitive advantage and improve environmental quality [5]. However, due to limited resources and capabilities, a number of Chinese firms still show no great interest in participating in green innovation practices, which prevents them from improving their green innovation performance.

Thus, it is vital to find factors that promote green innovation performance in the area of innovation studies.

Earlier studies have shown that integrating green customers and suppliers makes firms expand their green innovation search scope, which in turn improves green innovation performance [6]. Moreover, including green customers and green suppliers in green innovation can provide firms with more knowledge and expertise about novel ideas and technology that can help to coordinate information exchanges; thereby, green innovation performance can be improved [7]. Due to reciprocal interdependence benefits, firms can integrate green customers and suppliers in green innovation in order to gain their favor and obligation. For the sake of maintaining bilateral relationships, green customers and suppliers can also try to promote firms' green innovation performance [7,8]. Chen et al. [9] posited that green absorptive capacity—the ability to gain, absorb, transform, and use environmental knowledge—enables firms to efficiently integrate external and internal sources of extant and novel environmental knowledge. Moreover, Wang et al. [10] discovered that organizational green learning will encourage firms to gain more new environmental knowledge and improve their green innovation performance. Environmental corporate social responsibility enables firms to shift their focus from economic to environmental issues [11,12]. Thus, environmental corporate social responsibility may be an underlying predictor of green innovation performance. Environmental corporate social responsibility refers to firms' practices that combine environmental concerns with their competitive strategy, operations, commercial activities, and interactions with stakeholders beyond the narrow commercial profit and lawful requirements of the firms [13–15]. Prior studies have discussed the environmental corporate social responsibility outcomes at the firm level [16,17]. A number of studies highlight the impact of environmental corporate social responsibility on financial performance, firm value, and business performance [18–20]. Meanwhile, some studies also have explored the effect of environmental corporate social responsibility on innovation performance. On the basis of stakeholder theory, Bereskin et al. [21] proposed that environmental corporate social responsibility can cater to the expectations of stakeholders, which can help firms construct deeper relationships with their external stakeholders and extract critical resources from the network of relationships. The resources extracted from firms' stakeholders in turn improve firms' innovation performance. Wang and Zhang [22] posited that firms that shoulder environmental corporate social responsibility frequently invest heavily in adjacent fields to fund innovative research and development and product updates, which has a favorable influence on firms' innovation performance. Although the influence of environmental corporate social responsibility on firms' performance has attracted extensive academic attention [23], the environmental corporate social responsibility–green innovation performance relationship is still unclear.

Moreover, the underlying correlation mechanisms between environmental corporate social responsibility and firms' performance have not been illustrated thoroughly in extant research. Social identity theory provides a parsimonious framework that demonstrates how environmental corporate social responsibility may be correlated with green innovation performance. As stated in social identity theory, a perception of harmony between a group of employees can mean they perceive the destiny of the group as their own, which in turn can encourage them to take action to enhance their support for their organization [24,25]. Environmental corporate social responsibility highlights employees' engagement [26] and promotes the firm's vision, mission, and core values, which can easily spread and be shared across firms [27]. When employees perceive that they work for an environmentally responsible firm, they will take initiative to participate in green product and process innovation via learning novel environmental knowledge and introducing and applying green and novel ideas to practices that aim at reducing energy consumption, preventing pollution, and protecting the environment [28]. Thereby, green innovation performance can be improved. As stated above, the study proposes that shared vision capability can be the mediator in the environmental corporate social responsibility–green innovation

performance relationship, which is aimed at clarifying the correlation mechanism between environmental corporate social responsibility and green innovation performance.

Studies have illustrated that the level of the environmental corporate social responsibility and firms' performance relationship can be divergent because they hinge on firms' resources such as adequate capital, human resource investment, and technology [29,30]. Resource slack can be described as the gap between the extracted resource demands of all groups in a firm and the real demands of the firm [31] and may also refer to the possibility that resources can be rearranged and transferred to achieve organizational goals [32]. The resource-based theory illustrates that the basis of firms' operations is resources and capabilities. Different resources and capabilities are critical for firms to maintain a sustainable competitive edge [33]. These resources and capabilities are usually of great value, rarity, imperfect imitability, and non-substitutability [34]. Firms with adequate slack resources will have great flexibility for the sustainable allocation of resources to engage in environmental corporate social responsibility practices, such as investing in green product research and development, saving energy on manufacturing processes, and preventing environmental pollution innovatively. Thereby, firms' green innovation performance can be promoted. However, due to a lack of slack resources, firms are often short of the financial, human, and technology resources to shoulder environmental responsibility, so green innovation performance is less likely to be improved. Furthermore, inadequate slack resources may hinder firms' ability to mobilize the needed resources that should be put into environmental corporate social responsibility practices, resulting in less green innovation performance. Thus, resource slack is thought to be a moderator in the environmental corporate social responsibility–green innovation performance relationship. It must be understood in order to clarify the boundary conditions of the effect of environmental corporate social responsibility on green innovation performance and to better understand when environmental corporate social responsibility is more or less related to green innovation performance.

The study is organized into six sections: Section 2 presents the theoretical framework and hypothesis development. Section 3 shows the research methodology and Section 4 reflects the data analysis results. Section 5 is a discussion of the findings. The last section provides the conclusions.

2. Theoretical Framework and Research Hypotheses

The study hypothesizes that there is a positive relationship between environmental corporate social responsibility and green innovation performance. Shared vision capability mediates the environmental corporate social responsibility–green innovation performance relationship. Furthermore, the impact of environmental corporate social responsibility on green innovation performance will be moderated by resource slack. The study illustrates the hypothesized relationships based on social identity theory and resource-based theory.

2.1. *The Impact of Environmental Corporate Social Responsibility on Green Innovation Performance*

For the sake of improving green innovation performance, a number of internal and external stakeholders are often engaged in green innovation [35]. In this study, green innovation performance can be described as performance related to innovations that a firm implements in association with green products and processes, embracing technologies that are concerned with reducing energy consumption, protecting the environment, reusing waste, eliminating pollution, green product research and development, and firm environmental management [36,37]. Since green innovation performance can effectively improve the competitive advantage of firms and cater to the needs of constructing an environment-friendly society, the focus of academic and practical attention is how to enhance green innovation performance in the complex and uncertain world [10].

Environmental corporate social responsibility contributes to the enhancement of green innovation performance. Environmental corporate social responsibility represents a firm's voluntary actions to incorporate environmental concerns into its operational activities,

thereby enhancing the association with the firm's interested parties [38]. The construct concentrates on some elements that can help to address the economic and environmental effects surrounding the firm [39]. Indeed, environmental corporate social responsibility shows the environmentally friendly behavior of a firm in society and can bring about a good reputation and social admissibility [40].

From the perspective of external stakeholders, customers are becoming more concerned about the environmental effects of their purchases [41]. To satisfy customer demands, firms should strengthen R&D investments to develop green products and ensure that manufacturing processes and product quality meet customers' expectations. Meanwhile, environmental corporate social responsibility can be seen as a signal of a firm's non-opportunistic behavior and long-term green development [42], which can lessen informational asymmetry between shareholders [43]. This may, in turn, provide vital resource supports to green innovation. Moreover, environmental corporate social responsibility actions can be identified by external stakeholders, such as green suppliers, which encourage the firm to construct deeper relationships with them, thereby expanding the firm's green innovation search scope [44]; in turn, external knowledge can be integrated into the firm's internal knowledge pool and improve its green innovation performance [7]. From the perspective of internal stakeholders, as stated above, environmentally responsible firms have a good reputation among stakeholders. Employees who feel that they work for firms with a reputation for innovatively integrating green and novel ideas of energy saving, pollution prevention, and waste reuse into product manufacturing can feel pride in their work, and in turn may take the initiative to get involved in green innovation activities [28], thereby facilitating firms' green innovation performance. Thus, the study develops Hypothesis 1:

Hypothesis 1. *Environmental corporate social responsibility is positively related to green innovation performance.*

2.2. The Mediating Role of Shared Vision Capability

Shared vision capability can be described as a common understanding and identification among a firm's members concerning the firm's vision, mission, and core values; it indicates the developmental direction for the firm in the future [27,45]. It is seen as the basis of firm strategic management because it shows firm members' common aims, overall directions, and practices. Moreover, shared vision capability can help firms improve their learning capabilities and maintain a competitive advantage [46].

Social identity theory holds that the collective values and practices in association with those of a comparable group and the prestige of the group can be vital factors to enhance the tendency to identify with groups [24]. For the sake of developing shared vision capability, members of the firm need to have a collective understanding of the vision, mission, and core values of the firm [47]. On the one hand, environmentally responsible firms are devoted to integrating environmental concerns into a firm's values, operations, and commercial activities, which makes them different from comparable firms. This can help employees remain true to themselves and identify with the firm's visions. On the other hand, environmental corporate social responsibility serves the greater interests of society. Thus, environmentally responsible firms usually have good reputations. When employees feel oneness with prestige firms, they tend to feel pride and gradually discover the meaningfulness of their work [48]. The view that the firm is devoted to improving the environment, preventing pollution, and saving energy can enhance employees' identification with the firm's vision, mission, and core values [49]. Therefore, environmental corporate social responsibility is positively associated with shared vision capability.

Due to the increasing significance of shared vision capability, having an explicit understanding of these shared vision capabilities can also affect a firm's green innovation performance. Shared vision capability often links diverse departments and individual staff to a firm, as it produces a shared understanding of the firm's aims and suitable behaviors to realize them and encourages staff to move towards a shared vision. The empirical

study of O'Reilly and Tushman [50] indicated that a clear shared vision can improve a firm's innovation capability. As stated in social identity theory, employees' identification with an organization can strengthen their support for it. Meanwhile, identifying with an organization influences the outcomes conventionally related to group cooperation and intragroup cohesion [24]. Yang and Huang [51] also proposed that a shared vision can provide an image of a desired future state to employees, which can encourage employees to devote their efforts to the firm's aims such that the firm has better performance in innovation.

When employees of a firm identify with its environmentally responsible vision, mission, and core values, they may take the initiative to develop more environmental knowledge and integrate it, and thereby the knowledge pool can be enriched. The process of knowledge searching, and integration can obviously improve firms' green innovation performance. Moreover, there may be a number of difficulties in introducing and applying green and novel ideas into the manufacturing processes, and employees' strong identification with the common vision will make employees cooperate actively with others and discover opportunities by means of exchanging resources and combination across units to overcome risks and challenges from green innovation. Therefore, green innovation performance can be improved. Thus, Hypothesis 2 is proposed:

Hypothesis 2. *Shared vision capability mediates the environmental corporate social responsibility–green innovation performance relationship.*

2.3. The Moderating Role of Resource Slack

Enough support from organizational resources, e.g., adequate financial, human, and material resources, is critical to environmental corporate social responsibility [31]. Resource slack is potentially available resources that a business can divert or redeploy from its operations [52]. Jiao et al. [53] empirically examined how conducting green practices to shoulder ecological responsibilities can be positively associated with financial performance and found that this relationship is moderated by resource slack. Duque-Grisales and Aguilera-Caracuel [54] also proposed that resource slack provides resources for firms to undertake environmental responsibility that enhances financial performance via strengthening visibility and reputation. Furthermore, some studies show that shouldering environmental corporate social responsibility can encourage firms to find new innovation opportunities. At this time, firms with high levels of slack resources will invest financial and human resources to take advantage of innovation opportunities, and thereby green innovation performance can be improved [31,55]. Therefore, this study explores the idea that resource slack might play a moderating role in the relationship between environmental corporate social responsibility and green innovation performance.

As stated in resource-based theory, sufficiently valuable, rare, imperfectly imitable, and non-substitutable resources can help an organization to obtain a competitive advantage and realize its vision, mission, and strategic goals [34]. Moreover, to cope with internal and external pressures, firms can use slack resources to achieve the goal of strategic adjustment in an era full of instability, uncertainty, complexity, and ambiguity. High levels of slack resources can help firms loosen internal investment constraints, and provide finances, talent, and technology to support projects with long investment return cycles and high risk. Firms with low levels of slack resources must focus their resources on projects with high efficiency and short return cycles [56]. On the one hand, sufficient slack resources provide firms with the flexibility to allocate human, material, and financial resources to engage in green innovation in response to the strategy of environmental corporate social responsibility. Xiao et al. [57] also proposed that high levels of resource slack can decrease resource conflicts and constraints in a firm, so that an environmentally responsible firm can keep investing in environmental development activities, such as introducing and applying green and novel ideas to manufacturing processes. Therefore, green innovation performance can be improved. However, low levels of slack resources mean a firm's capability to

mobilize the necessary resources is limited [29]. Environmentally responsible firms with low levels of slack resources cannot concentrate adequate slack on the improvement of green manufacturing processes, so green innovation performance is less likely to be promoted. On the other hand, green innovation requires a variety of resource inputs, and the investment return cycle is quite long. Thus, green innovation has both risks and benefits. If firms have adequate resource slack, there will be more resources for them to bear risks and achieve green innovation performance in response to a firm's environmentally responsible strategy. Therefore, Hypothesis 3 is developed:

Hypothesis 3. *Resource slack moderates the environmental corporate social responsibility–green innovation performance relationship.*

Figure 1 shows an overview of the research model.

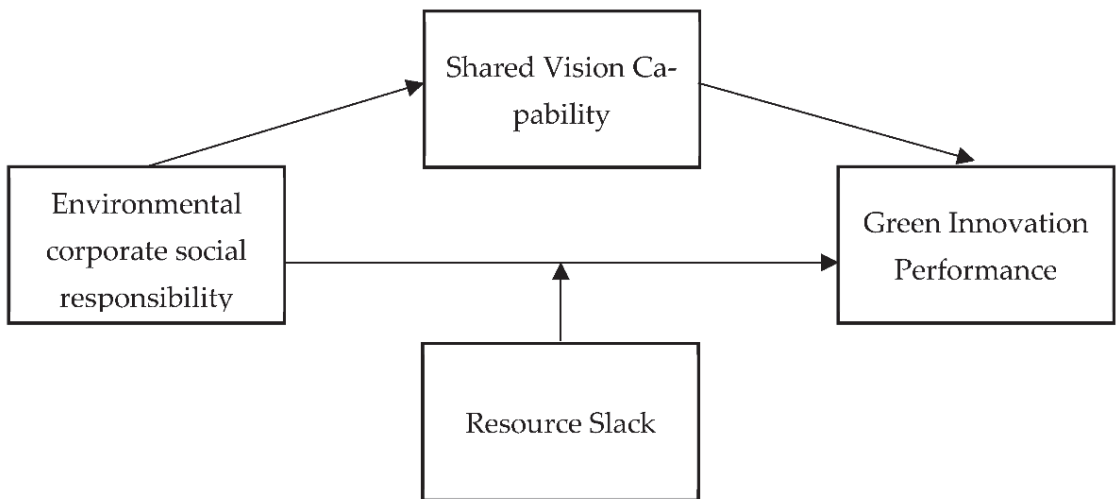


Figure 1. Research model.

3. Research Methodology

3.1. Sample and Data Collection

The study tested the impact of environmental corporate social responsibility on green innovation performance, the mediating role of shared vision capability, and the moderating role of resource slack. Data were collected from a sample of 351 employees from manufacturing firms in China via questionnaires. The data collection period was from March 2022 to June 2022, lasting almost three months. Referring to the study of Daniel et al. [58], we used the single-sample method to explore industry-related environmental corporate social responsibility and green innovation performance. We chose 45 representative firms from the manufacturing industry in China, mainly from Fujian Province, Guangdong Province, Sichuan Province, and Henan Province. Fujian Province, which is the first pilot ecological civilization construction zone in China, is expected to achieve high-quality development by relying on green innovation. As one of the low-carbon pilot provinces, Guangdong Province has implemented a number of measures to call on firms to shoulder environmental responsibility and realize green development. Sichuan Province is a vital industrial center of Western China. Henan reflects the advancement level of the manufacturing industry in Central China to a certain extent.

Ten questionnaires were distributed to each firm. Moreover, we used a probability sampling technique to send the questionnaires to employees. A brief introduction emphasizing the research objective and ensuring the respondents of confidentiality was included

in every questionnaire. The study conducted a time-lagged survey to avoid the potential problems associated with common method variance [59]. On the basis of the hypotheses, we included the responses of employees who replied during the two stages of the survey. At Time 1, participants provided demographic information and rated their environmental corporate social responsibility, resource slack, and shared vision capability. At Time 2 (three weeks afterward), participants needed to evaluate the green innovation performance of the firms they work for. Of 450 questionnaires, we received 372 usable responses from employees, representing an 82.67% return rate. After a rigorous examination of the received instruments, 351 questionnaires were valid, representing 78.00%.

Table 1 gives the sample characteristics: 55.80% of participants were female, and 54.40% of participants were aged between 31 and 40. Over 70.00% of participants had at least a bachelor's degree; 38.70% of participants were junior managers. Moreover, the average job tenure of participants in their firms was 6.39 years. Nearly 60.00% of the firms were private firms; 45.00% of the firms had between 51 and 200 employees, and 40.70% employed over 200 employees; 66.40% of the firms had been established for over 10 years.

Table 1. Sample characteristics of the study ($N = 351$).

Characteristics	Category	Quantity	Percentage
Gender	Male	155	44.20%
	Female	196	55.80%
Age	30 years old or under	134	38.20%
	31–40 years old	191	54.40%
	41–50 years old	20	5.70%
	Over 50	6	1.70%
Education	Senior high school (polytechnic school) or under	8	2.30%
	Junior college	52	14.80%
	Undergraduate	275	78.30%
	Graduate and above	16	4.60%
Job grade	General staff	114	32.50%
	Junior manager	136	38.70%
	Middle manager	92	26.20%
	Senior manager	9	2.60%
Firm type	Private firm	204	58.10%
	Foreign firm	34	9.70%
	State-owned firm	96	27.40%
	Sino-foreign joint venture	17	4.80%
Firm size	Fewer than 20 employees	11	3.10%
	20–50 employees	39	11.10%
	51–200 employees	158	45.00%
	Over 200 employees	143	40.70%
Firm age	10 years or under	118	33.60%
	Over 10 years	233	66.40%

3.2. Measures

We adopted existing well-supported measurement scales to ensure their reliability and validity. Referring to the back-translation procedures recommended by Brislin [60], we translated English-based measure scales into Chinese. Moreover, in order to evaluate the usability and quality of the measure items, we conducted a pre-test. Four experts on enterprise management and 45 manufacturing employees were invited to participate in a pre-test of the questionnaire. Referring to their specialized and useful feedback, we improved the questionnaire to guarantee that the items were suitable for the working contexts in China. The results of the pre-test demonstrated that Cronbach's Alpha of the questionnaire was greater than the criterion [61], showing that all items were appropriate.

All items were measured on the basis of a seven-point Likert scale, in which 1 stood for “strongly disagree”, while 7 stood for “strongly agree”. All measure items are shown in Table A1.

3.2.1. Environmental Corporate Social Responsibility (ECSR)

Environmental corporate social responsibility shows a firm’s voluntary actions including environmental concerns in its operational activities. The measurement of environmental corporate social responsibility was adapted from Farooq et al. [62]. The scale included four items. A sample item is “Our company implements special programs to minimize its negative impact on the natural environment”. Four items generated a Cronbach’s Alpha value of 0.871.

3.2.2. Shared Vision Capability (SVC)

Shared vision capability is a common understanding and identification of firms’ members concerning the firm’s vision, mission, and core values that indicate the developmental direction for the firm in the future. It was measured by six items taken from Luo et al. [27]. A sample item is “I fully understand the meaning of the company’s vision and mission and I can fully explain it in detail.” Six items generated a Cronbach’s Alpha value of 0.895.

3.2.3. Resource Slack (RS)

Resource slack is considered as potentially available resources that a business can divert or redeploy from its operations. The study used three items developed by Gao and Yang [29] to measure resource slack and generated a Cronbach’s Alpha value of 0.875. A sample item is “Our company can obtain resources at short notice to support new strategic initiatives”.

3.2.4. Green Innovation Performance (GIP)

Green innovation performance was the dependent variable in the study and can be described as the success of innovations that a firm implements in association with green products and processes, embracing technologies that help with reducing energy consumption, protecting the environment, reusing waste, eliminating pollution, green product research and development, and firm environmental management. This was operationalized by adopting eight items formulated by Chang et al. [63]. A sample item is “Our company chooses materials that produce the least amount of pollution for conducting the product development or design”. These six items generated a Cronbach’s Alpha value of 0.934.

3.2.5. Control Variables (Con)

Referring to prior studies [31,64], we took gender, age, education, job grade, and job tenure as control variables. For gender, male was coded 1, and female was coded 2. Age was divided into four groups: 30 years old or under, between 31 and 40 years old, between 41 and 50 years old, and over 50 years old, coded as 1–4, respectively. Education was divided into four groups: senior high school (polytechnic school) or under, junior college, undergraduate, or graduate and above, coded as 1–4, respectively. Job grade was divided into four groups: general staff, junior managers, middle managers, and senior managers, coded as 1–4, respectively. Job tenure was assessed by the number of years. Moreover, we controlled for firm type, size, and age. The firm type was divided into four groups: private, foreign, state-owned, and Sino–foreign joint ventures, coded as 1–4, respectively. The number of employees represented firm size and was divided into four groups: fewer than 20, between 20 and 50, between 51 and 200, and over 200, coded as 1–4, respectively. The number of years that the firm had been established was used to measure age. The study divided firm ages into two groups: 10 years or under and over 10 years, coded as 1 or 2, respectively.

3.3. Statistical Modeling

Based on the aforementioned theoretical analysis and research hypotheses, we tested the relationships between environmental corporate social responsibility, shared vision capability, green innovation performance, and resource slack by constructing models to be tested as follows.

$$\text{GIP} = \beta_0 + \beta_1 \text{ECSR} + \sum \alpha_i \text{Con}_i \ (i = 1, 2, 3, 4, 5, 6, 7, 8) + \varepsilon \quad (1)$$

$$\text{SVC} = \beta_0 + \beta_1 \text{ECSR} + \sum \alpha_i \text{Con}_i \ (i = 1, 2, 3, 4, 5, 6, 7, 8) + \varepsilon \quad (2)$$

$$\text{GIP} = \beta_0 + \beta_1 \text{SVC} + \sum \alpha_i \text{Con}_i \ (i = 1, 2, 3, 4, 5, 6, 7, 8) + \varepsilon \quad (3)$$

$$\text{GIP} = \beta_0 + \beta_1 \text{ECSR} + \beta_2 \text{SVC} + \sum \alpha_i \text{Con}_i \ (i = 1, 2, 3, 4, 5, 6, 7, 8) + \varepsilon \quad (4)$$

$$\text{GIP} = \beta_0 + \beta_1 \text{ECSR} + \beta_2 \text{RS} + \beta_3 \text{ECSR} \times \text{RS} + \sum \alpha_i \text{Con}_i \ (i = 1, 2, 3, 4, 5, 6, 7, 8) + \varepsilon \quad (5)$$

Equation (1) was used to test the impact of environmental corporate social responsibility on green innovation performance. Equations (1)–(4) were used to confirm the mediating role of shared vision capability in the relationship between environmental corporate social responsibility and green innovation performance. Equation (5) was used to test the moderating role of resource slack in the relationship between environmental corporate social responsibility and green innovation performance. β_0 , β_1 , β_2 , β_3 , and α_i ($i = 1, 2, 3, 4, 5, 6, 7, 8$) are regression coefficients. ε is a random error term.

3.4. Reliability and Validity

Table 2 shows the results of the reliability and validity analysis of the main constructs via using SPSS v25.0. https://www.ibm.com/products/spss-statistics?lot=5&mhsrc=ibmsearch_a&mhq=spss (accessed on 15 June 2020) As shown in the table, the Composite Reliability values of the four main constructs ranged from 0.757 to 0.881, and Cronbach's Alpha values were between 0.871 and 0.934. Both results indicate that the internal consistency reliability of these measurement scales was acceptable.

Table 2. The reliability and validity analysis results of main constructs.

Constructs	Items	Factor Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted	Square Root of Average Variance Extracted
Environmental Corporate Social Responsibility	ECSR1	0.832	0.871	0.878	0.647	0.804
	ECSR2	0.764				
	ECSR3	0.875				
	ECSR4	0.788				
Shared Vision Capability	SVC1	0.777	0.895	0.894	0.589	0.767
	SVC2	0.799				
	SVC3	0.777				
	SVC4	0.759				
	SVC5	0.815				
	SVC6	0.757				
Resource Slack	RS1	0.858	0.875	0.877	0.705	0.840
	RS2	0.816				
	RS3	0.850				
	GIP1	0.836				
Green Innovation Performance	GIP2	0.818	0.934	0.935	0.707	0.841
	GIP3	0.881				
	GIP4	0.854				
	GIP5	0.780				
	GIP6	0.865				

In order to examine the construct validity, we evaluated the convergent validity and discriminant validity. As presented in Table 2, the average variance extracted values of the

four main constructs were higher than 0.50, which meant that there was good convergent validity among the four main constructs in the study. Furthermore, we conducted an exploratory factor analysis. The factor loading of every measure item was significantly associated with its potential factor, and the factor loadings were greater than 0.70, further confirming the convergent validity [65].

Moreover, the study examined the discriminant validity by comparing the square root of the average variance extracted from four main constructs to the inter-construct correlation coefficient. According to Tables 2 and 3, the square root of the average variance extracted was higher than its correlation coefficients with the other main constructs, showing satisfactory discriminant validity [66]. Thus, the measure scales had good reliability and validity.

Table 3. Descriptive statistics and correlations ($N = 351$).

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender	1.560	0.0497												
2. Age	1.710	0.651	-0.071											
3. Education	2.850	0.514	0.056	-0.138 **										
4. Grade	1.990	0.831	-0.109 *	0.205 **	0.110 *									
5. Tenure	6.390	5.056	-0.149 **	0.647 **	-0.059	0.211 **								
6. Firm type	1.790	1.003	0.093 +	0.046	0.139 **	0.018	0.228 **							
7. Firm size	3.230	0.769	-0.193 **	0.165 **	0.225 **	0.165 **	0.237 **	0.216 **						
8. Firm age	1.660	0.473	-0.098 +	0.211 **	0.159 **	0.027	0.284 **	0.145 **	0.389 **					
9. ESCR	4.650	0.949	0.124 *	-0.009	0.030	0.060	-0.039	-0.070	-0.032	-0.081				
10. SVC	4.060	0.751	0.066	0.034	0.012	0.063	0.027	-0.083	0.041	-0.016	0.361 **			
11. GIP	4.042	1.019	0.029	-0.104 *	0.018	0.030	-0.111 *	-0.069	0.047	-0.081	0.343 **	0.347 **		
12. RS	4.058	1.201	0.014	0.033	0.042	0.122 *	-0.034	-0.085	0.030	0.014	0.354 **	0.338 **	0.394 **	

Note: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.

4. Results

4.1. Common Method Bias (CMB)

Since we used employee responses to a questionnaire, the underlying common method bias (CMB) needed to be tested [67]. In order to avoid the risk of common method bias, Harman's single-factor test was adopted to examine whether there was a possible effect of CMB via using SPSS 25.0. The results illustrated that all the main constructs had eigenvalues higher than 1.00 and together accounted for 73.574% of the variance. The first construct accounted for 38.766% of the variance and was below 40.00%. Furthermore, a confirmatory factor analysis was conducted to evaluate CMB using MPLUS 7.0. <http://www.statmodel.com/verhistory.shtml> (accessed on 17 July 2020) [68]. The fit indices of one single factor model were $\chi^2/df = 17.073$, comparative fit index (CFI) = 0.480, Tucker Lewis index (TLI) = 0.415, standardized root mean square residual (SRMR) = 0.171, and root mean squared error of approximation (RMSEA) = 0.214. These were unacceptable and significantly worse than for other measurement models, illustrating that there were several disconnected factors. Thus, CMB may not be a concern in the study.

4.2. Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was adopted to ensure that the four main constructs had good discriminant validity using MPLUS 7.0. Following the practice of Keem et al. [69], a four-factor model, two three-factor models, a two-factor model, and a single-factor model were included in the confirmatory factor analysis. Results showed that the four-factor model (environmental corporate social responsibility, shared vision capability, resource slack, and green innovation performance) fit the data well: $\chi^2/df = 3.421$, CFI = 0.925, TLI = 0.912, SRMR = 0.047, and RMSEA = 0.083. For one three-factor model, we loaded environmental corporate social responsibility and green innovation performance indicators on a factor, and the results were $\chi^2/df = 7.936$, CFI = 0.780, TLI = 0.748, SRMR = 0.115, and RMSEA = 0.141. For the other, the study loaded shared vision capability and resource slack indicators on a factor, and the results were $\chi^2/df = 6.730$, CFI = 0.818, TLI = 0.792, SRMR = 0.099, and RMSEA = 0.128. In the two-factor model, we loaded shared vision capability, green innovation performance, and resource slack indicators on

a factor, and the results were $\chi^2/df = 13.099$, CFI = 0.611, TLI = 0.560, SRMR = 0.155, and RMSEA = 0.186. As stated above, for a model in which all four constructs were set to load on a single factor, the results were $\chi^2/df = 17.073$, CFI = 0.480, TLI = 0.415, SRMR = 0.171, RMSEA = 0.214. As the results show, the research model was acceptable and significantly better than the measure models.

4.3. Descriptive Statistics

The means (M), standard deviations (SD), and correlations of all variables are reported in Table 3. The mean values (standard deviations) of environmental corporate social responsibility and green innovation performance were 4.650 (0.949) and 4.042 (1.019), demonstrating that Chinese firms have shouldered environmental corporate social responsibility more actively in recent years. However, there was heterogeneity in terms of green innovation performance among these firms. The mean value of shared vision capability was 4.060, indicating that employees tended to identify with firms that actively shouldered environmental corporate social responsibility. The mean value of resource slack was 4.058 and the standard deviation was 1.201, which showed that there was a difference in resource slack between firms. Moreover, as the results show, environmental corporate social responsibility was positively associated with green innovation performance ($r = 0.343, p < 0.01$) and shared vision capability ($r = 0.361, p < 0.01$). The results also confirm that shared vision capability was significantly related to green innovation performance ($r = 0.347, p < 0.01$). Moreover, resource slack was found to be positively associated with green innovation performance ($r = 0.394, p < 0.01$), and also with shared vision capability at work ($r = 0.338, p < 0.01$).

4.4. Hypothesis Testing

We used a hierarchical regression analysis to examine the proposed hypotheses in SPSS 25.0 [69]. Table 4 shows the results of the hypothesis testing. Firstly, environmental corporate social responsibility had a significantly positive impact on green innovation performance ($\beta = 0.360, p < 0.01$). Therefore, Hypothesis 1 was confirmed.

Table 4. Hierarchical regression analysis results.

Variables		Shared Vision Capability			Green Innovation Performance				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Control Variables	Gender	0.154 ⁺	0.082	0.089	−0.004	0.018	−0.032	0.005	0.060
	Age	−0.001	−0.004	−0.118	−0.122	−0.117	−0.120	−0.153	−0.147
	Education	0.012	−0.006	−0.015	−0.037	−0.020	−0.035	−0.050	−0.052
	Grade	0.048	0.026	0.057	0.028	0.035	0.019	−0.010	0.007
	Tenure	0.007	0.008	−0.011	−0.011	−0.015	−0.014	−0.005	−0.004
	Firm type	−0.088 [*]	−0.066	−0.072	−0.044	−0.032	−0.021	−0.025	−0.032
	Firm size	0.077	0.070	0.162 [*]	0.153 [*]	0.127	0.129 ⁺	0.144 ⁺	0.156 [*]
Independent Variable	Firm age	−0.058	−0.018	−0.178	−0.126	−0.151	−0.119	−0.157	−0.164
	ECSR		0.277 ^{**}		0.360 ^{**}		0.264 ^{**}	0.243 ^{**}	0.305 ^{**}
Mediator	SVC					0.463 ^{**}	0.347 ^{**}		
	RS							0.267 ^{**}	0.254 ^{**}
Moderator	ECSR × RS								0.126 ^{**}
	R ²	0.025	0.143	0.034	0.034	0.147	0.199	0.227	0.257
Interaction Variable	ΔR ²	0.025	0.118	0.143	0.109	0.114	0.165	0.193	0.03
	F	1.098	47.069 ^{**}	1.499	43.210 ^{**}	45.426 ^{**}	34.974 ^{**}	42.408 ^{**}	13.876 ^{**}

Note: ⁺ $p < 0.10$; ^{*} $p < 0.05$; ^{**} $p < 0.01$.

Hypothesis 2 proposed that shared vision capability mediates the relationship between environmental corporate social responsibility and green innovation performance. Referring to the traditional testing methods recommended by Baron and Kenny [70], we evaluated the mediating role of shared vision capability: (1) controlling for gender, age,

education, job grade, job tenure, firm type, firm size, and firm age, and environmental corporate social responsibility positively affected shared vision capability ($\beta = 0.277, p < 0.01$); (2) environmental corporate social responsibility had a positive impact on green innovation performance ($\beta = 0.360, p < 0.01$); (c) shared vision capability had a positive influence on green innovation performance ($\beta = 0.463, p < 0.01$); and (d) after taking shared vision capability into account, the impact of environmental corporate social responsibility on green innovation performance became smaller and significant ($\beta = 0.264, p < 0.01$), which represented partial mediation. To confirm the robustness of the mediating role of shared vision capability, we used PROCESS, an SPSS macro (95% CI, 1000 bootstrap resamples) to examine it. The results indicated that environmental corporate social responsibility had a positive influence on green innovation performance through shared vision capability (Indirect effect = 0.096, CI (0.048,0.154)), supporting Hypothesis 2.

Hypothesis 3 predicted that firms with high levels of slack resources can strengthen their green innovation performance even more via shouldering environmental corporate social responsibility than firms with low levels of slack resources. As shown in Table 4, the results demonstrated that the interaction between environmental corporate social responsibility and resource slack had a statistically significant and positive impact on green innovation performance ($\beta = 0.126, p < 0.01$). In order to further demonstrate the moderating role of resource slack, we drew interaction diagrams on the basis of a procedure suggested by Aiken and West [71]. Figure 2 depicts how the positive impact of environmental corporate social responsibility on green innovation performance is stronger with high levels of resource slack (1 SD above the mean) than with low levels of resource slack (1 SD below the mean). Moreover, to test Hypothesis 3, we adopted a simple slope analysis. The simple slope test showed that environmental corporate social responsibility was more strongly correlated to increased green innovation performance with high levels of resource slack (slope = 1.042, $t = 4.711, p < 0.01$) than with low levels of resource slack (slope = 0.665, $t = 5.119, p < 0.01$). Thus, Hypothesis 3 was supported.

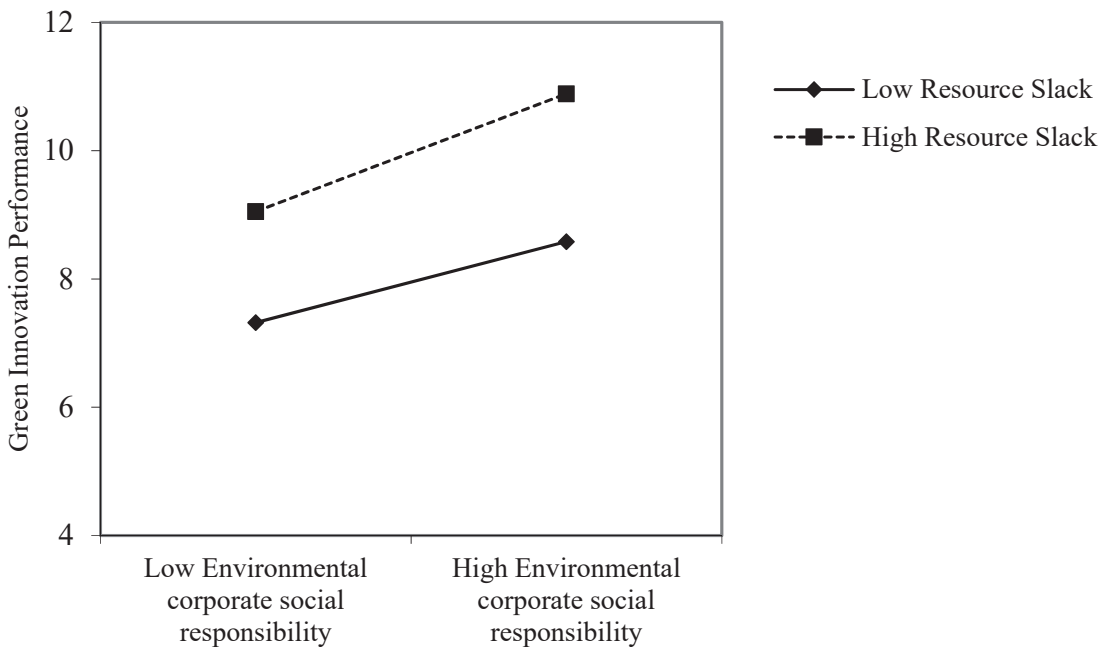


Figure 2. The moderating effect of resource slack.

For the sake of confirming the findings about the moderating role of resource slack, we adopted PROCESS, an SPSS macro (95% CI, 1000 bootstrap resamples), to examine Hypothesis 3. As shown in Table 5, environmental corporate social responsibility had a significant and direct influence on green innovation performance with high levels of resource slack (Effect = 0.408; CI (0.249, 0.567)). However, the moderating effect was smaller with low levels of resource slack (Effect = 0.119; CI (0.004, 0.234)). Hypothesis 3 was supported again.

Table 5. The impact of environmental corporate social responsibility on green innovation performance on different levels of resource slack.

RS	Effect	Boot SE	Boot LCI	Boot UCI
Mean – 1 SD	0.119	0.058	0.004	0.234
Mean	0.201	0.056	0.092	0.311
Mean + 1 SD	0.408	0.081	0.249	0.567

5. Discussion

5.1. Theoretical Implications

Firstly, extant studies indicated that there is a positive impact of corporate social responsibility on firms' outcomes [43,72]. However, few studies have explored the environmental corporate social responsibility–green innovation performance relationship, and the correlation mechanism is still unclear. On the basis of social identity theory, we confirmed that environmental corporate social responsibility is positively associated with green innovation performance via shared vision capability. This finding indicates that a future research direction might be exploring corresponding mechanisms by which corporate social responsibility connects to firms' outcomes [73]. Moreover, there are conflicting views on the impact of corporate social responsibility on innovation outcomes [74,75]. This finding can also help to clarify the inconclusive results of previous studies by suggesting that a mediating role of shared vision capability exists between environmental corporate social responsibility and green innovation performance.

Secondly, most prior studies have confirmed that green customer and supplier integration [7], green absorptive capacity [45], and organizational green learning [10] can be drivers of green innovation performance. The study provides new insight into the antecedents of green innovation performance. We scrutinized the environmental corporate social responsibility–green innovation performance link and the shared vision capability–green innovation performance link in Chinese firms. The results of the data analysis indicate that environmental corporate social responsibility and shared vision capability are positively associated with green innovation performance, which expands the existing research on the antecedents of green innovation performance. The finding also responds to the call of Du et al. [7], who put forward future research directions that deepen the research on the antecedents of green innovation performance.

Finally, we found that resource slack played a positive moderating role in the relationship between environmental corporate social responsibility and green innovation performance. Previous studies showed that resource slack can moderate the corporate social responsibility–firms' outcomes relationship. Alshorman et al. [76] empirically confirmed that resource slack moderated the influence of corporate social responsibility on firm market value by investigating 95 nonfinancial Jordanian firms. Xie [77] found that slack resources can improve the positive link between corporate social responsibility and green technology innovation. Our finding extends the knowledge pool by linking the environmental corporate social responsibility, resource slack, and green innovation performance literature [7,11,76]. Meanwhile, the finding about the moderating role of resource slack verifies the proposition of resource-based theory [29]. High levels of resource slack can provide firms with adequate human, material, and financial resources to innovatively make manufacturing processes greener and lower carbon in response to an environmentally

responsible strategy. Thus, we further clarified the boundary conditions of the effect of environmental corporate social responsibility on green innovation performance, which deepens the research conclusions of Mo et al. [73] and gives insight into the moderating role of resource slack on the corporate social responsibility–firms' outcomes relationship.

5.2. Managerial Implications

The above findings offer some practical implications for managers of firms aiming at gaining competitive advantages via improving green innovation. Firstly, the study indicates that environmental corporate social responsibility can help to promote green innovation performance. The practical value of the result lies in a better understanding of how environmental corporate social responsibility contributes to the improvement of green innovation performance. Firms should actively integrate environmental concerns into their competitive strategy, operations, and commercial activities, which can help them adhere to the national strategy of building an environmentally friendly society and ensure needed resources from internal and external stakeholders, such that green innovation performance can be improved. Moreover, firms' environmentally responsible initiatives can be communicated to the public via brochures and advertisements, which can let the public know that the firm's manufacturing processes and products are green and low carbon. Thereby, green innovation performance can be improved.

