IMPACT OF CORPORATE SUSTAINABILITY ON MARKET PERFORMANCE:
MEDIATING ROLE OF REVENUES AND MODERATING ROLE OF PROFITABILITY

DOCTORAL THESIS

Muhammed Aslam CHELERY KOMATH

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ÖZET

KURUMSAL SÜRDÜRÜLEBİLİRLİĞİN PİYASA PERFORMASINA ETKİSİ: GELİRLERİN ARACI ROLÜ VE KARLILIĞIN DÜZENLEYİCİ ROLÜ

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Anadolu Üniversitesi, Lisansüstü Eğitim Enstitüsü, Kasım 2023
Danışman: Doç. Dr. Özlem SAYILIR

Bu çalışmada, kurumsal sürdürülebilirlik performansı ile firmaların piyasa değeri arasındaki ilişkinin altında yatan mekanizmalar incelenmiştir. Kurumsal sürdürülebilirlik performansının ölçütü olarak Refinitiv ESG Veritabanı'ndan alınan ESG skorları kullanılmıştır. Hem genel ESG skoru ile ölçülen kurumsal sürdürülebilirlik performansı skorları, hem de ESG alt boyutlarının skorları, yani çevresel performans, sosyal performans ve yönetişim performansı skorları dikkate alınmıştır, Firmaların piyasa performansının ölçütü olarak şirketlerin piyasa değeri kullanılmıştır. Örneklemimiz, 5 bölgedeki 74 ülkeden 5450 şirketin 2018-2022 dönemindeki yıllık verilerinden oluşmaktadır. Kurumsal sürdürülebilirlik performansı ile firmaların piyasa değeri arasındaki ilişkiyi incelemek için, Hayes Süreç Modellemesi kullanılmış ve düzenleyici aracılık modelleri kurulmuştur. Genel ESG skorlarına ilişkin sonuçlar, sürdürülebilirlik performansı ile firmaların piyasa değeri arasında anlamlı pozitif bir ilişki olduğunu ortaya koymaktadır. Ayrıca, firmaların gelirinin, ESG performansı ve firmaların piyasa değeri arasındaki ilişkiye aracılık ettiği bulunmuştur. Dolayısıyla, bir firmanın ESG performansına olan bağlılığının, gelirlerini olumlu etkilediği ve gelirlerin de firmaların piyasa değerini önemli ölçüde etkilediği çıkarımı yapılabilir. Yanısıra, ESG performansının firmaların piyasa değeri üzerindeki doğrudan etkisinin ve firmaların geliri aracılığıyla ESG performansının firmaların piyasa değeri üzerindeki dolaylı etkisinin ROA tarafından düzenlendiği bulunmuştur. Ayrıca, ESG'nin alt boyutlarının firmaların piyasa değeri üzerindeki etkisi aynı modelleme yöntemiyle analiz edilerek benzer sonuçlar bulunmuştur.

Anahtar Kelimeler: Kurumsal sürdürülebilirlik performansı, ESG, Çevresel performans, Sosyal performans, Yönetişim performansı, Firma değeri, Düzenleyici aracılık.

ABSTRACT

IMPACT OF CORPORATE SUSTAINABILITY ON MARKET PERFORMANCE: MEDIATING ROLE OF REVENUES AND MODERATING ROLE OF PROFITABILITY

Muhammed Aslam CHELERY KOMATH

Business Administration/ Finance Department, November 2023

Supervised by Assoc. Prof. Dr. Özlem SAYILIR

This study examined the underlying mechanisms of the relationship between corporate sustainability performance and the market value of firms. We utilized ESG scores obtained from the Refinitiv ESG Database as a proxy for corporate sustainability performance. We considered both the corporate sustainability performance, measured by overall ESG score, and the individual ESG dimension performance measured by ESG pillar scores, i.e., environmental performance, social performance, and governance performance scores. We utilized the market value of companies as a proxy of market performance. Our sample includes 5450 companies from 74 countries in 5 regions for 10 sectors with annual data in 2018 - 2022. We used Hayes Process Modeling to explore the relationship between corporate sustainability performance and the market value of firms. We constructed moderated mediation models. Regarding the overall ESG scores, the results reveal a significant positive relationship with sustainability performance and the market value of firms. We also found that firms' revenue mediates the relationship between ESG performance and the market value of firms. Hence, it can be inferred that a firm's commitment to ESG performance positively influences its revenues, which significantly affects its market value. In addition, we found that the direct effect of ESG performance on the market value of firms and the indirect effect of ESG performance on the market value of firms through firms' revenue is moderated by ROA. Furthermore, we analyzed the impact of individual pillars within ESG on the market value of firms using the same modeling method and found similar results.

Keywords: Corporate sustainability performance, ESG, Environmental performance, Social performance, Governance performance, Market value, Moderated mediation.