Secondly, firms should concentrate on fostering shared vision capabilities when carrying out environmental corporate social responsibility strategies. The study shows that shared vision capability can mediate the impact of environmental corporate social responsibility on green innovation performance. Thus, when a firm is formulating an environmental corporate social responsibility strategy, it needs to pay close attention to how it transmits information to employees. That is to say, the firm should help all members comprehend the firm's environmental responsibility efforts and make them feel oneness and pride with the firm, which can help firms to strengthen their green innovation performance.

Finally, managers can take advantage of the interplay between resource slack and environmental corporate social responsibility to improve their green innovation performance. As stated above, managers should focus not only on increasing available resources but also on slack resource allocation. Therefore, firms should play a more active role in making effective use of resources to strengthen green innovation performance in response to the environmentally responsible strategy. Meanwhile, when firms have a large number of discretionary resources, managers need to concentrate on slackness and inefficiency to prevent abusing slack resources.

6. Conclusions, Limitations, and Directions for Future Research

6.1. Conclusions

In this study, we have investigated the roles of environmental corporate social responsibility, shared vision capability, and resource slack in improving green innovation performance based on a sample of Chinese companies. We found that environmental corporate social responsibility is significantly associated with green innovation performance, and shared vision capability mediates the environmental corporate social responsibility–green innovation performance relationship. Our findings also indicate that, when the level of resource slack is higher, the relationship between environmental corporate social responsibility and green innovation performance can be stronger.

This study makes three major contributions to extant literature and practices. Firstly, it provides a better research model for comprehending both the direct and indirect impacts of environmental corporate social responsibility on green performance. By concentrating on the mediating effect of shared vision capability, which is overlooked in a number of prior studies, we emphasize the collective understanding of a firm's vision to maximize the impact of environmental corporate social responsibility on green innovation performance.

Secondly, the study offers empirical evidence that resource slack has an indirect effect (moderating role) on the link between environmental corporate social responsibility and

green innovation performance. Though the significance of resource slack was acknowledged in prior studies [78,79], its moderating effect in the environmental corporate social responsibility–green innovation performance relationship remains somewhat ambiguous. Our findings expand the extant literature and enhance our understanding of the moderating role of resource slack on the influence of environmental corporate social responsibility on green innovation performance, which offers firms more measures to improve green innovation performance.

Finally, the study empirically examines the impact of environmental corporate social responsibility on green innovation performance and takes shared vision capability as a mediator and resource slack as a moderator in the Chinese context. In recent years, the central government has issued strict environment protection regulations encouraging firms to save energy and reduce emissions in the production process, which is aimed at realizing the goals of peak emissions and carbon neutrality by 2060. Due to the policy background and unique business environment, firms in China can have different performances in environmental corporate social responsibility, shared vision capability, resource slack, and green innovation performance. Therefore, our findings offer a well-timed and discerning contribution to comprehending the role of environmental corporate social responsibility in the Chinese business context.

6.2. Limitations and Directions for Future Research

There are some limitations to the study. Firstly, it explores the causality in the environmental corporate social responsibility–green innovation performance relationship. Although the study tests the direct impact of environmental corporate social responsibility on green innovation performance, the mediating role of shared vision capability and the moderating role of resource slack between them via time-lagged measures for the main variables, there are difficulties in making causal inferences due to the correlational design of the research. The conclusions of the study provide the directionality of the environmental corporate social responsibility–green innovation performance relationship, which is developed by more theoretical than empirical perspectives. Moreover, in the future, a longitudinal study design can be used to explore the complicated relationships between environmental corporate social responsibility, shared vision capability, resource slack, and green innovation performance, which can make the conclusions more precise and generalized.

Secondly, the impact of environmental corporate social responsibility on green innovation performance can be divergent for firms in different cultures. The study relied on a survey of Chinese employees and thus such a cultural effect may exist. Future studies can validate the research in different countries to confirm the generality of the research model.

Thirdly, the study collected self-reported data using a questionnaire. Although we have purposefully obtained primary data, each questionnaire with four main variable measurement scales and a basic characteristics information form is filled out by one employee according to his/her own subjective evaluation, which may involve some deviation. Future studies can adopt public secondary data to test our research model and compare the results with our study in order to strengthen the robustness of the research conclusions.

Finally, the study focuses on the mediating role of shared vision capabilities, and the moderating role of resource slack in the environmental corporate social responsibility–green innovation performance relationship on the basis of social identity theory and resource-based theory. Future studies can explore contextual factors (e.g., green organizational climate and institutional pressures) that serve as moderators. Moreover, the study has bridged the relationship between environmental corporate social responsibility and green innovation performance through shared vision capability. Future studies can also consider dynamic capability, corporate social capital, and green trust as mediators to deepen the study of the environmental corporate social responsibility–green innovation performance relationship. Meanwhile, not only social identity theory and resource-based theory but also resource slack theory can be a theoretical basis for exploring the relationship between

environmental corporate social responsibility and green innovation performance. Therefore, future studies can adopt the resource slack theory to further investigate the environmental corporate social responsibility–green innovation performance link.

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Appendix A

Table A1. Measure items of the questionnaire.

Constructs	Items Numbers	Measurement Items	References
Gender	Control Variable 1	Male Female	
Age	Control Variable 2	30 years old or under 31–40 years old 41–50 years old Over 50	
Education	Control Variable 3	Senior high school (polytechnic school) or under Junior college Undergraduate Graduate and above	
Grade	Control Variable 4	General staff Junior managers Middle managers Senior managers	Afsar et al. [64]; Liao and Long [31]
Tenure	Control Variable 5	Fill-in-the-blank question	
Firms' type	Control Variable 6	Private firms Foreign firms State-owned firms Sino–foreign joint venture	
Firms' size	Control Variable 7	Fewer than 20 employees 20–50 employees 51–200 employees Over 200 employees	
Firms' Age	Control Variable 8	10 years or under Over 10 years	

Table A1. Cont.

Constructs	Items Numbers	Measurement Items	References
Environmental Corporate Social Responsibility	ECSR1	Our company participates in activities which aim to protect and improve the quality of the natural.	Farooq et al. [62]
	ECSR2	Our company makes investments to create a better life for future generations.	
	ECSR3	Our company implements special programs to minimize its negative impact on the natural environment.	
	ECSR4	Our company targets sustainable growth which considers future generations.	
Shared Vision Capability	SVC1	I fully understand the meaning of our company's vision and mission and I can fully explain it in detail.	Luo et al. [27]
	SVC2	I can understand the meaning of the phrase "make culture" embedded in our vision.	
	SVC3	I fully engaged and in accordance with our company's vision and mission.	
	SVC4	I can explain our company's vision and mission and business direction in detail.	
	SVC5	Vision and business direction of our company are adequately set.	
	SVC6	I know what need to do in order to achieve our company's vision.	
Resource Slack	RS1	Our company has a pool of uncommitted resources that can quickly be used to fund new strategic initiatives.	Gao and Yang [27]
	RS2	Our company can obtain resources at short notice to support new strategic initiatives.	
	RS3	Our company has substantial resources at the discretion of management for funding new strategic initiatives.	
Green Innovation Performance	GIP1	Our company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design.	Chang et al. [63]
	GIP2	Our company chooses the materials of their products that consume the least amount of energy and resources for conducting the product development or design.	
	GIP3	Our company would circumspectly evaluate whether their products are easy to recycle, reuse, and decompose for conducting the product development or design.	
	GIP4	The manufacturing process of our company effectively reduces the emission of hazardous substances or wastes.	
	GIP5	The manufacturing process of our company effectively recycles wastes and emissions that can be treated and reused.	
	GIP6	The manufacturing process of our company effectively reduces the consumption of water, electricity, coal, or oil.	

References

1. Qin, Y.; Harrison, J.; Chen, L. A framework for the practice of corporate environmental responsibility in China. *J. Clean. Prod.* **2019**, *235*, 426–452. [[CrossRef](#)]
2. Dangelico, R.M.; Pujari, D.; Pontrandolfo, P. Green product innovation in manufacturing firms: A sustainability-oriented dynamic capability perspective. *Bus. Strateg. Environ.* **2017**, *26*, 490–506. [[CrossRef](#)]
3. Qi, G.; Zou, H.; Xie, X. Governmental inspection and green innovation: Examining the role of environmental capability and institutional development. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1774–1785. [[CrossRef](#)]
4. Nuryakin, N.; Maryati, T. Green product competitiveness and green product success. Why and how does mediating affect green innovation performance? *Entrep. Sustain. Issues* **2020**, *7*, 3061–3077. [[CrossRef](#)]
5. Kesidou, E.; Demirel, P. On the drivers of eco-innovations: Empirical evidence from the UK. *Res. Policy* **2012**, *41*, 862–870. [[CrossRef](#)]
6. Zhang, Y.; Li, H. Innovation search of new ventures in a technology cluster: The role of ties with service intermediaries. *Strateg. Manag. J.* **2010**, *31*, 88–109. [[CrossRef](#)]
7. Du, L.; Zhang, Z.; Feng, T. Linking green customer and supplier integration with green innovation performance: The role of internal integration. *Bus. Strat. Environ.* **2018**, *27*, 1583–1595. [[CrossRef](#)]
8. Feng, T.; Sun, L.; Zhang, Y. The effects of customer and supplier involvement on competitive advantage: An empirical study in China. *Ind. Market. Manag.* **2010**, *39*, 1384–1394. [[CrossRef](#)]
9. Chen, P.C.; Wan, S.; Hung. Collaborative green innovation in emerging countries: A social capital perspective. *Int. J. Oper. Prod. Manag.* **2014**, *34*, 347–363. [[CrossRef](#)]
10. Wang, N.; Zhang, J.; Zhang, X.; Wang, W. How to improve green innovation performance: A conditional process analysis. *Sustainability* **2022**, *14*, 2938. [[CrossRef](#)]
11. Liu, Y.; Xi, B.; Wang, G. The impact of corporate environmental responsibility on financial performance-based on Chinese listed companies. *Environ. Sci. Pollut. Res.* **2021**, *28*, 7840–7853. [[CrossRef](#)] [[PubMed](#)]
12. Wang, S.; Wang, H.; Wang, J.; Yang, F. Does environmental information disclosure contribute to improve firm financial performance? an examination of the underlying mechanism. *Sci. Total Environ.* **2020**, *714*, 136855. [[CrossRef](#)]
13. Carroll, A.B. A three-dimensional conceptual model of corporate performance. *Acad. Manag. Rev.* **1979**, *4*, 497–505. [[CrossRef](#)]
14. McWilliams, A.; Siegel, D. Corporate social responsibility: A theory of the firm perspective. *Acad. Manag. Rev.* **2001**, *26*, 117–127. [[CrossRef](#)]
15. Cheng, B.; Ioannou, I.; Serafeim, G. Corporate social responsibility and access to finance. *Strateg. Manag. J.* **2014**, *35*, 1–23. [[CrossRef](#)]
16. Long, W.; Li, S.; Wu, H.; Song, X. Corporate social responsibility and financial performance: The roles of government intervention and market competition. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 525–541. [[CrossRef](#)]
17. Hakobyan, N.; Khachatryan, A.; Vardanyan, N.; Chortok, Y.; Starchenko, L. The implementation of corporate social and environmental responsibility practices into competitive strategy of the company. *Market. Manag. Innov.* **2019**, *2*, 42–51. [[CrossRef](#)]
18. Javed, M.; Rashid, M.A.; Hussain, G.; Ali, H.Y. The effects of corporate social responsibility on corporate reputation and firm financial performance: Moderating role of responsible leadership. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1395–1409. [[CrossRef](#)]
19. Choi, W.Y.; Lee, H.; Hong, C. Corporate social responsibility and firm value: Focused on corporate contributions. *Korean Manag. Rev.* **2009**, *38*, 407–432.
20. Bacinello, E.; Tontini, G.; Alberton, A. Influence of maturity on corporate social responsibility and sustainable innovation in business performance. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 749–759. [[CrossRef](#)]
21. Bereskin, F.L.; Campbell, T.C.; Hsu, P.H. Corporate philanthropy, research networks, and collaborative innovation. *Financ. Manag.* **2016**, *45*, 175–206. [[CrossRef](#)]
22. Wang, Z.; Zhang, J. Nexus between corporate environmental performance and corporate environmental responsibility on innovation performance. *Environ. Dev. Sustain.* **2022**, *30*, 1–28. [[CrossRef](#)]
23. Dorobantu, S.; Kaul, A.; Zelnor, B. Nonmarket strategy research through the lens of new institutional economics: An integrative review and future directions. *Strateg. Manag. J.* **2017**, *38*, 114–140. [[CrossRef](#)]
24. Ashforth, B.E.; Mael, F. Social identity theory and the organization. *Acad. Manag. Rev.* **1989**, *14*, 20–39. [[CrossRef](#)]
25. Chen, L.; Ruan, R.; He, P. The double-edged sword: A work regulatory focus perspective on the relationship between organizational identification and innovative behaviour. *Creat. Innov. Manag.* **2022**, *31*, 64–76. [[CrossRef](#)]
26. Bae, J.; Park, H. The impact of SME's organizational capabilities on proactive CSR and corporate performance: The mediating effect of proactive CSR. *J. Serv. Res. Stud.* **2016**, *6*, 101–118. [[CrossRef](#)]
27. Luo, W.; Zhang, C.; Li, M. The influence of corporate social responsibilities on sustainable financial performance: Mediating role of shared vision capabilities and moderating role of entrepreneurship. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 1266–1282. [[CrossRef](#)]
28. Ruan, R.; Chen, W.; Zhu, Z. Research on the relationship between environmental corporate social responsibility and green innovative behavior: The moderating effect of moral identity. *Environ. Sci. Pollut. Res.* **2022**, *29*, 52189–52203. [[CrossRef](#)]
29. Gao, L.; Yang, F. Do resource slack and green organizational climate moderate the relationships between institutional pressures and corporate environmental responsibility practices of SMEs in China? *Environ. Dev. Sustain.* **2022**, *8*, 1–26. [[CrossRef](#)]

30. Huang, J.; Xie, P.; Zeng, Y.; Li, Y. The effect of corporate social responsibility on the technology innovation of high-growth business organizations. *Sustainability* **2021**, *13*, 7286. [[CrossRef](#)]
31. Liao, Z.; Long, S. CEOs' regulatory focus, slack resources and firms' environmental innovation. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 981–990. [[CrossRef](#)]
32. George, G. Slack resources and the performance of privately held firms. *Acad. Manag. J.* **2005**, *48*, 661–676. [[CrossRef](#)]
33. Wernerfelt, B. A resource-based view of the firm. *Strateg. Manag. J.* **1984**, *5*, 171–180. [[CrossRef](#)]
34. Barney, J.B. Firm resource and sustained competitive advantage. *J. Manag.* **1991**, *17*, 99–120. [[CrossRef](#)]
35. Melander, L. Customer and supplier collaboration in green product innovation: External and internal capabilities. *Bus. Strat. Env.* **2017**, *27*, 677–693. [[CrossRef](#)]
36. Chen, Y.S. The driver of green innovation and green image-green core competence. *J. Bus. Ethics* **2008**, *81*, 531–543. [[CrossRef](#)]
37. Nanath, K.; Pillai, R.R. The influence of green IS practices on competitive advantage: Mediation role of green innovation performance. *Inform. Syst. Manag.* **2016**, *34*, 3–19. [[CrossRef](#)]
38. Huang, Y.; Sarfraz, M.; Khalid, R.; Ozturk, I.; Tariq, J. Does corporate social responsibility and green product innovation boost organizational performance? a moderated mediation model of competitive advantage and green trust. *Econ. Res.* **2022**, *35*, 1–21. [[CrossRef](#)]
39. Ji, H.; Miao, Z. Corporate social responsibility and collaborative innovation: The role of government support. *J. Clean. Prod.* **2020**, *260*, 121028. [[CrossRef](#)]
40. Zhou, Z.; Ki, E. Exploring the role of CSR fit and the length of CSR involvement in routine business and corporate crises settings. *Public Relat. Rev.* **2018**, *44*, 75–83. [[CrossRef](#)]
41. Iyer, G.; Soberman, D.A. Social responsibility and product innovation. *Market. Sci.* **2016**, *35*, 727–742. [[CrossRef](#)]
42. Flammer, C. Competing for government procurement contracts: The role of corporate social responsibility. *Strateg. Manag. J.* **2018**, *39*, 1299–1324. [[CrossRef](#)]
43. Ko, K.C.; Nie, J.; Ran, R.; Gu, Y. Corporate social responsibility, social identity, and innovation performance in China. *Pac-Basin Financ. J.* **2020**, *6*, 101415. [[CrossRef](#)]
44. Katila, R. New product search over time: Past ideas in their prime? *Acad. Manag. J.* **2002**, *45*, 995–1010. [[CrossRef](#)]
45. Chen, Y.S.; Chang, C.H.; Lin, Y.H. The determinants of green radical and incremental innovation performance: Green shared vision, green absorptive capacity, and green organizational ambidexterity. *Sustainability* **2014**, *6*, 7787–7806. [[CrossRef](#)]
46. Lu, W.; Ye, M.; Chau, K.W.; Flanagan, R. The paradoxical nexus between corporate social responsibility and sustainable financial performance: Evidence from the international construction business. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 844–852. [[CrossRef](#)]
47. Colakoglu, S. Shared vision in MNE subsidiaries: The role of formal, personal, and social control in its development and its impact on subsidiary learning. *Thunderbird Int. Bus.* **2012**, *54*, 639–652. [[CrossRef](#)]
48. Aguinis, H.; Glavas, A. On corporate social responsibility, sensemaking, and the search for meaningfulness through work. *J. Manag.* **2019**, *45*, 1057–1086. [[CrossRef](#)]
49. Afridi, S.A.; Afsar, B.; Shahjehan, A.; Rehman, Z.U.; Haider, M.; Ullah, M. Perceived corporate social responsibility and innovative work behavior: The role of employee volunteerism and authenticity. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1865–1877. [[CrossRef](#)]
50. O'Reilly, C.A.; Tushman, M.L. Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Res. Organ. Behav.* **2008**, *28*, 185–206. [[CrossRef](#)]
51. Yang, J.J.; Huang, S.Z. A study on the effects of supply chain relationship quality on firm performance under the aspect of shared vision. *J. Interdiscip. Math.* **2018**, *21*, 419–430. [[CrossRef](#)]
52. Nohria, N.; Gulati, R. Is slack good or bad for innovation? *Acad. Manag. J.* **1996**, *39*, 1245–1264. [[CrossRef](#)]
53. Jiao, J.; Liu, C.G.; Xu, Y.; Hao, Z.R. Effects of strategic flexibility and organizational slack on the relationship between green operational practices adoption and firm performance. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 561–577. [[CrossRef](#)]
54. Duque-Grisales, E.; Aguilera-Caracuel, J. Environmental, social and governance (ESG) scores and financial performance of multinationals: Moderating effects of geographic international diversification and financial slack. *J. Bus. Ethics* **2021**, *168*, 315–334. [[CrossRef](#)]
55. Mattingly, J.E.; Olsen, L. Performance outcomes of investing slack resources in corporate social responsibility. *J. Leadersh. Organ. Stud.* **2018**, *25*, 1–18. [[CrossRef](#)]
56. Danneels, E. Organizational antecedents of second-order competences. *Strateg. Manag. J.* **2008**, *29*, 519–543. [[CrossRef](#)]
57. Xiao, C.; Wang, Q.; van Donk, D.P.; van der Vaart, T. When are stakeholder pressures effective? An extension of slack resources theory. *Int. J. Prod. Econ.* **2018**, *199*, 138–149. [[CrossRef](#)]
58. Daniel, F.; Lohrke, F.T.; Fornaciari, C.J.; Turner, R.A. Slack resources and firm performance: A meta-analysis. *J. Bus. Res.* **2004**, *57*, 565–574. [[CrossRef](#)]
59. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.Y.; Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **2003**, *88*, 879–903. [[CrossRef](#)]
60. Brislin, R.W. Back-translation for cross-cultural research. *J. Cross. Cult. Psychol.* **1970**, *1*, 185–216. [[CrossRef](#)]
61. Nunnally, J.; Bernstein, I. *Psychometric Theory*; McGraw-Hill: New York, NY, USA, 1978.

62. Farooq, M.; Farooq, O.; Jasimuddin, S.M. Employees response to corporate social responsibility: Exploring the role of employees' collectivist orientation. *Eur. Manag. J.* **2014**, *32*, 916–927. [[CrossRef](#)]
63. Chang, C.H.; Chen, Y.S. Green organizational identity and green innovation. *Manag. Decis.* **2013**, *51*, 1056–1070. [[CrossRef](#)]
64. Afsar, B.; Al-Ghazali, B.; Umrani, W. Corporate social responsibility, work meaningfulness, and employee engagement: The joint moderating effects of incremental moral belief and moral identity centrality. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1–15. [[CrossRef](#)]
65. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Market. Res.* **1981**, *18*, 29–50. [[CrossRef](#)]
66. Ru, X.; Qin, H.; Wang, S. Young people's behaviour intentions towards reducing PM2.5 in China: Extending the theory of planned behaviour. *Resour. Conserv. Recy.* **2019**, *141*, 99–108. [[CrossRef](#)]
67. Podsakoff, P.M.; Organ, D.W. Self-reported in organizational research: Problems and prospects. *J. Manag.* **1986**, *12*, 531–544. [[CrossRef](#)]
68. Sanchez, J.I.; Brock, P. Outcomes of perceived discrimination among Hispanic employees: Is diversity management a luxury or a necessity? *Acad. Manag. J.* **1996**, *39*, 704–719. [[CrossRef](#)]
69. Keem, S.; Shalley, C.E.; Kim, E.; Jeong, I. Are creative individuals bad apples? A dual pathway model of unethical behavior. *J. Appl. Psychol.* **2018**, *103*, 416–431. [[CrossRef](#)]
70. Baron, R.M.; Kenny, D.A. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* **1986**, *51*, 1173–1182. [[CrossRef](#)]
71. Aiken, L.S.; West, S.G.; Reno, R.R. *Multiple Regression: Testing and Interpreting Interactions*; Sage Publications: Newbury Park, CA, USA, 1991.
72. Ioannou, I.; Serafeim, G. The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strateg. Manag. J.* **2015**, *36*, 1053–1081. [[CrossRef](#)]
73. Mo, X.; Boadu, F.; Liu, Y.; Chen, Z.; Ofori, A.S. Corporate social responsibility activities and green innovation performance in organizations: Do managerial environmental concerns and green absorptive capacity matter? *Front. Psychol.* **2022**, *13*, 938682. [[CrossRef](#)] [[PubMed](#)]
74. Mithani, M.A. Innovation and CSR-do they go well together? *Long Range Plan* **2017**, *50*, 699–711. [[CrossRef](#)]
75. Szutowski, D.; Ratajczak, P. The relation between CSR and innovation. Model approach. *J. Entrep. Manag. Innov.* **2016**, *12*, 77–94. [[CrossRef](#)]
76. Alshorman, S.; Qaderi, S.; Alhmoud, T.; Meqbel, R. The role of slack resources in explaining the relationship between corporate social responsibility disclosure and firm market value: A case from an emerging market. *J. Sustain. Financ. Inv.* **2022**, *9*, 1–26. [[CrossRef](#)]
77. Xie, Y. The relationship between firms' corporate social performance and green technology innovation: The moderating role of slack resources1. *Front. Environ. Sci.* **2022**, *10*, 949146. [[CrossRef](#)]
78. Soetanto, D.; Jack, S.L. Slack resources, exploratory and exploitative innovation and the performance of small technology-based firms at incubators. *J. Technol. Transf.* **2018**, *43*, 1213–1231. [[CrossRef](#)]
79. Sun, Y.; Du, S.; Ding, Y. The relationship between slack resources, resource bricolage, and entrepreneurial opportunity identification-based on resource opportunity perspective. *Sustainability* **2020**, *12*, 1199. [[CrossRef](#)]

Article

The Impact of TMT Experience Heterogeneity on Enterprise Innovation Quality: Empirical Analysis on Chinese Listed Companies

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Abstract: High-quality innovation can solve the “bottleneck” problem of key enterprise technologies and drive the high-quality development of enterprises. Therefore, how to improve innovation quality has become a growing concern in the academic industry. In previous studies, the impact of TMT experience heterogeneity on enterprise innovation quality has not been well explored. Based on the panel data of Chinese A-share listed companies, this paper explored how TMT experience heterogeneity affects enterprise innovation quality. The following constitutes our findings: (1) TMT functional experience heterogeneity positively affects partner diversity to promote innovation quality, while industrial experience heterogeneity shows the opposite result. (2) Enterprise partner diversity partially mediates the relationship between TMT experience heterogeneity and innovation quality. (3) TMT technological participation positively regulates the relationship between TMT experience heterogeneity and enterprise partner diversity. This paper gave theoretical support for enterprises to play the role of TMT experience heterogeneity in enhancing innovation quality, and we extended the research on TMT heterogeneity based on empirical analysis. This study also provided new micro evidence for enterprises to use diverse partners to improve innovation quality.

Keywords: TMT experience heterogeneity; innovation quality; partner diversity; TMT technological participation

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1. Introduction

Innovation is not only the key factor for an enterprise to maintain its core competitiveness [1,2], but it is also the source of power for its economic development [3,4]. At present, the impact of the COVID-19 epidemic and the ebb of globalization lead to turbulence in the international market. Chinese enterprises are under increasing competitive pressure. To realize sustainable development, they need to rely on high-quality innovation to overcome the fundamental technological challenges and solve the “bottleneck” problem of key enterprise technologies. Meanwhile, the State Intellectual Property Office of China has repeatedly stressed that although the total number of patent applications of Chinese enterprises has been ranked first in the world, the quality of patents is generally low. China’s economy has entered a high-quality development stage, which puts forward higher requirements for an innovation-driven strategy that enables quantity to match quality. This also requires enterprises to shift from the traditional pursuit of innovation ability and innovation quantity to the pursuit of innovation quality. Therefore, it is necessary to explore ways to improve innovation quality.

As the collective leader of the enterprise, the Top Management Team (TMT) has the highest strategic decision-making power, so the TMT has a great impact on enterprise innovation [5,6]. In recent years, due to the increasing difficulty of innovation decision making, TMT heterogeneity has attracted more and more attention [7,8]. TMT heterogeneity refers to the differences in demographic background characteristics and important cognitive concepts and values among senior management members. Based on the upper

echelon theory, TMT heterogeneity affects the organization's performance and strategic choices [9,10]. In particular, more and more strategically minded researchers focus on how TMT heterogeneity affects innovation [11,12]. Among them, most scholars found that TMT heterogeneity can promote enterprise innovation. For example, Camelo-Ordaz (2005) [13] argued that TMT education heterogeneity is positively related to innovation performance. Taking the listed companies in the US healthcare industry as an example, Bass A E (2019) [14] found that TMT gender heterogeneity can promote enterprise innovation. On the contrary, some scholars have found that TMT heterogeneity inhibits innovation [15,16]. For example, Liu (2012) [17] believed that TMT age heterogeneity had a negative correlation with enterprise innovation performance.

In summary, two research gaps are shown in the existing literature on the influence of TMT heterogeneity on innovation. Firstly, prior studies have examined the effects of TMT heterogeneity on innovation outcomes [18] and innovation capability [7,19], but they have not yet deeply discussed its effect on innovation quality. The underlying mechanism between them has not been figured out. Secondly, there have been few studies on the effects of TMT experience heterogeneity on innovation quality compared to heterogeneity in terms of gender, age, education, and cognitive and functional background [18,19]. The influence of TMT experience heterogeneity on enterprise innovation quality has not attracted enough attention.

According to the knowledge classification method proposed by Michael Polanyi, experience is a rare tacit knowledge that is the essence of enterprise core competence. Experience, which is hard to learn, imitate, and transfer between enterprises, comes from the long-term work experience of TMT members and is a key source of enterprise core competitiveness. Yang et al. (2020) [7] argue that it is important to concentrate on TMT experience heterogeneity when investigating strategic issues, which is supported by Gu et al. (2020) [20]. Therefore, it is very important to explore the impact of TMT experience heterogeneity on enterprise innovation quality. In addition, TMT experience heterogeneity is an implicit feature, which needs the help of corporate behavior to manifest its role in innovation quality. At present, the speed of technological iteration is accelerating, and the difficulty of innovation is increasing. It is difficult for enterprises to achieve high-quality technological innovation by themselves. Therefore, looking for partners has become an important link in the process of enterprise innovation. Enterprises need to actively seek cooperation with the outside world and give full play to the resource advantages of each cooperative subject to achieve high-quality innovation. Meanwhile, in the process of seeking partners, TMTs have different familiarity with the market, partners, and customers due to their different technical participation, which will affect the direction of enterprise innovation, development, and partner selection. Therefore, to some extent, TMT technical participation will affect the relationship between TMT experience heterogeneity and enterprise partner diversity.

Therefore, the main questions to be solved in this study are listed as follows:

1. How does TMT experience heterogeneity including functional experience heterogeneity and industrial experience heterogeneity affect enterprise innovation quality?
2. What role does enterprise partner diversity play in the relationship between TMT experience heterogeneity and innovation quality?
3. How does TMT technological participation affect the relationship between TMT experience heterogeneity and innovation quality?

We contribute to TMT research in several ways. Firstly, we further enrich the research on TMT heterogeneity based on empirical analysis and provide a theoretical basis for enterprises to optimize the configuration of the TMT to improve innovation quality. Experience, as a kind of tacit knowledge, is an important source of competitive advantage for enterprises. This serves as our jumping-off point for a thorough analysis of the mechanisms behind the decision-making process and decision-making quality of various forms of TMT experience heterogeneity, and we expose their various contributions to the innovation quality. Secondly, we uncover the "black box" that TMT experience heterogeneity affects

innovation quality from an internal perspective. We discover the role of partner diversity as an intermediary, which offers theoretical support for enterprises to rationally optimize and organize TMT members, encourages the formation of diversified partnerships, and is of great practical significance because it helps enterprises to enhance innovation quality. Thirdly, we reveal the practical significance of TMT's participation in technology R&D in the context of different experience heterogeneities, which points out the practical path for enterprises to achieve high-quality innovation under the current complex economic environment. We also provide important guidance for TMTs with different experience heterogeneities to participate in innovation R&D, thus further helping enterprises avoid risks when making strategic decisions and ensuring the stable, sustainable, and high-quality development of enterprises.

The rest of this paper is organized as follows: Section 2 reviews the existing research. Section 3 introduces the theory and hypotheses about the effects of TMT experience heterogeneity on innovation quality. Section 4 clarifies the methodology and describes the data collection and processing. Section 5 presents our empirical results. Section 6 is heterogeneity analysis of talent, followed by Section 7 which highlights the discussion and conclusions.

2. Literature Review

2.1. Research on TMT Characteristics Based on the Upper Echelon Theory

Based on the cognitive basis and values of decision makers, Hambrick and Mason (1984) [9] explored the theoretical framework of enterprise strategic decision making and creatively put forward the upper echelon theory. Hambrick and Mason (1984) [9] argued that the behavior of senior managers is a response to their cognitive, value, and experience characteristics. By influencing team cognition, TMT characteristics enable them to make different judgments on alternative plans, future events, and corresponding results, thus affecting strategic decisions and ultimate outcomes. This theory aims to optimize the characteristics of TMTs to improve the team's operation level and subsequent enterprise performance [12,13]. The characteristics of TMTs proved to be an important factor affecting management and even corporate behavior [21].

Scholars have made many achievements in exploring the relationship between TMT characteristics and organizational performance. These scholars mainly focus on two aspects of TMT characteristics: the team's demographic characteristics and heterogeneity. In the face of the complex external strategic environment, executives will bring personal psychological factors (cognitive type, values, personality, etc.) and observable factors (age, gender, education, etc.) into the strategic decision-making process [19]. The advantage of using demographic characteristics for academic research is that it is simple and objective, easy to understand, easy to measure, and has a good predictive effect [22]. TMT heterogeneity refers to the differences in demographic background characteristics and important cognitive concepts and values among senior management members [23]. Theoretically, such differences can cover countless dimensions, including easily identifiable differences such as age, gender, race, educational background, functional experience, and industry experience (as well as differences such as personality and values that are difficult to measure specifically) [7,24]. In fact, considering the availability of data, most of the existing studies focus on the heterogeneity of easily identifiable and stable characteristics. Many organizations and strategically minded researchers apply the upper echelon theory to study the relationship between TMT heterogeneity and organizational performance [24,25]. With the increasingly complex decision-making environment and the increasing difficulty of decision making, heterogeneity has attracted more and more attention [18,26–28]. However, the research on TMT experience heterogeneity is still insufficient.

2.2. Research on TMT Heterogeneity and Innovation

Scholars have conducted extensive research on the impact of TMT heterogeneity on innovation. Researchers advocating a positive view believe that TMT heterogeneity is more likely to stimulate and amplify team members' creativity and innovation, which

ultimately promotes the success of enterprise innovation [29]. Beckman (2006) [30] found that teams with a strong heterogeneity of work experience showed more exploratory and innovative behaviors because they have more external contacts and unique ideas. Henneke and Lüthje (2007) [31] pointed out that the composition of interdisciplinary entrepreneurial teams affects the quality of the enterprise's strategic planning process, thus indirectly promoting product innovation. Ni et al. (2016) [32] studied the impact of the balance of team heterogeneity on team creativity. They found that the balance of team knowledge heterogeneity can positively affect team creativity.

Researchers advocating a negative view believe that TMT heterogeneity is not necessarily more conducive to innovation than homogeneity. Amason et al. (2006) [33] found that in highly innovative enterprises, due to the increasing demand for face-to-face communication, the performance of homogeneous teams that could conduct open and collaborative communication was better than that of heterogeneous teams, a finding later supported by Elsbach and Kramer (2003) [34]. Chattopadhyay (1999) [35] argued that differences between team members significantly reduced mutual trust. This was not conducive to the information exchange and integration of the whole team and had a negative impact on innovation. Knight (1999) [36] found that the TMT education heterogeneity could increase the differences among members, trigger internal conflicts, and thus reduce the efficiency of enterprise decision making. The internal conflict caused by TMT heterogeneity also weakened the enterprise's innovation ability [37].

In summary, the existing research demonstrated the impact of TMT heterogeneity on innovation capability and innovation performance from different perspectives, but they have not yet reached a consensus or conclusion. In addition, there is a lack of research on the relationship between TMT experience heterogeneity and innovation quality. According to the patent statistics report of the World Intellectual Property Organization (WIPO) in recent years, the ratio of the effective amount to the applied amount of Chinese invention patents is low, the patent life is short, and a large number of invention patents become invalid before the protection period, which indicates that the patent quality is not high. Based on this, this paper will study the impact and mechanism of TMT experience heterogeneity on enterprise innovation quality to reveal the mechanism "black box" and theoretical boundary of this causal chain.

3. Theory and Hypotheses

3.1. TMT Experience Heterogeneity and Innovation Quality

As tacit knowledge, TMT experience is both difficult to transfer and difficult to be imitated, which is an important source of enterprise competitiveness. The experience heterogeneity caused by individual differences influences the creation of competitive advantages. According to the upper echelon theory, TMT experience heterogeneity influences the team's perception and interpretation of a given situation, which affects strategic decisions such as enterprise innovation [38]. Based on the existing research, TMT experience heterogeneity can be divided into functional experience heterogeneity and industrial experience heterogeneity [7,39,40].

Functional experience heterogeneity refers to the variations in the professional knowledge resources, experience skills, and modes of thought that TMT members possess depending on their job tasks and functions. The stronger the functional experience heterogeneity is, the greater the differences in the experience of general management, financial management, production management, marketing, and technology among members are [7]. Industrial experience heterogeneity reflects the differences in product processes, technology, and customer needs that TMT members have encountered within the industries in which they have worked [20]. The stronger the heterogeneity of industry experience is, the greater the knowledge differences among members regarding industry regulation, opportunities, threats, competitors, suppliers, and customers are. These two types of heterogeneity have different effects on innovation quality.

The knowledge of market service modes is fully integrated after combining members with different functional experiences. This can improve the quality of team decision making and create complementary benefits in company strategic decision making by reducing knowledge blind spots and developing varied thinking patterns [41,42].

Specifically, team members can first create diverse information-processing views based on their own functional experience thanks to the variability of TMT functional experience. On the one hand, it makes TMT members more sensitive to changes in the internal and external environment, which makes it easier to identify new routes for innovation [41] and lowers its uncertainty. On the other hand, it stimulates the TMT to respond to strategies in time, discourages the TMT from engaging in group thinking [9], and offers more innovative decision-making solutions to enhance innovation quality [43]. Secondly, TMT functional experience heterogeneity can promote innovation change [44]. The professional experience of TMT members is an important basis for TMT decision making. Meanwhile, differentiated functional backgrounds provide various professional knowledge, skills, and ideas for solving problems. The collision of cross-functional experiences can effectively enhance the team's capacity for decision making and problem solving [45], which makes TMT more inclined to implement innovation change and finally improve innovation quality. Therefore, we propose the first hypothesis: Hypothesis 1.

Hypothesis 1 (H1). *TMT functional experience heterogeneity is positively related to innovation quality.*

TMT industry experience represents the familiarity and sensitivity of team members to regulations, opportunities, threats, competitors, and industrial chains in the sector [10], which is a unique human capital that those outside the sector do not possess. However, TMT industry experience heterogeneity may diminish the enterprise's understanding of market change and knowledge base, which would lower the enterprise's ability to innovate [46]. First, the senior executives' inability to fully comprehend the current industry due to their experience working across multiple sectors makes it difficult for TMT to accurately identify market opportunities, perceive market changes, and comprehend the underlying changes taking place in the sector, all of which affect the quality of innovation decisions. Second, because high-quality innovation is characterized by specialization, refinement, and novelty [47], enterprises need to enhance vertical knowledge innovation and creativity, concentrate knowledge, human resources, and other resources to develop new technologies and vigorously develop specialized production. For this reason, many enterprises employ executives with extensive industry knowledge. They make sound decisions for high-quality innovation since they are knowledgeable about industry regulations and technological trends. On the contrary, frequently changing the industry in which they work makes senior executives lack professional knowledge and a unique perspective on the industry. Due to their lack of industry experience, they are not only unable to acquire and integrate resources in a more targeted way to meet the needs of high-quality innovation [48], but they also find it difficult to point out the direction for improving innovation quality. Together, these arguments suggest that TMT industry experience heterogeneity may hinder the improvement of enterprise innovation quality. Therefore, we propose the second hypothesis: Hypothesis 2.

Hypothesis 2 (H2). *TMT industry experience heterogeneity is negatively related to innovation quality.*

3.2. The Mediating Effect of Enterprise Partner Diversity

Technological innovation is the process of recombining knowledge elements. The current ebb of globalization has intensified the market competition of Chinese enterprises. At the same time, the first wave of the industrial, scientific, and technological revolution swept in, offering new challenges to the quality and complexity of enterprise innovation. The enterprise's own knowledge elements are difficult to overcome the key core technologies to meet the above challenges [49,50]. Therefore, enterprises need to actively carry out R&D cooperation with various types of subjects to meet the requirements of high-quality innovation.

On the one hand, different types of partners have different advantages such as power and knowledge. Cooperation with the government can gain the support and trust of the government [51–53] and strive for a good external political environment. Cooperation with universities and scientific research centers enhances the degree of enterprise talent team construction [54], which in turn enhances the quality of enterprise innovation. It also allows universities to contribute their specialists, cutting-edge technology, and scientific information [55,56]. Consumer collaboration can help gain timely product feedback and offer fresh ideas for innovation. Diverse partners bring many high-quality external resources and access to knowledge for enterprises, broaden the knowledge base, optimize the original knowledge structure, and provide intellectual support for high-quality innovation [57,58]. Diverse collaborative research and development across departments, fields, and geographies can overcome geographic constraints, utilize several disciplines to solve innovative issues, and produce higher-quality innovation [59]. On the other hand, diversified partners provide enterprises with diversified thinking modes and R&D methods. This can effectively enhance enterprises' knowledge absorption capacity, promote the upgrading of original technologies and processes, and ultimately improve enterprise innovation quality. Therefore, partner diversity has a positive effect on innovation quality [60].

Based on the important role of partner diversity, exploring its antecedents is of great significance for improving innovation quality. TMT experience heterogeneity affects the team's resource acquisition and specialization, which affects the enterprise's partner selection and relationship maintenance. As for TMT functional experience heterogeneity, according to the resource-based theory, TMTs with a strong functional experience heterogeneity have a broader social network and contacts [61,62]. On the one hand, it supplies enterprises with the opportunity to establish cooperative relationships with partners who master different scarce technological resources. On the other hand, it provides enterprises with comprehensive and precise information to help them understand the real situation and benefits of potential partners so as to make the best decision [63,64]. In addition, TMT functional experience heterogeneity enables the team to have a diversified perspective on information processing, which is conducive to improving the team members' ability to perceive and control risks [65]. Moreover, it allows enterprises to coordinate cooperative relationships with different partners, maximize the advantages of cooperative innovation, and improve innovation quality. Therefore, we propose the third hypothesis: Hypothesis 3.