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STATEMENT OF COMPLIANCE WITH

ETHICAL PRINCIPLES AMD RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with "scientific plagiarism detection program" used by Anadolu University, and that "it does not have any plagiarism" whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

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1. INTRODUCTION

Will companies with higher sustainable performance outperform those with lower sustainable performance? This is a long-standing question; no proper answer has yet been reached. Investing in sustainable activities is getting normalized in modern management, and new generations tend to be more motivated to make sustainable investments for future generations. Concerns about environmental and social issues have brought attention to corporate sustainability, which led to a visible shift from traditional financial expectations to corporate sustainability performance (CSP) (Laskar et al., 2017). According to Ates (2020), companies are compelled to satisfy not only financial but also non-financial requirements, which are crucial for retaining customer interest and market share. Similarly, companies are getting increased pressure from internal and external stakeholders for sustainability compliance and implementing relevant sustainability strategies to avoid public disfavor as well as to satisfy the expectations of the stakeholders (Davis, 1973; Wilkinson et al., 2001). Companies tend to gain long-term financial benefits by implementing sustainable corporate strategies and engaging in sustainable activities (Goyal et al., 2013). It is evident that investors' expectations have changed dramatically and hence companies have been putting efforts to become "better citizens." Therefore, practical assessment of the impact of sustainable strategies on the financial performance of companies is vital.

Friedman (1970) argued that business entities are artificial persons and do not have the responsibilities of a natural person. He also claimed that business responsibilities should be limited to economic gains for shareholders, and anything apart from that would deviate from the goal of profit maximization. However, (Altman & Vidaver-Cohen, 2000; Maignan & Ferrell, 2000; Matten & Crane, 2005) opposes this opinion by suggesting that business entities are corporate citizens, and they are responsible for having a code of social ethics and they have other societal responsibilities. Likewise, Laskar et al. (2017) supports this idea by indicating that short-term and long-term economic, social, and environmental performance has become essential for retaining a healthy relationship between the company and the stakeholders of the company. There is a growing concern in social and environmental areas, and stakeholders are more interested in knowing sustainability performance of companies as they believe it may add value to the company in the long run (O'Dwyer & Owen, 2005). Hence, sustainable business strategies will

convey a better environmental and ecological balance as well as socially responsible business practices and human capital development.

World Commission for Environment and Development WCED (1987) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development combines economic prosperity, environmental protection, and social equity, and incorporating these with the firm is known as corporate sustainability (CS) (Figge & Hahn, 2004). Similarly, Bansal (2005) proposes that the concept of sustainability relies on the principles of equity (society), prosperity (economy), and integrity (environment). At the same time, Labuschagne and Labuschagne et al. (2005) define corporate sustainability as "adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future." Likewise, Caron and Caron and Turcotte (2009) defined corporate sustainability performance (CSP) as a tool to measure the economic, environmental, and governance activities within a firm's operations and their ultimate impact on the company and society. The corporate sustainability goal discusses social solidarity, preserving natural resources, and equal economic development (Laskar, 2018).

Brundtland Report of (WCED) in 1987 and Warhurst (2000) stimulated a ground-breaking strategic change in companies by suggesting the concept of "triple bottom line" (TBL). The triple bottom line implies that every organization should give equal importance to the society, the environment, and the economy (Elkington, 1994). Triple Bottom Line (TBL) encompasses economic prosperity, social well-being, and environmental quality as dimensions of corporate sustainability performance (Aras et al., 2018). Isolated strategies towards the society and the environment are no longer sufficient, instead, comprehensive sustainability strategies are expected from the organizations. There is a positive relationship between sustainability reporting and firm performance (Laskar, 2018). Cost reduction through efficient use of resources, building healthy relationships between the company and the stakeholders, enhanced productivity, and attracting more capital through ethical investments can be counted as the benefits of aligning sustainability activities with corporate strategy (Laskar, 2018).

Firms have initiated reporting their sustainability performances after aligning sustainability strategies into their business. These include the natural resources they

consume, the environmental impact of their operations, and corporate governance mechanisms and labor rights. Considering that context, reports on corporate sustainability have increased intensively to measure, disclose, and account for the firm's economic, environmental, and social acts. A study by (Laskar et al., 2017) elaborated on the dimensions of corporate sustainability, such as emissions and waste management for environmental issues, workforce diversity and community involvement for social performance, and governance measures incorporating stakeholder engagement and shared voting rights.

Although various studies have been conducted on corporate social responsibility (CSR), studies on corporate sustainability performance are still emerging. Even though many authors have distinguished between CSR and Corporate Sustainability Performance (CSP), these concepts deal with similar issues, such as the company's impact on society and the company's responsibilities towards society (Lourenço et al., 2012). Over the past decade, various studies have investigated the significance of implementing the idea of sustainability into corporate strategy. However, still, there has yet to be a unified agreement in the industry (Maletic, Maletic et al. 2015). Therefore, the relationship between sustainability performance and the financial performance of companies has emerged as a relevant research topic in academia.