Hypothesis 3 (H3). *Partner diversity plays a mediating role between TMT functional experience heterogeneity and enterprise innovation quality. That is, TMT functional experience heterogeneity improves innovation quality by improving partner diversity.*

Members of teams with substantial TMT industrial experience heterogeneity have fairly distinct innovation knowledge bases because different industries have different technological R&D paradigms and innovation points. It is easy to have differences in opinion among members in the selection of partners, which leads to management conflicts and is not conducive to the selection of diversified partners. In addition, high-quality innovation needs to be supported by deep industry experience. Executives may not immerse themselves in a particular industry and become specialists in it due to the conversion of numerous industries. Years of work experience in the same industry has made senior executives enjoy a high reputation, which helps attract more types of partners. In the face of numerous choices, executives rely on long-term industry experience to identify which partners can support enterprise innovation. These are all unattainable due to industry experience heterogeneity. Therefore, teams with strong industrial experience heterogeneity find it challenging to identify the fundamental problems impacting innovation quality and develop diversified partnerships due to the absence of broad knowledge in the industry. Therefore, we propose the fourth hypothesis: Hypothesis 4.

Hypothesis 4 (H4). *Partner diversity plays a mediating role between TMT industrial experience heterogeneity and enterprise innovation quality. That is, TMT industrial experience heterogeneity reduces innovation quality by reducing partner diversity.*

3.3. The Moderating Effect of TMT Technological Participation

It is a common practice for senior executives to participate in technology R&D. By participating in technology R&D, senior executives can fully understand the problems and resources needed in the R&D process [66] and make their intellectual labor and creative activities play a leading role in the enterprise's technological innovation process. For a TMT with strong functional heterogeneity, senior executives who participate in R&D can better utilize their advantages in resource acquisition, select partners to better address R&D demands, and develop diversified cooperative relationships. At the same time, when TMTs participate in the process of technology R&D, they often have a risk aversion tendency to maintain their professional reputation [12]. As a result, the TMT is more ready to use its varied knowledge to mobilize resources in the social network, choose diversified partners, avoid R&D risks, and enhance the quality of innovation the higher its technological engagement [67]. Therefore, TMT technological participation enhances the promotion effect of TMT functional experience heterogeneity on partner diversity. Therefore, we propose the fifth hypothesis: Hypothesis 5.

Hypothesis 5 (H5). *TMT technological participation positively moderates the relationship between functional experience heterogeneity and partner diversity.*

When members of the TMT engage in technology R&D, they necessarily draw on their prior industry knowledge to inform their decision making because of the major disparities in innovation models and innovation elements, or in other words, across different industries. This can lead to divisions among TMT members over the choice of partners, causing conflicts, which is not conducive to the establishment and maintenance of diversified partnerships. Therefore, TMT technological participation enhances the inhibition effect of TMT industrial experience heterogeneity on partner diversity. Therefore, we propose the sixth hypothesis: Hypothesis 6.

Hypothesis 6 (H6). *TMT technological participation positively moderates the relationship between industrial experience heterogeneity and partner diversity.*

In summary, the conceptual model of this study is shown in Figure 1.

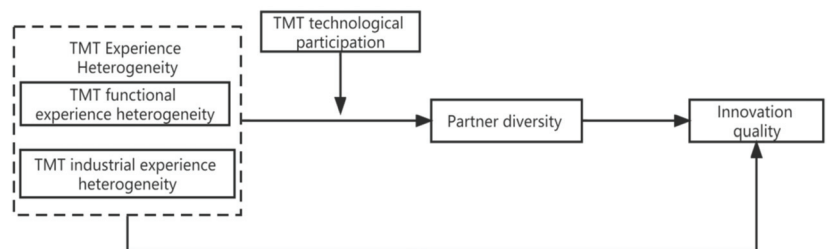


Figure 1. Conceptual model of the impact of TMT experience heterogeneity on innovation quality.

4. Research Design

4.1. Data Collecting

The initial study sample includes all Chinese A-share (RMB ordinary stock) companies listed on the Shanghai and Shenzhen Stock Exchanges from 2011 to 2020. The patent data of this study are from the database of the State Intellectual Property Office of China, and the information on listed companies and the original data of related variables are from the China Stock Market and Accounting Research (CSMAR) database. The following approaches were used to screen the data: (1) Excluding listed companies that issued both

A-shares and B-shares since they had multiple financial sources, a complicated financial structure, and potentially inconsistent data quality. (2) Eliminating any companies with unreasonable financial data or losses that have lasted longer than two years, namely the ST (Special Treatment, that is to say, exercise additional control over the stock trading of the listed companies with abnormal financial or other conditions), * ST (Early warning of delisting risk for stocks that have lost money for three consecutive years), and PT (Particular Transfer, that is to say, stop any trading, clear the price, and wait for delisting) samples of the companies. (3) The status of publicly traded financial corporations is not taken into consideration because they operate, manage, and innovate in ways that are distinct from real economy enterprises, making it difficult to calculate enterprise innovation and other key metrics. Among them, the classification of enterprises by industry refers to the Guidelines on the Classification of Listed Companies by Industry. (4) Eliminating enterprises with serious missing indicators and abnormal data. The data of this research on TMT heterogeneity are from the CSMAR China Listed Company Database.

The enterprise patent data used in this study to calculate the enterprise innovation quality, partner diversity, and other indicators are from the patent database of the State Intellectual Property Office of P.R. China (SIPO). In the database, the number of invention patents and practical patents applied by enterprises from 2011 to 2020 was searched with “applicant = enterprise name”, and a total of 422,978 patents were retrieved (Figure 2). Then this research extracts the patent field information of each patent, such as title, application number, application date, IPC, applicant type, and inventor. On this basis, this research calculates the enterprise innovation quality, partner diversity, and the TMT technological participation of each enterprise by using Python and other tools. After the above processing, the remaining 2691 enterprises have 12,797 observations.

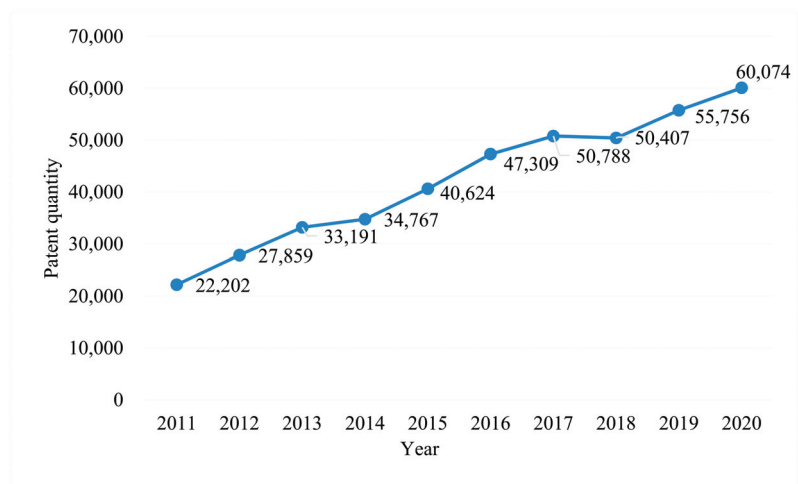


Figure 2. Distribution of annual patent applications of sample enterprises.

4.2. Variable Design and Specification

4.2.1. Independent Variable: TMT Experience Heterogeneity

Based on the research of Daellenbach et al. (1999) [39], Ston et al. (2005) [40], and Yang et al. (2020) [7], this study divides the experience heterogeneity of senior management teams into functional experience heterogeneity and industrial experience heterogeneity.

Functional Experience Heterogeneity (FEH). Firstly, this paper, which is enlightened by Tihanyi et al. (2000) [68] and Yang et al. (2020) [7] and is based on the situation of sample companies, divides the functional backgrounds of TMT members into six categories: (1) manufacturing, (2) research and development, (3) financial accounting, (4) marketing, (5) law, and (6) administrative management (including Party affairs, Communist

Youth Leagues, trade unions, etc.). Secondly, this paper uses Blau (1977)'s categorical index to calculate the TMT functional experience heterogeneity, and the formula is: $HFE = 1 - \sum_i^n p_{ijt}^2$. Among them, p_{ijt} is the percentage of members with a type i functional background in TMT of j enterprise in year t , and n is the number of functional background categories. The value of TMT functional experience heterogeneity ranges from 0 to 1. The closer the value is to one, the higher the functional experience heterogeneity of the team.

Industrial experience heterogeneity (IEH). Referring to Yang et al. (2018) [69], firstly, this research paper divides the TMT members' industries and determines the number of various industries. Secondly, the categorical index of Blau is used to calculate the value of each categorical variable separately, and the calculation formula is: $IEH = 1 - \sum_i^n p_{ijt}^2$. Among them, p_{ijt} is the percentage of members with a type i industrial background in TMT of j enterprise in year t , and n is the number of industry background categories. The value of TMT industrial background heterogeneity ranges from 0 to 1. The closer the value is to 1, the higher the industrial background heterogeneity of the team.

4.2.2. Dependent Variable: Enterprise Innovation Quality (Eiq)

A patent is an important carrier of enterprise innovation achievements. Traditionally, scholars take the number of patent applications and the number of patent citations as the measurement indicators of innovation quality. With the continuous deepening of research on patent text information mining, scholars are more inclined to use the breadth of enterprise patent knowledge to measure enterprise innovation quality [44,70–72].

This paper draws on the research of Liu et al. (2020) [73] and Wu Liu et al. (2022) [74], which uses the breadth of patent knowledge to represent innovation quality. First, according to the IPC classification system, which consists of five levels, namely part, large class, small class, large group, and group, the Herfindahl–Hirschman index (HHI index) at the large group level is used to measure the knowledge breadth of each patent. The calculation formula is as follows: $HHI = 1 - \sum \alpha_p^2$. Among them, α represents the proportion of each major group classification in the IPC classification number of patent documents, and p represents the patent number. A larger HHI means a larger difference in the IPC large group classification level, a wider range of technological fields, and higher patent quality.

As for the annual innovation quality of enterprises, this study uses the natural logarithm of the median of the enterprise's annual patent knowledge breadth index plus one to measure the innovation quality of the enterprise in that year. It should be noted that according to the provisions of Chinese Patent Law on invention, utility model and design patents as well as invention and utility models have strong novelty, creativity, and practicability, but design patents are of low quality and do not have an IPC classification system. Therefore, this study only considers invention and utility model patents when measuring enterprise innovation quality.

4.2.3. Mediating Variable: Enterprise Partner Diversity (Epd)

According to the classification standards of patent applicants of the State Intellectual Property Office, the applicant types are divided into five categories: enterprises, scientific research institutions, colleges and universities, government organizations, and individuals. Based on Wang's research (2021) [75], the Blau index is used to calculate the Epd, and the formula is: $Edp = 1 - \sum_i^n s_i^2$. Among them, S_i represents the proportion of partner type i in the annual technological innovation process of the target enterprise, and n represents the number of partner types in the annual technological innovation portfolio of the enterprise. The Epd index ranges from 0 to 1. The larger the Epd value is, the higher the cooperation diversity of the enterprise.

4.2.4. Moderating Variable: TMT Technological Participation (TMTTP)

TMTTP will not only affect the innovation quality of enterprises but will also change the relationship between TMT experience heterogeneity and Edp to a certain extent. Drawing on the research of Zeng (2012) [76], TMTTP is used as a moderating variable in this

study. The formula of TMTP is: $TMTP = T_{tm-i} / T_{total-i}$. Among them, T_{tm-i} represents the number of patents with senior executives among the inventors of patents applied by the enterprise in year i , and $T_{total-i}$ represents the total number of the patent applications of the enterprise in that year. The TMTP ranges from 0 to 1. The larger the value of TMTP is, the stronger the TMT technological participation is.

4.2.5. Control Variables

In order to reduce the interference of factors other than independent variables and dependent variables in this study, several control variables are included in the analysis drawing on the research of Yang et al. (2018, 2019) [69], Fang et al. (2016) [77], Xiao et al. (2019) [78], and Zhang et al. (2022) [79].

(1) Proportion of technical employees: Human resources are the main force in technological innovation. It is crucial to have a certain number of technical personnel for high-quality innovation. (2) Employee proportion with a bachelor's degree or above: it affects the quality of enterprise human capital, and controlling this variable can avoid the interference caused by the difference of human capital among enterprises. (3) TMT average age: TMT average age reflects the risk tendency of the team members to make decisions. (4) Enterprise size: It may affect the extent of resources that firms commit for capabilities such as innovation. The resources will influence the speed and outcome of strategic decisions made by the TMT. (5) The TMT size: it affects the process and results of internal collaboration among team members [1]. (6) R&D investment: it is an important reflection of its innovation capability and innovation quality. (7) Enterprise capital structure: Capital structure is the result of enterprise financing. It determines the ownership of the property of the enterprise and also stipulates the rights and interests of different investment subjects and the risks borne by them.

Table 1 shows the definitions and descriptions of all variables.

Table 1. Variable definition and description.

Variable	Variable Name	Variable Code	Measurement/Source
Independent variable	Functional Experience	FEH	Blau (1977) classification index
	Heterogeneity Industrial experience heterogeneity	IEH	Blau (1977) classification index
Dependent variable	Enterprise innovation quality	Eiq	The natural logarithm of the median of the enterprise's annual patent knowledge breadth index plus 1
Moderating variable	TMT Technological participation	TMTP	The ratio of the number of patents participated by senior executives to the total number of patents applied by enterprises every year
Mediating variable	Enterprise partner diversity	Epd	Blau (1977) classification index
	Proportion of technical employees	Pte	The ratio of the number of technical personnel disclosed by the enterprise to the total number of employees
Control variable	Employee proportion of bachelor's degree or above	Epbda	Proportion of employees with bachelor's degree or above disclosed by the enterprise in the total number of employees
	TMT average age	TMT age	The average age of TMT per year
	Enterprise size	Size	The number of employees in an enterprise
	TMT size	TMT size	Number of TMT members
	R&D investment	Rdi	Logarithm of R&D investment of enterprise in each year
Enterprise capital structure	Ecs	Ratio of total liabilities to total assets	

4.3. Research Model

We use the OLS model for empirical analysis. First, to examine the impact of TMT experience heterogeneity on innovation quality, the model is designed as follows:

$$\text{Eiq} = \beta_0 + \beta_1\text{EH} + \beta(\text{Control} + \text{Year} + \text{Industry}) + \varepsilon \quad (1)$$

In Model (1), Eiq is enterprise innovation quality. EH is experience heterogeneity including FEH and IEH. FEH and IEH are respectively substituted into the formula for calculation.

Second, to examine the mediating effect of enterprise partner diversity (Epd), we also use the OLS regression model. The model is designed as follows:

$$\text{Eiq} = \beta_0 + \beta_1\text{EH} + \beta_2\text{Epd} + \beta(\text{Control} + \text{Year} + \text{Industry}) + \varepsilon \quad (2)$$

Epd is added on the basis of Model (1). In Model (2), if the coefficient of β_2 is positive, it indicates that partner diversity plays an intermediary role in promoting enterprise innovation. Based on Hypotheses 3 and 4, we expect β_2 to be significantly positive. The definition of the remaining variables in Model (2) is the same as in Model (1).

Third, to test the moderating effect of TMT technological participation (TMTTP), we add the variable TMTTP and its interaction term with the Epd to Model (1). The model is designed as follows:

$$\text{Epd} = \beta_0 + \beta_1\text{EH} + \beta_2\text{TMTTP} + \beta_3\text{Epd} * \text{TMTTP} + \beta(\text{Control} + \text{Year} + \text{Industry}) + \varepsilon \quad (3)$$

FEH and IEH are respectively substituted into the formula for calculation, and the other variables are defined the same as the previous models. In Model (3), if the coefficient of β_3 is positive, it indicates that TMT technological participation positively moderates the relationship between TMT experience heterogeneity and partner diversity. Based on hypotheses 5 and 6, we expect β_3 to be significantly positive.

5. Results

5.1. Descriptive Statistics and Basic Analysis Results

Table 2 shows the descriptive statistics of all the variables. The maximum value of the dependent variable innovation quality is 0.625, while the minimum is 0, which reveals that the innovation quality of different enterprises varies greatly. The mean and standard deviation of innovation quality are 0.139 and 0.182, which indicates that the overall level of innovation quality of Chinese listed companies is not high. The mean of TMT functional experience heterogeneity and industrial experience heterogeneity are 0.647 and 0.560, which shows that the TMT experience in most enterprises is heterogeneous. In addition, the average, standard deviation, maximum, and minimum values of the other variables in this study are all within reasonable limits.

Table 3 reports the correlation coefficients between the variables. It can be seen that there is a significant correlation among independent variables, regulatory variables, intermediary variables, and dependent variables. Among them, FEH is significantly positively correlated with the Eiq, indicating that with the enhancement of FEH, the innovation quality also gradually improves, which is consistent with Hypothesis 1. Meanwhile, IEH is significantly negatively correlated with the Eiq, indicating that with the enhancement of IEH, the innovation quality gradually decreases, which is consistent with Hypothesis 2.

Table 4 reports the regression results of model (1). The dependent variable is Eiq, the independent variables are FEH and IEH. The control variables, year dummy variables, and industry variables are gradually added. Column (1) to (4) report the regression results with the independent variable as FEH, while column (5) to (8) reports the regression results with the independent variable as IEH. Eiq is significantly positively correlated with FEH (significant at the 1% level), indicating that FEH can improve innovation quality, which is consistent with Hypothesis 1. Eiq is significantly negatively correlated with IEH (significant

at the 1% level), indicating that IEH can hinder the improvement of innovation quality, which is consistent with Hypothesis 2. The remaining variables are within the typical range and have no extreme values.

Table 2. Descriptive analysis.

Variable	Mean	p50	SD	Min	Max
FEH	0.647	0.667	0.086	0.180	0.819
IEH	0.560	0.571	0.146	0.067	0.888
Eiq	0.139	0.000	0.182	0.000	0.625
TMTTP	0.256	0.000	0.374	0.000	1.000
Epd	0.042	0.000	0.137	0.000	0.781
Pte	0.227	0.166	0.182	0.002	2.465
Epbda	0.271	0.211	0.215	0.000	2.226
TMT age	47.236	47.364	3.746	33.000	62.75
Size	7.654	7.575	1.113	4.143	12.438
TMT size	6.955	7.000	2.316	2.000	23.000
Rdi	5.105	7.363	4.397	0.000	14.221
Ecs	0.396	0.384	0.202	0.000	4.995

Table 3. Correlation analysis of each variable.

	Eiq	FEH	IEH	TMTTP	Epd	Pte	Epbda	TMT Age	Size	TMT Size	Rdi	Ecs
Eiq	1											
FEH	0.162 ***	1										
IEH	−0.060 ***	−0.029 ***	1									
TMTTP	0.123 ***	0.052 ***	−0.087 ***	1								
Epd	0.163 ***	0.022 **	−0.100 ***	0.098 ***	1							
Pte	−0.005	0.043 ***	0.019 **	−0.043 ***	−0.005	1						
Epbda	−0.032 ***	0.026 ***	0.076 ***	−0.125 ***	0.016 *	0.681 ***	1					
TMT age	−0.009	−0.031 ***	0.050 ***	−0.125 ***	0.026 ***	−0.060 ***	−0.027 ***	1				
Size	−0.044 ***	−0.078 ***	0.085 ***	−0.068 ***	0.049 ***	−0.206 ***	−0.187 ***	0.217 ***	1			
TMT size	−0.005	0.070 ***	−0.087 ***	0.100 ***	0.059 ***	0.035 ***	0.054 ***	0.107 ***	0.295 ***	1		
Rdi	−0.118 ***	0.037 ***	0.130 ***	−0.398 ***	−0.112 ***	0.075 ***	0.142 ***	0.158 ***	0.110 ***	−0.091 ***	1	
Ecs	−0.066 ***	−0.072 ***	0.079 ***	−0.098 ***	0.033 ***	−0.089 ***	−0.049 ***	0.116 ***	0.415 ***	0.169 ***	0.101 ***	1

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. Basic results analysis.

	(1) Eiq	(2) Eiq	(3) Eiq	(4) Eiq	(5) Eiq	(6) Eiq	(7) Eiq	(8) Eiq
FEH	0.354 *** (16.61)	0.358 *** (16.77)	0.323 *** (15.24)	0.314 *** (14.82)				
IEH					−0.075 *** (−6.15)	−0.048 *** (−3.92)	−0.054 *** (−4.44)	−0.051 *** (−4.14)
Pte		0.010 (0.78)	−0.008 (−0.61)	0.000 (0.00)		0.024 * (1.83)	0.006 (0.47)	0.019 (1.37)

Table 4. Cont.

	(1) Eiq	(2) Eiq	(3) Eiq	(4) Eiq	(5) Eiq	(6) Eiq	(7) Eiq	(8) Eiq
Epbda		−0.040 *** (−3.51)	−0.056 *** (−4.60)	−0.042 *** (−3.59)		−0.034 *** (−2.97)	−0.044 *** (−3.88)	−0.036 *** (−3.09)
TMT age		0.002 *** (3.35)	0.001 *** (2.99)	0.001 *** (2.64)		0.001 ** (2.00)	0.001 (1.45)	0.0015 (1.03)
Size		−0.003 * (−1.65)	−0.012 *** (−5.95)	−0.011 *** (−5.48)		−0.002 (−1.19)	−0.010 *** (−5.00)	−0.009 *** (−4.45)
TMT size		−0.001 (−1.45)	−0.001 (−0.70)	−0.001 (−1.14)		−0.0001 (−0.09)	0.0004 (0.49)	−0.0001 (−0.09)
Rdi		−0.004 *** (−10.26)	0.012 *** (7.69)	0.011 *** (6.81)		−0.005 *** (−10.64)	0.010 *** (6.49)	0.009 *** (5.74)
Ecs		−0.049 *** (−5.03)	−0.041 *** (−4.22)	−0.030 *** (−3.00)		−0.049 *** (−5.04)	−0.041 *** (−4.29)	−0.03 *** (−3.12)
_cons	−0.070 *** (−5.01)	−0.067 ** (−2.33)	0.029 (0.97)	0.008 (0.24)	0.181 *** (25.65)	0.185 *** (7.37)	0.250 *** (9.55)	0.233 *** (7.44)
N	10196	10196	10196	10196	10360	10360	10360	10360
Year	No	No	Yes	Yes	No	No	Yes	Yes
Industry	No	No	No	Yes	No	No	No	Yes
R2	0.026	0.045	0.077	0.093	0.004	0.021	0.052	0.070
adj. R2	0.026	0.044	0.075	0.090	0.004	0.020	0.050	0.067

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.2. Mediating Effect Test

Table 5 reports the regression results for Model (2). As mentioned in the previous theoretical analysis, enterprise partner diversity (Epd) is an important mechanism by which TMT experience heterogeneity affects innovation quality. This paper examines the mediating effect of Epd based on a three-step method. The first step involves testing the relationship between TMT experience heterogeneity and innovation quality. The results of column (1) of Table 5 show that FEH has a significantly positive correlation with innovation quality, and the results of column (4) show that IEH has a significantly negative correlation with innovation quality. They are consistent with the main effect's test results, indicating that FEH can improve innovation quality, but IEH can hinder the improvement of innovation quality. The second step involves testing the regression of the intermediary variable and the independent variable. It can be seen from columns (2) and (5) in Table 5 that there is a significantly positive correlation between FEH and Epd but a negative correlation between IEH and Epd, indicating that FEH increases enterprise partner diversity, whereas IEH reduces it. The third step involves testing the dependent variable's relationship with the independent and mediating variables. The results of column (3) show a significantly positive correlation between FEH and innovation quality and a significantly positive correlation between Epd and innovation quality. The results of column (6) show a significantly negative correlation between IEH and innovation quality and a significantly positive correlation between Epd and innovation quality [80–82]. The influence of the coefficients of the independent factors on the dependent variable decreases when an intermediary variable is added. Epd partially mediates between TMT experience heterogeneity and innovation quality, according to the test of the mediation effect. The above results support Hypotheses 3 and 4.

Table 5. Intermediary effect test.

	(1) Eiq	(2) Epd	(3) Eiq	(4) Eiq	(5) Epd	(6) Eiq
FEH	0.306 *** (14.46)	0.0563 *** (3.52)	0.296 *** (14.07)			
IEH				−0.0507 *** (−4.17)	−0.0963 *** (−10.22)	−0.0325 *** (−2.69)
TMTTP	0.0377 *** (6.97)	0.0249 *** (6.27)	0.0334 *** (6.21)	0.0456 *** (8.39)	0.0273 *** (6.74)	0.0396 *** (7.34)
Pte	−0.00165 (−0.12)	−0.0205 * (−1.93)	0.00237 (0.17)	0.0166 (1.21)	−0.0190 * (−1.78)	0.0211 (1.56)
Epbda	−0.0336 *** (−2.87)	0.0341 *** (3.81)	−0.0386 *** (−3.32)	−0.0255 ** (−2.20)	0.0345 *** (3.84)	−0.0321 *** (−2.79)
TMT age	0.00146 *** (2.97)	0.00114 *** (3.03)	0.00130 *** (2.64)	0.000714 (1.46)	0.00105 *** (2.78)	0.000526 (1.08)
Size	−0.0102 *** (−4.95)	0.00318 ** (2.02)	−0.0106 *** (−5.16)	−0.00756 *** (−3.70)	0.00335 ** (2.13)	−0.00812 *** (−4.01)
TMT size	−0.00137 * (−1.68)	0.00101 (1.63)	−0.00149 * (−1.84)	−0.000671 (−0.83)	0.000548 (0.88)	−0.000740 (−0.93)
Rdi	0.0105 *** (6.49)	0.00123 (1.00)	0.0103 *** (6.41)	0.00828 *** (5.31)	0.00149 (1.24)	0.00798 *** (5.18)
Ecs	−0.0268 *** (−2.71)	0.0182 ** (2.41)	−0.0291 *** (−2.96)	−0.0268 *** (−2.74)	0.0187 ** (2.47)	−0.0300 *** (−3.10)
Epd			0.134 *** (11.35)			0.177 *** (15.08)
_cons	−0.0257 (−0.75)	−0.0162 (−0.62)	−0.0233 (−0.69)	0.184 *** (5.81)	0.0769 *** (3.15)	0.168 *** (5.36)
N	10,196	11,313	10,196	10,360	11,298	10,360
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.097	0.040	0.109	0.076	0.051	0.096
adj. R2	0.094	0.037	0.105	0.073	0.048	0.093

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.3. Moderating Effect Test

Table 6 reports the regression results for model (3). It presents the moderating effect of the technological participation of the top management team (TMTTP) on the relationship between TMT experience heterogeneity and Epd. Column (2) and (3) added FEH, IEH and their interaction terms to test Hypotheses 5 and 6, respectively. In column (2), the regression coefficients of the interaction items between FEH×TMTTP and Epd are positive at the level of 1%, indicating that TMTTP enhances the positive correlation between FEH and Epd, which supports Hypothesis 5. In column (3), the regression coefficients of the interaction items between IEH×TMTTP and Epd are positive at the level of 1%, indicating that TMTTP strengthens the negative correlation between IEH and Epd, which supports Hypothesis 6.

Table 6. Moderation effect test.

	(1) Epd	(2) Epd	(3) Epd
FEH	0.057 *** (3.17)	0.046 *** (2.85)	
IEH	−0.105 *** (−10.02)		−0.107 *** (−11.16)
TMTTP	0.028 *** (6.37)		
Pte	−0.024 ** (−2.05)	−0.020 * (−1.92)	−0.019 * (−1.78)
Epbda	0.038 *** (3.83)	0.034 *** (3.79)	0.034 *** (3.76)
TMT age	0.001 *** (2.96)	0.001 *** (3.06)	0.001 *** (2.75)
Size	0.00367 ** (2.09)	0.003 ** (2.01)	0.003 ** (2.05)
TMT size	0.000 (0.65)	0.001 * (1.65)	0.001 (0.92)
Rdi	0.002 (1.25)	0.001 (1.00)	0.002 (1.32)
Ecs	0.021 ** (2.45)	0.018 ** (2.42)	0.019 ** (2.44)
FEH * TMTTP		0.038 *** (6.27)	
IEH * TMTTP			0.044 *** (6.16)
_cons	0.039 (1.35)	−0.010 (−0.37)	0.088 *** (3.63)
N	10,015	11,313	11,298
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
R2	0.053	0.040	0.051
adj. R2	0.049	0.037	0.047

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.4. Robustness Test

Table 7 shows the robustness of the evaluation methods and indicators. That is, when changing certain parameters, the evaluation methods and indicators still maintain a relatively consistent and stable interpretation of the evaluation results. This research uses the method of replacing the dependent variable for the robustness test. According to the existing research, this paper chooses the ratio of the invention patents number to all patents numbers to measure innovation quality from the perspective of innovation output [83,84]. In columns (1) and (2), the regression coefficients between FEH and Eiq are positive at the level of 1%, while the regression coefficients are negative at the level of 1%. Therefore, the results of the multiple regression analysis remain unchanged after altering the measurement method of innovation quality, indicating that FEH promotes innovation quality while IEH inhibits it.

Table 7. Robustness Test.

	(1) Eiq	(2) Eiq
FEH	0.396 *** (10.74)	
IEH		−0.142 *** (−6.56)
Pte	0.151 *** (6.18)	0.180 *** (7.32)
Epbda	0.201 *** (9.77)	0.184 *** (8.93)
TMT age	0.00410 *** (4.73)	0.00275 *** (3.16)
Size	−0.00980 *** (−2.71)	−0.00709 ** (−1.97)
TMT size	0.00293 ** (2.04)	0.00444 *** (3.11)
Rdi	0.0255 *** (8.93)	0.0237 *** (8.58)
Ecs	−0.0530 *** (−3.04)	−0.0702 *** (−4.03)
_cons	0.151 *** (6.18)	0.180 *** (7.32)
N	11,313	11,298
Year	Yes	Yes
Industry	Yes	Yes
R2	0.198	0.198
adj. R2	0.195	0.196

Note: t statistics in parentheses; ** $p < 0.05$, *** $p < 0.01$.

6. Heterogeneity Analysis of Talent

Talent is an important driving force for the development of enterprise innovation. High-quality talent has become a solid foundation for enterprises to realize the high-quality development of innovation. This paper discusses the impact of TMT experience heterogeneity on enterprise innovation quality. However, the role of technological talents in innovation quality still needs to be further discussed. As the main carrier of technological knowledge, technological talents can promote information and knowledge spillover and improve the enterprise innovation quality, which is an important driving force for the high-quality development of the enterprise economy. Enterprise technological talents may help an organization keep up with or surpass international advanced levels in advanced experimental technology and method innovation. In view of the important role of technical personnel, we explored how the main effect was impacted by the technological talent distribution's heterogeneity.

We used the median regression method. In the first step, the median proportion of enterprise technological talents was 0.166. The proportion of enterprise technological talents less than 0.166 was organized into the group of low technical talents, and the others were organized into the group of high technical talents. In the second step, regression analysis was carried out on the two groups, respectively. According to columns (1) and (2) of Table 8, it can be found that the FEH and IEH regression coefficients of enterprises with low and high technological talents proportions were significant at the 0.01 level and 0.1 level, respectively. The results show that regardless of the technological talents level, the relationship between the enterprises' FEH, IEH, and innovation quality is affected by the proportion of technological talents. Technical personnel play an important role in the high-quality development of enterprises, which is conducive to the effective implementation of the R&D strategy formulated by the TMT, constantly improve the quality of the innovation of the enterprise's products or technologies, and thus make the enterprise handle the

leading position in the industry. Therefore, enterprises should pay attention to the structure of technological talents, improve management systems to attract technological talents effectively, and guarantee the high-quality development of enterprises. In the third step, the independent variables were tested separately using the inter-group coefficient difference test. It was found that the coefficients of both groups in FEH and IEH indicators were not significant, so the coefficients of the two groups could not be directly compared.

Table 8. Heterogeneity test of the proportion of technical talents.

	(1) Enterprises with Low Proportion of Technical Talents	(2) Enterprises with High Proportion of Technical Talents
FEH	0.283 *** (9.22)	0.305 *** (9.21)
IEH	−0.0357 * (−1.94)	−0.0314 * (−1.70)
TMTTP	0.0310 *** (3.80)	0.0432 *** (5.31)
Epd	0.153 *** (9.24)	0.108 *** (6.17)
Epbda	−0.0340 (−1.60)	−0.0276 ** (−2.09)
TMT age	0.000156 (0.21)	0.00231 *** (3.09)
Size	−0.00811 *** (−2.60)	−0.00916 *** (−2.90)
TMT size	−0.000565 (−0.43)	−0.00202 * (−1.76)
Rdi	0.0104 *** (4.53)	0.00531 ** (2.10)
Ecs	−0.0767 *** (−5.38)	0.0116 (0.73)
_cons	0.0710 (1.41)	−0.118 ** (−2.21)
N	4425	4652
Year	Yes	Yes
Industry	Yes	Yes
Ch2	0.24	0.03
R2	0.140	0.096
adj. R2	0.133	0.088

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

7. Conclusions and Discussion

Innovation is the strategic support for promoting high-quality development and building a modern economic system. The government of China has repeatedly emphasized that quality comes first. From a macro perspective, enhancing innovation quality is an inevitable requirement for China to promote the construction of quality power and lead high-quality development. From a micro perspective, it is the top priority for enterprises to maintain vitality and achieve sustainable development. Therefore, it is of great practical significance to explore the driving factors of innovation quality. This research takes the data of Chinese A-share market-listed companies from 2011 to 2020 as research samples. Based on the perspective of experience in tacit knowledge, this research investigates how TMT experience heterogeneity affects enterprise innovation quality, which provides enlightenment for the high-quality development path of China's enterprise innovation. Our findings comprise the following: (1) TMT functional experience heterogeneity positively affects partner diversity to promote innovation quality, while industrial experience heterogeneity shows the opposite result. Hypotheses 1 and 2 are supported. (2) Enterprise partner diversity partially mediates the relationship between TMT experience heterogeneity and

innovation quality. Hypotheses 3 and 4 are supported. (3) TMT technological participation positively regulates the relationship between TMT experience heterogeneity and enterprise partner diversity. Hypotheses 5 and 6 are supported.

The increasingly complex global market environment has put forward higher requirements for the stability and sustainability of the high-quality development of enterprise innovation. Accordingly, enterprises should coordinate the advantages of TMT functional and industry experience, build a reasonable and effective executive team, strengthen their awareness of market opportunities and threats, and support the continual improvement of enterprise innovation quality. In addition, enterprises should utilize TMT functional and industry experience to carry out diverse cooperation with other enterprises, scientific research institutions, universities, government agencies, and organizations. In this way, they can realize the training, introduction, exchange, and sharing of technological talents so as to promote the long-term growth of enterprise innovation quality.

Specifically, firstly, optimize the TMT structure. Building an efficient TMT is not only a need that faces the complex market environment at home and abroad, but it is also an inevitable requirement for enterprises to maintain stability and development. This paper finds that functional experience heterogeneity can promote the improvement of innovation quality, while heterogeneous industry experience can inhibit the improvement of innovation quality. Therefore, enterprises should implement the job rotation system to enrich the working experience of senior executives in different functional positions, which can enhance the team's diversified thinking and innovation awareness and promote the improvement of innovation quality. At the same time, enterprises should hire experts or professional managers who have worked in the industry for many years and reduce the employment of personnel who change frequently in the industry so as to reduce the inhibitory effect of industry experience heterogeneity on innovation quality.

Secondly, establish diversified innovation cooperation relationships and promote technology exchange and sharing. High-quality innovation usually faces a longer R&D cycle and greater risks while putting forward higher requirements on the technology and resources of enterprises. Creating diverse innovation partnerships can, on the one hand, realize resource complementarity and promote knowledge creation and absorption. On the other hand, it can spread risk over a larger group of participants by creating technology co-ownership enabling companies to respond to the challenges posed by high-quality innovation. Therefore, in the process of improving the quality of enterprise innovation, TMT can make full use of the functional and industry experience to actively carry out stable and diversified cooperation with other enterprises, scientific research institutions, colleges and universities, organs, and organizations.

Thirdly, TMT should actively participate in the technology R&D process. TMT not only has a keen perception of the market, partners, and customers but also has the ability to integrate internal and external resources. When TMT members participate in technology R&D, they often have stricter requirements for innovation in order to maintain their professional reputation. An in-depth understanding of the innovation process and problems is conducive to improving the quality of innovation decision making. The enterprise should actively encourage the technical participation of TMT, which can increase the consistency between the innovation achievements and the market demand trend and strengthen the supervision of the enterprise's innovation process to improve the quality of innovation achievements.

8. Limitations and Future Directions

In addition, there are some limitations in this study. (1) Due to a lack of sufficient data, this research only focused on Chinese listed organizations, ignoring the position of unlisted companies, which is only representative for a limited period. However, this research model can be used in different enterprises in other countries. (2) Based on the classification basis of functions and industries in Tihanyi (2000), Yang (2020), and Yang (2018), this study divides experience heterogeneity into functional experience heterogeneity and industry experience

heterogeneity, which is insufficient. The classification basis will be refined in future studies to improve the focus of the research results. (3) In this paper, the matching procedure for sample data acquisition based on several databases may involve some manual errors.

Therefore, in future research, based on more comprehensive data, scholars can expand beyond the objects of local Chinese enterprises and consider studying TMTs of multinational enterprises or enterprises in different countries so as to reduce the impact caused by regional cultural differences. In addition, scholars also need to establish a cross-level model from the individual and organizational levels to further analyze the impact of TMT experience heterogeneity on innovation quality.