It is evident that the company's performance will improve once the stakeholders understand the benefits of sustainable investment and how a sustainable firm can capitalize on its sustainable performance in the long run. So, it is essential to identify the value behind sustainability investments (Ates, 2020). At the same time, companies should communicate their sustainable activities effectively to their stakeholders through sustainability reporting as corporate sustainability reports help the stakeholders to understand and track the firm's performance because of sustainability investments (Caron & Turcotte, 2009). In addition, many international standardized guidelines have been developed for facilitating corporate sustainability performance (CSP) reporting, such as United Nations Global Compact, United Nations Principles for Responsible Investment, and the Global Reporting Initiatives (GRI). These frameworks help the stakeholders to monitor the sustainability investment by each firm and evaluate the impact of such investment on the financial performance (Gilbert et al., 2011). According to McKinsey & Company, sustainability lowers costs and can increase operating profits by up to 60% (Tim Koller, 2020). Moreover, being sustainable also boosts output since, according to a

Deloitte (2021) study, inclusive cultures are associated with 27% higher profitability and 22% increased company productivity.

As companies strive to take greater responsibility to comply with stakeholders' expectations to act more sustainably, the number of corporations reporting has increased over the past years. However, universally accepted corporate sustainability standards and indicators are not easily available for stakeholders. Hence, there is a lack of guidance over their assessment process and a gap between what the corporations report and how stakeholders' access, digest, and find relevant information from the sustainability reports. The content of sustainability reports varies widely and includes different sustainability dimensions and information; thus, making comparisons among organizations is challenging. For example, some reports focus on environmental aspects, while others focus on social factors. At the company level, it is required to assess and evaluate the operations regarding internal and external impacts. Optimal decisions can only be made when the economic, social, and environmental consequences are considered.

Various sustainability indicators have been used in the previous studies to evaluate the corporate sustainability performance whether nationally, internationally, locally or company focused(Waddock & Graves, 1997). Appendix 1 demonstrates the list of corporate sustainability indicators used in the literature. However, in this study we used Refinitiv ESG Database formerly known as Thomson Reuters. Refinitiv ESG score has been widely used in many recent papers (AYDOĞMUŞ et al., 2022; Bătae et al., 2021; Bodhanwala & Bodhanwala, 2018; D'Amato et al., 2022; Demers et al., 2021; Sassen et al., 2016). Refinitiv provides an extensive ESG Database, which encompasses over 85% of the worldwide market capitalization, detailing more than 630 distinct ESG measures, with records tracing back to 2002 (Refinitiv, 2022). Refinitiv ESG Database is based on the data from public sources such as business websites, NGO websites, Stock exchange filings, CSR reports, news sources and other company reports. Refinitiv also obtains some of the data directly from the companies. The data will be audited and standardized for preparing the final ESG score (Refinitiv, 2022).

Regarding the industries, many papers have analyzed corporate sustainability performance in different industries. Appendix 2 illustrates the list of literature covered by various industry groups over the corporate sustainability studies. In this study we obtained corporate sustainability performance from 10 economic sectors such as: Basic Materials, Consumer Cyclicals, Consumer Non-Cyclicals, Energy, Healthcare,

Industrials, Technology, Utilities, Real-estate, and Financials. These 10 economic sectors include 49 industry groups. These economic sectors are obtained through The Refinitiv Business Classification (TRBC). The TRBC is a market-driven industry classification system owned by Refinitiv Database. Unlike traditional systems, it categorizes organizations based on the markets they serve, not their products or services, allowing investors to group companies with similar market characteristics. For example, airline catering services are classified as airport services because their performance depends on the airline market. (Refinitiv, 2022).

Most studies on corporate sustainability performance and financial performance have been limited to developed nations, especially U.S. markets (Artiach et al., 2010; Jennifer Ho & Taylor, 2007; Lourenço et al., 2012). However, the current study covers 74 countries. Previous studies on corporate sustainability performance have often been restricted to specific regions, potentially bias results and limiting broader applicability. Appendix 3 demonstrates the corporate sustainability analysis on specific regions. Our study covers five diverse regions: the Americas, Europe, Asia, Africa, and Oceania. By broadening the geographical scope, we capture varied corporate practices across different economic and cultural landscapes. This global approach enhances the generality of our findings. Our multi-regional analysis offers a more comprehensive perspective on the corporate sustainability and financial performance relationship than traditional, region-centric studies.

Drawing from these insights, this study attempts to model how corporate sustainability performance impacts the financial performance of firms. Our motivation mainly stems from the research gap identified and the challenge to reveal the underlying mechanisms of the relationship between corporate sustainability performance and financial performance. More specifically, the current study applies conditional process analysis to examine the direct and indirect effects of revenues and return on assets (ROA) on the impact of sustainability performance measures on the market value of firms. For this purpose, we utilized ESG scores from the Refinitiv database as a proxy for sustainability performance and the market value of companies as a proxy of financial performance. To the best of our knowledge, this study is one of the first comprehensive studies to utilize Refinitiv's overall ESG scores and the three dimensions of ESG scores as indicators of corporate sustainability performance for 10 different sectors. Our sample includes 5450 companies from 74 countries in 5 regions. The dataset consists of annual

data between 2018 - 2022. Various studies have attempted to investigate the impact of overall ESG scores on the firm's financial performance. However, in this study we will be looking at the impact of overall ESG scores as well as the individual pillars of ESG scores such as environmental, social and governance performance on the financial performance of the firms. This detailed analysis provided a comprehensive perspective, highlighting which sustainability dimensions most contribute to firms' financial objectives.

2. THEORETICAL BACKGROUND

2.1. Corporate Sustainability

Corporate sustainability is a strategic approach that emphasizes the long-term viability of a business. Corporate sustainability involves incorporating social, environmental, and economic activities into the company's core operations. This paradigm shift is rooted in the concept of the triple bottom line (TBL) that seeks a balance between profits, social responsibilities, and environmental duties (O'DWYER, 2009). The shifting landscape of modern commerce has been characterized by a more careful consumer base and increasingly stricter regulations. As a result, companies must recognize their environmental impact and social obligations within their communities. Thus, today incorporating sustainability practices is more of a necessity than a choice in the contemporary business environment.

Sustainability should not be viewed merely as a defensive strategy. Research indicates that it can also be considered as an innovation and growth strategy (Nidumolu et al., 2013). Companies that infuse sustainability into their strategies are more likely to identify untapped opportunities, leading to reinvigoration of competitive advantage. This competitive advantage stems from various areas, such as creating eco-friendlier products, developing more efficient supply chains, and investing in renewable energy (Nidumolu et al., 2013). These sustainable practices not only work towards reducing a company's carbon footprint, but also operational costs in the long run, which are some of the potential benefits of adopting sustainable business models.

Another critical facet of corporate sustainability lies in its role in risk management. Businesses that employ sustainable practices are better positioned to anticipate and adapt to regulatory changes and shifts in stakeholder expectations. This

proactive approach to managing potential risks gives these businesses a significant edge over their competitors. Similarly, companies that have implemented sustainable practices are noted to have better reputations, increasing their resilience during periods of crisis Eccles et al. (2014) highlights the role of sustainability as a core component of contemporary business strategy, going beyond its traditional perception as an optional add-on.

A higher commitment to sustainable practices increases innovation, financial and market performance (Maletic et al., 2015). Sustainability investments could generate competitive advantage for companies in emerging economies where sustainability performance is typically relatively low (Xiao et al., 2018). There is a considerable positive correlation between sustainability and company performance indicators (return on invested capital, equity, assets, and earnings per share) (Bodhanwala & Bodhanwala, 2018). Hence, companies implementing exceptional sustainable development strategies report greater profitability and significantly lower gearing ratios.

Most importantly, the question of whether sustainable practices affect an organization's financial health has been the subject of several studies. Therefore, a thorough investigation of the relationship between corporate sustainability and financial performance is necessary to determine how sustainable business models provide a competitive edge. For example, Fang et al. (2017) argues that there is a significant positive association between corporate sustainability, sales growth rate, and market value. Through market valuation, investors are more likely to reward companies with excellent sustainable strategies and penalize highly profitable companies with low CSP levels (Lourenço et al., 2012). Hence, sustainability usually boosts a company's market value. A meta-analysis of 52 papers and 33,878 observations demonstrates a clear correlation between corporate social/environmental performance and CFP across industries (Orlitzky, 2013). Similarly, Ates (2020) demonstrated a negative correlation between poor corporate sustainability and superior market value. The findings of this study show the significance of firms' listing in a sustainability index in emerging markets (Ates, 2020).

2.2. Circular Economy

By 2050, the world will consume as if there were three earths, even though there is only one. Moreover, in the next forty years, the global use of commodities such as

biomass, fossil fuels, metals, and minerals are forecast to quadruple, while annual waste creation is projected to increase by 70 percent by 2050 (Commission, 2020). Therefore, environmental and sustainability challenges have increasingly garnered global focus. The United Nations has notably pledged to 17 sustainable development goals (SDGs), which serve as a collective roadmap to ensure well-being and harmony for both individuals and the Earth, both now and for future generations (Nations, 2023).

Moreover, the concept of Circular Economy (CE), has recently gained more importance on policymakers' agendas to address these sustainability issues. The circular economy concept derives from the closed-loop circulation of goods, materials, and manufacturing equipment (Heyes et al., 2018). Boulding (1966) proposed the concept in his book “The Economics of the Coming Spaceship Earth.” Boulding argued that circular processes within the global economy are necessary to sustain human life on Earth over the long term. The Ellen MacArthur Foundation (2016) offers one of the most widely accepted definitions of the CE currently available: "A circular economy is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles." (Foundation, 2016).