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References

- Chen, Z.; Wang, X. Innovation, sunk cost and enterprise survival: An empirical analysis using China's micro-level data. *Sci. Sci. Manag. S. T.* **2014**, *10*, 142–149.
- Maxamadumarovich, U.A.; Obrenovic, B.; Amonboyev, M. Understanding the innovation concept. *J. Innov. Sustain. RISUIS* **2012**, *3*, 19–26. [[CrossRef](#)]
- Saunila, M. Innovation capability in achieving higher performance: Perspectives of management and employees. *Technol. Anal. Strateg. Manag.* **2017**, *29*, 903–916. [[CrossRef](#)]
- Saunila, M.; Ukko, J. A conceptual framework for the measurement of innovation capability and its effects. *Balt. J. Manag.* **2006**, *7*, 355–375. [[CrossRef](#)]
- Wang, X.Y.; Xing, Y. The diversified analysis of the diversification of the executive team affects the innovation capabilities of the enterprise—empirical test based on GEM data. *Manag. Comment* **2020**, *32*, 101–111.
- Wan, P.Y.; Wang, H.Y. The executive team's interactive memory system, ability reconstruction and corporate innovation performance—the perspective of team self-anti-nature. *Sci. Technol. Res.* **2020**, *40*, 157–166.
- Yang, L.; He, X.; Gu, H. Top management team's experiences, dynamic capabilities and enterprise's strategy mutation: Moderating effect of managerial discretion. *J. Manag. World* **2020**, *36*, 168–188.
- Li, C.L.; Chen, B.Y.; Wang, J. The sources of the sources of the executive team of heterogeneity on the impact of corporate innovation performance-regulatory effects based on equity incentive. *Financ. Account. Commun.* **2020**, *22*, 31–35.
- Hambrick, D.C.; Mason, P.A. Upper echelons: The organization as a reflection of its top managers. *Acad. Manag. Rev.* **1984**, *9*, 193–206. [[CrossRef](#)]
- Hambrick, D.C. Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types. *Acad. Manag. J.* **1983**, *26*, 5–26. [[CrossRef](#)]
- Li, X.; Fu, B.; Guo, J. Digital finance, executive team's heterogeneity and enterprise innovation. *Stat. Decis.* **2022**, *38*, 161–165.
- Shakil, M.H.; Wahab, N.S.A. Top management team heterogeneity, corporate social responsibility and enterprise risk: An emerging country perspective. *J. Financ. Report. Account.* **2021**. [[CrossRef](#)]
- Camelo-Ordaz, C.; Hernández-Lara, A.B.; Valle-Cabrera, R. The Relationship between Top Management Teams and Innovative Capacity in Companies. *J. Manag. Dev.* **2005**, *24*, 683–705. [[CrossRef](#)]
- Talke, K.; Salomo, S.; Kock, A. Top Management Team Diversity and Strategic Innovation Orientation: The Relationship and Consequences for Innovativeness and Performance. *J. Prod. Innov. Manag.* **2011**, *28*, 819–832. [[CrossRef](#)]
- Zenger, T.R.; Lawrence, B.S. Organizational demography: The differential effects of age and tenure distributions on technical communication. *Acad. Manag. J.* **1989**, *32*, 353–376. [[CrossRef](#)]
- Ensley, M.D.; Pearson, A.W.; Amason, A.C. Understanding the dynamics of new venture top management teams: Cohesion, conflict, and new venture performance. *J. Bus. Ventur.* **2002**, *17*, 365–386. [[CrossRef](#)]
- Liu, K.; Li, J.; Hesterly, W.; Cannella, A. Top Management Team Tenure and Technological Inventions at Post-IPO Biotechnology Firms. *J. Bus. Res.* **2012**, *65*, 1349–1356. [[CrossRef](#)]
- Mehrabi, H.; Coviello, N.; Ranaweera, C. When is top management team heterogeneity beneficial for product exploration? Understanding the role of institutional pressures. *J. Bus. Res.* **2021**, *132*, 775–786. [[CrossRef](#)]

19. Kanchanabha, B.; Badir, Y.F. Top management Team's cognitive diversity and the enterprise's ambidextrous innovation capability: The mediating role of ambivalent interpretation. *Technol. Soc.* **2021**, *64*, 1–11. [[CrossRef](#)]
20. Gu, M.; Zhang, X.; Wang, D. Research on industrial experience heterogeneity of entrepreneurial team, governance mechanism and venture growth performance. *Sci. Technol. Prog. Policy* **2021**, *38*, 11–19.
21. Carpenter, M.A.; Geletkanycz, M.A.; Sanders, W.G. Upper Echelons Research Revisited: Antecedents, Elements, and Consequences of Top Management Team Composition. *J. Manag.* **2004**, *30*, 749–778. [[CrossRef](#)]
22. Zhang, J.J.; Zhang, Y.L. Chairman-General Manager's heterogeneity, gap and harmonious relationship and organizational performance of the general manager—evidence from listed companies. *Manag. World* **2016**, *1*, 110–120+188.
23. Finkelstein, S.; Hambrick, D.C. Top-management-team Tenure and Organizational Outcomes: The Moderating Role of Managerial Discretion. *Adm. Sci. Q.* **1990**, *35*, 484–503. [[CrossRef](#)]
24. Knippenberg, D.V.; Schippers, M.C. Work Group Diversity. *Annu. Rev. Psychol.* **2007**, *58*, 515–541. [[CrossRef](#)] [[PubMed](#)]
25. Hambrick, D.C. Upper echelons theory: An update. *Acad. Manag. Rev.* **2007**, *32*, 334–343. [[CrossRef](#)]
26. Kilduff, M.; Angelmar, R.; Mehra, A. Top Management-Team Diversity and Firm Performance: Examining the Role of Cognitions. *Organ. Sci.* **2000**, *11*, 21–34. [[CrossRef](#)]
27. Quttainah, M.A. Upper Echelon Theory: Role of Community and Strategy. *Int. J. Innov. Econ. Dev.* **2018**, *1*, 35–44. [[CrossRef](#)]
28. Asa, A.R.; Campbell, H.; Nautwima, J.P. A Critical Review of Organizing Knowledge Management for Innovation. *Int. J. Manag. Sci. Bus. Adm.* **2022**, *8*, 7–15.
29. Mellewigt, T.; Späth, J.F. Entrepreneurial Teams—A Survey of German and US Empirical Studies. *Z. Für Betr. Sonderh.* **2022**, *5*, 107–126.
30. Beckman, C.M. The Influence of Founding Team Company Affiliations on Firm Behavior. *Acad. Manag. J.* **2006**, *49*, 741–758. [[CrossRef](#)]
31. Henneke, D.; Lüthje, C. Interdisciplinary heterogeneity as a catalyst for product innovativeness of entrepreneurial teams. *Creat. Innov. Manag.* **2007**, *16*, 121–132. [[CrossRef](#)]
32. Ni, X.D.; Xiang, X.X.; Yao, C.X. The influence of the balance of heterogeneity on the team on team creativity. *J. Psychol.* **2016**, *48*, 556–565.
33. Amason, A.C.; Shrader, R.C.; Tompson, G.H. Newness and Novelty: Relating Top Management Team Composition to New Venture Performance. *J. Bus. Ventur.* **2006**, *21*, 125–148. [[CrossRef](#)]
34. Elsbach, K.D.; Kramer, R.M. Assessing creativity in Hollywood pitch meetings: Evidence for a dual-process model of creativity judgments. *Acad. Manag. J.* **2003**, *46*, 283–301. [[CrossRef](#)]
35. Chattopadhyay, P. Beyond Direct and Symmetrical Effects: The Influence of Demographic Dissimilarity on Organizational Citizenship Behavior. *Acad. Manag. J.* **1999**, *42*, 273–287. [[CrossRef](#)]
36. Knight, D.; Pearce, C.L.; Smith, K.G.; Olian, J.D.; Sims, H.P.; Smith, K.A.; Flood, P. Top Management Team Diversity, Group Process, and Strategic Consensus. *Stra. Manag. J.* **1999**, *20*, 445–465. [[CrossRef](#)]
37. Schoenecker, T.S.; Daellenbach, U.S.; McCarthy, A.M. Factors affecting a firm's commitment to innovation. In *Academy of Management Proceedings*; Academy of Management: Briarcliff Manor, NY, USA, 1995; pp. 52–56.
38. Frynas, J.G.; Mol, M.J.; Mellahi, K. Management Innovation Made in China: Haier's Rendanheiyi. *Calif. Manag. Rev.* **2018**, *61*, 71–93. [[CrossRef](#)]
39. Daellenbach, U.S.; McCarthy, A.M.; Schoenecker, T.S. Commitment to Innovation: The Impact of Top Management Team Characteristics. *R D Manag.* **1999**, *29*, 199–208. [[CrossRef](#)]
40. Stone, W.S.; Tudor, T.R. The effects of functional background experience, industry experience, generic executive management experience on perceived environmental uncertainty and enterprise performance. *Adv. Compet. Res.* **2005**, *13*, 1–9.
41. Bantel, K.A.; Jackson, S.E. Top management and innovations in banking: Does the composition of the top team make a difference? *Strateg. Manag. J.* **1989**, *10*, 107–124. [[CrossRef](#)]
42. Ma, J.C.; Huang, X. TMT experience and corporate social (ir) responsibility: The moderating effects of faultlines. *Nankai Bus. Rev. Int.* **2022**. [[CrossRef](#)]
43. Wang, X.L.; Ma, L.; Wang, Y.L. The Impact of TMT Functional Background on Enterprise Performance: Evidence from IT Public Listed Companies in China. *Nankai Bus. Rev.* **2013**, *16*, 80–93.
44. Simons, T.; Pelled, L.; Smith, K. Making Use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Acad. Manag. J.* **1999**, *42*, 662–673. [[CrossRef](#)]
45. Hambrick, D.C.; Cho, T.S.; Chen, M.J. The Influence of Top Management Team Heterogeneity on enterprises' Competitive Moves. *Adm. Sci. Q.* **1996**, *41*, 659–684. [[CrossRef](#)]
46. Duan, Y.; Yang, M.; Huang, L.; Chin, T.; Fiano, F.; de Nuccio, E.; Zhou, L. Unveiling the impacts of explicit vs. tacit knowledge hiding on innovation quality: The moderating role of knowledge flow within a enterprise. *J. Bus. Res.* **2022**, *139*, 1489–1500. [[CrossRef](#)]
47. Han, J. Promote the continued healthy development of specialized, refined, distinctive and novel SMEs. *People's Trib.* **2022**, *7*, 90–93.
48. Wiklund, J.; Shepherd, D. Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strateg. Manag. J.* **2010**, *24*, 1307–1314. [[CrossRef](#)]

49. Liu, X.; Tong, D.; Huang, J.; Zheng, W.; Kong, M.; Zhou, G. What matters in the e-commerce era? Modelling and mapping shop rents in Guangzhou, China. *Land Use Policy* **2022**, *123*, 106430. [[CrossRef](#)]
50. Xu, L.; Liu, X.; Tong, D.; Liu, Z.; Yin, L.; Zheng, W. Forecasting Urban Land Use Change Based on Cellular Automata and the PLUS Model. *Land* **2022**, *11*, 652. [[CrossRef](#)]
51. Wu, B.; Monfort, A.; Jin, C.; Shen, X. Substantial response or impression management? Compliance strategies for sustainable development responsibility in family firms. *Technol. Forecast. Soc. Chang.* **2021**, *174*, 121214. [[CrossRef](#)]
52. Si, D.K.; Li, X.L.; Huang, S.J. Financial deregulation and operational risks of energy enterprise: The shock of liberalization of bank lending rate in China. *Energy Econ.* **2021**, *93*, 105047. [[CrossRef](#)]
53. Gazley, B.; Brudney, J.L. The Purpose (and Perils) of Government-Nonprofit Partnership. *Nonprofit Volunt. Sect. Q.* **2007**, *36*, 389–415. [[CrossRef](#)]
54. Huang, Z. A study of the political strategy of American companies and its implications for China. *Mod. Manag.* **2004**, *42*, 61–64.
55. Cheng, C.; Wang, L.M. How companies configure digital innovation attributes for business model innovation? A configurational view. *Technovation* **2022**, *112*, 102398. [[CrossRef](#)]
56. Su, D.; Zhou, D.; Liu, C.; Kong, L. Government-driven university-industry linkages in an emerging country: The case of China. *J. Sci. Technol. Policy Manag.* **2015**, *6*, 263–282. [[CrossRef](#)]
57. Mindruta, D. Value creation in university-enterprise research collaborations: A matching approach. *Strateg. Manag. J.* **2012**, *34*, 644–665. [[CrossRef](#)]
58. Cui, S.; Li, L.; Tang, Y.; Li, C. Exploring the Diversity of Alliance Portfolio and enterprise Performance Based on the QCA Method. In Proceedings of the 2021 IEEE 6th International Conference on Cloud Computing and Big Data Analytics (ICCCBDA), Chengdu, China, 24–26 April 2021. [[CrossRef](#)]
59. Ma, Y.; Yang, X.; Kong, L. A study of the key general purpose technologies cooperation networks based on industrial heterogeneity. *Stud. Sci. Sci.* **2021**, *39*, 1036–1049.
60. Teirlinck, P.; Spithoven, A. Formal R&D management and strategic decision making in small enterprises in knowledge-intensive business services. *RD Manag.* **2012**, *43*, 37–51.
61. McGahan, A.M. Integrating Insights From the Resource-Based View of the enterprise Into the New Stakeholder Theory. *J. Manag.* **2021**, *47*, 1734–1756.
62. Freeman, R.E.; Dmytryiev, S.D.; Phillips, R.A. Stakeholder Theory and the Resource-Based View of the enterprise. *J. Manag.* **2021**, *47*, 1757–1770.
63. Shaikh, M.; Levina, N. Selecting an open innovation community as an alliance partner: Looking for healthy communities and ecosystems. *Res. Policy* **2019**, *48*, 103766. [[CrossRef](#)]
64. Flaherty, E.; Bartels, S.J. Addressing the Community-Based Geriatric Healthcare Workforce Shortage by Leveraging the Potential of Interprofessional Teams. *J. Am. Geriatr. Soc.* **2019**, *67* (Suppl. S2), S400–S408. [[CrossRef](#)]
65. Cannella, A.A.; Park, J.H.; Lee, H.U. Top Management Team Functional Background Diversity and enterprise Performance: Examining The Roles of Team Member Colocation and Environmental Uncertainty. *Acad. Manag. J.* **2008**, *51*, 768–784.
66. Ahlstrom, D.; Arregle, J.; Hitt, M.A.; Qian, G.; Ma, X.; Faems, D. Managing technological, sociopolitical, and institutional change in the new normal. *J. Manag. Stud.* **2020**, *57*, 411–437. [[CrossRef](#)]
67. Micheli, P.; Schoeman, M.; Baxter, D.; Goffin, K. New Business Models for Public-Sector Innovation: Successful Technological Innovation for Government. *Res.-Technol. Manag.* **2012**, *55*, 51–57. [[CrossRef](#)]
68. Tihanyi, L.; Ellstrand, A.E.; Daily, C.M.; Dalton, D.R. Composition of the Top Management Team and enterprise International Diversification. *J. Manag.* **2000**, *26*, 1157–1177.
69. Yang, Gu, H.; Li, S. Executive team experience and corporate cross-border growth strategy: The regulatory effect of management autonomy. *Sci. Sci. Technol. Manag.* **2018**, *39*, 101–119.
70. Shi, J.; Li, X. Government subsidies and corporate innovation capability: A new empirical finding. *Bus. Manag. J.* **2021**, *43*, 113–128.
71. Mao, C.X.; Zhang, C. Managerial Risk-Taking Incentive and enterprise Innovation: Evidence from FAS 123R. *J. Financ. Quant. Anal.* **2018**, *53*, 867–898. [[CrossRef](#)]
72. Shen, Y.; Huang, H.; Zhao, L. Local government “innovation worship” and corporate patent bubble. *Res. Manag.* **2018**, *4*, 83–91.
73. Liu, F.; Hu, L.; Fan, X. Research on the Influence of Industry University Research Cooperation on Enterprise Innovation Quality. *Econ. Manag.* **2020**, *42*, 120–136.
74. Wu, X.; Ma, Z. How does institutional embeddedness affect the quality of corporate innovation after cross-border mergers and acquisitions? *Econ. Manag.* **2022**, *44*, 98–115.
75. Wang, Y.; Yuan, C.; Zhang, S. From cooperation to integration: Industry-university-research alliance portfolio diversity of private enterprises in China’s transition economy. *Stud. Sci. Sci.* **2021**, *39*, 1257–1266.
76. Zeng, P.; Wu, Y. The impact of female executives participation on technological innovation—Evidence from Chinese GEM companies. *Stud. Sci. Sci.* **2012**, *30*, 773–781.
77. Fang, F.; Cai, W. Banking competition and enterprise growth: Empirical evidence from industrial enterprises. *J. Manag. World* **2016**, *7*, 63–75.
78. Xiao, Z.; Lin, L. Financialization, life cycle and persistent innovation: An empirical research based on the industrial difference. *J. Financ. Econ.* **2019**, *45*, 43–57.

79. Zhang, L.; Lin, X. Research on the influence of enterprises' financialization behavior on innovation quality. *East China Econ. Manag.* **2022**, *36*, 33–44.
80. Zhou, X.; Han, L.; Han, Y. Corporate Business Risk, Overseas M&A and Innovation Quality. *Friends Account.* **2022**, *40*, 95–101.
81. Wen, Z.; Ye, B. Analyses of mediating effects: The development of methods and models. *Adv. Psychol. Sci.* **2014**, *22*, 731–745. [[CrossRef](#)]
82. Wen, Z.; Fang, J.; Xie, J. Methodological research on mediation effects in China's mainland. *Adv. Psychol. Sci.* **2022**, *30*, 1692–1702. [[CrossRef](#)]
83. Fang, V.W.; Tian, X.; Tice, S. Does Stock Liquidity Enhance or Impede enterprise Innovation? *Soc. Sci. Electron. Publ.* **2014**, *69*, 2085–2125.
84. Cai, S.; Yu, L. Innovation quantity, innovation quality and enterprise benefit. *China Soft Sci.* **2017**, *5*, 30–37.

Article

Social and Environmental Regulations and Corporate Innovation

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Abstract: In this study, we investigate the effects of mandatory social and environmental regulations (MSER) on firm innovation. In 2008, the Shanghai and Shenzhen Stock Exchange in China published regulations that mandate some public firms to disclose their social and environmental governance information in their annual reports. As the MSER apply only to selected firms, this provides an ideal setting for us to observe the effects of MSER on firm innovation. Using a difference-in-differences with propensity-score-matching methodology, we find that the treatment firms experience a significant increase in innovation in terms of the number of total patents and invention patents. More importantly, we further explore three possible mechanisms underlying this association, that is, the corporate social responsibility (CSR)-improving effect, information-disclosing effect, and market-reaction effect, and demonstrate that this positive relationship is mainly driven by the CSR-improving effect and market-reaction effect, manifesting in an improvement in CSR performance and a decline in transient institutional investors for the treatment firms, respectively.

Keywords: mandatory disclosure; difference-in-differences; CSR performance; institutional investors

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1. Introduction

Corporate social responsibility (CSR) has become an important topic that has attracted significant attention not only from academic scholars but also from business practitioners and governments. For example, Europe enacted the Non-Financial Reporting Directive (NFRD) in 2014, which requires public companies with more than 500 employees to disclose the methods through which they manage social and environmental challenges [1]. The Indian government passed a new law that requires specific firms (according to firms' profitability, net worth, and size) to spend at least 2% of their net income on CSR each year [2]. In China, in 2008, the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) published regulations that mandate some public firms to disclose their social and environmental governance information in their annual reports. Previous studies have examined the effects of mandatory social and environmental regulations (hereafter, MSER) on business operations such as firm performance, shareholder value, and CSR expenditure [2–5].

However, we have little knowledge about how the MSER have impacted firms' other important activity—innovation. Innovation is a dominant corporate strategy that boosts long-term growth and enhances sustainable competitiveness [6,7]. In 2018, PwC surveyed 1000 public firms around the world and found that these firms spent a total of USD 782 billion on innovation activities [8]. Moreover, a report suggests that innovation-related activities account for around 50% of a country's total GDP growth, with their effects varying depending on the level of economic development and the phase of the economic cycle of each country [9]. Accordingly, it is necessary and paramount to investigate whether firm innovation activities are affected by the local government's sudden implementation of MSER.

The relationship between MSER and firm innovation is not immediately clear. On the one hand, such mandatory regulations may lead to a reduction in investment in innovation activities, especially for small- and medium-sized enterprises (SMEs). This is because the affected firms may allocate parts of their available funding, which could be used on innovation projects, to investment in social and environmental governance, thereby causing a decline in the innovation activities. For SMEs whose financial resources are limited [10], their R&D expenditures would rapidly shrink once they are forced by the government to conduct environmental and social activities. On the other hand, MSER may also increase innovation. First, the improvement in CSR performance driven by the regulations may enhance employees' satisfaction, teamwork, and innovative productivity (i.e., CSR-improving effect), which consequently sparks innovation output [11,12]. Second, disclosing non-financial information allows a firm to increase its transparency and reduce uncertainty and information costs (i.e., information-disclosing effect), thereby possibly prompting firm innovation [13–15]. Third, MSER may encourage innovation by reducing the pressures on managers to pursue short-term benefits [16–19], as myopic investors treat these regulations as a negative sign and escape from these firms (i.e., market-reaction effect) [2,3]. Therefore, we attempt to answer the following questions in this study:

- RQ1: How do mandatory social and environmental regulations influence corporate innovation?
- RQ2: What are the underlying mechanisms that drive this relationship?

A Chinese policy provides an ideal setting to identify the causal effect between MSER and firm innovation. At the end of 2008, the SSE and SZSE announced regulations that require certain firms to disclose social and environmental governance information. Since the regulations were unexpected for Chinese firms and only covered some public firms, this provides a quasi-experimental context that can help us accurately estimate the impact of MSER. We leverage this exogenous variation and adopt difference-in-differences with propensity-score matching (DID-PSM) to identify the impact of MSER on firm innovation. We found that MSER led to a significant increase in the firm innovation output measured by the number of patents in the post-regulation period. Specifically, the treatment firms experienced a higher innovation output than the control firms by 19.7% three years after the regulations. The results also revealed that the number of invention patents that were more innovative and original from the treatment firms significantly increased following the regulations, relative to the control firms. Thus, the increase suggests a positive impact on innovation quality. The findings hold up to a variety of robustness checks.

To understand the underlying mechanisms of this association further, we explored the three possible channels proposed above. First, we examined whether CSR performance of the treatment firms was enhanced after the regulations. Prior studies have suggested that the improvement in CSR performance would facilitate firm innovation by increasing the work atmosphere and employee satisfaction [11,12,20]. Our regression results revealed that the CSR performance of the treatment firms increased significantly compared to the control firms. Thus, this supports the mechanism of the CSR-improving effect. Second, we examined whether the information asymmetry of the treatment firms declined after the regulations. MSER may reduce firms' environmental uncertainty and information asymmetry by disclosing more information to stakeholders, thereby eliminating the transaction costs to prompt innovation [15,21]. Ref. [13] also documented that high transparency (i.e., low uncertainty and information asymmetry) facilitates innovation by reducing information costs. If a firm becomes more transparent, an analyst's forecast will be more accurate [22]. Therefore, we adopted the analysts' forecast errors to capture the information asymmetry. The results showed that these errors did not drop significantly for the treatment firms after the regulations, thus suggesting that the positive effect of the regulations on innovation was not driven by the information-disclosing effect. Last, we examined whether the pressures on managers to reap short-term benefits were reduced after the regulations. The extant literature documents that the pressures on short-term benefits from institutional investors stifled firm innovation [16–19]. Accordingly, we explored how institutional ownership

changed when firms were affected by MSER. Our regression results indicated that institutional ownership declined significantly for the treatment firms after the regulations. Thus, this supports the market-reaction effect. In sum, these results revealed that the effects of MSER on firm innovation were primarily driven by the CSR-improving effect and market-reaction effect.

This study is mostly related to Hong et al. [23] and Mbanyele et al. [24] who investigated the impact of mandatory CSR disclosure on firms' green innovation. Although their research provided us with initial insight into the relationship between MSER and green innovation, we do not know how much MSER have impacted firms' whole innovation activities (e.g., non-green innovation). Moreover, previous research did not address why these types of regulations would impact firm innovation activities and output. Accordingly, this study contributes to the literature by examining the impact of MSER on firms' whole innovation output and also provides deeper insights into the underlying mechanisms that explain why the regulations would impact innovation activities.

2. Literature Review

2.1. Government Policy and Corporate Innovation

Our research is related to the literature about how macro country characteristics, such as laws and policies, affect corporate innovation. Conventional policies, such as intellectual property protection [25–27], bankruptcy laws [28,29], universal demand laws [30–32], internet blockade orders [33], emissions trading scheme pilots [34], and antitrust laws [35], have been well studied. Recently, a growing number of studies have focused on the policies that aim to protect the interests of employees and investigated how these laws affect the incentives to innovate [36]. For example, ref. [37] estimated the impact of wrongful discharge laws, which protect employees against unjust dismissal, on innovation. Using the staggered adoption of wrongful discharge laws across U.S. states, they found that the laws indeed had a positive impact on innovation and new firm creation. Ref. [38] revealed a positive causal effect between the passage of smoke-free laws, which banned smoking in workplaces, and corporate innovation measured by patents and patent citations. Ref. [11] examined the effect of state-level stakeholder orientation policies, known as constituency statutes, which allow directors to consider the interests of stakeholders such as employees when making business decisions, on firm innovation. Although prior studies have focused on employee protection laws, the direct effect of MSER on innovation remains unclear.

2.2. Mandatory Non-Financial Disclosure

The last strand of literature is related to mandatory non-financial disclosure. Non-financial disclosure usually refers to the disclosure of CSR- or ESG-related reports. Research on accounting has demonstrated that voluntary non-financial disclosure reduces firms' cost of equity capital, finance, and information asymmetry [22,39,40]. Although an increasing number of firms are willing to disclose non-financial information, a large proportion of companies are still averse to such disclosures. Therefore, several countries and regions have passed laws to mandate public firms to disclose their non-financial information. Ref. [41] investigated the stock market reaction to the passage of the NFRD in Europe and documented that the market reacts negatively to these types of events on average. Ref. [5] examined the impact of mandatory CSR reporting regulations on firms' disclosure practices and valuations using a sample from Denmark, Malaysia, China, and South Africa. They revealed that the disclosure behavior and Tobin's Q of the affected firms increased following the regulations. Similarly, ref. [3] examined whether mandatory CSR disclosure impacted firms' performance and social externalities and observed that the treatment firms experienced a significant decrease in profitability subsequent to the regulations. However, the extant literature did not document the association between mandatory CSR reporting and corporate innovation, which is important for policymakers and firms' managers considering the role of innovation. Therefore, this study contributes to this literature by examining the impact of MSER on innovation.

3. Data and Methodology

3.1. Background

In China, the SSE announced on 30 December 2008 that firms listed in its “Corporate Governance Index” were required to disclose social and environmental governance information in their annual reports beginning in 2008. On 31 December 2008, the SZSE also released a similar announcement that required all firms on its “Shenzhen 100 Index” to disclose social and environmental governance information. Given that the SSE and the SZSE are owned by the Chinese government, the announcements were consistent with the regulations published by the government. Specifically, the SSE Corporate Governance Index consists of 230 listed companies that use best governance practices, which are usually reflected in the total market value, free-float market value, and share turnover. Similarly, the SZSE 100 index is composed of the top 100 listed firms in terms of market value, free-float market value, and share turnover. Although the regulations only required the affected firms to disclose social and environmental governance information, prior research shows that the regulations have led to substantial changes in firms’ activities such as environmental improvements [3] and increases in CSR expenditure [4]. Moreover, this requirement is mandatory for these firms. Accordingly, we leverage this exogenous variation to investigate the impact of mandatory social and environmental regulations on firm innovation. Considering the rules of the SSE Corporate Governance Index and SZSE 100 Index, the treatment firms in our research cannot be randomly assigned. Therefore, to mitigate this concern, we refer to the identification strategy that has been widely used in previous research [3,4,42] and utilize DID-PSM methodology to identify the impact of MSER.

3.2. Data

The sample consists of all A-share firms listed on the SSE and the SZSE from 2006 to 2011. We first excluded firms pertaining to financial service industries (i.e., banking and insurance industries), given that these firms are subject to different regulations. Next, we excluded firms that had non-positive shareholders’ equity in our sample period because these firms do not have a normal operating environment. Moreover, a few firms that voluntarily disclosed social and environmental governance information before the announcement of the regulations were dropped from our sample, as this study mainly focuses on the influence of mandatory regulations on firm innovation. Finally, we removed firms that only appeared in the pre-regulation or post-regulation periods. Table 1 presents the steps for organizing data. The above selection criteria yielded an initial sample of 6670 firm-year observations (1145 unique firms), where the treatment group consisted of 1595 firm-year observations representing 267 treatment firms and the control group consisted of 5075 firm-year observations representing 878 control firms. We obtained the firm-level financial information from the China Securities Markets and Accounting Research (CSMAR) database.

Table 1. The Processes of Data Organization.

	Process	Observations
Step 1	Exclude firms pertaining to financial service industries;	10,596
Step 2	Exclude firms that have non-positive shareholders’ equity;	9812
Step 3	Drop firms that voluntarily disclose social and environmental governance information;	7762
Step 4	Remove firms that only appear in the pre-regulation or post-regulation periods.	6670

Note: The observations in the initial sample size were 10,787.

3.3. Variable Measurement

Dependent Variables. To measure firm innovation, we followed common practices in the innovation literature and constructed the metrics, e.g., in [11,13,14,16]. First, we used the patent-based measure to capture the corporate innovation output, that is, the natural

logarithm of one plus the number of patents that the firm has filed (*LnPatents*). More precisely, this variable only counts the annual number of filed patent applications that were eventually granted. As China's State Intellectual Property Office (SIPO) does not require the citation of all related patents when applying for a patent, Chinese patent filing has a well-known problem, that is, a lack of patent citation information [27,34,43]. Accordingly, we used the natural logarithm of one plus the number of invention patents (*LnInventions*), which are more innovative and original, to reflect the quality of the innovation output.

Following the practices used in previous innovation research [27,34,43], we combined the number of invention and utility patents as the firm's innovation output. We collected the number of patents for all public firms from the CSMAR database. In total, 108,969 patents were filed in the sample period including 48,663 invention patents and 60,306 utility patents.

Control Variables. In our regression model, we referred to prior research to control for a vector of firm-level characteristics that may influence innovation [11,16]. All control variables were collected from the CSMAR database. Specifically, we controlled for *firm size*, *firm age*, *return on assets (ROA)*, *leverage*, *cash holdings*, and *R&D intensity*. Firm size is the natural logarithm of total assets. Firm age is the natural logarithm of the number of years since the firm's inception. ROA is the ratio of net income to total assets. The leverage ratio is the total liabilities divided by the total assets. Cash holdings is the ratio of cash to total assets. R&D intensity is calculated as the R&D investment, which is collected from the annual report of each firm, scaled by the total assets. To control for outliers, we winsorize all continuous control variables at the 1st and 99th percentiles of their empirical distributions, i.e., data above (below) the 99th (1st) percentile are set to the 99th (1st) percentile. The definitions of all variables used in this paper are presented in Table A1.

3.4. Methodology

Difference-in-Differences. To explore how MSER affect firm innovation, we adopted a DID approach based on the exogenous regulations in China. The logic here was to compare the relative difference between the treatment group and the control group before and after the exogenous shock. One important presumption for this estimation is the satisfaction of "parallel trends" between the treatment and control groups (we discuss this later). In this way, we can control for unobservable sources of heterogeneity across groups. If MSER facilitate firm innovation, we expect to observe that the difference in the increase in innovation between the treatment and control firms was more salient in the post-regulation period than in the pre-regulation period.

Given that the MSER were announced at the end of 2008 (30 December 2008 for SSH and 31 December 2008 for SZSH), we set 2009 as the first year the policy began to influence the treatment firms' behavior. Thus, we selected 2009 to 2011 as the post-regulation period and 2006 to 2008 as the pre-regulation period. We opted for a three-year window for two reasons: (i) the range should not be too short because time is necessary to determine the effect of the event on the innovation outputs; and (ii) it should not be too long to avoid confounding events. We also varied the length of the observation window in robustness analyses. Our specification model is as follows:

$$Innovation_{it} = \alpha_0 + \alpha_1 Treated + \alpha_2 Post + \alpha_3 Treated \times Post + \gamma X_{it} + I_j + \varepsilon_{it}, \quad (1)$$

where i denotes firms; t denotes years; and j denotes industries. The dependent variable in this model is our measure of a firm's innovation output (i.e., *LnPatents* and *LnInventions*). *Treated* is a dummy variable that is equal to one for the treatment firms and zero for the control firms. *Post* is a dummy variable that equals one if a firm year belonged to the post-regulation period (2009–2011) and zero if a firm year belonged to the pre-regulation period (2006–2008). X is the vector of the control variables, which included firm size, firm age, ROA, leverage, cash holdings, and R&D intensity. We also included the industry fixed effects (I_j) to absorb the industrially time-invariant differences that were not captured by firm characteristics. ε is the error term. To account for the serial correlation of the error

term, we clustered standard errors at the firm level. The coefficient of interest is α_3 , which measures the effect of MSER on innovation.

Propensity-Score Matching. To mitigate the differences between the treatment and control firms, we generated a matched control sample using the PSM approach with respect to the observed characteristics. The basic logic was that each treated firm was matched with “control” firms, which were otherwise similar to the treated firm in terms of the propensity for being treated. A matching method can reduce the bias between two groups and allow for more accurate comparisons of innovation trends between the pre- and post-regulation periods. This approach enabled us to make stronger causal claims about the effect of MSER on firm innovation.

The PSM approach is based on the conditional probability of assignment to a particular treatment given a vector of observed covariates [44]. We adopted a probit regression to determine whether or not a particular firm was “treated” (included in the regulation list). Specifically, we included the firm size, return on equity, share turnover, stock returns, state ownership, and R&D intensity as the determinants that have been closely linked with the entry of regulation lists [3,4]. We selected the pre-regulation period as the matching window. Thus, all the covariates included in the probit regression were averages over the pre-regulation period (2006–2008). Additionally, we incorporated the growth measure of innovation (*patent growth*), which is measured by the growth ratio of the number of a firm’s patents over the pre-regulation period, to ensure that the parallel trends assumption was satisfied. We then used the one-to-two nearest-neighbor matching algorithm with replacements to identify the control units. To ensure that the matching procedures improved the balance, we compared the differences in the means between the treatment and control firms (before and after matched) for these covariates. As shown in Table A2, the results revealed that the PSM procedures effectively reduced the differences between our treatment and control firms before the regulations. This procedure resulted in a matching sample of 2958 firm-year observations, 1589 of which were treatment firm years and 1369 of which were control firm years. Table A1 presents the distribution of the matched sample firms across the industry. We found that most observations in our sample came from the manufacturing industry, accounting for 54%, which is similar to the actual distribution of Chinese public firms.

4. Results

4.1. Summary Statistics

Table 2 reports the descriptive statistics of the matched sample firms for the variables used in our main regression and the corresponding correlation matrix. The first two rows contain the main dependent variables, i.e., *LnPatents* and *LnInventions*. The average number of patents (the raw value) was 16.02 before matching versus 29.39 after matching; the average number of invention patents was 7.30 before matching versus 14.19 after matching. The average number of invention patents (after matching) was smaller than the average number of utility patents (14.19 vs. 15.19), thus suggesting that applications for invention patents were harder to attain than utility patents [27]. As the correlation matrix shows, firms with higher ROA, lower leverage, and more cash holdings were more likely to invest in R&D; firms with a larger size, older age, and higher leverage had higher innovation outputs, that is, a higher number of patents.

4.2. Main Results

We report the regression results of Equation (1) in Table 3. Columns 1–2 show the regression results for the innovation outputs—*LnPatents* and *LnInventions*—respectively. The coefficient of the interaction term, *Treated* \times *Post*, is positive and statistically significant in column 1, suggesting the positive impact of MSER on firms’ patent counts. In other words, the treatment firms that were required to disclose social and environmental governance information experienced a striking increase in patents relative to the control firms. The economic effect was also sizeable, that is, the number of patents for the treatment

firms increased by 19.7% three years after the regulations. Column 2 shows a positive and significant coefficient and suggests that the number of invention patents increased by 16.6% for the treatment firms compared to the control firms. To mitigate concerns regarding potentially omitted variables, we also performed an alternative specification that included the firm and year fixed effects in our DID estimation. The inclusion of firm fixed effects can rule out the interpretation from time-invariant firm characteristics; year fixed effects can absorb common shocks into all firms in a given year. Columns 3 and 4 in Table 3 indicate that our inferences remained unchanged with this alternative specification.

Table 2. Descriptive Statistics and Correlation Matrix (after Matching).

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7
1 LnPatents	1.476	1.652	0.000	8.277	1						
2 LnInventions	0.945	1.313	0.000	8.211	0.903	1					
3 Firm size	22.272	1.109	19.272	24.813	0.264	0.260	1				
4 Firm age	2.659	0.279	1.386	3.258	0.053	0.022	0.069	1			
5 ROA	0.051	0.051	−0.179	0.197	0.010	0.045	−0.012	− 0.106	1		
6 Leverage	0.511	0.178	0.040	0.870	0.089	0.054	0.356	0.077	− 0.439	1	
7 Cash holdings	0.150	0.107	0.005	0.766	0.030	0.050	− 0.120	− 0.132	0.314	− 0.313	1
8 R&D intensity	0.004	0.009	0.000	0.058	0.348	0.359	−0.025	−0.030	0.132	− 0.078	0.117

N = 2958. The bold correlation coefficient represents $p < 0.05$.

We further assessed the dynamics of the treatment effect. To do so, we used 2008 as the benchmark year, *Year* (0), and replaced *Post* with five year dummies: *Year* (−2) and *Year* (−1) for the two years prior to the regulations; *Year* (1), *Year* (2), and *Year* (3) for the first, second, and third years after the regulations, respectively. We then made these year dummies interact with *Treated* to capture the dynamic impact of the regulations on firm innovation. As shown in Table 4, the coefficients of all pre-regulation dummies (i.e., *Treated* × *Year* (−2) and *Treated* × *Year* (−1)) were small and insignificant. This evidence reassured us that this matched sample had no pre-existing trend. Thus, the parallel trends were stratified. Moreover, we found that the effect became significant only two years after the regulations, thus suggesting that the MSER took 24 months to translate to higher innovative output, which is consistent with the innovation lag found in previous studies [11,37]. Overall, our main results revealed that MSER in China had a significant effect on firm innovation output. Specifically, the innovation quantity (i.e., total patents) and innovation quality (i.e., the number of invention patents) experienced a striking increase for the treatment firms.

Table 3. The Impact of MSER on Firm Innovation.

	LnPatents (1)	LnInventions (2)	LnPatents (3)	LnInventions (4)
<i>Treated</i> × <i>Post</i>	0.197 *** (0.072)	0.166 *** (0.060)	0.214 *** (0.069)	0.176 *** (0.058)
<i>Treated</i>	0.330 *** (0.094)	0.235 *** (0.077)		
<i>Post</i>	0.183 *** (0.063)	0.324 *** (0.055)		
Firm size	0.398 *** (0.058)	0.356 *** (0.051)	0.130 * (0.078)	0.156 ** (0.071)
Firm age	0.417 ** (0.181)	0.187 (0.159)	1.137 ** (0.573)	1.234 ** (0.529)
ROA	−0.248 (0.802)	0.038 (0.723)	0.337 (0.493)	0.312 (0.417)

Table 3. Cont.

	LnPatents (1)	LnInventions (2)	LnPatents (3)	LnInventions (4)
Leverage	−0.142 (0.288)	−0.131 (0.237)	0.159 (0.231)	−0.140 (0.219)
Cash holdings	−0.025 (0.367)	−0.019 (0.323)	0.184 (0.257)	0.115 (0.217)
R&D intensity	29.520 *** (5.654)	27.919 *** (6.078)	6.222 ** (2.970)	5.218 * (3.049)
Constant	−8.836 *** (1.254)	−7.712 *** (1.107)	−4.643 *** (2.082)	−5.828 *** (2.004)
Industry fixed effects	Yes	Yes	Yes	Yes
Firm, year fixed effects	No	No	Yes	Yes
Observations	2958	2958	2958	2958
Adjusted R ²	0.496	0.415	0.822	0.804

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 4. The Dynamic Effects of MSER on Firm Innovation.

	LnPatents (1)	LnInventions (2)
Treated	0.353 *** (0.103)	0.253 *** (0.089)
<i>Treated</i> × Year (−2)	−0.083 (0.083)	−0.028 (0.070)
<i>Treated</i> × Year (−1)	0.010 (0.074)	−0.026 (0.061)
<i>Treated</i> × Year (0)	(Omitted)	
<i>Treated</i> × Year (1)	0.113 (0.077)	0.076 (0.066)
<i>Treated</i> × Year (2)	0.219 ** (0.087)	0.183 *** (0.070)
<i>Treated</i> × Year (3)	0.194 ** (0.097)	0.189 ** (0.082)
Controls	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	2958	2958
Adjusted R ²	0.498	0.416

Note. The results of the year dummies are omitted for conciseness. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

4.3. Robustness Checks

Nonpatenting Firms. Our regression sample contained firms that did not file patents throughout the sample period, which accounted for 18.7% of all observations. Therefore, our results may have been affected by these nonpatenting firms. Although the inclusion of firm fixed effects in previous analyses has helped to mitigate this concern, we re-estimated our regression after excluding the nonpatenting firms. The results were unchanged (see columns 1–2 in Table 5).

Alternative Observation Windows. In our main analyses, we adopted a three-year observation window to observe the impact of MSER on innovation. In this part, we extend our observation window to four or five years to verify whether our results were sensitive to the selection of the observation window. As shown in Table 5, our results were robust in the four- and five-year observation windows. Moreover, the coefficient of the interaction term, *Treated* × *Post*, increased with the rise in the observation window. In particular, column 5 indicates that the number of patents for the treatment firms increased by 21.1% five years

after the regulations, which was larger than the influence after four years (20.6%, column 3) and three years (19.7%, column 1). Similar to the total patents, the impact on invention patents increased with the extension of the observation window (19.6%, 17.6%, and 16.6% after five, four, and three years of the regulations, respectively). The evidence shows that the influence of the MSER still existed after five years.

Table 5. Robustness Checks I—Changing Observation Window

	Excluding Nonpatenting Firms		Four Years after the Regulations		Five Years after the Regulations	
	LnPatents (1)	LnInventions (2)	LnPatents (3)	LnInventions (4)	LnPatents (5)	LnInventions (6)
<i>Treated</i> × <i>Post</i>	0.152 * (0.083)	0.141 ** (0.071)	0.206 *** (0.074)	0.176 *** (0.062)	0.211 *** (0.075)	0.196 *** (0.065)
Treated	0.349 *** (0.114)	0.274 *** (0.096)	0.272 *** (0.098)	0.187 ** (0.081)	0.256 *** (0.098)	0.172 ** (0.081)
Post	0.305 *** (0.077)	0.129 * (0.069)	0.172 *** (0.065)	0.042 (0.058)	0.178 ** (0.068)	0.039 (0.060)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2406	2406	3345	3345	3821	3821
Adjusted R^2	0.439	0.375	0.523	0.445	0.541	0.469

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Alternative Matching Rules. In our main regression, we used the PSM approach with a combination of one-to-two nearest-neighbor matching and replacement. Here, we selected different matching rules to check the robustness of our findings. Table 6 presents the corresponding results. First, we adopted different nearest-neighbor algorithms, i.e., one-to-one nearest-neighbor matching and nearest-three-neighbors matching, to generate the matched sample. Columns 1–4 indicate that the impact of MSER on the total number of patents and invention patents was unchanged. Second, we set a caliper of 0.02 to the one-to-two nearest neighbor because the *propensity score* between the matched pair may have been too far even if we used the “nearest neighbor”. Common practice is to set the caliper to a 0.25* standard error of the propensity score. However, the difference in the propensity scores of all matched pairs in our sample was smaller than a 0.25* standard error of the propensity score (0.07) using default one-to-two nearest-neighbor matching. Therefore, we selected 0.02, a smaller and more restrictive rule, as the size of the caliper. As shown in columns 5 and 6, our results were robust to this setting.

Table 6. Robustness Checks II—Alternative Matching Rules.