The circular economy is an environmentally beneficial idea. The challenge is to identify what economic effect this philosophy provides and how to quantify it. To answer this question Ungerman and Dědková (2020) put together a circular economy model to determine the financial result of enterprises' involvement in the circular economy. The results reveal a positive long-term impact on the economy. In the short term, the primary challenge is the initial investment in technology and techniques for processing waste. However, the results of this study conclusively demonstrate that the circular economy has significant effects on the environment, the economic prosperity of businesses, and the overall economy. To support this, Geissdoerfer et al. (2018) argue that Businesses that adopt circular economy models can save money. This is mainly because the price of primary raw materials is high, and their prices tend to fluctuate wildly.

Moreover, the circular economy helps the entire community because fewer primary resources are extracted, reducing environmental damage. Hence, the Circular Economy has been hailed as a progressive approach to doing business that will ensure the long-term viability of our economy and the well-being of future generations. Furthermore, it is believed that educated innovators and intermediates and explicit

decision-making tools are required to assist the Circular Economy's implementation (Golinska et al., 2015).

A traditional linear supply chain is one that follows a straight line from raw materials to manufacturing to disposal. This is obviously not very cost-effective. The consumer will inevitably trash the products at some point. Therefore, when a new product is introduced, the old one is thrown in a landfill. Figure 2. 1 displays the stages of linear system.

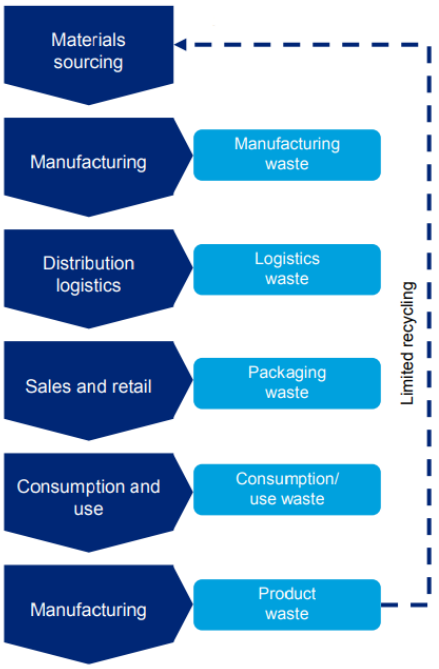

Figure 2. 1. *Linear Value Chain*

On the contrary, the circular system or the closed loop value chain would involve the constant cycle of raw materials, products, and materials, which would be reused in production rather than ending up in a landfill (Kalmykova et al., 2018). Figure 2. 2. Closed Loop Value Chain.

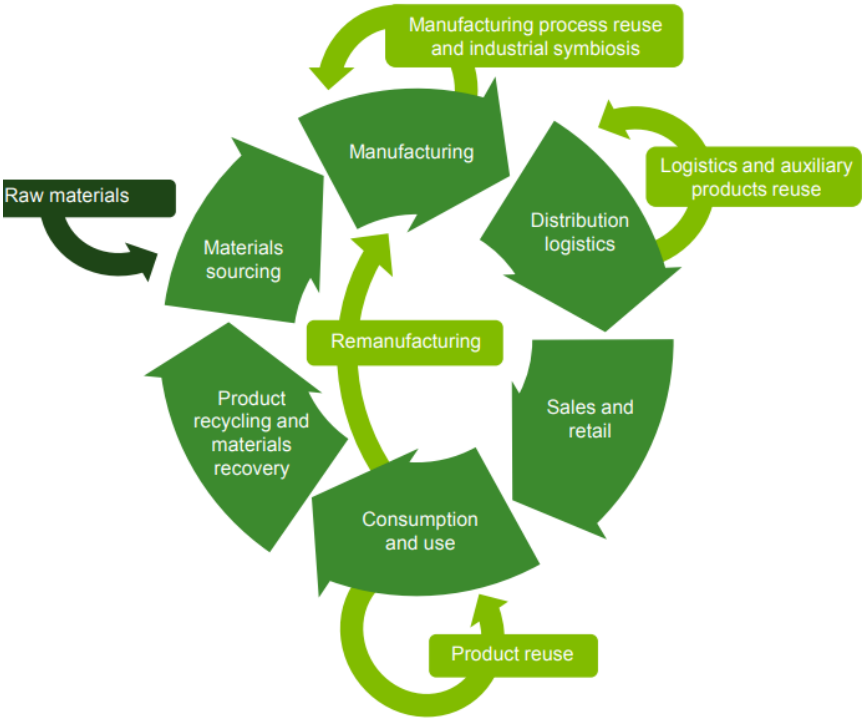

Figure 2. 2. *Closed Loop Value Chain*[1]

In a Circular Economy, businesses are inventing methods to continuously re-acquire and reintroduce them to the market instead of discarding commodities after a single product cycle. Three Rs within a Circular Economy are defined as reduction, reuse, recycle and they go beyond the treatment of waste. The first R, "reduction," represents the goal of eco-efficiency in production and consumption (DeSimone & Popoff, 2000). Eco-efficiency is both a business framework and a goal, aiming to "generate profit while reducing environmental effect" (Huppes & Ishikawa, 2005). Therefore, two motivations are essential for the CE: economic and environmental enhancements. The goal of ecoefficiency makes no explicit mention of the social dimension. However, resource-efficient production conserves resources for future generations or other uses. Thus, resource efficiency indirectly improves social welfare (Ness, 2008). The second R, "reuse," suggests a more efficient design of products and business models for a "disassembly and reuse" cycle (Ghisellini et al., 2016). The third R, "recycle," refers to "any recovery procedure in which waste materials are reprocessed into products, materials, or substances, whether for their original or other intended purposes." It covers

[1]https://www2.deloitte.com/content/dam/Deloitte/fi/Documents/risk/Circular%20economy%20FINAL%20web.pdf

the reprocessing of organic material but excludes energy recovery and the reprocessing of materials into fuels and backfilling processes (Union, 2008).

Several obstacles must be overcome to achieve successful adoption of Circular Economy, such as administrative burdens to switch to a circular economy business model, poor support from the supply chain, a lack of technical and technological knowledge, flaws in the company's environmental culture, a lack of information, and inadequate government and legislative support (Rizos et al., 2016). However, the interest of the government, business, society, and academics in the circular economy is growing. The emphasis is primarily on the optimal utilization and recycling of resources. Minimizing resource consumption, energy use, emissions, and waste spillage can mitigate environmental repercussions without hindering growth and prosperity. This approach promotes a harmonious relationship between economic advancement, environmental protection, and societal well-being (Manninen et al., 2018).

2.3. Contemporary Corporate Sustainability Concepts

Sustainable investing, which integrates environmental, social, and governance (ESG) factors into investment decisions, seeks to create long-term competitive financial returns and positive societal impacts. Renneboog et al. (2008) confirm this by demonstrating the viability of sustainable investing in generating comparable or sometimes superior returns to traditional investment strategies. There are growing expectations that sustainable investing (SI), which takes environmental, social, and governance (ESG) information into account - will contribute to the achievement of societal goals (Kölbel et al., 2020). Similarly, responsible investing actively incorporates ESG factors into the investment decision-making process. Responsible investing helps investors to manage risks and generate sustainable, long-term returns. In fact, responsible investing also contributes positively to society while enhancing the financial performance of portfolios (Revelli & Viviani, 2015).

Sustainable finance has emerged as an essential concept at the intersection of finance and the SDGs (Sustainable Development Goals). More than $400 billion of new funds were raised on capital markets in 2020, which includes $357.5 billion from sustainability bonds and $76.5 billion from green bonds (Refinitiv, 2020). Sustainable finance is a set of financial regulations, standards, norms, and products that pursue ESG aspects during capital investment decisions and corporate financing decisions. This

approach promotes long-term investments in sustainable economic activities and projects, ultimately contributing to a more sustainable future (Commission, 2020). There are multiple reasons behind the shift towards sustainable finance, including supporting environmental sustainability (Schoenmaker, 2018), generating long-lasting wealth for current and future generations (Fatemi & Fooladi, 2013), moving towards sustainable banking (Jeucken, 2010), mitigating climate change (Ryszawska, 2016), and responding to continued policy support for sustainability and sustainable development (Kuhn, 2022). In policy and industry circles, sustainable finance should be viewed as "finance for sustainability" (Migliorelli, 2021), since sustainable finance has a significant role in achieving specific sustainable development goals (Ziolo et al., 2021).

Green investing, which is another branch of sustainable finance, focuses on investment activities that support and fund projects and companies that postpone impeachment (Friede et al., 2015). Examples include investments in renewable energy, energy-efficient technologies, and green buildings. The main aim of green investing is to reduce carbon emissions and foster a transition towards a low-carbon economy. Despite some challenges in quantifying the environmental impact, green investing has shown promising results in offering competitive returns while contributing to environmental sustainability (Friede et al., 2015). Investing in sectors like renewable energy, energy-efficient technologies, and green buildings can contribute to environmental sustainability while providing competitive returns (Clark et al., 2015).

On the other hand, impact investing aims to generate a measurable social or environmental impact alongside a financial return (Brest & Born, 2013). Impact investing stands out from other sustainable investing approaches by emphasizing measuring and reporting investments' positive social and environmental outcomes, not just financial returns. Impact investments create social and environmental benefits, emphasizing the importance of measuring and reporting these positive outcomes in addition to financial returns (Geczy et al., 2021). In short, sustainable, responsible, green, and impact investing investment approaches share the common goal of incorporating ESG factors into investment decisions. However, their focus, methods, and degree of engagement differ in managing ESG risks and capitalizing on ESG opportunities. Understanding these nuances is essential for investors seeking to align their financial strategies with sustainability goals and commitments.