	One-to-One Matching		Nearest Three Neighbors		Matching within Caliper	
	LnPatents (1)	LnInventions (2)	LnPatents (3)	LnInventions (4)	LnPatents (5)	LnInventions (6)
<i>Treated</i> × <i>Post</i>	0.173 ** (0.080)	0.138 ** (0.066)	0.178 ** (0.070)	0.146 ** (0.059)	0.195 *** (0.073)	0.162 *** (0.061)
Treated	0.353 *** (0.107)	0.258 *** (0.089)	0.322 *** (0.088)	0.239 *** (0.073)	0.320 *** (0.094)	0.230 *** (0.078)
Post	0.216 *** (0.074)	0.100 (0.065)	0.217 *** (0.059)	0.092 * (0.052)	0.189 *** (0.064)	0.063 (0.056)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2477	2477	3318	3318	2910	2910
Adjusted R^2	0.488	0.415	0.492	0.416	0.494	0.414

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Placebo Test. Here, we conducted a placebo test by replicating our analysis using a fabricated shock [45]. We set 2007 as the time when the false “MSER” occurred. To avoid “contamination” due to real treatment effects, we only used observations from 2006 to 2008 and supplemented the data on these observations from 2005 to construct balanced before-and-after observation windows. Thus, in this placebo test, our pre-regulation period ranged from 2005 to 2006, and the post-regulation period ranged from 2007 to 2008. This test can help us to rule out alternative explanations caused by unobservable factors. As shown in Table 7, the estimates for *Treated* × *Post* were all attenuated to zero and both coefficients were insignificant, thus suggesting that our main findings were not attributable to any unidentified factors.

Table 7. Robustness Checks III—Placebo Test (2005–2008).

	LnPatens (1)	LnInventions (2)
<i>Treated</i> × <i>Post</i>	0.040 (0.070)	0.040 (0.056)
<i>Treated</i>	0.265 *** (0.092)	0.188 ** (0.074)
<i>Post</i>	0.145 ** (0.067)	0.102 * (0.057)
Controls	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	1861	1861
Adjusted R^2	0.385	0.310

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

5. Mechanisms

The above estimates indicate that MSER were associated with an increase in firm innovation output, i.e., the number of patents and invention patents. In this section, we explore the underlying mechanisms behind this association. Three potential channels can explain why MSER influenced firm innovation activities: the CSR-improving effect, information-disclosing effect, and market-reaction effect. Below, we discuss each channel in detail and conduct estimates to verify them.

5.1. CSR-Improving Effect

First, we explored whether the CSR-improving effect was dominant in the impact of MSER on firm innovation. An extensive body of literature has investigated the impact of CSR on corporate innovation, and most studies showed that CSR performance could facilitate firm innovation output [11,20]. For example, ref. [20] analyzed panel data collected from firms in the S&P 500 and revealed that the improvement in corporate social performance was able to prompt firm innovation. Ref. [11] found that stakeholder orientation that increased firms’ CSR performance sparked innovation by encouraging experimentation (i.e., more tolerance of employees’ failures) and enhancing employees’ innovative productivity. In addition, ref. [12] demonstrated that firms with higher CSR performance (e.g., better employee treatment schemes) produced more and better patents by improving employee satisfaction and teamwork. Accordingly, the increase in innovation for the treatment firms after the MSER were implemented may have been caused by the improvement in CSR performance.

To test this conjecture, we collected the CSR performance data from the Environmental, Social, and Governance (ESG) database of Bloomberg. The ESG dataset of Bloomberg offers ESG metrics and disclosure scores for more than 11,800 firms in over 100 countries. The ESG data are compiled based on company-sourced filings, such as CSR or sustainability reports, annual reports, company websites, online news, and a Bloomberg survey that requests information directly from the company. We used the rating scores of firms in

the Bloomberg ESG database to measure the firms' CSR performance. If this conjecture is valid, the CSR performance of the treatment firms should show a significant increase after the regulations compared with the control firms. The results are reported in Table 8. As shown in column 1 in Table 8, the coefficient of the interaction term *Treated* × *Post* was positive and statistically significant. This indicates that the CSR performance of the treatment firms increased significantly, thus supporting the *CSR-improving effect*. Therefore, the impact of MSER on firm innovation was partially derived from the improvement in CSR performance.

Table 8. Mechanism Analyses.

	CSR Performance (1)	Forecast Error (2)	Institutional Ownership (3)
<i>Treated</i> × <i>Post</i>	4.180 *** (0.453)	0.003 (0.003)	−0.054 *** (0.018)
<i>Treated</i>	3.586 *** (0.421)	−0.002 (0.003)	0.074 *** (0.014)
<i>Post</i>	1.272 *** (0.436)	−0.014 *** (0.003)	0.181 *** (0.014)
Controls	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	1538	2246	2940
Adjusted <i>R</i> ²	0.475	0.177	0.374

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

5.2. Information-Disclosing Effect

Second, we explored whether the MSER affected innovation through the information-disclosing effect by examining the decrease in information asymmetry. Information asymmetry usually indicates an unpredictable, complex, and volatile transaction environment, which increases transaction costs and hinders firms' innovation activities [15,21]. Thus, the reduction in information asymmetry may prompt innovation. Previous studies have also demonstrated similar results. For example, ref. [14] found that transparency (i.e., low information asymmetry) directly boosted innovation by reducing the sensitivity of management turnover to poor innovative output, and ref. [13] revealed that the more transparent the information environment, the higher the rate of R&D and patenting. At the same time, non-financial reporting for the treatment firms after the MSER were implemented, supplementary to normal financial reports, may have reduced the information asymmetry between the internal managers and outside stakeholders [22,46], thereby improving innovation outputs. To test this conjecture, we followed [22] by using the analyst forecast accuracy (*forecast error*) to measure the firms' information asymmetry. We used the analyst forecast error as an inverse measure of the forecast accuracy, which is defined as the average of the absolute errors of all forecasts made in the year for the target earnings scaled by the stock price at the beginning of the year. If the treatment firms' information asymmetry decreases, we should observe a significant decline in the forecast errors for these firms. Column 2 in Table 8 presents an insignificant coefficient for the analyst forecast accuracy. This observation indicates that the information asymmetry of the treatment firms did not increase after the regulations. Thus, we find the evidence to be inconsistent with this mechanism.

5.3. Market-Reaction Effect

Last, we explored the mechanism of the market-reaction effect. MSER might be a negative sign for investors who argue that treatment firms invest more in social and environmental governance at the expense of shareholders' benefits. Ref. [41] examined the market reaction to events associated with the passage of a directive in Europe mandating increased non-financial disclosure that was related to firms' ESG performance. They found

a negative market reaction to events that increased the likelihood of the passage of these regulations. Similarly, ref. [2] investigated the mandatory CSR policy in India using the event study method, as well as a regression discontinuity design, and found that this policy caused a 4.1% drop on average in the stock prices of the affected firms. In China, ref. [3] also revealed that the MSER led to negative effects on firms' ROA and ROE. Consequently, the MSER were interpreted as a negative sign for outside investors.

Institutional investors who pursue short-term benefits may argue that these types of regulations will drive affected firms to pay increased attention to social and environmental issues at the expense of shareholders' benefits [6,47,48]. Therefore, they reduce the stock ownership of firms subject to the MSER. However, a reduction in institutional ownership may encourage firm innovation by eliminating the short-term earning pressures on managers [16–19,49]. Accordingly, the increase in innovation for the treatment firms after the MSER were implemented may have been caused by the reduction in institutional ownership. Institutional ownership is the percentage of outstanding shares held by institutional investors, data on which were collected from the Chinese Research Data Services (CNRDS) database. If the innovation increase for the treatment firms was caused by this, we expected to observe a significant decline in institutional ownership for the treatment firms. As shown in column 3 in Table 8, the coefficients of the interaction term, $Treated \times Post$, were negative and significant, thus supporting the *market-reaction effect*.

Furthermore, institutional investors are usually classified into two types: transient institutional investors and dedicated institutional investors [17,47–49]. Dedicated institutional investors, such as pension funds, insurance companies, and banks, are institutions that have long-term holdings, are less constrained by liquidity needs, and are more willing to use longer periods to evaluate managers' performance [49]. In contrast, transient institutional investors are institutions that chase short-term price appreciation. Thus, they take small equity positions in many firms and tend to trade frequently [49]. Therefore, we suspect that the reduction in institutional ownership (column 3 in Table 8) stemmed mainly from the transient institutional investors. To test this expectation, we investigated the effects of the MSER on the changes in specific institutional investors. Table A4 reports the results. We found that the ownership of dedicated institutional investors (e.g., insurance companies in column 3 and social security funds in column 4) did not experience a striking decline after the regulations. In contrast, the ownership of normal funds that were smaller and more likely to chase short-term profits had a significant decrease after the regulations (see column 1). Additionally, the ownership of securities companies slightly declined (see column 2). The results in column 5 also reveal that qualified foreign institutional investors (QFII) did not change their investment strategies for the treatment firms, thus suggesting foreign investors in China were more likely to chase long-term profits.

In summary, we considered three potential mechanisms and demonstrated that the positive impact of the MSER in China on firm innovation was mainly due to the CSR-improving effect and market-reaction effect.

6. Discussion

An increasing number of countries and regions are paying attention to social and environmental issues and have enacted related laws and policies to cope with them. Previous studies have examined the equity market reaction to these mandatory social and environmental policies [2,41] and the impact of these policies on firm financial performance [3–5], whereas there is little knowledge of how these policies have affected firm innovation activities. On the one hand, some argue that MSER could reduce firm innovation because they could stifle investment in corporate innovation activities. On the other hand, some argue that MSER could facilitate firm innovation due to the benefits from the improvement in CSR performance or report disclosure.

Using the implementation of MSER that occurred in China, we empirically found that the treatment firms' innovation outputs significantly increased after the announcement of

the MSER. We further analyzed the possible mechanisms and found that the CSR-improving effect and market-reaction effect played an important role in driving this relationship.

These findings contribute to the literature on the determinants of innovation [50], especially research that investigates the impact of various types of legislation on innovation [11,25,27,28,33–35,37]. In this study, we complemented this line of research by examining the effect of MSER on firm innovation. Our study documented the influencing mechanisms of social and environmental policies on innovation (i.e., the improvement in CSR performance and reduction in institutional ownership). It is helpful to understand the impact of mandatory social and environmental regulations. Additionally, our study contributes to the literature that investigates the impact of CSR and innovation. The endogenous issues related to this relationship have prevented prior researchers from making efficient causal inferences [20,51]. In this study, we addressed this challenge by leveraging an exogenous shock on firms' CSR practices and utilizing a difference-in-differences approach to estimate the relationship between CSR and innovation.

Our findings also have potentially important implications for managers and policymakers. Our findings demonstrate that the net effect of MSER on innovation was positive. In other words, CSR performance and innovation performance were not completely paradoxical. Accordingly, with the increasing CSR pressure nowadays, companies that are eager to innovate may find it worthwhile to improve social and environmental governance. For policymakers, our findings provide an unexpected result, that is, MSER have led to an increase in innovation. Understanding the impact of MSER on firms' other operating activities (e.g., innovation) and their underlying mechanisms allows legislators to comprehensively master the effectiveness of their enacted policies, which is able to assist with the formulation of future policy. This study finds that the CSR-improving effect plays a major role in influencing firm innovation. Thus, the government, for example, can publish policies that require companies to improve employee welfare or can set a higher environmental standard to prompt companies to improve their production technologies.

7. Conclusions

In this study, we answered two research questions: (1) How do mandatory social and environmental regulations influence corporate innovation? and (2) What are the underlying mechanisms that drive this relationship? We exploited an exogenous shock in China in 2008 to examine the impact of MSER on innovation. Using a difference-in-differences with propensity-score matching methodology, we found that MSER in China led to a significant increase in firm innovation. In particular, we found that firms that were mandated to disclose social and environmental information generated more patents, including invention patents that were more innovative and original, than the control firms, which were not required to adhere to these rules after three years of the regulations. Lastly, we verified that the positive effects of the MSER on firm innovation were mainly caused by the CSR-improving effect and market-reaction effect, manifesting in an improvement in CSR performance and a reduction in institutional ownership, respectively.

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Abbreviations

The following abbreviations are used in this manuscript:

MSER	mandatory social and environmental regulations
DID	difference-in-differences
PSM	propensity-score matching
CSR	corporate social responsibility
SSE	Shanghai Stock Exchange
SZSE	Shenzhen Stock Exchange

Appendix A

Table A1. Industry Distribution of Matched Sample.

	Total	Treatment	Control
Agriculture, Forestry, and Fishing (A)	66 (2%)	18 (1%)	48 (4%)
Mining (B)	118 (4%)	65 (4%)	53 (4%)
Manufacturing (C)	1604 (54%)	873 (55%)	731 (53%)
Utilities (D)	222 (8%)	108 (7%)	114 (8%)
Construction (E)	59 (2%)	41 (3%)	18 (1%)
Transportation (F)	201 (7%)	125 (8%)	76 (6%)
Information Technology (G)	144 (5%)	78 (5%)	66 (5%)
Wholesale and Retail (H)	149 (5%)	66 (4%)	83 (6%)
Real Estate (J)	228 (8%)	120 (8%)	108 (8%)
Services (K)	41 (1%)	23 (1%)	18 (1%)
Entertainment (L)	36 (1%)	12 (1%)	24 (2%)
Conglomerates (M)	90 (3%)	60 (4%)	30 (2%)
Total	2958 (100%)	1589 (100%)	1369 (100%)

Table A2. Propensity-Score Matching (PSM) Results.

	Full Sample			Matched Sample			
	Treatment	Control	Difference in Means (before)	Treatment	Control	Difference in Means (after)	Bias Reduction (%)
Firm size	22.264	21.157	1.107 ***	22.264	22.270	−0.006	99.5
ROE	0.119	0.032	0.087 ***	0.119	0.125	−0.006	93.2
Share turnover	3.195	3.649	−0.454 ***	3.195	3.049	0.145	68.0
Stacks return	0.895	0.598	0.297 ***	0.895	0.878	0.016	94.5
State ownership	0.310	0.237	0.073 ***	0.310	0.315	−0.005	92.5
R&D intensity	0.002	0.003	0.000	0.002	0.003	0.000	45.7
Patent growth	1.328	0.485	0.843 ***	1.328	1.390	−0.062	92.6

Note. All covariates in the above table are averages over the pre-regulation period (2006–2008), except for *patent growth*. Patent growth is measured by the growth ratio of the number of a firm's patents over the pre-regulation period, that is, (a firm's patents in 2008–the firm's patents in 2006)/the firm's patents in 2006. Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A3. Definitions of All Variables Used in This Study.

Variables	Definition
Lnpatent	The natural logarithm of one plus the number of invention and utility patents that the firm has filed.
Lnvention	The natural logarithm of one plus the number of invention patents that the firm has filed.
Treated	A dummy variable that is equal to one for treatment firms and zero for control firms.
Post	A dummy variable that equals one if a firm year belongs to the post-regulation period (2009–2011) and zero if a firm year belongs to the pre-regulation period (2006–2008).

Table A3. Cont.

Variables	Definition
Firm size	The natural logarithm of total assets.
Firm age	The natural logarithm of the number of years since the firm's inception.
ROA	The ratio of net income to total assets.
ROE	The ratio of net income to shareholders' equity.
Leverage	Total liabilities divided by total assets.
Cash holdings	The ratio of cash to total assets.
R&D Intensity	The ratio of R&D expenses to total assets.
Share turnover	The total number of shares traded divided by the total number of shares outstanding.
Stacks return	Annual stock return of each year.
State ownership	The number of state-owned shares divided by the number of total shares.
Patents growth	The growth ratio of the number of a firm's patents over the pre-regulation period (2006–2008).
Innovative productivity.	The number of patents per 100 employees.
Forecast error	The average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year.
Voluntary disclosure	A dummy variable that is equal to one if a firm voluntarily discloses social and environmental governance information and zero if otherwise.
Institution ownership	The percentage of outstanding shares held by institutional investors.
Normal Funds	The percentage of outstanding shares held by normal funds.
Securities company	The percentage of outstanding shares held by securities companies.
Insurance company	The percentage of outstanding shares held by insurance companies.
Social security funds	The percentage of outstanding shares held by social security funds.
QFII	The percentage of outstanding shares held by Qualified Foreign Institutional Investors (QFII).

Table A4. The Types of Institutional Investors.

	Normal Funds (1)	Securities Company (2)	Insurance Company (3)	Social Security Funds (4)	QFII (5)
<i>Treated</i> × <i>Post</i>	−0.062 *** (0.012)	−0.001 * (0.001)	−0.000 (0.001)	−0.001 (0.001)	−0.001 (0.001)
<i>Treated</i>	0.079 *** (0.012)	0.001 * (0.000)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)
<i>Post</i>	−0.030 *** (0.009)	0.001 ** (0.000)	0.000 (0.001)	−0.002 * (0.001)	−0.002 ** (0.001)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	2958	2958	2958	2958	2958
<i>Adjusted R²</i>	0.353	0.036	0.050	0.027	0.035

Note. This table reports the estimated coefficients and heteroskedasticity-adjusted robust standard errors clustered at the firm level (in parentheses). Significance at * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

References

- European Commission. Corporate Sustainability Reporting. Available online: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en (accessed on 18 November 2022).
- Manchiraju, H.; Rajgopal, S. Does corporate social responsibility (CSR) create shareholder value? Evidence from the Indian Companies Act 2013. *J. Account. Res.* **2017**, *55*, 1257–1300. [CrossRef]
- Chen, Y.C.; Hung, M.; Wang, Y. The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. *J. Account. Econ.* **2018**, *65*, 169–190. [CrossRef]
- Lu, T.; Sivaramakrishnan, K.; Wang, Y.; Yu, L. The real effects of mandatory corporate social responsibility reporting in China. *Prod. Oper. Manag.* **2021**, *30*, 1493–1516. [CrossRef]
- Ioannou, I.; Serafeim, G. The consequences of mandatory corporate sustainability reporting. In *Harvard Business School Research Working Paper*; Harvard Business School: Boston, MA, USA, 2017.
- Porter, M.E. Capital disadvantage: America's failing capital investment system. *Harv. Bus. Rev.* **1992**, *70*, 65–82.
- Chang, X.; Fu, K.; Low, A.; Zhang, W. Non-executive employee stock options and corporate innovation. *J. Financ. Econ.* **2015**, *115*, 168–188. [CrossRef]

8. Murray, A. Corporate R&D Spending Is at a Record High—With Chinese Firms Posting the Fastest Growth. Available online: <https://fortune.com/2018/11/01/corporate-rd-spending-2018-china> (accessed on 18 November 2022).
9. OECD. *OECD Innovation Strategy 2015 an Agenda for Policy Action*; OECD: Paris, France, 2015.
10. Meramveliotakis, G.; Manioudis, M. Sustainable Development, COVID-19 and Small Business in Greece: Small Is Not Beautiful. *Adm. Sci.* **2021**, *11*, 90. [[CrossRef](#)]
11. Flammer, C.; Kacperczyk, A. The impact of stakeholder orientation on innovation: Evidence from a natural experiment. *Manag. Sci.* **2016**, *62*, 1982–2001. [[CrossRef](#)]
12. Chen, C.; Chen, Y.; Hsu, P.H.; Podolski, E.J. Be nice to your innovators: Employee treatment and corporate innovation performance. *J. Corp. Financ.* **2016**, *39*, 78–98. [[CrossRef](#)]
13. Brown, J.R.; Martinsson, G. Does transparency stifle or facilitate innovation? *Manag. Sci.* **2019**, *65*, 1600–1623. [[CrossRef](#)]
14. Zhong, R.I. Transparency and firm innovation. *J. Account. Econ.* **2018**, *66*, 67–93. [[CrossRef](#)]
15. Hsieh, C.T.; Huang, H.C.; Lee, W.L. Using transaction cost economics to explain open innovation in start-ups. *Manag. Decis.* **2016**, *54*, 2133–2156. [[CrossRef](#)]
16. He, J.J.; Tian, X. The dark side of analyst coverage: The case of innovation. *J. Financ. Econ.* **2013**, *109*, 856–878. [[CrossRef](#)]
17. Fang, V.W.; Tian, X.; Tice, S. Does stock liquidity enhance or impede firm innovation? *J. Financ.* **2014**, *69*, 2085–2125. [[CrossRef](#)]
18. Qi, J. *The Threat of Shareholder Intervention and Firm Innovation*; Technical Report, Working Paper; University of Minnesota: Minneapolis, MN, USA, 2015.
19. Yang, H. *Institutional Dual Holdings and Risk Shifting: Evidence from Corporate Innovation*; Working Paper; University of Massachusetts Amherst: Amherst, MA, USA, 2019.
20. Wagner, M. Corporate social performance and innovation with high social benefits: A quantitative analysis. *J. Bus. Ethics* **2010**, *94*, 581–594. [[CrossRef](#)]
21. Suematsu, C. Innovation and Transaction Cost. In *Transaction Cost Management*; Springer: Berlin/Heidelberg, Germany, 2014; pp. 255–262.
22. Dhaliwal, D.S.; Radhakrishnan, S.; Tsang, A.; Yang, Y.G. Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *Account. Rev.* **2012**, *87*, 723–759. [[CrossRef](#)]
23. Hong, M.; Drakeford, B.; Zhang, K. The impact of mandatory CSR disclosure on green innovation: Evidence from China. *Green Financ.* **2020**, *2*, 302–322. [[CrossRef](#)]
24. Mbanyele, W.; Huang, H.; Li, Y.; Muchenje, L.T.; Wang, F. Corporate social responsibility and green innovation: Evidence from mandatory CSR disclosure laws. *Econ. Lett.* **2022**, *212*, 110322. [[CrossRef](#)]
25. Lerner, J. The empirical impact of intellectual property rights on innovation: Puzzles and clues. *Am. Econ. Rev.* **2009**, *99*, 343–348. [[CrossRef](#)]
26. Williams, H.L. Intellectual property rights and innovation: Evidence from the human genome. *J. Polit. Econ.* **2013**, *121*, 1–27. [[CrossRef](#)] [[PubMed](#)]
27. Fang, L.H.; Lerner, J.; Wu, C. Intellectual property rights protection, ownership, and innovation: Evidence from China. *Rev. Financ. Stud.* **2017**, *30*, 2446–2477. [[CrossRef](#)]
28. Acharya, V.V.; Subramanian, K.V. Bankruptcy codes and innovation. *Rev. Financ. Stud.* **2009**, *22*, 4949–4988. [[CrossRef](#)]
29. Cerqueiro, G.; Hegde, D.; Penas, M.F.; Seamans, R.C. Debtor rights, credit supply, and innovation. *Manag. Sci.* **2017**, *63*, 3311–3327. [[CrossRef](#)]
30. Lin, C.; Liu, S.; Manso, G. Shareholder litigation and corporate innovation. *Manag. Sci.* **2021**, *67*, 3346–3367. [[CrossRef](#)]
31. Brown, J.R.; Martinsson, G.; Petersen, B.C. Law, stock markets, and innovation. *J. Financ.* **2013**, *68*, 1517–1549. [[CrossRef](#)]
32. Levine, R.; Lin, C.; Wei, L. Insider trading and innovation. *J. Law Econ.* **2017**, *60*, 749–800. [[CrossRef](#)]
33. Zheng, Y.; Wang, Q. Shadow of the great firewall: The impact of Google blockade on innovation in China. *Strateg. Manag. J.* **2020**, *41*, 2234–2260. [[CrossRef](#)]
34. Zhu, J.; Fan, Y.; Deng, X.; Xue, L. Low-carbon innovation induced by emissions trading in China. *Nat. Commun.* **2019**, *10*, 1–8. [[CrossRef](#)]
35. Kwon, S.; Marco, A.C. Can antitrust law enforcement spur innovation? Antitrust regulation of patent consolidation and its impact on follow-on innovations. *Res. Policy* **2021**, *50*, 104295. [[CrossRef](#)]
36. He, J.; Tian, X. Finance and corporate innovation: A survey. *Asia-Pac. J. Financ. Stud.* **2018**, *47*, 165–212. [[CrossRef](#)]
37. Acharya, V.V.; Baghai, R.P.; Subramanian, K.V. Wrongful discharge laws and innovation. *Rev. Financ. Stud.* **2014**, *27*, 301–346. [[CrossRef](#)]
38. Gao, H.; Hsu, P.H.; Li, K.; Zhang, J. The real effect of smoking bans: Evidence from corporate innovation. *J. Financ. Quant. Anal.* **2020**, *55*, 387–427. [[CrossRef](#)]
39. Orens, R.; Aerts, W.; Cormier, D. Web-based non-financial disclosure and cost of finance. *J. Bus. Financ. Account.* **2010**, *37*, 1057–1093. [[CrossRef](#)]
40. Dhaliwal, D.S.; Li, O.Z.; Tsang, A.; Yang, Y.G. Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *Account. Rev.* **2011**, *86*, 59–100. [[CrossRef](#)]
41. Grewal, J.; Riedl, E.J.; Serafeim, G. Market reaction to mandatory nonfinancial disclosure. *Manag. Sci.* **2019**, *65*, 3061–3084. [[CrossRef](#)]

42. Kumar, N.; Qiu, L.; Kumar, S. Exit, voice, and response on digital platforms: An empirical investigation of online management response strategies. *Inf. Syst. Res.* **2018**, *29*, 849–870. [[CrossRef](#)]
43. Zhou, K.Z.; Gao, G.Y.; Zhao, H. State ownership and firm innovation in China: An integrated view of institutional and efficiency logics. *Adm. Sci. Q.* **2017**, *62*, 375–404. [[CrossRef](#)]
44. Rosenbaum, P.R.; Rubin, D.B. The central role of the propensity score in observational studies for causal effects. *Biometrika* **1983**, *70*, 41–55. [[CrossRef](#)]
45. Bertrand, M.; Duflo, E.; Mullainathan, S. How much should we trust differences-in-differences estimates? *Q. J. Econ.* **2004**, *119*, 249–275. [[CrossRef](#)]
46. Lys, T.; Naughton, J.P.; Wang, C. Signaling through corporate accountability reporting. *J. Account. Econ.* **2015**, *60*, 56–72. [[CrossRef](#)]
47. Bushee, B.J. Do institutional investors prefer near-term earnings over long-run value? *Contemp. Account. Res.* **2001**, *18*, 207–246. [[CrossRef](#)]
48. Zhang, Y.; Gimeno, J. Earnings pressure and long-term corporate governance: Can long-term-oriented investors and managers reduce the quarterly earnings obsession? *Organ. Sci.* **2016**, *27*, 354–372. [[CrossRef](#)]
49. Bushee, B.J. The influence of institutional investors on myopic R&D investment behavior. *Account. Rev.* **1998**, 305–333.
50. Manso, G. Motivating innovation. *J. Financ.* **2011**, *66*, 1823–1860. [[CrossRef](#)]
51. Shen, R.; Tang, Y.; Zhang, Y. *Does Firm Innovation Affect Corporate Social Responsibility?*; Working Paper; Harvard Business School: Paris, France, 2016.

Article

Can ESG Ratings Stimulate Corporate Green Innovation? Evidence from China

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Abstract: Green innovation serves as both a catalyst for businesses to pursue sustainable development and a crucial step in achieving green circular economic development. Green innovation is the practice of organizations considering environmental, social, and governance (ESG) aspects and the ESG advantages resulting from this process may become a driving force for enterprises to undergo a green transformation. Therefore, based on data related to Chinese A-share listed companies from 2009 to 2020, we study the relationship between ESG rating performance and corporate green innovation and its boundary mechanism. The results show that ESG ratings can improve the green innovation level of listed enterprises, and the relationship between ESG ratings and green innovation was also found to be strengthened by the institutional environment and redundant organizational resources. This study previously confirmed the positive impact of enterprises' ESG ratings on their green innovation, which has important implications for realizing the effective combination of ESG advantages and green innovation, promoting the construction of an ecological civilization, and realizing the concept of a community with a shared future for mankind.

Keywords: ESG rating; corporate green innovation; institutional environment; redundant organizational resources

1. Introduction

Enterprises are reforming their business philosophies in response to the necessity for social responsibility brought on by sustainable development. Friedman once held that enterprises' main social obligation is to maximize their profits [1]. Other accountability obligations imposed on enterprises are infeasible and disrupt the market economy. However, the increasingly prominent social issues related to sustainability, such as climate change, wealth disparity, and infectious diseases, as well as frequent political resistance to national response actions [2], have led to differing views on maximizing shareholders' interests [3]. Enterprises are required to incorporate environmental (E), social (S), and governance (G) factors into investment decisions and seek solutions to social problems at the enterprise level by practicing ESG concepts combined with the coordination of international organizations. Investors and government policies are presently highly interested in ESG. The impact of COVID-19 is increasing the market share of global responsible investment in response to the green recovery. The number of institutions endorsing the United Nations-supported principles of responsible investment surged by 28% in 2020 [3]. Despite the late start of China's ESG growth, all facets of society have given it more attention. ESG policies and investments have been greatly improved, particularly since Chinese Chairman Xi proposed the UN General Assembly's "2060 carbon neutrality" objective.

A key indicator of corporate sustainable development and environmental, social, and corporate governance (ESG) is the expansion and enrichment of the socially responsible investing (SRI) concept [4,5]. A growing number of businesses now accept the ratings provided by ESG rating firms as the green concept gains traction. This indicates that academic attention is now heavily focused on how ESG ratings affect company strategy [6]. Existing

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research on the effectiveness of ESG ratings is unfortunately frequently disputed. According to academics who support ESG ratings, such evaluations objectively and effectively gauge a company's ESG efforts through its competitive advantage, social reputation, and operating performance; give stakeholders access to resources [7]; reduce regulatory and reputational risks; and provide stakeholders with comprehensive and comparable data to correct information asymmetries [8]. A company's better ESG performance has lower equity capital costs [9] and loan costs [10]. ESG should be a key instrument for improving corporate finance in a negative loan market [11]. Moreover, ESG can help firms to hedge risks [12], build trust against shocks in a crisis [13], and improve corporate performance and long-term value [14]. In contrast, other scholars believe that ESG ratings are ineffective, arguing that they lead to symbolic compliance with external requirements in order to obtain various benefits, which may not be effective in improving corporate sustainability behavior [15]; rather, they represent institutional regression and may mislead stakeholders [16,17]. These contrasting views have led to a large number of studies on the effectiveness of ESG ratings, most of which have examined the relationship between ESG ratings and firm financial performance [18,19] or capital market reactions [20,21]. These studies have undoubtedly contributed significantly to our understanding of the impact of ESG; however, few studies have examined corporate sustainability investment responses following ESG ratings, and even fewer have focused on their impact on corporate green innovation. Meanwhile, "Dual externalities" based on green innovation highlight green technology [22]. At the macro level, green innovation technology's external spillover effect lowers costs, improves environmental protection, and achieves high-quality economic development; at the micro level, businesses reshape their development models, introduce new ideas for reducing emissions and preserving energy, and encourage the green transformation of enterprises. As a result, we are as yet unable to foresee how ESG would affect corporate strategic decision making about green innovation and the aforementioned relationship's mechanisms [23]. In view of the actions of organizations and the significance of their participation in sustainable development activities, this research examines the impact of ESG ratings on the green innovation strategies of businesses to make up for deficiencies in pertinent domains [24].

As a result, the theoretical impact and boundary mechanism of ESG ratings on companies' green innovation are considered to be the primary focus of this article. The non-financial companies listed on the A-share market in China from 2009 to 2020 are the research subjects of this paper, which also describes the complete green innovation activities of the companies in conjunction with data from the World Intellectual Property Organization and authoritative green innovation patents. It also measures the performance level of ESG using data from ESG ratings and emphasizes the influence of ESG ratings on the level of green innovation of the companies. This research also illustrates a potential border mechanism from the redundant organizational resources and institutional environment perspectives. The following conclusions are obtained: (i) ESG ratings have significantly promoted green innovation; (ii) the completeness of the institutional environment and the abundance of redundant organizational resources have strengthened the positive impact of ESG ratings on corporate green innovation.

The remainder of the paper is organized as follows: Section 2 proposes the relevant theories and hypotheses; Section 3 describes the data and methodology; Section 4 provides empirical findings; Section 5 provides the study's conclusions.

2. Literature Review and Hypothesis Development

2.1. Literature Review

This section presents a list of empirical studies that use GI variables and ESG consequence variables in their models (Table 1). The list provides the variables most often associated with GI and ESG and suggests where to find theoretical or empirical gaps in this research. Nevertheless, a large proportion of the most cited articles in the field concern theoretical works aimed at conceptualizing and developing markers. In this research, the empirical use of GI and ESG variables was carried out in response to the literature

studies. This may be because GI and ESG research is still in its infancy or because there are different and interchangeable terms to refer to the same topic. Table 1 provides the names of the authors, journal titles, and variables used in each study. We assessed and distinguished between the types of variables to identify the roles associated with GI: GI drivers (modeling GI as dependent variables), GI outcomes (modeling GI as independent variables), and moderating or mediating variables. In addition, the variables and associated impact mechanisms of ESG on the strategic consequences of the firms were also assessed.

Table 1. Selected prior empirical research on GI and ESG.

Author	Journal Titles	Drivers of GI	Outcomes of GI	Moderating Variables	Mediating Variables
Research literature on the outcomes of green innovation (GI)					
Xu et al. (2021) [25]	Energy Economics		carbon emission performance		energy consumption structure effect, industrial structure effect, urbanization effect, and foreign direct investment (FDI) effect
Huang et al. (2021) [26]	Technology in Society		sustainable development		marketization, local government competition
Lin et al. (2021) [27]	Technological Forecasting and Social Change		brand value		marketing capability and R&D intensity
Javeed et al. (2022) [28]	International Journal of Environmental Research and Public Health		Corporate Financing	Corporate Social Responsibility and Gender Diversity	
Aguilera-Caracuel and Ortiz-de-Mandojana (2013) [29]	Organization and Environment		Financial performance	national institutional conditions	
Research literature on influencing factors of green innovation (GI)					
Yuan and Cao (2022) [30]	Technology in Society	corporate social responsibility practices			green dynamic capability
Chu et al. (2018) [31]	The International Journal of Logistics Management	Customer pressure		organizational culture	
Shahzad et al. (2021) [32]	Business Strategy and the Environment	knowledge management process		sustainable development practices	
Zhou et al. (2021) [33]	Resources Policy	environmental legitimacy		green absorptive capacity	Senior management cognition and green strategic orientation
Xia et al. (2022) [34]	Energy Policy	Government subsidy		board diversity and independent directors	
Fang et al. (2021) [35]	Economic Analysis and Policy	Government's awareness of environmental protection			information disclosure
Xiang et al. (2022) [36]	International Review of Economics and Finance	Internal and external financing			debt financing and equity financing.

Table 1. Cont.

Author	Journal Titles	Drivers of GI	Outcomes of GI	Moderating Variables	Mediating Variables
Jiang and Bai (2022) [37]	Technology in Society	institutional investors' site visits		Firm size	CEO duality or low-competitive market environment.
Tan et al. (2022) [38]	Resources Policy	green credit policy		financing constraint or the fiercer the industrial competition and degree of marketization	
Research on the outcomes of ESG					
Author	Journal	Outcomes of ESG		Moderating Variables	Mediating Variables
Gillan et al. (2021) [39]	Journal of Corporate Finance	Corporate Social Responsibility		Institutional investor ownership	
Bofinger et al. (2022) [40]	Journal of Banking and Finance	Market efficiency		market sentiment toward sustainability	
Nekhili et al. (2021) [41]	Corporate Governance: An International Review	financial performance		employee board representation	
Chen and Xie (2022) [42]	International Review of Financial Analysis	financial performance		ESG investors	
Tang (2022) [43]	Sustainability	corporate Innovation			Financial Constraints and Agency Cost
Zhou, Liu, and Luo (2022) [44]	Business Strategy and the Environment	company market value			financial performance

In studies on corporate green innovation, “consequential performance impacts” and “drivers” were the most common categories. On the one hand, the independent variables as drivers of green innovation in existing studies included corporate social responsibility practices [30], customer pressure [31], knowledge management processes [32], environmental legitimacy [33], government subsidy [34], government’s awareness of environmental protection [35], internal and external financing [36], institutional investors’ site visits [37], green credit policy [38], etc. On the other hand, the main strategic consequences of green innovation included carbon emission performance [25], sustainable development [26], brand value [27], corporate financing [28], and financial performance [29]. The moderating mechanism variables mainly included organizational culture [31], sustainable development practices [32], green absorptive capacity [33], board diversity and independent directors, etc. [34], which were mainly discussed from the perspective of executive characteristics and organizational capacity. Table 1 provides a deeper and more accurate understanding of the variables that were the effective drivers, outcomes, and impact mechanisms of GI. In addition, in terms of ESG consequences, the main focus was on CSR [39], market efficiency [40], financial performance [41], innovation [43], and market value [44], and the moderating mechanisms mainly included board representation, institutional investor ownership, and market sentiment.

In summary, according to Table 1, there is a lack of research on the relationship between ESG and corporate green innovation, whether due to the consequences of the ESG strategy or the influencing factors of green innovation. In particular, in terms of the moderating mechanisms, the internal mechanisms primarily focused on executive characteristics and organizational capacity, with less consideration given to the regulatory mechanisms. The external research focused primarily on market competition and less on the legitimacy of the institutional environment, and research has shown that companies that effectively respond to institutional pressures are more likely to obtain the external resources required for sustainable development by achieving social legitimacy. As a result, from the ESG research perspective, this paper systematically integrated the internal and

external moderate mechanism variables of previous studies, combined institutional theory and resource-based perspectives, and introduced two moderate variables, the external institutional environment and internal redundant organizational resources, to examine the boundary conditions of ESG and corporate green innovation, rewarding and extending the existing literature.

2.2. Hypothesis Development

2.2.1. ESG and Corporate Green Innovation

This paper believes that the increasingly stringent social responsibility challenges brought about by the requirements of sustainable development will provide some enterprises that respect environmental, social, and governance factors and gradually accumulate and establish specific ESG performance in practicing the ESG concept with a brand-new competitive advantage in transnational investment. This ESG rating performance deviates from the profit maximization motivation (only applicable to shareholders), which is completed when we promote the enterprise to meet the social responsibility requirements and actively respond to all stakeholders [45]. The term “ESG rating performance” specifically refers to the sum of the valuable and scarce resources, systems, and capabilities established by enterprises in ESG practice, such as green technology, brand, social responsibility system, and other ESG asset advantages and institutional advantages. ESG differs from conventional monopolistic advantages as it emphasizes meeting the demands of shareholders, consumers, suppliers, communities, and other stakeholders and pursues inclusive development, which contributes to economic and social development through interaction with non-market factors. Therefore, we found that the benefits of ESG promoted the green innovation of enterprises by encouraging them to develop new competitive advantages in the following two aspects: First, they surpassed the limitations of traditional asset ownership advantages and created unique asset ownership advantages. ESG practices can assist businesses in modernizing their technology and products, enhancing their capacity for green innovation, and fostering better ties with their employees, suppliers, and other stakeholders [13]. In exceptional circumstances (such as the period of COVID-19), an enterprise will obtain tremendous development if it treats upstream and downstream producers and other stakeholders with sincerity. Meanwhile, ESG practices account for a high proportion of the development of intangible assets [46], and the enhancement of the reputation value for those enterprises that emphasize ESG will actively disclose the information about their social responsibility to the public, both objectively and subjectively, so that the public can judge the social responsibility behavior of the enterprise, and the enterprise can establish a trustworthy reputation [47]. Compared with other wary enterprises, those that have benefited in their asset advantage and reputation due to ESG practices will seize market share in addition to the pursuit of ESG by investors and customers [48]. For example, the financing convenience brought about by the favor of investors and creditors can encourage the green innovation of enterprises as it copes with the stress of capital constraints in green innovation [49]. Therefore, the ESG rating performance can significantly reduce the cost of financing, enhance a company’s overall competitiveness, and help it gain more market share. Schuler and Cording (2006) have proposed that enterprises equipped with a better corporate social performance will be more competitive, and those with a good ESG performance that satisfy the requirements of stakeholders may incur lower financing costs and hold greater market share [50].

Second, they enhance the legitimacy of green innovation investment. The enterprise ESG advantage’s most distinctive feature is its legitimacy. Environmental protection, stakeholders’ rights and the protection of interests, and upholding social obligations are not just what customers and investors expect from corporations but are also slowly becoming what regulatory agencies require of them [51]. Impacted by ESG practices, enterprises regard green innovation investment as an important driving force to promote economic growth and believe that they have made contributions to overall social welfare due to protecting the interests of stakeholders [51]. On the contrary, if an enterprise violates the ESG concept,

it may result in the rapid spread of public concern, impairing its enterprise image and brand reputation significantly; hence, the legitimacy of enterprise operations will become more prominent [52].