2.4. Environmental, Social and Governance (ESG) Performance

2.4.1. Historical Origins

Early initiatives to encourage socially responsible investing targeted offending products like guns, tobacco, pornography, or bad practices like environmental degradation and human rights abuses. Investors would simply avoid buying such company stocks. Many of these investors took their cue from religious orders like the Quakers, the Methodists, or Muslims, many of whom had longstanding prohibitions on investments in businesses associated with slavery, weapons, or alcohol. An early example in the genre was the Pioneer group, a mutual fund founded in 1928 that excluded companies involved in tobacco, alcohol, and gambling. In the wake of the 1970s campaigns against the South African apartheid and against the Vietnam War, financial institutions began to offer portfolios that emitted companies in the traditional sense sectors and companies operating in South Africa contracting with US Defense Department. Examples included the Pax World Fund, launched in 1971, the first spectrum fund launched in the same year, and the Dreyfus third century Fund, which was launched in 1972. Investors in these funds were motivated more by ethical principles than the prospect of the risk-adjusted return, since researchers found that such exclusionary strategies pursued returns either mirroring the market or slightly underperforming the market. There may be some financial benefits in the form of lower risk, particularly during crises, although such outcomes are not the intention of the portfolios constructed.

2.4.2. ESG

In the investment sector, the global value of sustainable assets reached $37.8 trillion by the close of 2021, with projections indicating a rise to over $53 trillion by 2025.(Intelligence, 2021). Also, the corporate sector's interest in ESG/CSR is evident in the significant rise in sustainability or corporate responsibility reports by S&P 500 firms. Although less than 20% of S&P 500 firms released such reports in 2011, 86% did so in 2018 (Governance & Accountability Institute, 2019). Investors also show a growing interest in ESG. In 2019, mutual funds adhering to ESG criteria witnessed net inflows of $20 billion, marking a fourfold increase from the 2018 figures (Jon Hale, 2020). In addition, over 3000 institutional investors and service providers have signed onto the PRI (Principles for Responsible Investment), agreeing to incorporate ESG issues into their

investment analysis and decision-making processes. These investors have seen their assets under management grow from $6.5 trillion in 2006 to over $86 trillion in 2019 (Gillan et al., 2021).

In recent years, research on environmental, social, and governance (ESG) has gained widespread attention in the academic community. Notably, there has been significant interest in examining the impact of ESG performance on corporate value. Specifically, scholars have focused on the influence of environmental performance (Aouadi & Marsat, 2018; Cojoianu et al., 2021; Wellalage et al., 2022), social responsibility performance (Al-Shammari et al., 2022; Khan et al., 2023; Pfajfar et al., 2022; Tsai & Wu, 2022), and corporate governance performance (Almashhadani & Almashhadani, 2022; Kurniati, 2019; Purbawangsa et al., 2020) on corporate value, to understand the relationship between these three levels of sustainability performance and the financial performance of firms.

Given that a firm's primary objective is to generate higher returns, an important area of inquiry has been understanding how environmental, social, and governance (ESG) factors are reflected in a firm's financial performance (FP) and value. This question has been the focus of numerous empirical studies for a long, which draw upon various theoretical frameworks to provide insights into different aspects of ESG and help researchers understand the impact of ESG on a firm's operations. By examining these frameworks and conducting empirical investigations, scholars can understand how ESG factors influence firm performance and how firms can integrate ESG considerations into their overall business strategy to enhance their financial performance and value.

Stakeholder theory is a one of the popular theoretical approaches that focuses on the relationship between a firm and all the entities involved in its business domain. This theory emphasizes the importance of considering stakeholder interests when making business decisions, as it directly links a corporation's sustainability initiatives to the degree to which it prioritizes shareholder benefits (Campbell, 2007; Donaldson & Preston, 1995; Driver & Thompson, 2002). Stakeholder theory emerged in response to the growing need to integrate sustainability initiatives with a firm's stakeholder interaction (Diez-Cañamero et al., 2020). One key metric developed to assess a firm's integration of sustainability issues is the environmental, social, and governance (ESG) score (Birindelli et al., 2018; Ferrero-Ferrero et al., 2016). By incorporating ESG standards into a firm's financing strategy, stakeholders become a crucial driver of

corporate social responsibility, and ESG becomes a key metric (Diez-Cañamero et al., 2020). Stakeholder theory also provides valuable insights into a firm's financial benefits (Driver & Thompson, 2002). For example, Gillan et al. (2021) argues that ESG initiatives can drive value in two ways. First, by enhancing a firm's reputation, ESG initiatives can help attract more customers, thereby increasing cash flow levels. Second, by maximizing shareholder utility, sustainable firms can generate higher shareholder value, as shareholders are more likely to invest in firms that prioritize ESG considerations.

The stakeholder theory provides a comprehensive framework for understanding the relationship between sustainability and firm performance. By integrating ESG standards into a firm's financing strategy, stakeholders can become key drivers of corporate social responsibility. At the same time, ESG metrics can provide valuable insights into a firm's financial performance and value. This underscores the importance of considering stakeholder interests and ESG factors when making business decisions, as these considerations can ultimately lead to greater financial returns and long-term value creation.