In addition, the endogenous institutional advantages derived from social responsibility formed around the ESG concept are also conducive to embedding the value system of the business strategy, thus reducing the pressure of institutional isomorphism [52]. ESG advantages address the legal issue of green innovation and endow enterprises with flexible green innovation strategies, which in turn, improve the level of green innovation. In addition, the general recognition of the legitimacy of the ESG concept lowers the transfer costs of the green technology, brand reputation, and institutional mechanism obtained through ESG practices, facilitating the production of green innovation resources and realizing the driving effect of ESG advantages on enterprise strategy [53]. The green innovation method utilizes internal transfer in addition to ESG advantages and can internalize open market transaction expenses to obtain internalized advantages [53]. Enterprises that adopt market mechanisms will run into issues with market failures such as information asymmetry between parties in technology license agreements and horizontal externalities brought on by brand sharing. Green innovation can minimize market transaction costs and take advantage of organizations' economies of scale and scope by placing essential assets under shared control. Therefore, hypothesis 1 is proposed:

Hypothesis 1. *ESG rating performance has a positive impact on corporate green innovation.*

2.2.2. Moderation Effect of Institutional Environment

According to institutional theory, the institutional environment has a crucial influence on the structure and behavior of an organization [54]. An efficient legal system, good government market relations, and well-developed product and factor markets can support healthy market development by facilitating information flow, supporting competition, and minimizing externalities [55]. Firms that respond effectively to institutional pressures and comply with norms and rules have easier access to the external resources needed for survival and growth by ensuring social legitimacy [56]. Accordingly, in order to operate smoothly and stably, firms need to respond to institutional pressures [57] and the level of institutional pressures affects the strategic choices and effectiveness of firms [58]. Meanwhile, the resources and regulations on which green innovation depends are key variables for innovation, whereas the access to core resources depends on a combination of market-based and non-market-based strategies and is determined by the institutional environment [39]. For example, companies need to improve their ESG rating performance to respond to stakeholder pressure [59]. Therefore, the impact of firm ESG ratings on green innovation may vary depending on the role of the pressures from the institutional environment, and it is necessary to investigate the impact of each type of institutional pressure [60], which can be classified as coercive, normative, or imitative, on green innovation by interacting with firm ESG ratings.

First, coercive pressures are defined as “formal or informal pressures arising from the institutions and regulations of the society to which the firm belongs” [61]. Coercive pressures resulting from the influence of those in power, such as regulations by government agencies, can shape the standards of corporate behavior and encourage firms to adopt or reinforce certain behaviors [60]. In this regard, ESG-related government policies and regulations constitute coercive pressures on firms and influence their expectations for green innovation strategies. Second, imitation pressures refer to the pressure to imitate competitors' behavior, which is identified as success. A firm that adapts to imitation pressures is more likely to protect itself from potential losses and gain legitimacy in its decisions. Thus, it imitates leading competitors to ensure social legitimacy and decision legitimacy [61,62]. From this perspective, the ESG rating performance reflects the imitation of peer organizations' behavior, which is perceived as successful by stakeholders in a similar organizational structure [62]. For example, manufacturers tend to imitate their competitors in managing extended supply chain activities in order to achieve sustainably

managed carbon reduction targets. This measure can increase corporate green innovation by enhancing the legitimacy and legality of corporate activities [63]. Normative pressures come from the values and standards of behavior recommended and expected by external stakeholders [64]. Firms must understand and comply with the standards, norms, and expectations of external stakeholders in order to achieve social legitimacy. In particular, customer demands form a key normative pressure [65], which can be an important driver for companies to enhance certain activities [60]. For example, positive consumer perception of a firm's environmentally friendly products and socially responsible activities can change a firm's green innovation decisions by acting as a normative pressure [66].

Thus, on the one hand, in regions with relatively well-developed institutional environments, the three institutional pressures mentioned above enhance the impact of ESG ratings on a firm's reputation and image, and the key factors of the ESG rating performance depend mainly on its market-oriented operations and management capabilities, which are consistent with entrepreneurs' knowledge and social legitimacy perception structures. This will undoubtedly strengthen the role of the ESG rating performance in promoting corporate green innovation strategies. On the other hand, a sound institutional environment can provide the necessary property rights protection, guarantee the benefits of strategic decisions, enhance the long-term orientation of decision makers, further strengthen the motivation of enterprises to engage in green innovation driven by ESG performance [67], effectively protect the green innovation achievements of enterprises, and enhance their willingness to adopt green innovation. Therefore, hypothesis 2 is proposed.

Hypothesis 2. *The more perfect the institutional environment, the stronger the positive relationship between the ESG rating performance and corporate green innovation.*

2.2.3. Moderation Effect of Redundant Organizational Resources

Resource redundancy in organizations is defined as resources kept within an organization beyond their usefulness and serves as a practicable or potential resource buffer to enhance an organization's ability to respond to unexpected changes in the external environment and devise strategies [68]. At the organizational level, green innovation strategies emphasize that organizations should make greater resource investments [64], and having more disposable resources facilitates an organization's ability to operate and that an organization's redundant resources can provide resource support for green innovation strategies. In particular, the increasing level of redundant resources for disposal coincides with an organization's ability to implement green innovation behaviors and behavioral freedom [69]. Gruber (2010) showed that a higher degree of redundancy in organizational resources facilitates an organization to try more unpredictable occurrences and supports an organization to search for opportunities and problem solutions on a larger scale [70]. At the managerial level, redundant organizational resources increase the risk perception of managers' decisions. For decision makers, the degree of risk perception is an important reference point for their strategic choices, and managers' preferences for strategic decisions depend on the impact of the same decision risk on different organizations [71]. Managers may make riskier strategic choices when organizations are more resilient to external risks as a result of the high level of redundant organizational resources, whereas they tend to be more conservative when making decisions [72]. Consequently, the ESG rating performance may have a greater impact on corporate green innovation in the context of abundant redundant organizational resources. Figure 1 shows the theoretical research model, as follow.

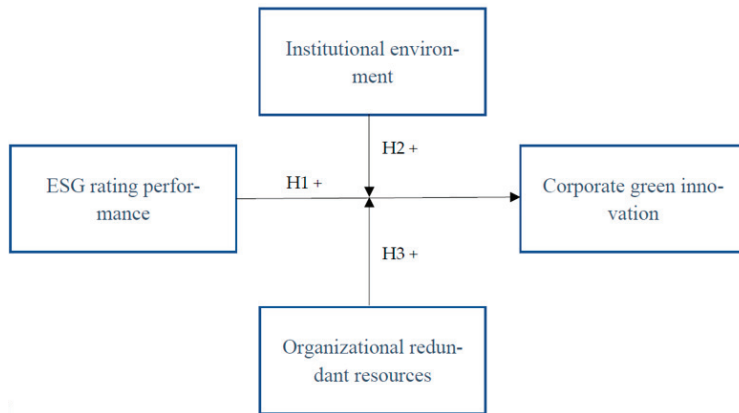


Figure 1. Theoretical research model.

Hypothesis 3. *The higher degree of redundant organizational resources will strengthen the positive relationship between ESG rating performance and corporate green innovation.*

3. Data and Methodology

3.1. Data and Samples

This paper investigated the impact of the ESG rating announcement on green innovation for the listed companies of the Shanghai and Shenzhen Stock Exchange from 2009 to 2020 as the research case. The specific case selection process was as follows: (i) exclude listed finance and insurance companies that greatly differed from other companies in terms of the main business, company size, and information disclosure in China; (ii) exclude special treatment (ST)-listed companies that greatly differed from other companies in financial indicators and information disclosure; (iii) exclude the companies listed in that year that had a shorter listing period and historical information duration, and greatly differed from other companies in information disclosure; (iv) eliminate the missing samples such as green innovation patents and control variables; (v) obtain a total of 21,616 observations. This paper employed Winsor2 to perform the tailing treatment on the continuous variables at the levels of 0.01 and 0.99 to mitigate the impact of extreme values on the empirical results. ESG rating data were collected from the Wind database and other data were from the CSMAR database. The green innovation data were derived from the patent classification number data of the China research data service platform (CNRDS) and the “International Patent Classification green list” issued in 2010 by the World Intellectual Property Organization (WIPO).

3.2. Variables Definition

3.2.1. Dependent Variable

Green innovation. The number of patents is an essential indicator of the green innovation level of an enterprise. As reported by Ko et al. (2021) [73], we applied the natural logarithm of the sum of the total number of applications of green innovation patents and utility patents plus 1 to measure corporate green innovation (GRInno). We classified the application of green invention patents as exploratory green innovation (GRInva) and the application of utility patents as exploitative green innovation (GRUma). Furthermore, we employed various green innovation patent applications as the dependent variable (corporate green innovation) for the robustness test to promote the reliability of the research results.

3.2.2. Independent Variable

ESG Rating (ESG). All the listed companies were rated as nine by the China Securities ESG rating, and the ratings from low to high are C, CC, CCC, B, BB, BBB, A, AA, and AAA.

The ESG rating of the enterprise was assigned a number from 1 to 9 from low to high in the regression analysis in reference to the practice of Lin et al. (2021)13 [8]. The ESG rating increases as the value increases.

3.2.3. Moderation Variables

Institutional Environment (InEnv). This paper refers to the research of Wei et al. (2011). Currently, the degree of marketization is often used as its proxy variable to measure the regional institutional environment. Therefore, this paper judged the external institutional environment based on existing research data and the marketization index of the province where the enterprise was located [74]. A larger index and a higher index produce a better institutional environment.

Redundant organizational resources (OrRes). The cash ratio was adopted to determine the redundant organizational resources given their importance in firms' green innovation via referring to the research of Kim and Bettis (2014). A higher ratio is simultaneous with richer redundant organizational resources [75].

3.2.4. Control Variables

We controlled for the following variables at the firm level: firm size (total assets), firm age (years since the firm's founding), Top1 (largest shareholder), ROA (return on asset to proxy for firm performance), and Lev (asset-liability ratio). To control for other important characteristics of boards and CEOs, we included the following variables in our models: Board (natural logarithm of the number of directors); Inde (independent director), which denoted the proportion of independent directors on the board; and Dualiy (CEO and chairman duality), which indicated the overlap of the CEO and Chairman of the board. In addition, this paper controlled the industry effects (Industry) and year effects (Year) on firms' green innovation, respectively.

Based on this, the descriptions of the variables are summarized in Table 2.

Table 2. The descriptions of the variables.

Variables		Description
Dependent Variable	Green innovation.	We applied the natural logarithm of the sum of the total number of applications of green innovation patents and utility patents plus 1 to measure corporate green innovation (GRInno). We classified the application of green innovation patents as exploratory green innovation (GRInva) and the application of utility patents as exploitative green innovation (GRUma).
Independent Variable	ESG rating	All listed companies were rated by the China Securities ESG rating score
Moderation Variables	Institutional Environment	the degree of marketization is often used as its proxy variable
	Redundant Organizational Resources	The cash ratio was adopted to determine the redundant organizational resources given their importance in firms' green innovation, in reference to the research of Kim and Bettis (2014). Specifically, cash ratio = (Cash + marketable securities)/current liabilities)
Control Variables	Size	The natural logarithm of the total assets
	Age	The number of years that the firm has been established.
	Top1	Percentage of shares held by the largest shareholder
	ROA	Net profit divided by average total assets
	Lev	The total liabilities divided by the total assets
	Board	The natural logarithm of the number of directors on the board
	Inde	The number of independent directors divided by the total number of all directors.
Dualiy	Whether the chairman and the general manager are the same people	

3.3. Models Establishment

In order to verify the influence of ESG ratings on corporate green innovation and the moderating effect of the institutional environment and redundant organizational resources, the following regression models were established in reference to the model settings of Wen and Zhou, 2017.

$$\text{GRInno}_{i,t+1} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_k \sum \text{Control}_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

$$\text{GRInva}_{i,t+1} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_k \sum \text{Control}_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

$$\text{GRUma}_{i,t+1} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_k \sum \text{Control}_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (3)$$

$$\text{GRInno}_{i,t+1} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_2 \text{InEnv}_{i,t} + \alpha_3 \text{ESG}_{i,t} \times \text{InEnv}_{i,t} + \alpha_k \sum \text{Control}_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (4)$$

$$\text{GRInno}_{i,t+1} = \alpha_0 + \alpha_1 \text{ESG}_{i,t} + \alpha_2 \text{OrRes}_{i,t} + \alpha_3 \text{ESG}_{i,t} \times \text{OrRes}_{i,t} + \alpha_k \sum \text{Control}_{i,t} + \mu_i + \delta_t + \varepsilon_{i,t} \quad (5)$$

In the above formulas, subscript *i* represents the listed company; *t* represents the year; ε represents the random error term; GRInno represents corporate green innovation; GRInva and GRUma represent exploratory green innovation and exploitative green innovation, respectively; ESG represents the ESG rating; InEnv represents the institutional environment; OrRes represents redundant organizational resources; and Control represents the control variables.

4. Empirical Findings

4.1. Descriptive Statistics and Correlation Analysis

Table 3 provides the descriptive statistics and correlation test results. The GRInno's mean value of 0.445 and the standard deviation of 0.852 indicate that most companies involved have conducted green innovation activities as required by the research, whereas their green innovation levels had some exceptions. The mean and standard deviation values of ESG were 4.070 and 1.054, respectively, indicating that the overall level of ESG ratings of China's A-share listed companies was at a medium level, and various companies shared similar ESG ratings. The mean value of the institutional environment was 8.150 and the standard deviation was 1.934, demonstrating that the regional institutional environment of the listed companies was relatively perfect. The mean value of redundant organizational resources was 0.968 and the standard deviation was 1.698, showing that each listed company held unique redundant organizational resources. The correlation coefficient of ESG and corporate green innovation was 0.159 and they had a significant positive correlation at a level of 1%, suggesting that ESG ratings had a promoting effect on corporate green innovation. H1 was primarily verified. Furthermore, the fact that the main variables under investigation had standard deviations that were comparatively high and correlation coefficients that were much lower than 0.8 suggests that there was no multicollinearity between the variables, making them appropriate for multiple regression analysis.

4.2. Multiple Regression Analysis

4.2.1. The Effect of ESG Ratings on Corporate Green Innovation

Table 4 reports the impact of ESG ratings on companies' green innovation. H1 predicted that the ESG rating would be positively correlated with the companies' green innovation. First, model 1 in Table 4 reveals a significant positive correlation between ESG ratings and the green innovation of the companies (coef. = 0.019, $p < 0.01$). In addition, model 2 and model 3 in Table 4 show that ESG ratings had a significant positive correlation with exploratory green innovation and exploitative green innovation (coef. = 0.017, $p < 0.01$; coef. = 0.011, $p < 0.01$). Therefore, hypothesis 1 in this study is supported.

Table 3. Descriptive statistics and correlation analysis.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. GRInno	0.445	0.852	1													
2. GRInva	0.301	0.678	0.928 ***	1												
3. GRUma	0.269	0.619	0.881 ***	0.694 ***	1											
4. ESG	4.070	1.054	0.159 ***	0.155 ***	0.131 ***	1										
5. InEnv	8.150	1.934	0.105 ***	0.101 ***	0.085 ***	0.070 ***	1									
6. OrRes	0.968	1.698	-0.066 ***	-0.055 ***	-0.075 ***	0.074 ***	-0.013 **	1								
7. Size	22.025	1.246	0.237 ***	0.246 ***	0.218 ***	0.151 ***	0.001	-0.287 ***	1							
8. Age	2.792	0.355	-0.016 **	0.005	-0.026 ***	-0.065 ***	0.113 ***	-0.196 ***	0.175 ***	1						
9. Top1	0.369	0.149	0.018 ***	0.007	0.036 ***	0.104 ***	0.021 ***	0.066 ***	0.119 ***	-0.170 ***	1					
10. Roa	0.039	0.061	0.041 ***	0.043 ***	0.025 ***	0.230 ***	0.054 ***	0.205 ***	-0.107 ***	-0.175 ***	0.175 ***	1				
11. Lev	0.415	0.206	0.093 ***	0.088 ***	0.105 ***	-0.110 ***	-0.115 ***	-0.544 ***	0.489 ***	0.176 ***	-0.043 ***	-0.377 ***	1			
12. Board	2.251	0.177	0.049 ***	0.053 ***	0.045 ***	0.029 ***	-0.142 ***	-0.075 ***	0.269 ***	0.020 ***	-0.013 **	0.013 **	0.166 ***	1		
13. Inde	0.374	0.053	0.009	0.010	0.010 *	0.071 ***	0.043 ***	0.012 **	0.003	-0.017 ***	0.054 ***	-0.019 ***	-0.017 ***	-0.516 ***	1	
14. Dually	0.274	0.446	0.006	0.003	0.001	-0.009	0.147 ***	0.103 ***	-0.187 ***	-0.083 ***	-0.00700	0.045 ***	-0.158 ***	-0.185 ***	0.114 ***	1

Notes: N = 21,616. *** correlation is significant at 1%. ** correlation is significant at 5%. * correlation is significant at 10%. t-statistics in parentheses.

Table 4. The regression results of ESG ratings on corporate green innovation.

	(1) GRInno	(2) GRInva	(3) GRUma
ESG	0.019 *** (3.789)	0.017 *** (4.247)	0.011 *** (2.968)
Size	0.046 *** (4.405)	0.043 *** (4.968)	0.026 *** (3.158)
Age	0.118 * (1.806)	0.116 ** (2.153)	0.055 (1.071)
Top1	−0.075 (−1.199)	−0.012 (−0.237)	−0.070 (−1.438)
Roa	0.519 *** (5.679)	0.306 *** (4.063)	0.380 *** (5.338)
Lev	0.121 *** (2.938)	0.101 *** (2.988)	0.068 ** (2.139)
Board	0.015 (0.327)	0.016 (0.406)	−0.018 (−0.490)
Inde	−0.069 (−0.540)	−0.037 (−0.350)	−0.070 (−0.701)
Dualiy	0.002 (0.160)	−0.005 (−0.430)	0.002 (0.176)
Constant	−1.000 *** (−3.247)	−1.081 *** (−4.262)	−0.433 * (−1.804)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	21,616	21,616	21,616
Adj,R ²	0.692	0.673	0.643

Notes: *** correlation is significant at 1%. ** correlation is significant at 5%. * correlation is significant at 10%. t-statistics in parentheses.

4.2.2. The Moderating Effect of Institutional Environment and Redundant Organizational Resources

Table 5 shows the moderating effects of the institutional environment and redundant organizational resources. H2 predicted that the institutional environment would strengthen the positive relationship between ESG ratings and corporate green innovation. From model 1 in Table 5, it can be seen that the interaction term between ESG ratings and the institutional environment had a significant correlation with corporate green innovation (coef. = 0.009, $p < 0.01$). The institutional environment strengthened the positive relationship between ESG ratings and corporate green innovation. Therefore, H2 is partially supported.

H3 predicted that redundant organizational resources would strengthen the positive relationship between ESG ratings and green innovation. Model 2 in Table 5 shows that the interaction term between ESG ratings and redundant organizational resources had a significant positive correlation with the share of corporate green innovation (coef. = 0.067, $p < 0.05$), demonstrating that redundant organizational resources strengthened the positive relationship between ESG ratings and corporate green innovation. Therefore, H3 is supported. In addition, Model 3 in Table 5 demonstrates that the aforementioned two moderating factors were included in the integration model for the regression test, and the results indicate the validity of the conclusions.

Table 5. The moderating effects of the institutional environment and redundant organizational resources.

	(1) GRInno	(2) GRInno	(3) GRInno
ESG	0.019 *** (3.939)	0.018 *** (3.647)	0.019 *** (3.799)
InEnv	−0.004 (−0.360)		−0.004 (−0.390)

Table 5. Cont.

	(1) GRInno	(2) GRInno	(3) GRInno
ESG × InEnv	0.009 *** (3.819)		0.009 *** (3.790)
OrRes		0.001 (0.449)	0.001 (0.461)
ESG × OrRes		0.067 ** (2.140)	0.066 ** (2.092)
Size	0.046*** (4.447)	0.045 *** (4.337)	0.046 *** (4.380)
Age	0.113 * (1.732)	0.116 * (1.765)	0.112 * (1.695)
Top1	−0.079 (−1.265)	−0.075 (−1.198)	−0.079 (−1.264)
Roa	0.520 *** (5.690)	0.518 *** (5.667)	0.519 *** (5.679)
Lev	0.118 *** (2.881)	0.129 *** (2.923)	0.126 *** (2.875)
Board	0.014 (0.289)	0.017 (0.365)	0.015 (0.327)
Inde	−0.058 (−0.452)	−0.069 (−0.537)	−0.058 (−0.450)
Dualiy	0.002 (0.122)	0.002 (0.157)	0.002 (0.119)
Constant	−1.261 *** (−3.004)	−1.265 *** (−2.993)	−1.248 *** (−2.958)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	21,616	21,616	21,616
Adj.R ²	0.692	0.692	0.692

Notes: *** correlation is significant at 1%. ** correlation is significant at 5%. * correlation is significant at 10%. t-statistics in parentheses.

4.3. Robustness Test

4.3.1. The Change of the Measurement Method of Corporate Green Innovation

This paper adopted various green innovation variables to test robustness. Specifically, we classified the application of green innovation patents as exploratory green innovation (GRInva) and the application of utility patents as exploitative green innovation (GRUma). Table 6 indicates the robustness of this paper concluded from the regression results similar to those described in previous sections.

Table 6. Substitute variables for corporate green innovation.

	(1) GRInva	(2) GRUma	(3) GRInva	(4) GRUma
ESG	0.018 *** (4.421)	0.012 *** (3.097)	0.017 *** (4.118)	0.011 *** (2.796)
InEnv	0.002 (0.189)	−0.002 (−0.191)		
ESG × InEnv	0.009 *** (4.315)	0.006 *** (3.248)		
OrRes			0.004 (1.491)	0.002 (0.666)
ESG × OrRes			0.065 *** (2.653)	0.064 *** (2.605)

Table 6. Cont.

	(1) GRInva	(2) GRUma	(3) GRInva	(4) GRUma
Size	0.043 *** (5.009)	0.026 *** (3.192)	0.042 *** (4.887)	0.025 *** (3.073)
Age	0.111 ** (2.068)	0.051 (1.007)	0.123 ** (2.272)	0.054 (1.045)
Top1	−0.016 (−0.305)	−0.073 (−1.493)	−0.015 (−0.286)	−0.070 (−1.442)
Roa	0.306 *** (4.071)	0.381 *** (5.346)	0.308 *** (4.096)	0.380 *** (5.328)
Lev	0.098 *** (2.907)	0.067 ** (2.087)	0.121 *** (3.336)	0.078 ** (2.260)
Board	0.014 (0.367)	−0.019 (−0.522)	0.017 (0.436)	−0.016 (−0.442)
Inde	−0.026 (−0.244)	−0.063 (−0.625)	−0.034 (−0.319)	−0.070 (−0.695)
Dualiy	−0.005 (−0.478)	0.001 (0.143)	−0.005 (−0.480)	0.002 (0.168)
Constant	−1.004 *** (−3.953)	−0.383 (−1.593)	−1.027 *** (−4.029)	−0.376 (−1.559)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	21616	21616	21616	21616
Adj.R ²	0.674	0.644	0.673	0.644

Notes: *** correlation is significant at 1%. ** correlation is significant at 5%. t-statistics in parentheses.

4.3.2. The Change of the Measurement Method of Standard Errors

This paper has referred to existing research methods. This paper employed Driscoll–Kraay standard errors to estimate the standard errors to remove the possible heteroscedasticity [76], cross-sectional correlation, and sequence correlation of panel data, with the regression results shown in Table 7. The study found that the research hypotheses were still tenable with a high validity performance upon replacing the regression standard error calculation method.

Table 7. The change of the measurement method of standard errors.

	(1) GRInno	(2) GRInno	(3) GRInno
ESG	0.019 *** (3.279)	0.018 *** (3.078)	0.019 *** (3.173)
InEnv	−0.004 (−0.254)		−0.004 (−0.275)
ESG × InEnv	0.009 *** (3.341)		0.009 *** (3.321)
OrRes		(0.421) 0.067 *	(0.433) 0.066 *
ESG × OrRes		(1.909) (0.421)	(1.879) (0.433)
Size	0.046 *** (2.928)	0.045 *** (2.862)	0.046 *** (2.893)
Age	0.113 (1.062)	0.116 (1.078)	0.112 (1.037)
Top1	−0.079 (−0.877)	−0.075 (−0.830)	−0.079 (−0.877)
Roa	0.520 *** (5.053)	0.518 *** (5.031)	0.519 *** (5.040)

Table 7. Cont.

	(1) GRInno	(2) GRInno	(3) GRInno
Lev	0.118 ** (2.325)	0.129 ** (2.374)	0.126 ** (2.339)
Board	0.014 (0.223)	0.017 (0.282)	0.015 (0.253)
Inde	−0.058 (−0.347)	−0.069 (−0.412)	−0.058 (−0.345)
Dualiy	0.002 (0.102)	0.002 (0.130)	0.002 (0.099)
Constant	−1.007 ** (−2.110)	−1.000 ** (−2.078)	−0.998 ** (−2.079)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	21616	21616	21616
Adj.R2	0.043	0.042	0.043

Notes: *** correlation is significant at 1%. ** correlation is significant at 5%. * correlation is significant at 10%. t-statistics in parentheses.

5. Conclusions and Discussion

5.1. Conclusions

Public awareness of sustainable development worldwide has focused attention on green innovation. This green innovation trend may reshape the competitive advantages of enterprises and have a profound impact on their green transformation and development. Therefore, this paper believes that the specific advantages of pursuing inclusive social development with ESG as the core will become particularly significant in green innovation strategies in comparison with the traditional pursuits of private profits. Based on the panel data of China's A-share listed companies from 2009 to 2020, this paper employed the fixed effect model to empirically analyze the relationship between the ESG ratings of the sample enterprises and the green innovation performances of the enterprises and further tested the regulatory effects of the external institutional environment and the redundant resources of the internal organization. The following conclusions were made: (i) ESG ratings significantly promoted green innovation; (ii) the completeness of the institutional environment and the abundance of organizational redundancy strengthened the positive impact of ESG ratings on corporate green innovation. The findings demonstrate that businesses can successfully react to a complex business environment thanks to the strategic flexibility provided by their ESG rating performance. The ESG rating performance, however, can encourage green innovation and enterprise growth through positive spillover channels such as the demonstration effect.

China is at a critical stage of building a green circular development and striving to transform it into a sustainable economic model. Given the important value of ESG ratings in the green innovation of enterprises, accelerating the promotion of ESG governance, optimizing the cultivation of enterprises with ESG advantages, and striving to create new advantages in green competition conform to the internal requirements of the concept of sustainable development and offer a vital opportunity to improve the high-quality green development of the economy. These research findings have the following practical implications.

Members of boards of directors should take the initiative by taking responsibility for environmental preservation and social responsibility while concentrating on corporate governance and non-financial performance in order to maintain sustainable development and a competitive advantage. A high ESG performance also means that the enterprise will have an advantage over its rivals in the market. Board members should focus on improving their ESG performance in order to enhance their corporate green innovation capabilities, attract value investment from investors with an ESG bias, and generate higher market competitiveness. This is due to the ESG performance playing a key role in promoting corporate green innovation. Moreover, board members should take the initiative by assuming envi-

ronmental protection and social responsibilities, placing emphasis on corporate governance and non-financial performance, performing cognitive modeling of the ESG concept and the allocation of redundant organizational resources to green innovation strategies, and forming a green sustainable development system.

For strategic investors, an enterprise's ESG performance is critical since it somewhat indicates how well-run and innovative the business is. ESG scores are therefore non-financial indicators that investors can use to evaluate the worth of a company's investment when choosing investment targets in order to better manage risks and earn matching long-term returns.

As policymakers, the government should focus more attention on the encouragement and promotion of ESG. To further encourage businesses to adopt sound ESG ideas and advance the development of their environmental, social, and corporate governance capabilities, the government and pertinent ministries should release related policies and privileged regulations, which are beneficial for improving the regional institutional environment and promoting the development of corporate green innovation.

From a national standpoint, the introduction of a system of rewards and punishments for corporate ESG performance should be encouraged. Through a variety of incentives, including tax rebates, green credit incentives, and lowered entry barriers, the government can encourage businesses to enhance their ESG performance and advance sustainable socio-economic growth. The government should actively recognize the stimulating impact of government subsidies on green innovation and provide incentives to creative businesses. In order to encourage green innovation, the government should aggressively recognize the role that subsidies play in the process and provide financial support to forward-thinking businesses.

5.2. Discussion

To make ESRs more sustainable, the government could potentially raise taxes and other penalties. Through punitive measures such as tax increases, the government can also force companies with poor ESG performance to improve their performance. The government should also actively promote an ESG disclosure system that is broadly applicable so that businesses, investors, and the general public pay more attention to the ESG performance of businesses and support the transition to a green economy. The main contributions of this study are as follows. First, it responds to the debate surrounding the effectiveness of ESG in emerging markets by providing new insights into the relationship between corporate ESG ratings and green innovation and their mechanisms of action. Existing research on ESG ratings has focused on developed markets that have developed relatively mature concepts. For example, Chouaibi (2021) analyzed the role of ESG practices in the UK and German systems in improving financial performance by benefiting from green innovation [77]. Meanwhile, Cohen (2020) reached a different conclusion and pointed out the opposite relationship between ESG scores and green innovation in the U.S. energy sector [78]. Existing studies are limited and focus on developed countries with relatively mature ESG systems. In contrast, emerging markets are still in their infancy due to significant institutional differences. The findings of this study help to ascertain whether ESG ratings have contributed to the green transition and enriched the results related to ESG practices in developing countries. Second, this study further expands the influencing factors of green innovation beyond the mainstream research paradigm of government-level environmental regulations on green innovation, with special emphasis on third-party rating agencies, providing new perspectives and empirical support for the guiding role of ESG ratings on green innovation. Third, this study expands the scope of green innovation measurement to compensate for the existing literature's preference for green innovation in terms of quantity rather than quality. Drawing on detailed patent census data in China, this study uses green patent citations to measure the quality of green innovation, which is conducive to deriving more meaningful research questions, emphasizing objective data on green innovation patent applications, and improving their impact. Fourth, this study analyzes the

moderating mechanism between ESG ratings and green innovation through the external institutional environment and internal redundant organizational resources, deconstructs the internal logic, extends the research boundary, and provides a realistic reference for the promotion of ESG ratings by examining the heterogeneity in the Chinese context from multiple dimensions such as institutions, markets, and firms as emerging markets continue to develop.

This study provides a new theoretical framework for corporate green innovation by highlighting the importance of the external institutional environment and internal redundant organizational resources for corporate green innovation. However, there are still some limitations in our research.

First, the primary limitation of our study is linked to the nature of our sample, which only included companies in China, and companies listed in other emerging countries should be included. Meanwhile, other factors influencing ESG performance (e.g., systematic risk and board structure) should also be taken into consideration in further research. From a future research perspective, we could examine other factors affecting the market. In the future, we could obtain data from other third-party platforms and involve more samples with different languages. Some alternative variables could measure green innovation more than the patent application measurement, and updated research data could replace the relevant indicators to make a comprehensive measurement of the level of green innovation.

Second, the findings of this paper are also limited in terms of the mechanisms that enhance corporate green innovation, which need to be explored and further tested. In terms of future research directions, in relation to the moderating mechanisms, although this study investigated the institutional environment and redundant organizational resources as the moderating factors, other factors such as political capital (Lin et al., 2015), environmental ethics (El-Kassar and Singh, 2019), or top management characteristics (Galbreath, 2019) could also influence the relationship between the ESG ratings and corporate green innovation. In addition, we plan to conduct a heterogeneity analysis concerning the discrepancies in diverse industries and property rights to reveal the impact level of ESG ratings on corporate green innovation.

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References

1. Friedman, M. The social responsibility of business is to increase its profits. In *Corporate Ethics and Corporate Governance*; Springer: Berlin/Heidelberg, Germany, 2007; pp. 173–178.
2. Hambrick, D.C.; Wowak, A.J. CEO sociopolitical activism: A stakeholder alignment model. *Acad. Manag. Rev.* **2021**, *46*, 33–59. [[CrossRef](#)]
3. Nguyen, P.A.; Kecskes, A.; Mansi, S. Does corporate social responsibility create shareholder value? The importance of long-term investors. *J. Bank. Financ.* **2020**, *112*, 1–65. [[CrossRef](#)]
4. Michelson, G.; Wailes, N.; Van Der Laan, S.; Frost, G. Ethical investment processes and outcomes. *J. Bus. Ethics* **2004**, *52*, 1–10. [[CrossRef](#)]
5. Nekhili, M.; Boukadhaha, A.; Nagati, H.; Chtioui, T. ESG performance and market value: The moderating role of employee board representation. *Int. J. Hum. Resour. Manag.* **2021**, *32*, 3061–3087. [[CrossRef](#)]
6. Cappucci, M. The ESG integration paradox. *J. Appl. Corp. Financ.* **2018**, *30*, 22–28. [[CrossRef](#)]
7. Buallay, A. Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Manag. Environ. Qual. Int. J.* **2019**, *30*, 98–115. [[CrossRef](#)]

8. Humphrey, J.E.; Lee, D.D.; Shen, Y. The independent effects of environmental, social and governance initiatives on the performance of UK firms. *Aust. J. Manag.* **2012**, *37*, 135–151. [[CrossRef](#)]
9. Ben Hmiden, O.; Rjiba, H.; Saadi, S. Competition through environmental CSR engagement and cost of equity capital. *Financ. Res. Lett.* **2022**, *47*, 102773. [[CrossRef](#)]
10. Goss, A.; Roberts, G.S. The impact of corporate social responsibility on the cost of bank loans. *J. Bank. Financ.* **2011**, *35*, 1794–1810. [[CrossRef](#)]
11. Ng, T.-H.; Lye, C.-T.; Chan, K.-H.; Lim, Y.-Z.; Lim, Y.-S. Sustainability in Asia: The roles of financial development in environmental, social and governance (ESG) performance. *Soc. Indic. Res.* **2020**, *150*, 17–44. [[CrossRef](#)]
12. Albuquerque, R.; Koskinen, Y.; Zhang, C. Corporate social responsibility and firm risk: Theory and empirical evidence. *Manag. Sci.* **2019**, *65*, 4451–4469. [[CrossRef](#)]
13. Lin, Y.; Fu, X.; Fu, X. Varieties in state capitalism and corporate innovation: Evidence from an emerging economy. *J. Corp. Financ.* **2021**, *67*, 101919. [[CrossRef](#)]
14. Broadstock, D.C.; Chan, K.L.; Cheng, L.T.W.; Wang, X.W. The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Financ. Res. Lett.* **2021**, *38*, 101716. [[CrossRef](#)] [[PubMed](#)]
15. Garvey, G.T.; Kazdin, J.; Nash, J.; LaFond, R.; Safa, H. A Pitfall in Ethical Investing: ESG Disclosures Reveal Vulnerabilities, Not Virtues. *Not Virtues*, 19 September 2016.
16. Avetisyan, E.; Hockerts, K. The consolidation of the ESG rating industry; as an enactment of institutional retrogression. *Bus. Strat. Environ.* **2017**, *26*, 316–330. [[CrossRef](#)]
17. Entine, J. The myth of social investing: A critique of its practice and consequences for corporate social performance research. *Organ. Environ.* **2003**, *16*, 352–368. [[CrossRef](#)]
18. Atan, R.; Razali, F.A.; Said, J.; Zainun, S. Environmental, social and governance (ESG) disclosure and its effect on firm's performance: A comparative study. *Int. J. Econ. Manag.* **2016**, *10*, 355–375.
19. Friede, G.; Busch, T.; Bassen, A. ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Sustain. Financ. Investig.* **2015**, *5*, 210–233. [[CrossRef](#)]
20. Feng, J.; Goodell, J.W.; Shen, D. ESG rating and stock price crash risk: Evidence from China. *Financ. Res. Lett.* **2022**, *46*, 102476. [[CrossRef](#)]
21. Eliwa, Y.; Aboud, A.; Saleh, A. ESG practices and the cost of debt: Evidence from EU countries. *Crit. Perspect. Account.* **2021**, *79*, 102097. [[CrossRef](#)]
22. Jang, G.-Y.; Kang, H.-G.; Lee, J.-Y.; Bae, K. ESG scores and the credit market. *Sustainability* **2020**, *12*, 3456. [[CrossRef](#)]
23. Zhang, F.; Qin, X.; Liu, L. The interaction effect between ESG and green innovation and its impact on firm value from the perspective of information disclosure. *Sustainability* **2020**, *12*, 1866. [[CrossRef](#)]
24. Montiel, I.; Cuervo-Cazurra, A.; Park, J.; Antolin-López, R.; Husted, B.W. Implementing the United Nations' sustainable development goals in international business. *J. Int. Bus. Stud.* **2021**, *52*, 999–1030. [[CrossRef](#)] [[PubMed](#)]
25. Xu, L.; Fan, M.; Yang, L.; Shao, S. Heterogeneous green innovations and carbon emission performance: Evidence at China's city level. *Energy Econ.* **2021**, *99*, 105269. [[CrossRef](#)]
26. Huang, H.; Wang, F.; Song, M.; Balezentis, T.; Streimikiene, D. Green innovations for sustainable development of China: Analysis based on the nested spatial panel models. *Technol. Soc.* **2021**, *65*, 101593. [[CrossRef](#)]
27. Lin, W.L.; Ho, J.A.; Sambasivan, M.; Yip, N.; Mohamed, A.B. Influence of green innovation strategy on brand value: The role of marketing capability and R&D intensity. *Technol. Forecast. Soc. Chang.* **2021**, *171*, 120946.
28. Javeed, S.A.; Teh, B.H.; Ong, T.S.; Chong, L.L.; Abd Rahim, M.F.B.; Latief, R. How Does Green Innovation Strategy Influence Corporate Financing? Corporate Social Responsibility and Gender Diversity Play a Moderating Role. *Int. J. Environ. Res. Public Health* **2022**, *19*, 8724. [[CrossRef](#)]
29. Aguilera-Caracuel, J.; Ortiz-de-Mandojana, N. Green innovation and financial performance: An institutional approach. *Organ. Environ.* **2013**, *26*, 365–385. [[CrossRef](#)]
30. Yuan, B.; Cao, X. Do corporate social responsibility practices contribute to green innovation? The mediating role of green dynamic capability. *Technol. Soc.* **2022**, *68*, 101868. [[CrossRef](#)]
31. Chu, Z.; Wang, L.; Lai, F. Customer pressure and green innovations at third party logistics providers in China: The moderation effect of organizational culture. *Int. J. Logist. Manag.* **2018**, *30*, 57–75. [[CrossRef](#)]
32. Shahzad, M.; Qu, Y.; Zafar, A.U.; Appolloni, A. Does the interaction between the knowledge management process and sustainable development practices boost corporate green innovation? *Bus. Strat. Environ.* **2021**, *30*, 4206–4222. [[CrossRef](#)]
33. Zhou, M.; Govindan, K.; Xie, X.; Yan, L. How to drive green innovation in China's mining enterprises? Under the perspective of environmental legitimacy and green absorptive capacity. *Resour. Policy* **2021**, *72*, 102038. [[CrossRef](#)]
34. Xia, L.; Gao, S.; Wei, J.; Ding, Q. Government subsidy and corporate green innovation-Does board governance play a role? *Energy Policy* **2022**, *161*, 112720. [[CrossRef](#)]
35. Fang, Z.; Kong, X.; Sensoy, A.; Cui, X.; Cheng, F. Government's awareness of environmental protection and corporate green innovation: A natural experiment from the new environmental protection law in China. *Econ. Anal. Policy* **2021**, *70*, 294–312. [[CrossRef](#)]
36. Xiang, X.; Liu, C.; Yang, M. Who is financing corporate green innovation? *Int. Rev. Econ. Financ.* **2022**, *78*, 321–337. [[CrossRef](#)]

37. Jiang, L.; Bai, Y. Strategic or substantive innovation?—The impact of institutional investors’ site visits on green innovation evidence from China. *Technol. Soc.* **2022**, *68*, 101904. [[CrossRef](#)]
38. Tan, X.; Yan, Y.; Dong, Y. Peer effect in green credit induced green innovation: An empirical study from China’s Green Credit Guidelines. *Resour. Policy* **2022**, *76*, 102619. [[CrossRef](#)]
39. Gillan, S.L.; Koch, A.; Starks, L.T. Firms and social responsibility: A review of ESG and CSR research in corporate finance. *J. Corp. Financ.* **2021**, *66*, 101889. [[CrossRef](#)]
40. Bofinger, Y.; Heyden, K.J.; Rock, B. Corporate social responsibility and market efficiency: Evidence from ESG and misvaluation measures. *J. Bank. Financ.* **2022**, *134*, 106322. [[CrossRef](#)]
41. Nekhili, M.; Boukadhaha, A.; Nagati, H. The ESG–financial performance relationship: Does the type of employee board representation matter? *Corp. Gov. Int. Rev.* **2021**, *29*, 134–161. [[CrossRef](#)]
42. Chen, Z.; Xie, G. ESG disclosure and financial performance: Moderating role of ESG investors. *Int. Rev. Financ. Anal.* **2022**, *83*, 102291. [[CrossRef](#)]
43. Tang, H. The Effect of ESG Performance on Corporate Innovation in China: The Mediating Role of Financial Constraints and Agency Cost. *Sustainability* **2022**, *14*, 3769. [[CrossRef](#)]
44. Zhou, G.; Liu, L.; Luo, S. Sustainable development, ESG performance and company market value: Mediating effect of financial performance. *Bus. Strategy Environ.* **2022**. [[CrossRef](#)]
45. Barko, T.; Cremers, M.; Renneboog, L. Shareholder engagement on environmental, social, and governance performance. *J. Bus. Ethics* **2021**, *180*, 1–36. [[CrossRef](#)]
46. Wong, J.B.; Zhang, Q. Stock market reactions to adverse ESG disclosure via media channels. *Br. Account. Rev.* **2022**, *54*, 101045. [[CrossRef](#)]
47. Zhang, Q.; Loh, L.; Wu, W. How do environmental, social and governance initiatives affect innovative performance for corporate sustainability? *Sustainability* **2020**, *12*, 3380. [[CrossRef](#)]
48. Flammer, C. Does product market competition foster corporate social responsibility? Evidence from trade liberalization. *Strateg. Manag. J.* **2015**, *36*, 1469–1485. [[CrossRef](#)]
49. Li, T.-T.; Wang, K.; Sueyoshi, T.; Wang, D.D. ESG: Research progress and future prospects. *Sustainability* **2021**, *13*, 11663. [[CrossRef](#)]
50. Wang, H.M.D. Corporate social performance and financial-based brand equity. *J. Prod. Brand Manag.* **2010**, *19*, 335–345. [[CrossRef](#)]
51. Cohen, S.; Kadach, I.; Ormazabal, G.; Reichelstein, S. *Executive Compensation Tied to ESG Performance: International Evidence*; Finance Working Paper; European Corporate Governance Institute: Brussels, Belgium, 2022.
52. Schuler, D.A.; Cording, M. A corporate social performance–corporate financial performance behavioral model for consumers. *Acad. Manag. Rev.* **2006**, *31*, 540–558. [[CrossRef](#)]
53. Drempetic, S.; Klein, C.; Zwergel, B. The influence of firm size on the ESG score: Corporate sustainability ratings under review. *J. Bus. Ethics* **2020**, *167*, 333–360. [[CrossRef](#)]
54. Dorobantu, S.; Kaul, A.; Zelner, B. Nonmarket strategy research through the lens of new institutional economics: An integrative review and future directions. *Strateg. Manag. J.* **2017**, *38*, 114–140. [[CrossRef](#)]
55. Ciszewska-Mlinarič, M.; Trapczyński, P. Foreign market adaptation and performance: The role of institutional distance and organizational capabilities. *Sustainability* **2019**, *11*, 1793. [[CrossRef](#)]
56. Pfeffer, J.; Salancik, G.R. *The External Control of Organizations: A Resource Dependence Perspective*; Stanford University Press: New York, NY, USA, 2003.
57. Rathert, N. Strategies of legitimation: MNEs and the adoption of CSR in response to host-country institutions. *J. Int. Bus. Stud.* **2016**, *47*, 858–879. [[CrossRef](#)]
58. Matthiesen, M.L.; Salzmann, A.J. Corporate social responsibility and firms’ cost of equity: How does culture matter? *Cross. Cult. Strateg. Manag.* **2017**, *24*, 105–124. [[CrossRef](#)]
59. Colwell, S.R.; Joshi, A.W. Corporate ecological responsiveness: Antecedent effects of institutional pressure and top management commitment and their impact on organizational performance. *Bus. Strateg. Environ.* **2013**, *22*, 73–91. [[CrossRef](#)]
60. Chu, Z.; Xu, J.; Lai, F.; Collins, B.J. Institutional theory and environmental pressures: The moderating effect of market uncertainty on innovation and firm performance. *IEEE Trans. Eng. Manag.* **2018**, *65*, 392–403. [[CrossRef](#)]
61. DiMaggio, P.J.; Powell, W.W. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Am. Soc. Rev.* **1983**, *48*, 147–160. [[CrossRef](#)]
62. Abrahamson, E.; Rosenkopf, L. Institutional and competitive bandwagons: Using mathematical modeling as a tool to explore innovation diffusion. *Acad. Manag. Rev.* **1993**, *18*, 487–517. [[CrossRef](#)]
63. Zhu, Q.; Geng, Y. Drivers and barriers of extended supply chain practices for energy saving and emission reduction among Chinese manufacturers. *J. Clean. Prod.* **2013**, *40*, 6–12. [[CrossRef](#)]
64. Zhang, Y.; Wei, Y.; Zhou, G. Promoting firms’ energy-saving behavior: The role of institutional pressures, top management support and financial slack. *Energy Policy* **2018**, *115*, 230–238. [[CrossRef](#)]
65. Yang, H.; Lee, M.; Park, S. The impact of institutional pressures on green supply chain management and firm performance: Top management roles and social capital. *Sustainability* **2017**, *9*, 764.
66. Rahdari, A.; Sheehy, B.; Khan, H.Z.; Braendle, U.; Rexhepi, G.; Sepasi, S. Exploring global retailers’ corporate social responsibility performance. *Heliyon* **2020**, *6*, E04644. [[CrossRef](#)] [[PubMed](#)]

67. Tan, Y.; Zhu, Z. The effect of ESG rating events on corporate green innovation in China: The mediating role of financial constraints and managers' environmental awareness. *Technol. Soc.* **2022**, *68*, 101906. [[CrossRef](#)]
68. Bourgeois, L.J., III. On the measurement of organizational slack. *Acad. Manag. Rev.* **1981**, *6*, 29–39. [[CrossRef](#)]
69. Yun, L.; Yao, X.; Zhu, W.; Zhang, Z. Evaluating the Effect of Redundant Resources on Corporate Entrepreneurial Performance. *Sustainability* **2022**, *14*, 7101. [[CrossRef](#)]
70. Gruber, M. Exploring the origins of organizational paths: Empirical evidence from newly founded firms. *J. Manag.* **2010**, *36*, 1143–1167. [[CrossRef](#)]
71. Hoskisson, R.E.; Chirico, F.; Zyung, J.; Gambeta, E. Managerial risk taking: A multitheoretical review and future research agenda. *J. Manag.* **2017**, *43*, 137–169. [[CrossRef](#)]
72. Audia, P.G.; Greve, H.R. Less likely to fail: Low performance, firm size, and factory expansion in the shipbuilding industry. *Manag. Sci.* **2006**, *52*, 83–94. [[CrossRef](#)]
73. Ko, Y.J.; O'Neill, H.; Xie, X. Strategic intent as a contingency of the relationship between external knowledge and firm innovation. *Technovation* **2021**, *104*, 102260. [[CrossRef](#)]
74. Brockman, P.; Unlu, E. Dividend policy, creditor rights, and the agency costs of debt. *J. Financ. Econ.* **2009**, *92*, 276–299. [[CrossRef](#)]
75. Kim, C.; Bettis, R.A. Cash is surprisingly valuable as a strategic asset. *Strateg. Manag. J.* **2014**, *35*, 2053–2063. [[CrossRef](#)]
76. Driscoll, J.C.; Kraay, A.C. Consistent covariance matrix estimation with spatially dependent panel data. *Rev. Econ. Stat.* **1998**, *80*, 549–560. [[CrossRef](#)]
77. Chouaibi, S.; Chouaibi, J.; Rossi, M. ESG and corporate financial performance: The mediating role of green innovation: UK common law versus Germany civil law. *Eur. Med. J. Bus.* **2021**, *17*, 46–71. [[CrossRef](#)]
78. Cohen, L.; Gurun, U.G.; Nguyen, Q.H. *The ESG-Innovation Disconnect: Evidence from Green Patenting*; National Bureau of Economic Research: Cambridge, MA, USA, 2020.

Article

The Impact of Economic Policy Uncertainty on Executives' Self-Interest Behaviors: Evidence from China

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Abstract: This paper empirically studies the impact of economic policy uncertainty on executives' self-interest behaviors, distinguishes explicit self-interest behaviors from implicit ones, and studies the moderating effect of internal control. The results illustrate that rising policy uncertainty will inhibit explicit self-interest behaviors of executives, yet the implicit ones will be encouraged. Internal control can regulate the above effects. Further research proves that the above-mentioned impact is more significant in state-owned enterprises (SOEs). Stable institutional investors and sound market competition can play a certain role in governance. Our paper contributes to the literature on the impact of economic policy uncertainty on corporate governance.

Keywords: uncertainty of economic policy; self-interest behavior of executives; corporate governance

1. Introduction

In recent years, a series of major global events, including the Sino-US trade friction, the outbreak of the COVID-19 pandemic, the Russia-Ukraine conflict, etc., have significantly elevated economic uncertainty, and the growth of many major economies worldwide has been hit hard. Economic development has been restricted by multiple factors, encountering various challenges and subdued growth. The uncertainty in global economic prospects has increased. China is in the midst of an increasingly grave and complicated international landscape, involving the frequent and sporadic pandemic outbreak, the ongoing "new normal" of pandemic control measures, and the boosted downward pressure on the economy. Owing to the global trend of economic integration, the sustainability and stability of China's growth is restricted by multiple factors, and the uncertainty of domestic economic policies is still high. Against this background, it is important to measure uncertainty of economic policy and study its impact.

Differently from other countries in the world, China uses the term "socialist market economy with Chinese characteristics" to describe its theory of economic policy. Since 1949, the central government in China has played a dominant role in economic life in the country. Furthermore, since 1978, China has enacted reform and started to use market economy tools to power up its economic development. Overall, while welcoming the free market economy, China still regarded the planned economy as the main component of China's national economy.

China's economic theory is relatively similar to the Keynesian economic theory. It advocates that the state adopts expansionary economic policies to promote economic growth by increasing demand; that is, to expand government spending, implement fiscal deficits, stimulate the economy, and maintain prosperity. From this perspective, considering the dependence of the economy on the government, uncertainty in the economic policy of China can exert a significant impact on the economy.

Economic uncertainty is a state in which economic entities cannot have accurate expectations on such issues as "whether to adjust policies", "how to adjust policies", and "the outcome and effect of policy execution". Under rising uncertainty, the government

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will introduce corresponding macroeconomic policies to stabilize the market and avert growth dilemma. Meanwhile, the adoption of new macro-control measures brings about new uncertainty. The uncertainty of economic policy will be transmitted to or directly affect enterprises, exerting impact on their behaviors. The changes in economic policies will significantly impact enterprises. For enterprise executives, in order to cope with the possible impact of economic policy uncertainty on enterprises and themselves, they will adjust strategic direction and behaviors in a timely manner in response to the external environment, so as to achieve stable development. In this process, facing the adverse effect of uncertainty, due to agency problems, executives may sacrifice the interests of shareholders and enterprises to protect their own interests.

The manner by which to alleviate the principal-agent conflict between managers and shareholders has always been the focus of corporate governance, and its causes and preventive measures have always been highlighted by the academic community. The self-interest behavior of executives is a typical embodiment of the principal-agent problem. According to principal-agent theory, executives adopt self-interest behaviors by sacrificing the interests of shareholders and enterprises to obtain personal benefits. As the utility functions of management and shareholders are different, and the separation of ownership and control leads to information asymmetry and incentive problems, management often seeks benefits for itself through various channels in order to maximize its own interests, which may damage the interests of shareholders and the company, negatively affecting enterprise performance. In the long run, the development of capital market becomes constrained and the healthy development of economy and society endangered [1].

Exploring the causes of executives' self-interest behavior is helpful to raise people's awareness to executives' irrationality and lay the foundation for taking corresponding countermeasures to executives' self-interest behavior. The existing literature studies the causes of such self-interest behaviors, most of which take the perspectives of corporate governance structure [2], government intervention [3], etc. The uncertainty of external economic policies, a factor often overlooked, also affects the behavior of executives. Existing research has found that the occurrence of executives' self-interest behavior is closely related to the external environment. The cognition and behavioral choices of executives are often influenced by the macro environment. The impact of rising uncertainty of external economic policy on executives' self-interest behavior is still unknown. Based on the theory of myopic behavior, for the sake of maximizing personal interests, higher risks will induce executives to pursue short-term interests, which can be quickly materialized, at the price of long-term ones. Based on prospect theory, with the risk of external uncertainty, executives are subject to higher dismissal risk and tougher employment conditions. As a result, their decisions and behaviors will be more conservative, thus inhibiting self-interest behaviors. In conclusion, from the theoretical point of view, the jury is still out on whether executives' self-interest behavior is influenced by the uncertainty of external economic policy.

Based on the existing research, this paper studies the influence of economic policy uncertainty on executives' self-interest behavior, and introduces the moderating effect of internal control, so as to examine the changes of such influence under different levels of corporate internal control. Selecting A-share listed companies in China from 2010 to 2021 as research samples, this paper empirically discovers that the uncertainty of economic policy will inhibit the explicit self-interest behavior of executives, namely excessive executive compensation. However, the uncertainty of economic policy encourages, rather than restrains, the implicit self-interest behavior of executives, namely excessive on-the-job consumption. Further research illustrates that, under the uncertainty of economic policy, effective internal control is conducive to restraining executives' implicit self-interest behavior, as well as its explicit counterpart. Finally, we found that the above effect is more significant in SOEs. In addition, strong market competition and stable institutional investors are conducive to restraining executives' implicit self-interest.

2. Literature Review

The causes of policy uncertainty are failure of the government to clarify the direction and intensity of economic policy expectation, policy execution, and changes in policy position [4]. Economic uncertainty is difficult for enterprises to predict, which will enhance the external risks of business operations, and affects executives' cognition and behavioral decisions.

The existing literature measures the uncertainty of economic policy from the following three perspectives. The first type of literature measures the uncertainty of economic policy through the occurrence of external events, including major political events and changes in bureaucrats [5]. Since the occurrence of these events is not ongoing, their usage is subject to certain limitations. The second category uses the implied volatility of the stock market as the proxy variable of economic policy uncertainty. However, fluctuation in the financial market, which often lags behind, cannot reflect external economic policy uncertainty in real time. The third category of literature adopts the economic policy uncertainty index developed by Baker et al., based on the text analysis of newspapers. This method is authoritative, real-time and continuous, based on the reports of authoritative newspapers around the world. In this paper, we adopt the third type of measurement method.

At present, the research on the uncertainty of economic policy mostly focuses on corporate behavior, including corporate investment and financing, enterprise innovation, cash holdings [6–9], etc. The research related to economic policy uncertainty and executives mostly adopts the traits of executives as intermediaries or moderating variables to further study the impact of economic policy uncertainty on corporate behavior, for instance, their career records, including political background and financial experience, overconfidence, management governance [7,10–16], etc. Few scholars focus on the impact of economic policy uncertainty on executives' cognition and behavioral decisions. Based on the perspective of internal risk hedging, Rao [17] found that when the external uncertainty is high, the probability of executive turnover decreases. Wu [18] found that the uncertainty of economic policy is negatively correlated with executives' overconfidence. From the perspective of prospect theory, the uncertainty of economic policy comprises the uncertainties from policy change, policy execution, and the alterations of government positions. Facing external uncertainty, executives have uncertain expectations for the future of enterprises and themselves, which will lead to irrational bias in cognition and behavior choice, affecting their self-interest behaviors. At present, existing research seldom studies the relationship between economic policy uncertainty and executives' self-interest behavior, and related research needs to be further expanded.

According to the principal-agent theory, executives' self-interest behavior refers to the exploitation of their own rights and information asymmetry [19], in order to maximize their interests at the cost of shareholders and the enterprise, as illustrated by surging on-the-job consumption [20], seeking excess compensation [21], myopic behavior, cash flow manipulation [3], etc. In order to reflect the common behaviors of executives in listed companies, and present the explicit manifestations of their self-interest behavior, most scholars differentiate explicit self-interest behaviors from the implicit ones for quantitative research [1]. For explicit self-interest behavior, scholars commonly adopt excessive compensation [22,23], etc. With regard to implicit self-interest behavior, scholars use variables including excessive on-the-job consumption, management expenses, turnover of total assets [2,24–26], etc. Enterprises often take measures, such as supervision, reward, punishment, and incentive, to restrain the self-interest behavior of executives, and scholars mostly conduct research through the above related measures, including internal and external supervision, salary mechanism [27,28], etc. Change in the external macro-environment also affects executives' cognition and behavior choices. Executives will be passively restrained from self-interest behavior, or they may actively reduce such behaviors in exchange for stable income. The influence of economic uncertainty on executives' self-interest behavior needs to be further explored.

According to both the domestic and foreign literature, internal control reduces the asymmetry of internal and external information, strengthens internal supervision, plays an important role in reducing executive fraud [29] and preventing insider trading by executives [30], and exerts certain governance effects on both the implicit and explicit corruption of executives [31]. The above facts also lay a theoretical basis for choosing internal control as the moderating variable in this paper. With regard to the measurement of internal control quality, some scholars made a comprehensive evaluation through the five elements of internal control [32,33]. Scholars often adopt the internal control index of the DIB database to measure the quality of internal control [34,35].

By reviewing the existing literature, we can find that the research on the influencing factors of executives' self-interest behavior mostly focuses on corporate institutions, the strength of executives' power, etc., and seldom considers the influence of the external economic policy environment. Based on existing theories, negative cognitive theory induces executives to boost self-interest behaviors and gain immediate benefits under uncertain economic policies; however, based on the potential cost and risk, it is believed that due to the superposition effect of risks, executives are urged to restrain self-interest and tend to "protect themselves" against the risk of dismissal, thus reducing their self-interest behavior. However, the research on the uncertainty of economic policy focuses more on its impact on macroeconomic trends, corporate investment and financing, innovation and R&D, and financial market fluctuation. Macroeconomic policy and the fluctuation in economic fundamentals are the important foundations of enterprise behavior on the micro-level, and the uncertainty of economic policy will profoundly affect and change corporate behavior and decision-making. Under different degrees of policy uncertainty, executives' self-interest behavior will be affected differently. In this paper, the macro-economic landscape is brought into the analysis framework of influencing factors of executives' self-interest behavior, and their self-interest behavior is refined into explicit and implicit categories. These two categories are quantitatively analyzed by adopting excessive compensation and on-the-job consumption, and the uncertainty of economic policy is adopted to analyze how the external environment affects executives' self-interest behavior, enriching the existing research results.

3. Theoretical Analysis and Research Hypothesis

This paper categorizes executive self-interest behaviors into explicit and implicit ones, and analyzes the influence of economic policy uncertainty on such behaviors. The explicit self-interest behavior of executives is exemplified by excessive compensation, and its implicit counterpart is measured by excessive on-the-job consumption.

On the one hand, at the corporate level, rising economic policy uncertainty amplifies the business risks of enterprises and exerts a negative impact on enterprise performance [36]. Changes in the economic environment will affect the survival and growth of enterprises. Rising economic policy uncertainty will make it difficult for management to predict the prospects of the market, as well as corporate financing and cash flow status in the future, making it more difficult to make decisions. In order to avert risks, C-suite often delays investment and lowers investment volume to alleviate the uncertainty, thus adversely affecting the performance of enterprises. Meanwhile, the financing of enterprises will also be affected by macroeconomic policies. Rising economic uncertainty will amplify instability in the future cash flow of enterprises and also aggravate the external financing challenges of enterprises. From the perspective of creditors such as banks, when economic policy is uncertain, the risk of loan default will rise, since it will be difficult to evaluate the credit of enterprises. Therefore, creditors will adopt a tight credit policy, raise the loan threshold, and reduce the loan amount, which pushes up the financing costs of enterprises and further undermines their development. Facing both internal and external difficulties, in order to maintain stable operation and ease operating pressure, enterprises will start to reduce expenses and compensation. On 2 June 2022, the State-owned Assets Supervision and Administration Commission (SASAC) issued the Notice on Further Implementing the

Tasks of Boosting Income and Reducing Expenditure of SOEs, which stipulated: “SOEs should strictly implement the linkage mechanism between total wages and profits, and the growth rate of total compensation shall not exceed that of total profit. SOEs with declining profits must cut total compensation.” Therefore, when the uncertainty of economic policy is high, enterprises will face greater business risks, which will reduce C-suite enumeration, inhibiting excessive compensation of executives and their explicit self-interest behavior.

On the other hand, higher uncertainty of economic policy will lead to tougher employment. With rising external uncertainty, the turnover of executives will be more frequent, boosting the risk of dismissal [37]. Based on prospect theory, people tend to choose “safe returns” instead of “taking a chance”. Even though self-interest behavior may bring some excess returns, if such behavior can be uncovered easily, the risk of turnover will also surge. Therefore, executives will suppress their explicit self-interest behavior to obtain “safe returns”. Meanwhile, some executives choose to fulfill their social responsibility by taking the initiative to reduce salaries before ordinary employees. According to Vanke’s 2021 annual report, due to the sharp decline in corporate performance, Yu Liang, chairman of the board of directors, voluntarily waived all bonuses in 2021 and reduced his compensation by nearly 90%. Eight directors, supervisors, and senior managers, including Yu Liang, reduced their salaries by half, totaling 24 million yuan. These executives not only fulfill their social responsibility, but also build good reputation and lay a solid foundation for their future career development. Therefore, when the uncertainty of economic policy is high, executives themselves will also choose to reduce their explicit self-interest behavior and excess remuneration.

However, executives’ implicit self-interest, namely excessive on-the-job consumption, is affected differently by the uncertainty of economic policies. On-the-job consumption, also known as perquisite consumption or perk consumption, is the nonmonetary consumption spent by the managers, incurred when the manager is performing duties. On-the-job consumption is generally included in administrative expenses, which can be further divided into office allowance, travel expenses, correspondence expenses, etc. Although the “optimal” level of on-the-job consumption may motivate managers to perform well, excess on-the-job consumption may hurt firm value [38].

Managers increase their nonmonetary compensation to achieve self-utility maximization when the government supervision or other restrictions are weak [28]. With weak legal constraints and corporate governance mechanisms, on-the-job consumption has become an important part of management compensation in China, far more even than monetary compensation. Furthermore, on-the-job consumption is implicit, has no contractual constraints, and is largely determined by the top executives; executives are likely to deviate from the objective of maximizing stakeholder value and use on-the-job consumption to gain self-interest [39].

Higher uncertainty of economic policy leads to greater information asymmetry in enterprises; thus, the difficulties of internal and external supervision are also elevated, which facilitates executives to make use of their authority for on-the-job consumption and implicit self-interest behavior. Furthermore, as analyzed above, whether voluntary or forced, when the external uncertainty is high, the explicit remuneration of executives will decline. Therefore, executives are more inclined to use their authority to earn implicit benefits through on-the-job consumption to make up for salary loss. In addition, rising uncertainty of external economic policies often brings about greater financing difficulties for enterprises. In order to prevent capital chain rupture, enterprises tend to reduce investment while holding excess cash to cope with financial risks, which also provides opportunities for executives’ invisible self-interest behavior.

In conclusion, concerning the impact of economic policy uncertainty on executives’ self-interest behavior, this paper puts forward the following assumptions:

Hypothesis 1 (H1a). *Rising economic policy uncertainty will inhibit the explicit self-interest behavior of executives.*

Hypothesis 1 (H1b). *Rising economic policy uncertainty will encourage the implicit self-interest behavior of executives.*

Executives' responses to the fluctuation of external economic policy uncertainty are also influenced by the internal organizational structure and supervision system of their enterprises. Facing the uncertainty of the external macro-environment, enterprises need to improve internal control to better manage production and business activities and counter unknown risks. An effective internal control system can restrain executive opportunism, reduce information asymmetry, and alleviate the principal-agent problem between shareholders and C-suite, which is conducive to the long-term development of enterprises. "Internal environment", one of the five elements of internal control, requires enterprises to set up corresponding supervision mechanisms, establish sound organizational mechanisms, realize internal power checks and balances, avert "tyranny of the minority" and "insider control issue", and supervise the behavioral decisions of executives. Among the five elements of internal control, "Risk Assessment" requires enterprises to assess the possible risks in the future and formulate corresponding policies to prevent executives from speculating on the grounds of external risks. "Control activities" require enterprises to improve various management systems, better control the actual income and cost of each production and operation procedure, fix the loopholes of which C-suite may take advantage, and prevent their self-interest behaviors. "Information communication" encourages enterprises to reduce internal and external information asymmetry and improve the quality of information disclosure, which is conducive to the supervision of agents by stakeholders.

To sum up, this paper puts forward the following assumptions:

Hypothesis 2 (H2a). *Under economic policy uncertainty, effective internal control can enhance the inhibition of executives' explicit self-interest behavior.*

Hypothesis 2 (H2b). *Under economic policy uncertainty, effective internal control can weaken the facilitation of executives' explicit self-interest behavior.*

4. Research Design

4.1. Data Sources and Sample Selection

This paper adopts the data of A-share-listed companies in the Shanghai and Shenzhen stock exchanges from 2006 to 2021 as the research object, and has taken the following screening measures: (1) excluding the listed companies that were classified as ST and PT at the end of 2012 to 2021; (2) excluding listed companies in the financial sector; (3) excluding the listed companies that were forcibly delisted during the sample period; (4) eliminating the samples with missing observation values in the selected period; meanwhile, the continuous variables are winsorized at the top and bottom 1%. A total of 24484 observation samples were obtained after screening. The related data of explanatory and control variables in this paper were extracted from CSMAR, the economic policy uncertainty index of explanatory variables was sourced from the <http://www.policyuncertainty.com/> website (accessed on 3 November 2022), and the internal control index of moderating variables was generated from the DIB database.

4.2. Definition of Variables

4.2.1. Explanatory Variable

In this paper, the self-interest behavior of executives is regarded as the explanatory variable, which is divided into explicit and implicit self-interest behavior, measured by C-suite excessive compensation (OverPay) and excessive on-the-job consumption (UnPerks), respectively.

The detailed measurement of explicit self-interest behavior of executives-excessive compensation (OverPay) is as follows. In this paper, we adopt "the total compensation

of top 3 executives" disclosed in the annual reports of A-share-listed companies in the Shanghai and Shenzhen stock exchanges as the data of executives' salaries, and the variables of C-suite compensation were obtained using a taking logarithm. Next, we drew from the practices of Core et al. [40], Luo et al. [41], etc. to measure the excessive compensation of executives. Firstly, Model (1) is regressed by years and industries using sample data to obtain the regression coefficient. Then, the estimated regression coefficient is multiplied by the factors that affect C-suite compensation, such as corporate scale and performance, to estimate the expected level of executive compensation; finally, according to Model (2), the actual C-suite compensation is subtracted from the expected C-suite compensation, and the difference is excessive compensation. The definitions of variables used in Model (1) are presented in Table 1.

$$Pay_{i,t} = \alpha_0 + \alpha_1 Size_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 IA_{i,t} + \alpha_4 Zone_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t} \quad (1)$$

$$OverPay = Pay_{i,t} - ExpectedPay_{i,t} \quad (2)$$

Table 1. Definition table of overpay variables of executives.

Variable	Name	Definition
Pay	Executive absolute compensation	The natural logarithm of the total remuneration of the Top 3 executives of listed companies
Size	Corporate size	The natural logarithm of the total income of the listed company in the same year
ROA	Accounting performance	Ratio of net profit to total assets
IA	Intangible assets ratio	Ratio of intangible assets to total assets
Zone	Region dummy variable	If corporate place of registration is coastal area, the value is 0; otherwise, the value is 1
Industry	Industry dummy variable	
Year	Year dummy variable	

The detailed measurement of implicit self-interest behavior of executives-excessive on-the-job consumption (UnPerks) is as follows. We draw from the research models of Quan et al. [42], Luo et al. [43], etc. and predict the normal on-the-job consumption of executives through the relevant corporate conditions of Model (3). The difference between actual and normal on-the-job consumption is abnormal on-the-job consumption. Among them, the C-suite on-the-job consumption is the balance of management expenses after deducting the total annual compensation, amortization of intangible assets, total provision for bad debts, and total provision for inventory depreciation. The definitions of variables used in Model (3) are presented in Table 2.

$$\frac{Perks_{i,t}}{Asset_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{Asset_{i,t-1}} + \beta_2 \frac{\Delta sale_{i,t}}{Asset_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \beta_4 \frac{Inventory_{i,t}}{Asset_{i,t-1}} + \beta_5 LnEmployee_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$UnPerks = Perks_{i,t} - ExpectedPerks_{i,t} \quad (4)$$

Table 2. Definition table of excessive on-the-job consumption variables of executives.

Variable	Name	Definition
Perks	On-the-job consumption of executives	Management expenses-total annual compensation of the management-amortization of intangible assets-total bad debt reserve-total inventory depreciation reserve
Asset _{<i>i,t-1</i>}	Ending total assets	Total assets at the end of last period
Δsale _{<i>i,t-1</i>}	Changes in main business income	Change of main business income in the current period
PPE _{<i>i,t</i>}	Fixed assets	Net value of fixed assets in the current period
Inventory _{<i>i,t</i>}	Stock	Total inventory in current period
LnEmployee _{<i>i,t</i>}	Number of employees	The natural logarithm of the total number of employees of the enterprise

4.2.2. Explanatory Variables

The Economic Policy Uncertainty Index (EPU) of China is drawn from the website of <http://www.policyuncertainty.com/> (accessed on 3 November 2022). From the newspapers People's Daily and Guangming Daily, Davis, Liu, and Sheng adopt the method of text analysis, counting articles related to economic policy uncertainty through scaling frequency, and formulating EPU after standardization treatment. At present, scholars at home and abroad use EPU when conducting research on economic policy uncertainty. This paper draws on the practice of Gu et al. [8]: the monthly data are arithmetically averaged, and then the logarithm is taken to obtain the explanatory variable EPU. Formula (5) provides more details.

$$EPU = LN \left(\frac{\sum \text{Economic policy uncertainty monthly}}{12} \right) \quad (5)$$

4.2.3. Moderating Variables

In this paper, moderating variables are selected from the DIB internal control index, which is based on the five elements of internal control and granularly measures the internal control quality of listed companies. When the index is high, corporate internal control management activities are effective and the internal control system is sound. In this paper, we refer to the practices of Zhou et al. [44], etc., to establish an internal control moderating index after taking the logarithm of the internal control index.

4.2.4. Control Variables

In this paper, the following indicators are selected as control variables, and the descriptions of each variable are illustrated in Table 3.

Table 3. Variable definition table.

Variable	Name	Meaning	Measurement Method	
Explanatory variable	OverPay	Executive overpayment	Modeling and calculation	
	UnPerks	On-the-job consumption of executives	Modeling and calculation	
Explanatory variable	EPU	Economic policy uncertainty index	Calculation	
Moderating variable	IC	Internal control index	Ln (internal control index score)	
	Size	Corporate size	Ln (total assets)	
	Lev	Corporate capital structure	Total liabilities/total assets	
	ROA	Return on total assets	Total return on assets adjusted by industry median	
	Cashflow	Cash flow ratio	Net cash flow from operating activities divided by total assets	
	Control variable	SOE	Nature of the property right	If the company is a state-owned enterprise, the value is 1; otherwise, it is 0
		Indep	Proportion of independent directors	Number of independent directors/number of board members
Dual		Combination of two powers	If the chairman and CEO are the same person, the value is 1; otherwise, it is 0	
Top1		Equity concentration	Shareholding ratio of the largest shareholder	
Balance		Equity balances and checks	Shareholding ratio of the second largest shareholder/shareholding ratio of the largest shareholder	
Big4		Audit quality	If the auditor is one of "Big 4" accounting firms, the value is 1; otherwise, it is 0	
INST		Share holding ratio of institutional investors	Total shares held by institutional investors divided by circulating equity capital	
Industry		Industry	Industry dummy variable to control industrial influence	
Year	Year	Year dummy variable to control the influence of the year		

4.3. Model Setting

4.3.1. Economic Policy Uncertainty and Executives' Self-Interest Behavior

In order to validate the relationship between economic policy uncertainty and executives' self-interest behavior, this paper constructs the following econometric regression models. Model (6) is used to test the influence of economic policy uncertainty on executives' explicit self-interest behavior, so as to verify hypothesis H1a in this paper. According to H1a, α_1 of Model (6) should be significantly negative. Model (7) is used to test the influence of economic policy uncertainty on executives' implicit self-interest behavior, so as to verify hypothesis H1b in this paper. According to H1b, β_1 of Model (7) should be significantly positive.

$$\text{OverPay} = \alpha_0 + \alpha_1 \text{EPU} + \alpha_n \sum \text{Controls} + \varepsilon_{i,t} \quad (6)$$

$$\text{Perk} = \beta_0 + \beta_1 \text{EPU} + \beta_n \sum \text{Controls} + \varepsilon_{i,t} \quad (7)$$

4.3.2. Moderating Role of Internal Control

Models (8) and (9) are used to test hypotheses H2a and H2b in this paper, respectively. By adding an interaction term including economic policy uncertainty and the internal control index to the regression equation, we can discuss the moderating function of internal control. Among them, in order to avoid the collinearity problem, in the interaction term of economic policy uncertainty and internal control index, the decentralized values of the two factors are multiplied.

$$\text{OverPay} = \alpha_0 + \alpha_1 \text{EPU} + \alpha_2 \text{IC} + \alpha_3 \text{EPU} \times \text{IC} + \alpha_n \sum \text{Controls} + \varepsilon_{i,t} \quad (8)$$

$$\text{Perk} = \beta_0 + \beta_1 \text{EPU} + \beta_2 \text{IC} + \beta_3 \text{EPU} \times \text{IC} + \beta_n \sum \text{Controls} + \varepsilon_{i,t} \quad (9)$$

5. Empirical Results and Analysis

5.1. Descriptive Statistical Analysis

Table 4 illustrates the descriptive statistical results of related variables. The average value of OverPay is -0.006 , which indicates that C-suite excessive compensation has been restrained to a certain extent in recent years. The median and average values of OverPay are both negative, indicating that most executives relinquish overpayment, yet the maximum value is 1.505, which is still high. The standard deviation of UnPerks is 0.023, which indicates that C-suite excessive on-the-job consumption in different enterprises is not divergent, and some executives still have high on-the-job consumption. The mean value of EPU is 5.229, with the standard deviation of 0.537, showing that the uncertainty of China's economic policy is still high, and the economic fundamentals are still volatile. The average value of Perks is 374.1991, which is much larger than the average value of Pay. The standard deviations of these two variables are relatively larger than other variables presented in the table, which indicates that the salary and consumption of managers varies greatly across different companies. The above results are in line with the fact that the managers in China, particularly managers in SOEs, are more likely to receive lower monetary compensation. With weak monitor mechanisms, managers in China are more likely to use on-the-job consumption to gain self-interest. Meanwhile, the standard deviation of corporate scale is 1.287, indicating quite different enterprise sizes.

Table 4. Descriptive statistical analysis.

	Ccount	Mean	S.D.	Min	P50	Max
OverPay	24,484	-0.0065	0.5603	-1.5678	-0.0181	1.5047
UnPerks	24,484	-0.0003	0.0235	-0.1168	-0.0007	0.0935
EPU	24,484	5.2291	0.5374	4.5230	5.3310	5.9671
IC	24,484	6.4722	0.1557	5.1402	6.4999	6.8512
Perk	24,484	374.1991	2270.3217	-14,741.5908	106.8724	83,383.8516
Pay	24,484	2.5679	289.1930	0.00005	1.852210	79.9235

Table 4. Cont.

	Ccount	Mean	S.D.	Min	P50	Max
Size	24,484	22.3851	1.2867	19.5245	22.2129	26.4297
Lev	24,484	0.4503	0.2009	0.0274	0.4481	0.9246
ROA_m	24,484	−0.0053	0.0630	−0.4595	−0.0052	0.2299
SOE	24,484	0.3989	0.4897	0.0000	0.0000	1.0000
Cashflow	24,484	0.0462	0.0680	−0.2244	0.0449	0.2568
Indep	24,484	0.3756	0.0543	0.2727	0.3636	0.6000
Dual	24,484	0.2485	0.4321	0.0000	0.0000	1.0000
Top1	24,484	0.3358	0.1472	0.0813	0.3114	0.7584
Balance	24,484	0.3473	0.2857	0.0062	0.2590	1.0000
Big4	24,484	0.0614	0.2401	0.0000	0.0000	1.0000
INST	24,484	0.4202	0.2298	0.0000	0.4324	0.8867

5.2. Correlation Analysis

The results of the Pearson correlation coefficient among variables involved in this model are illustrated in Table 5. It can be seen that the absolute values of the correlation coefficients between the main variables are all less than 0.5, demonstrating that the collinearity problem is not serious among the selected correlation indexes. As for the main explanatory variables, the correlation coefficient between economic policy uncertainty (EPU) and OverPay is −0.023 and significant, which indicates that rising economic policy uncertainty will inhibit executive excessive compensation, validating hypothesis H1a. The correlation coefficient between economic policy uncertainty (EPU) and UnPerks is 0.015 and significant, indicating that economic policy uncertainty will encourage C-suite excessive on-the-job consumption, validating hypothesis H1b. From the correlation between control variables and OverPay, corporate indebtedness, the shareholding ratio of the largest shareholder, and the number of independent directors are negatively correlated with OverPay. Meanwhile, the correlation coefficient between corporate operating cash flow and UnPerks is 0.108, which is significant. When the corporate operating cash flow rises, C-suite excessive on-the-job consumption will be boosted.

Table 5. Correlation analysis of variables.

	OverPay	UnPerks	EPU	IC	Size	Lev	ROA	SOE	Cashflow	Indep	Dual	Top1
OverPay	1.000											
UnPerks	0.089 ***	1.000										
EPU	−0.023 ***	0.015 **	1.000									
IC	0.019 ***	0.022 ***	−0.120 ***	1.000								
Size	0.041 ***	−0.103 ***	0.117 ***	0.187 ***	1.000							
Lev	−0.067 ***	−0.112 ***	−0.054 ***	−0.017 ***	0.471 ***	1.000						
ROA	0.021 ***	0.113 ***	−0.076 ***	0.354 ***	0.096 ***	−0.268 ***	1.000					
SOE	−0.091 ***	−0.065 ***	−0.113 ***	0.086 ***	0.295 ***	0.245 ***	−0.021 ***	1.000				
Cashflow	0.045 ***	0.108 ***	0.083 ***	0.122 ***	0.062 ***	−0.178 ***	0.365 ***	−0.013 **	1.000			
Indep	−0.019 ***	−0.023 ***	0.055 ***	−0.007 ***	0.016 **	−0.009 ***	−0.029 ***	−0.057 ***	−0.014 **	1.000		
Dual	0.052 ***	0.017 ***	0.061 ***	−0.030 ***	−0.131 ***	−0.098 ***	−0.008 ***	−0.283 ***	−0.009 ***	0.116 ***	1.000	
Top1	−0.102 ***	0.004 ***	−0.083 ***	0.140 ***	0.237 ***	0.102 ***	0.141 ***	0.276 ***	0.087 ***	0.034 ***	−0.077 ***	1.000
Balance	0.109 ***	0.005 ***	0.106 ***	−0.052 ***	−0.035 ***	−0.085 ***	−0.029 ***	−0.213 ***	0.006 ***	−0.016 **	0.048 ***	−0.589 ***
Big4	0.102 ***	−0.062 ***	0.001 ***	0.124 ***	0.353 ***	0.109 ***	0.060 ***	0.128 ***	0.079 ***	0.043 ***	−0.051 ***	0.152 ***
INST	0.037 ***	−0.012 *	−0.045 ***	0.167 ***	0.411 ***	0.166 ***	0.173 ***	0.363 ***	0.128 ***	−0.048 ***	−0.170 ***	0.493 ***

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

5.3. Collinearity Analysis

Table 6 illustrates the results of the variance inflation factor (VIF) of related variables, which is used to test whether there is multicollinearity among explanatory variables selected in this model. As can be seen from Table 6, the VIF values of all relevant variables selected in this model are all less than 5, proving that no multicollinearity problem exists in this research model. Further analysis can be performed according to the design model.

Table 6. Multiple collinearity analysis.

Variable	VIF	1/VIF
Top1	2.17	0.4607
Size	1.85	0.5407
INST	1.71	0.5851
Balance	1.70	0.5885
Lev	1.56	0.6415
ROA	1.46	0.6854
SOE	1.34	0.7460
IC	1.20	0.8332
Cashflow	1.19	0.8373
Big4	1.18	0.8484
EPU	1.11	0.8989
Dual	1.11	0.9020
Indep	1.03	0.9735

5.4. Regression Analysis

Table 7 illustrates the test results of Model (6) and (7). The fixed-effects panel regression model of control year and corporate individual (columns 2 and 3), as well as of control year and industry, are used in regression analysis, and corporate-level cluster-robust standard error is adopted to alleviate possible sequence-related problems (columns 4 and 5). The regression results demonstrate that the regression coefficient between economic policy uncertainty (EPU) and OverPay is always negative, which is significant at the level of 1%, indicating that there is a significant negative correlation between economic policy uncertainty and C-suite overpayment; that is, higher economic policy uncertainty will inhibit the C-suite OverPay policy. Therefore, Hypothesis H1a in this paper is supported. The regression coefficient between economic policy uncertainty (EPU) and UnPerks is always positive and significant, which indicates that there is a significant positive correlation between economic policy uncertainty and C-suite on-the-job consumption. Therefore, higher uncertainty of economic policy will encourage the implicit self-interest behavior of executives. Hypothesis H1b in this paper is thus supported.

The economic significance of the regression in Table 7 is presented as follows. For panel regression 1, OverPay increases 1422% when EPU increases by one standard deviation and UnPerks decreases 717% when EPU increases by one standard deviation. For panel regression 2, OverPay increases 835% when EPU increases by one standard deviation and UnPerks decreases 358% when EPU increases by one standard deviation.

The value for economic significance is very large, this may result from the following two reasons: (1) the values for OverPay and UnPerks are relatively small compared to the real amount of managers compensation and on-the-job consumption and (2) change in OverPay and UnPerks can lead to a reasonable economic significance change for the Pay and Perks.

At the level of the control variables, if CEO also serves as Chairman, he/she will be more incentivized to seek excessive compensation. The reason is that “tyranny of the minority” is more likely to occur when the two powers are concentrated, and C-suite will pursue self-interest by excessive compensation. There is a significant positive correlation between the cash flow generated by corporate business activities and on-the-job consumption of executives. When an enterprise generates larger amounts of cash flow, on-the-job consumption of executives will be “easier” to realize and thus be promoted.

Moreover, the control variable Big4 is negatively correlated with the excess on-the-job consumption of executives, which is also significant. Therefore, when an enterprise chooses “Big 4” accounting firms to perform audits, the excessive consumption of executives will be constrained, which is consistent with the previous research conclusions.

Table 7. Analysis of principal regression results.

	Panel Regression 1		Panel Regression 2	
	OverPay	UnPerks	Overpay	UnPerks
EPU	−0.172 *** (−6.526)	0.004 *** (2.805)	−0.101 *** (−6.054)	0.002 * (1.903)
Size	0.055 *** (3.735)	−0.003 *** (−3.668)	0.044 *** (4.768)	−0.002 *** (−5.610)
Lev	−0.164 *** (−3.469)	−0.003 (−1.349)	−0.359 *** (−7.290)	−0.004 ** (−2.022)
ROA	−1.155 *** (−15.890)	0.014 *** (4.043)	−0.460 *** (−4.441)	0.030 *** (7.224)
SOE	−0.030 (−0.874)	−0.002 (−1.328)	−0.114 *** (−5.430)	−0.002 ** (−2.217)
Cashflow	0.053 (1.025)	0.005 * (1.804)	0.333 *** (3.789)	0.029 *** (7.792)
Indep	−0.259 ** (−2.422)	0.004 (0.763)	−0.240 * (−1.833)	−0.009 * (−1.788)
Dual	0.038 *** (2.967)	−0.000 (−0.717)	0.061 *** (3.640)	−0.000 (−0.180)
Top1	−0.092 (−0.974)	0.008 * (1.862)	−0.555 *** (−7.144)	0.003 (1.100)
Balance	0.008 (0.234)	0.002 (0.882)	0.031 (0.906)	0.001 (0.458)
Big4	0.162 *** (2.991)	−0.006 ** (−2.339)	0.217 *** (4.989)	−0.004 *** (−2.646)
INST	0.102 *** (2.943)	0.001 (0.696)	0.268 *** (6.810)	0.002 (1.188)
_cons	−0.190 (−0.711)	0.038 *** (2.830)	−0.069 (−0.346)	0.039 *** (4.488)
Industry	—	—	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.037	0.010	0.058	0.038
F	15.044	3.584	7.488	7.573

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

5.5. Moderating Role of Internal Control

In order to test Hypothesis H2, this paper constructs Models (7) and (8) and adds the internal control index as a moderating variable to study the role of internal control on the relationship between economic policy uncertainty and executives’ self-interest behavior. As illustrated in Table 8, if α_3 and β_3 , the coefficients of the interaction term EPU*IC, are significantly negative, the effective internal control can strengthen the restraining effect of economic policy uncertainty on OverPay, which is conducive to suppressing executives’ explicit self-interest behavior. Meanwhile, effective internal control can also weaken the role of economic policy uncertainty in promoting C-suite on-the-job consumption, and help to restrain executives’ invisible self-interest behavior. To summarize, effective internal control is conducive to restraining the self-interest behavior of executives. Therefore, Hypotheses H2a and H2b are verified.

Table 8. Moderating effect regression.

	Panel Regression 1		Panel Regression 2	
	OverPay	UnPerks	Overpay	UnPerks
EPU	−0.173 *** (−6.537)	0.004 *** (2.868)	−0.092 *** (−5.355)	0.002 *** (2.588)
IC	−0.025 (−1.120)	0.000 (0.309)	0.038 (1.039)	0.004 *** (2.750)
EPU*IC	−0.173 *** (−4.535)	−0.007 *** (−3.635)	−0.254 *** (−4.514)	−0.013 *** (−5.407)
Size	0.059 *** (4.016)	−0.003 *** (−3.481)	0.043 *** (4.633)	−0.002 *** (−5.973)
Lev	−0.168 *** (−3.571)	−0.003 (−1.410)	−0.355 *** (−7.205)	−0.004 * (−1.891)
ROA	−1.112 *** (−15.354)	0.015 *** (4.207)	−0.439 *** (−4.144)	0.030 *** (7.004)
SOE	−0.030 (−0.870)	−0.002 (−1.312)	−0.113 *** (−5.356)	−0.002 ** (−2.134)
Cashflow	0.046 (0.896)	0.005 * (1.693)	0.319 *** (3.629)	0.029 *** (7.636)
Indep	−0.255 ** (−2.387)	0.004 (0.791)	−0.242 * (−1.841)	−0.009 * (−1.814)
Dual	0.038 *** (2.978)	−0.000 (−0.708)	0.061 *** (3.642)	−0.000 (−0.198)
Top1	−0.092 (−0.985)	0.008 * (1.847)	−0.555 *** (−7.140)	0.003 (1.083)
Balance	0.005 (0.134)	0.001 (0.798)	0.030 (0.859)	0.001 (0.402)
Big4	0.163 *** (3.000)	−0.006 ** (−2.333)	0.217 *** (4.977)	−0.004 *** (−2.696)
INST	0.101 *** (2.936)	0.001 (0.657)	0.266 *** (6.771)	0.002 (1.129)
_cons	−0.115 (−0.377)	0.032 ** (1.983)	−0.337 (−1.051)	0.013 (1.025)
Industry	—	—	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.039	0.011	0.060	0.040
F	14.769	4.014	7.833	8.070

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

6. Robustness Test and Further Analysis

6.1. Robustness Test

In order to ensure the reliability of the research conclusion, we conducted the following robustness tests.

6.1.1. Changing the Measurement Method of Executives' Excessive Compensation and On-The-Job Consumption

Referring to the practices of Luo et al. [43], etc., this paper adopts the total monetary compensation of the Top 3 directors, supervisors, and executives as the absolute compensation of corporate executives, then uses its logarithm as the executive compensation variable (Pay_r) and calculates the replacement variable (OverPay_r) of the executives through the model. Drawing from the practices of Luo Jinhui, etc., we adjust the management expenses through the main business income to obtain the on-the-job consumption (Perk_r) of executives. See Table 9 for the regression results. The test coefficients of the main variables in the regression results have not changed and are still significant, which demonstrates the robustness of the conclusion.

Table 9. Variables of executives' self-interest behavior under different methods.

	OverPay_r	Overpay_r	Perks	Perks
EPU	−0.183 *** (−7.163)	−0.107 *** (−6.525)	0.033 *** (8.501)	0.009 *** (4.039)
Size	0.065 *** (4.617)	0.051 *** (5.465)	−0.008 *** (−3.629)	−0.004 *** (−4.183)
Lev	−0.166 *** (−3.667)	−0.357 *** (−7.195)	−0.039 *** (−5.193)	−0.064 *** (−11.693)
ROA	−1.129 *** (−16.419)	−0.439 *** (−4.288)	−0.051 *** (−4.222)	−0.070 *** (−5.774)
SOE	−0.065 * (−1.906)	−0.176 *** (−8.407)	−0.012 *** (−2.706)	−0.005 *** (−3.031)
Cashflow	0.064 (1.258)	0.362 *** (4.187)	−0.035 *** (−4.276)	0.007 (0.753)
Indep	−0.254 ** (−2.522)	−0.284 ** (−2.207)	0.012 (0.957)	0.015 (1.255)
Dual	−0.022 * (−1.796)	−0.012 (−0.719)	−0.001 (−0.844)	0.001 (0.799)
Top1	−0.091 (−1.011)	−0.586 *** (−7.572)	0.050 *** (4.452)	−0.006 (−0.778)
Balance	0.002 (0.056)	0.012 (0.359)	0.008 * (1.835)	0.003 (0.803)
Big4	0.156 *** (2.918)	0.202 *** (4.721)	−0.009 ** (−2.166)	−0.006 ** (−2.056)
INST	0.092 *** (2.769)	0.250 *** (6.449)	0.004 (0.934)	0.003 (0.811)
_cons	−0.320 (−1.247)	−0.097 (−0.492)	0.041 (1.119)	0.091 *** (3.966)
Industry	—	Yes	—	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.038	0.067	0.139	0.191
F	15.888	8.310	62.835	49.331

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.1.2. Changing the Measurement Method of Economic Policy Uncertainty Index

When the above regression analysis was carried out in this paper, the method of processing the economic policy uncertainty index was to take the logarithm of its average. In the robustness test, the index is divided by 100 to obtain EPU2, the replacement variable of the economic policy uncertainty index, and then a regression analysis is carried out once again. The regression results are illustrated in Table 10. As can be seen from Table 10, the uncertainty of economic policy has a negative correlation with OverPay and is still significant, while the uncertainty of economic policy has a positive correlation with UnPerks. The main test coefficient in the regression results has not changed, so the conclusion of this paper is robust.

Table 10. Variables of economic policy uncertainty under different methods.

	OverPay	UnPerks	Overpay	UnPerks
EPU2	−0.094 *** (−6.526)	0.002 *** (2.805)	−0.045 *** (−6.054)	0.001 * (1.903)
Size	0.055 *** (3.735)	−0.003 *** (−3.668)	0.044 *** (4.768)	−0.002 *** (−5.610)
Lev	−0.164 *** (−3.469)	−0.003 (−1.349)	−0.359 *** (−7.290)	−0.004 ** (−2.022)
ROA	−1.155 *** (−15.890)	0.014 *** (4.043)	−0.460 *** (−4.441)	0.030 *** (7.224)

Table 10. Cont.

	OverPay	UnPerks	Overpay	UnPerks
SOE	−0.030 (−0.874)	−0.002 (−1.328)	−0.114 *** (−5.430)	−0.002 ** (−2.217)
Cashflow	0.053 (1.025)	0.005 * (1.804)	0.333 *** (3.789)	0.029 *** (7.792)
Indep	−0.259 ** (−2.422)	0.004 (0.763)	−0.240 * (−1.833)	−0.009 * (−1.788)
Dual	0.038 *** (2.967)	−0.000 (−0.717)	0.061 *** (3.640)	−0.000 (−0.180)
Top1	−0.092 (−0.974)	0.008 * (1.862)	−0.555 *** (−7.144)	0.003 (1.100)
Balance	0.008 (0.234)	0.002 (0.882)	0.031 (0.906)	0.001 (0.458)
Big4	0.162 *** (2.991)	−0.006 ** (−2.339)	0.217 *** (4.989)	−0.004 *** (−2.646)
INST	0.102 *** (2.943)	0.001 (0.696)	0.268 *** (6.810)	0.002 (1.188)
_cons	−0.894 *** (−2.861)	0.053 *** (3.458)	−0.495 ** (−2.426)	0.045 *** (5.667)
Industry	—	—	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.037	0.010	0.058	0.038
F	15.044	3.584	7.488	7.573

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.1.3. Instrumental Variable Regression

In this paper, instrumental variables are used for regression to reduce the interference of endogeneity problem on the regression conclusion. Drawing on the research of existing literature [45], the uncertainty of global economic policy will affect the uncertainty of China's economic policy, which accords with the correlation characteristics of the instrumental variables. However, the uncertainty of global economic policy will not directly affect the choice of C-suite self-interest behavior in China, which accords with the exogenous characteristics of the instrumental variables. Therefore, this paper uses the global economic policy uncertainty index as an instrumental variable to alleviate the endogeneity problems that may exist in the original regression model. Its calculation method is the same as the measurement method of China's economic policy uncertainty in the main regression, obtained by calculating the logarithm of the annual arithmetic average. Table 11 illustrates the regression results for the instrumental variables. From the results of Table 11, we can find that the regression coefficients of economic policy uncertainty and executive excessive compensation are always negative and significant, while the regression coefficients of economic policy uncertainty and executive excessive on-the-job consumption are always positive and significant, which is consistent with the original regression results. Therefore, the model in this paper can still be used to draw consistent research conclusions after using instrumental variables to control endogeneity problems.

Table 11. Instrumental variables.

	OverPay	UnPerks	Overpay	UnPerks
GEPU	−0.262 *** (−6.526)	0.006 *** (2.805)	−0.127 *** (−6.054)	0.002 * (1.903)
Size	0.055 *** (3.735)	−0.003 *** (−3.668)	0.044 *** (4.768)	−0.002 *** (−5.610)
Lev	−0.164 *** (−3.469)	−0.003 (−1.349)	−0.359 *** (−7.290)	−0.004 ** (−2.022)

Table 11. Cont.

	OverPay	UnPerks	Overpay	UnPerks
ROA	−1.155 *** (−15.890)	0.014 *** (4.043)	−0.460 *** (−4.441)	0.030 *** (7.224)
SOE	−0.030 (−0.874)	−0.002 (−1.328)	−0.114 *** (−5.430)	−0.002 ** (−2.217)
Cashflow	0.053 (1.025)	0.005 * (1.804)	0.333 *** (3.789)	0.029 *** (7.792)
Indep	−0.259 ** (−2.422)	0.004 (0.763)	−0.240 * (−1.833)	−0.009 * (−1.788)
Dual	0.038 *** (2.967)	−0.000 (−0.717)	0.061 *** (3.640)	−0.000 (−0.180)
Top1	−0.092 (−0.974)	0.008 * (1.862)	−0.555 *** (−7.144)	0.003 (1.100)
Balance	0.008 (0.234)	0.002 (0.882)	0.031 (0.906)	0.001 (0.458)
Big4	0.162 *** (2.991)	−0.006 ** (−2.339)	0.217 *** (4.989)	−0.004 *** (−2.646)
INST	0.102 *** (2.943)	0.001 (0.696)	0.268 *** (6.810)	0.002 (1.188)
_cons	0.257 (0.998)	0.028 ** (2.137)	0.066 (0.322)	0.037 *** (4.033)
Industry	—	—	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.037	0.010	0.058	0.038
F	15.044	3.584	7.488	7.573

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.1.4. Adding Macro-Level Control Variables

The conclusions of this paper may be subject to endogeneity problems due to the lack of macro-level variables. To alleviate this issue and prevent endogenous errors caused by changes in macro-economic factors, this paper refers to the research of Li and Yang [46], Gulen [4], etc., and adds the year-on-year GDP growth variable to the control variables of the original regression model. The regression results are illustrated in the Table 12. After controlling for the macro-factors, the regression results are still stable, alleviating the endogenous factors caused by the lack of macro-level variables.

Table 12. Adding macro-control variables.

	OverPay	UnPerks	Overpay	UnPerks
EPU	−0.188 *** (−6.472)	0.004 *** (2.907)	−0.149 *** (−5.835)	0.004 *** (3.157)
Size	0.055 *** (3.735)	−0.003 *** (−3.668)	0.044 *** (4.768)	−0.002 *** (−5.610)
Lev	−0.164 *** (−3.469)	−0.003 (−1.349)	−0.359 *** (−7.290)	−0.004 ** (−2.022)
ROA	−1.155 *** (−15.890)	0.014 *** (4.043)	−0.460 *** (−4.441)	0.030 *** (7.224)
SOE	−0.030 (−0.874)	−0.002 (−1.328)	−0.114 *** (−5.430)	−0.002 ** (−2.217)
Cashflow	0.053 (1.025)	0.005 * (1.804)	0.333 *** (3.789)	0.029 *** (7.792)
Indep	−0.259 ** (−2.422)	0.004 (0.763)	−0.240 * (−1.833)	−0.009 * (−1.788)

Table 12. Cont.

	OverPay	UnPerks	Overpay	UnPerks
Dual	0.038 *** (2.967)	−0.000 (−0.717)	0.061 *** (3.640)	−0.000 (−0.180)
Top1	−0.092 (−0.974)	0.008 * (1.862)	−0.555 *** (−7.144)	0.003 (1.100)
Balance	0.008 (0.234)	0.002 (0.882)	0.031 (0.906)	0.001 (0.458)
Big4	0.162 *** (2.991)	−0.006 ** (−2.339)	0.217 *** (4.989)	−0.004 *** (−2.646)
INST	0.102 *** (2.943)	0.001 (0.696)	0.268 *** (6.810)	0.002 (1.188)
GDP	−0.055 *** (−5.303)	0.002 *** (3.597)	−0.039 *** (−4.075)	0.002 *** (4.522)
_cons	0.017 (0.067)	0.032 ** (2.402)	0.249 (1.178)	0.024 ** (2.460)
Industry	—	—	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	24,484	24,484	24,484	24,484
adj. R2	0.037	0.010	0.058	0.038
F	15.044	3.584	7.488	7.573

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.1.5. Controlling the Fixed Effects of Provinces

Since the uncertainty levels of different regions can be different, the influence of provincial factors can only be overlooked if controlling for the influence from industries. Therefore, the fixed effects of provinces were added to the robustness test, so as to reduce endogeneity problems. As can be seen from Table 13, the regression coefficient between economic policy uncertainty and OverPay remains negative and significant at the level of 1%. The regression coefficient between economic policy uncertainty and executives' excessive on-the-job consumption is still positive and significant, which is consistent with the main regression results.

Table 13. Controlling provinces as fixed effects.

	OverPay	UnPerks
EPU	−0.1067 *** (−6.5579)	0.0015 * (1.8796)
Size	0.0452 *** (5.1008)	−0.0021 *** (−5.7559)
Lev	−0.3052 *** (−6.6304)	−0.0029 (−1.4902)
ROA	−0.4247 *** (−4.2440)	0.0305 *** (7.3725)
SOE	−0.1095 *** (−5.2031)	−0.0016 ** (−2.0246)
Cashflow	0.3448 *** (4.1071)	0.0293 *** (7.9098)
Indep	−0.3589 *** (−2.8264)	−0.0102 ** (−2.0465)
Dual	0.0402 ** (2.4097)	−0.0005 (−0.8059)
Top1	−0.5854 *** (−7.8029)	0.0023 (0.7215)
Balance	0.0139 (0.4120)	0.0004 (0.3091)

Table 13. Cont.

	OverPay	UnPerks
Big4	0.1659 *** (3.8376)	−0.0045 *** (−3.1353)
INST	0.2727 *** (7.1380)	0.0018 (1.0879)
_cons	0.0875 (0.4450)	0.0453 *** (5.2376)
Industry	Yes	Yes
Province	Yes	Yes
Year	Yes	Yes
N	24,484	24,484
adj. R2	0.116	0.050

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.2. Further Analysis

6.2.1. Heterogeneity Analysis of Enterprise Property Rights

Considering China's political system and actual national conditions, enterprises with different property rights are divergent in business models, corporate organizational frameworks, etc. Therefore, a comparative analysis of enterprises with different property rights is an essential step in the study of corporate governance. In this paper, sample enterprises are divided into "SOE" and "non-SOE" groups according to the nature of property rights, and the relationship between the uncertainty of economic policy and excessive compensation and on-the-job consumption of executives is verified in groups. The verification results are illustrated in Table 14. From the results of the grouping regression, we can see that the impact of economic policy uncertainty on executive OverPay is still negative and significant in SOEs, but negative and not significant in non-SOEs. The reason is that, compared with non-SOEs, SOEs feature stricter control over the compensation of executives, exerting a strong restraining effect. Meanwhile, uncertain economic policy has a more significant effect on the promotion of C-suite excessive on-the-job consumption in SOEs. When executives' excessive compensation is restrained, they will actively make up for the shortfall through alternative methods, which is also in line with the hypotheses of this paper. Meanwhile, the nature of property rights of SOEs leads to multiple agency problems. The shareholders of SOEs do not actively play the role of supervisors, and thus a series of issues, including excessive on-the-job consumption of executives, have not been effectively addressed.

Table 14. Heterogeneity analysis of property lefts of enterprises.

	OverPay		UnPerks	
	SOEs	Non-SOEs	SOEs	Non-SOEs
EPU	−0.277 *** (−8.016)	−0.050 (−1.244)	0.004 * (1.741)	0.001 (0.665)
Size	0.037 (1.611)	0.049 *** (2.656)	−0.002 (−1.271)	−0.003 *** (−3.150)
Lev	−0.191 ** (−2.477)	−0.134 ** (−2.356)	−0.013 *** (−2.720)	0.003 (0.994)
ROA	−0.195 (−1.237)	−1.375 *** (−17.428)	0.027 *** (2.935)	0.010 *** (2.709)
Cashflow	−0.187 *** (−2.665)	0.155 ** (2.246)	−0.000 (−0.030)	0.007 ** (2.075)
Indep	−0.349 ** (−2.322)	−0.070 (−0.470)	0.004 (0.553)	0.001 (0.222)
Dual	0.033 (1.487)	0.040 *** (2.597)	−0.001 (−0.607)	0.000 (0.565)

Table 14. Cont.

	OverPay		UnPerks	
	SOEs	Non-SOEs	SOEs	Non-SOEs
Top1	−0.269 *	0.177	0.008	0.010 *
	(−1.848)	(1.472)	(1.114)	(1.753)
Balance1	−0.051	0.055	−0.000	0.003
	(−0.923)	(1.261)	(−0.137)	(1.296)
Big4	0.076	0.235 ***	−0.002	−0.006 **
	(1.207)	(2.736)	(−0.657)	(−2.012)
INST	0.093 **	0.132 ***	0.002	0.001
	(2.107)	(2.806)	(0.665)	(0.265)
_cons	0.818 **	−0.877 **	0.019	0.047 ***
	(2.014)	(−2.501)	(0.848)	(2.911)
Year	Yes	Yes	Yes	Yes
N	9766	14,718	9766	14,718
adj. R2	0.056	0.060	0.013	0.010
F	7.634	18.239	2.884	2.586

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.2.2. Heterogeneity Analysis of Institutional Investors

Different types of institutional investors play different roles in corporate governance. Therefore, this paper further analyzes the model by distinguishing the types of institutional investors. Drawing on the practices of Niu et al. [47], etc., this paper uses Formula 10 to study the heterogeneity of institutional investors through the dimensions of time and industry. The definitions of the variables used in Formula (10) are presented in Table 15.

$$\left\{ \begin{array}{l} SD_{it} = \frac{INVHit}{STD(INVHit-3, INVHit-2, INVHit-1)} \\ STABLE_{it} = \begin{cases} 1, SD_{it} \geq MEDIAN_{tj}(SD_{tj}) \\ 0, others \end{cases} \end{array} \right. \quad (10)$$

Table 15. Definition table of heterogeneity variables of institutional investors.

Variable	Definition
INVHit	Shareholding of institutional investors in Company i at Year t
STD(INVHit-3, INVHit-2, INVHit-1)	Standard deviation of institutional investors' shareholding of Company i in the first three years
SDit	The ratio of shareholding of institutional investors in Company i at Year t to the standard deviation of institutional investors' shareholding in the past three years
MEDIAN _{tj} (SD _{tj})	Median of Industry j in Year t
STABLE _{it}	Dummy variables of institutional investor stability

The results of the grouping regression for different types of institutional investors are illustrated in Table 16. The impact of economic policy uncertainty on OverPay is negative for both stable and transactional institutional investors, which is significant at the level of 1%. Yet the impact of economic policy on UnPerks is only significant for transactional institutional investors. The reason for this finding is that institutional investors of different natures are not uniformly enthusiastic about enterprise supervision. Due to long-term shareholding, stable institutional investors boast deeper understanding of the enterprise and are more active in corporate governance and supervision. Moreover, stable institutional investors highlight the long-term profits of enterprises, and thus their supervision of C-suite is more effective. Therefore, stable institutional investors wield a more prominent inhibitory effect on executives' excessive on-the-job consumption.

Table 16. Heterogeneity grouping regression results of institutional investors.

	OverPay		UnPerks	
	Stable	Transactional	Stable	Transactional
EPU	−0.204 *** (−5.790)	−0.128 *** (−3.248)	0.001 (0.578)	0.006 *** (2.992)
Size	0.045 ** (2.489)	0.061 *** (2.996)	−0.003 ** (−2.512)	−0.002 ** (−2.339)
Lev	−0.129 ** (−1.997)	−0.150 ** (−2.524)	−0.008 ** (−2.217)	0.002 (0.757)
ROA_m	−0.904 *** (−8.003)	−1.340 *** (−15.376)	0.017 *** (2.855)	0.012 *** (2.786)
SOE	−0.036 (−0.758)	0.006 (0.131)	−0.001 (−0.489)	−0.004 ** (−2.003)
Cashflow	−0.058 (−0.780)	0.088 (1.165)	0.007 (1.513)	0.003 (0.762)
Indep	−0.355 ** (−2.529)	−0.254 (−1.580)	0.002 (0.310)	0.005 (0.776)
Dual	0.032 * (1.781)	0.041 ** (2.379)	0.000 (0.084)	−0.001 (−1.411)
Top1	−0.072 (−0.583)	−0.035 (−0.268)	0.008 (1.210)	0.009 * (1.738)
Balance1	0.037 (0.800)	0.008 (0.177)	0.001 (0.573)	0.002 (1.020)
Big4	0.186 *** (2.978)	0.162 * (1.853)	−0.005 * (−1.880)	−0.006 (−1.562)
INST	0.095 * (1.740)	0.104 ** (2.351)	0.004 (1.250)	−0.001 (−0.639)
_cons	0.207 (0.640)	−0.597 (−1.556)	0.052 *** (2.761)	0.013 (0.734)
Year	Yes	Yes	Yes	Yes
N	12,415	12,069	12,415	12,069
adj. R2	0.030	0.056	0.013	0.008
F	6.363	13.201	2.987	1.774

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

6.2.3. Heterogeneity Analysis of Competitive Position of Enterprises

Market competition is an important bridge between macro-economy and corporate development. Drawing on the research of Yang and Yin [48], etc., this paper adopts the Lerner Index to measure the competitive position of enterprises, calculating the median of the Lerner Index by year and industry. If an enterprise's competitive index exceeds the median, the value of "1" is assigned, representing a strong competitive position. The competitive index of enterprises below the median value is assigned as "0", representing a weak competitive position. The results of the grouping regression according to competition positions are illustrated in Table 17. The influence of economic policy on OverPay is negative in enterprises with both strong and weak competitive positions, which is significant at the level of 1%, indicating that the uncertainty of economic policy will inhibit executive excessive compensation. However, in the enterprises with a stronger competitive position, higher uncertainty of economic policy will restrain C-suite excessive on-the-job consumption. On the contrary, in the enterprises with a weaker competitive position, rising policy uncertainty will encourage such consumption. The conclusion is that market competition can play a certain governance role and alleviate the principal-agent problem [49]. Market competition provides opportunities for corporate performance comparison, which empowers investors and analysts with more motives and channels to obtain relevant information of enterprises, influences the decision-making of enterprise executives through various ways such as information effect and reputation mechanism, and restricts the speculation and self-interest behavior of executives in more competitive enterprises.

Table 17. Heterogeneity group results of competitive position of enterprises.

	OverPay		UnPerks	
	Competitive	Non-Competitive	Competitive	Non-Competitive
EPU	−0.188 *** (−4.433)	−0.138 *** (−4.209)	−0.004 * (−1.917)	0.010 *** (5.331)
Size	0.046 ** (2.146)	0.044 ** (2.370)	−0.002 ** (−1.988)	−0.002 ** (−2.207)
Lev	−0.049 (−0.737)	−0.206 *** (−3.165)	0.000 (0.042)	−0.004 (−1.168)
ROA	−1.024 *** (−7.756)	−1.276 *** (−14.216)	0.036 *** (6.546)	0.011 ** (2.293)
SOE	0.014 (0.299)	−0.032 (−0.684)	−0.000 (−0.021)	−0.003 * (−1.798)
Cashflow	0.099 (1.201)	−0.111 * (−1.719)	0.001 (0.271)	0.005 (1.313)
Indep	−0.444 *** (−2.918)	−0.301 ** (−2.341)	0.007 (1.026)	−0.002 (−0.349)
Dual	0.029 * (1.673)	0.061 *** (3.297)	−0.000 (−0.460)	0.000 (0.188)
Top1	−0.086 (−0.648)	−0.002 (−0.019)	0.002 (0.400)	0.009 (1.396)
Balance	0.016 (0.331)	0.008 (0.178)	−0.001 (−0.373)	0.002 (0.777)
Big4	0.154 ** (2.093)	0.161 * (1.959)	−0.005 ** (−2.022)	−0.002 (−0.550)
INST	0.119 *** (2.782)	0.080 (1.595)	0.000 (0.136)	−0.001 (−0.253)
_cons	0.157 (0.423)	−0.220 (−0.617)	0.067 *** (3.625)	−0.001 (−0.057)
Year	Yes	Yes	Yes	Yes
N	12,297	12,187	12,297	12,187
adj. R2	0.030	0.046	0.032	0.015
F	5.630	11.984	5.612	3.379

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

7. Conclusions and Discussion

At present, with the normalization of pandemic control in China and the turbulent international landscape, it is important to highlight the impact of economic policy uncertainty. In addition to the impact of the policy itself on industries and enterprises, the uncertainties caused by policy changes and execution will also exert an adverse effect on enterprises. When the prospects of an enterprise are unclear, it will implement contractionary policies through reduce investment, which is not conducive to the growth of the enterprise and market as well as employment expansion, exerting a negative impact on the overall macro-economy. Therefore, in the period of sound economic operation, the government should give full control to the self-regulation of the market and enhance the capability of enterprises to predict and avert risks. If we are determined to adjust the economic policy, government organizations should establish consultation platforms. Before new policies are rolled out, we should thoroughly investigate and analyze the market trends and corporate development and reassure the market with stable expectations. After the introduction of policies, we should also manage to drive away people's concerns through policy interpretation. The policy should also be fully executed to avoid frequent and unnecessary changes, so as to ensure its long-term consistency.

Furthermore, facing the rising uncertainty of external macroeconomic policies, enterprises should improve risk identification and response mechanisms, stay alert to changes in economic policies, tap into their advantages, and improve the efficiency of resource allocation. Meanwhile, they should strengthen internal control and power restriction. The

C-suite supervision should not only target explicit self-interest behavior, but also loopholes in the underlying implicit self-interest behavior, so as to reduce such behaviors, including excessive on-the-job consumption. Furthermore, when determining C-suite compensation, enterprises should comprehensively consider the traits of executives, including capability, career goals, expected income, etc., and be aware that executives will not obtain perks only from one single channel. When suppressing their compensation, executives will seek alternative benefits through on-the-job consumption, etc. While allowing executives to have bargaining power in compensation, enterprises should also anticipate and guard against alternative channels of self-interest.

Finally, through the further analysis of this paper, we can find that SOEs should focus on the promotion effect of economic policy uncertainty on executives' implicit self-interest behavior. Stable institutional investors exert certain governance effects on C-suite self-interest behavior. Enterprises with unstable institutional investors should strengthen the quality of information disclosure, reduce information asymmetry, enhance internal control and supervision, and accept external monitoring from media and analysts, so as to better restrain the self-interest behavior of executives. Fair and orderly market competition can also deliver certain governance effects. The government should do its utmost to create a sound environment of market competition for the development of enterprises and give full control to the self-regulation of the market.

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References

1. Dai, B.; Peng, C. Is an International Board a “Haven” or a “Firewall” for Executive Self-interest? Empirical Evidence from China's a-share Listed Companies. *J. Zhongnan Univ. Econ. Law* **2019**, *4*, 25–35+57.
2. Gao, F. Research on Corporate Governance, Management Agency and Financial Restatement. *Nankai Manag. Rev.* **2016**, *19*, 168–177.
3. Ma, Y. Government Subsidies, Corporate Performance and Manager Self-interest: Empirical Evidence from Chinese Listed Companies. *J. Zhongnan Univ. Econ. Law* **2019**, *1*, 47–56.
4. Gulen, H.; Ion, M. Policy Uncertainty and Corporate Investment. *Rev. Financ. Stud.* **2016**, *29*, 523–564. [[CrossRef](#)]
5. Chen, D.; Chen, Y.; Dong, Z. Policy Uncertainty, the Intensity of Tax Collection and Administration and Enterprise Tax Avoidance. *Manag. World* **2016**, *5*, 151–163.
6. Luo, D.; Li, Z. Economic Policy on the Impact of Uncertainty on Corporate Financing Empirical Analysis. *J. Stat. Decis.* **2019**, *35*, 170–174.
7. Liu, L.; Wang, Y.; Pan, J. Economic Policy Uncertainty, Management, Governance and Corporate Debt Financing Decision. *J. Shanxi Univ. Financ. Econ.* **2019**, *9*, 83–97.
8. Gu, X.; Chen, Y.; Pan, S. Economic Policy Uncertainty and Innovation: An Empirical Analysis of Chinese Listed Companies. *Econ. Res. J.* **2018**, *53*, 109–123.
9. Zhang, G.; Qian, X.; Xu, J. Can Economic Policy Uncertainty Affect Corporate Cash Holding Behavior? *J. Manag. Rev.* **2017**, *29*, 15–27.
10. Chen, Y.; Cheng, L. Economic Policy Uncertainty, Executive Background and Cash Holdings. *J. Shanghai Univ. Financ. Econ.* **2018**, *20*, 94–108.
11. Han, S.; Zhang, X.; Guo, J. Economic Policy Uncertainty, Executive Political Background and R&D investment. *Friends Account.* **2020**, *13*, 79–87.
12. Li, L.; Zhang, D. Economic Policy Uncertainty, Executive Government Resume and Insider Trading Information Content. *J. Shanxi Univ. Financ. Econ.* **2019**, *9*, 93–107.

13. Yao, D.; Fu, X. Economic Policy Uncertainty, CEO of Financial Experience and Enterprise Financialization. *J. Financ. Theory Pract.* **2022**, *1*, 17–26.
14. Shen, Y.; Zhang, H.; Jia, X. Economic Policy Uncertainty, Executive Overconfidence and Firm Innovation. *Explor. Econ. Issues* **2019**, *2*, 39–50.
15. Dong, L. Economic Policy Uncertainty, Managers Self-Confidence and Enterprise Investment Efficiency. *J. Stat. Decis.* **2021**, *5*, 165–169.
16. Zhao, X.; Xu, C. Does Charitable Giving Affect Technological Innovation? Based on Regulation of Executive Overconfidence. *J. Account.* **2020**, *20*, 15–20.
17. Rao, P.; Xu, Z. Is Economic Policy Uncertainty Affecting Executive Change? *Manag. World* **2017**, *1*, 145–157.
18. Wu, H.; Liu, W. Economic Policy Uncertainty and Managers Overconfidence. *J. Soft Sci.* **2021**, *35*, 139–144.
19. Wu, Y.; Wu, S. Corporate Self-interested Behavior and Its Influencing Factors: Evidence Based on the Draft Equity Incentive of Chinese Listed Companies. *Manag. World* **2010**, *5*, 141–149.
20. Lu, R.; Wei, M.; Li, W. Management Power, in-service Consumption and Property Efficiency: Evidence from Chinese Listed Companies. *Nankai Manag. Rev.* **2008**, *5*, 85–92+112.
21. Xin, Q.; Lin, B.; Wang, Y. Government Control, Manager Compensation and Capital Investment. *Econ. Res. J.* **2007**, *8*, 110–122.
22. Iwasaki, T.; Otomasa, S.; Shiiba, A.; Shuto, A. The Role of Accounting Conservatism in Executive Compensation Contracts. *J. Bus. Financ. Account.* **2018**, *45*, 1139–1163. [[CrossRef](#)]
23. Cai, G.; Liu, J.; Ma, X. Non-state Shareholders Governance and Executive Compensation Incentive in State-owned Enterprises. *Manag. World* **2018**, *5*, 137–149.
24. Carter, M.R.; Zimmerman, F.J. The Dynamic Cost and Persistence of Asset Inequality in an Agrarian Economy. *J. Dev. Econ.* **2000**, *63*, 265–302. [[CrossRef](#)]
25. Zhao, C.; Yang, Y.; He, W. Policy Burdens, Eight Rules and Soe Executives Recessive. *J. Zhongnan Univ. Econ. Law* **2019**, *1*, 75–85+159.
26. Kong, M.; Tang, J.; Chen, D. Manager Self-interested Behavior and Tax Stickiness: Based on Empirical Evidence of A-share Listed Companies in Shenzhen and Shanghai. *Theory Pract. Financ. Econ.* **2020**, *9*, 103–108.
27. Zhai, S.; Xu, Y.; Yang, D. Can the Media Monitor the On-the-job Spending of State-owned Enterprise Executives? *Account. Res.* **2015**, *5*, 57–63+95.
28. Jensen, M.C.; Meckling, W.H. Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure. *J. Financ. Econ.* **1976**, *3*, 305–360. [[CrossRef](#)]
29. Donelson, D.C.; Ege, M.S.; McInnis, J.M. Internal control weaknesses and financial reporting fraud. *Audit. J. Pract. Theory* **2017**, *36*, 45–69. [[CrossRef](#)]
30. Skaife, H.A.; Veenman, D.; Wangerin, D. Internal control over financial reporting and managerial rent extraction: Evidence from the profitability of insider trading. *J. Account. Econ.* **2013**, *55*, 91–110. [[CrossRef](#)]
31. Hu, M.; Gan, S. Management Power, Internal Control and Executive Corruption. *J. Zhongnan Univ. Econ. Law* **2015**, *3*, 87–93.
32. Zhou, X. Evaluation Index System of Internal Control Effectiveness of Chinese enterprises. *Financ. Econ.* **2012**, *5*, 117–124.
33. Zhang, J.; Ji, D.; Sun, Y. Internal control effectiveness: An empirical study of factors affecting. *Manag. World* **2013**, *8*, 179–180.
34. Zhao, C.; Yang, D.; Cao, W. Executive power, control, and the corruption of state-owned enterprise executives. *J. Financ. Res.* **2015**, *9*, 78–89.
35. Bai, Y.; Tang, Y.; Yin, X. Internal Control, Social Audit and Corruption Governance. *Friends Account.* **2018**, *12*, 96–102.
36. Deng, M. The Impact of Economic policy Uncertainty on Corporate Performance: Empirical evidence from China's non-financial listed Companies. *Ind. Tech. Econ.* **2019**, *38*, 97–106.
37. Huang, H.; Liu, H.; Yang, B. Economic policy uncertainty and executive turnover. *China J. Account. Res.* **2021**, *14*, 83–100. [[CrossRef](#)]
38. Cai, H.; Fang, H.; Xu, L.C. Eat, Drink, Firms, Government: An Investigation of Corruption from The Entertainment and Travel Costs of Chinese Firms. *J. Law Econ.* **2011**, *54*, 55–78. [[CrossRef](#)]
39. Dong, W.; Ke, Y.; Li, S.; Chen, X.Y.; Wan, P. Does Social Trust Restrain Excess Perk Consumption? Evidence from China. *Int. Rev. Econ. Financ.* **2021**, *76*, 1078–1092. [[CrossRef](#)]
40. Core, J.; Guay, W.; Larcker, D.F. The power of the pen and executive compensation. *J. Financ. Econ.* **2008**, *88*, 1–25. [[CrossRef](#)]
41. Luo, H.; Huang, M.; Zhou, D.; Liu, B. Government subsidy, excess compensation and compensation defense. *Account. Res.* **2014**, *1*, 42–48+95.
42. Quan, X.; Wu, S.; Wen, F. Management power, private income and compensation manipulation. *Econ. Res.* **2010**, *45*, 73–87.
43. Luo, W.; Zhang, Y.; Zhu, N. Bank ownership and executive perquisites: New evidence from an emerging market. *J. Corp. Financ.* **2011**, *17*, 352–370. [[CrossRef](#)]
44. Zhou, M.; Lin, B.; Li, W. Family control, family involvement and internal control. *Contemp. Financ. Econ.* **2017**, *9*, 81–91.
45. Chen, S.; Liu, X. Economic policy uncertainty and corporate business credit. *J. Financ.* **2018**, *455*, 172–190.
46. Li, F.; Yang, M. Will economic policy uncertainty hold back business investment? An empirical study based on China's economic policy uncertainty index. *Financ. Res.* **2015**, *4*, 115–129.
47. Niu, J.; Wu, C.; Li, S. The role of institutional investors in voluntary disclosure. *Manag. Rev.* **2013**, *3*, 48–59.

48. Yang, X.; Yin, X. Industry concentration, firm competitive position and competitive effect of cash holdings. *Econ. Sci.* **2015**, *6*, 78–91.
49. Jiang, F.; Yi, Z.; Su, F.; Huang, L. Background characteristics of managers and overinvestment behavior of firms. *Manag. World* **2009**, *1*, 130–139.

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