2.4.3. ESG Investing Trends and Fund Performance

In 2021, ESG-integrated funds received more than $500 billion, leading to a 55% increase in assets under management for ESG-integrated products. The trend of investing in ESG is anticipated to persist in 2022 and beyond, with further growth expected (Wu, 2022). Hence the future of ESG looks bright; there are various reasons why ESG investing is here to stay; for example, Bloomberg 2023 reports that by 2025, the value of ESG assets is expected to reach $50 trillion, which would account for over one-third of the estimated $140.5 trillion in total global assets under management. Based on Bloomberg's survey of nearly 800 business decision-makers, 71% of global business leaders think, "Eventually, no investment decisions will be made without considering ESG." (Bloomberg, 2023). Moreover, Bloomberg (2023) anticipates that although Environmental concerns seem to have a more significant influence on ESG investing, there will be a growing focus on the social factors that evaluate a company's impact on its customers, employees, local communities, and society.

According to many investors, by 2030, Social factors will become more significant than Environmental factors in contributing to shareholder value. In addition, over the last ten years, ESG-oriented funds have functioned with insufficient regulatory

direction. However, the situation is quickly evolving. Regulatory authorities are displaying increased interest in the classification of fund names and the disclosure responsibilities of funds globally. This trend is being led by the Sustainable Finance Disclosure Regulation (SFDR) of the European Union, which demands that ESG funds report more transparently. Other significant market regulators are emulating the SFDR's initiatives. As disclosure requirements continue to emerge, managers will face heightened accountability, which may lead to revising ESG fund names and labels. The year 2023 is prepared to witness such changes (LLC, 2022). Figure 2. 3 explains the Jurisdictions with Active & Proposed Regulations for ESG Funds.

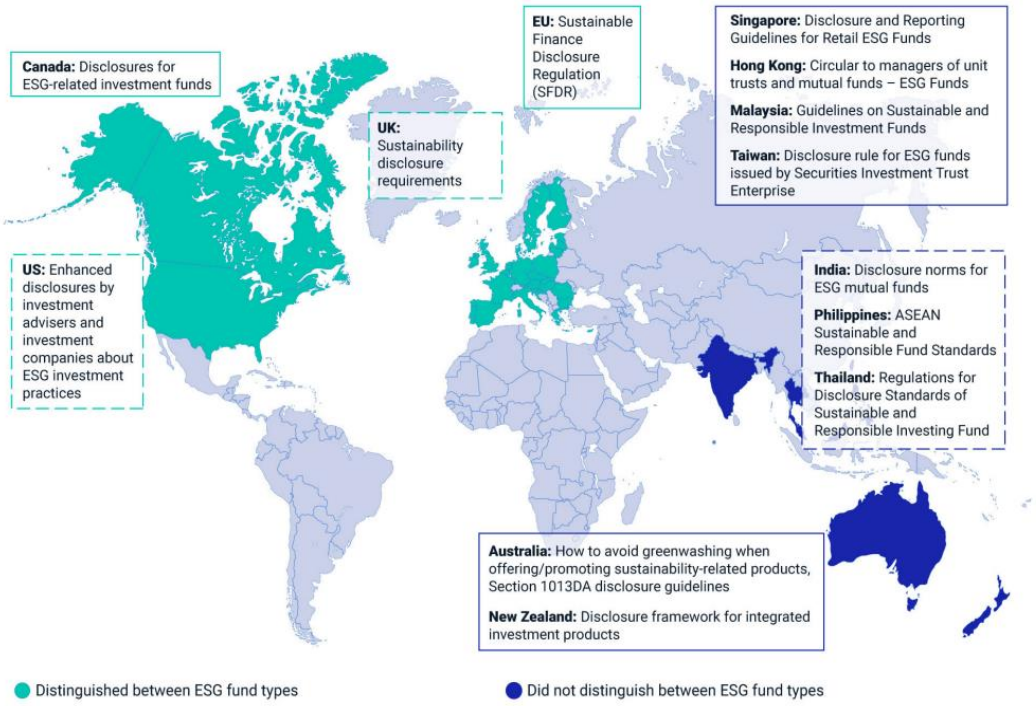

Figure 2. 3. *Jurisdictions with Active & Proposed Regulations for ESG Funds*[2]

Solid text boxes: Regulations in force

Dashed boxes: Proposed or planned regulations

[2]https://www.msci.com/documents/1296102/35124068/ESG+and+Climate+Trends+to+Watch+for+2023.pdf

U.S. (proposed); Canada; EU; U.K. (planned); Singapore; India (proposed); Hong Kong; Australia (including Section 1013DA); Malaysia; New Zealand; Philippines (proposed); Thailand (proposed); Taiwan.

A recent PwC survey (James Chalmers, 2021) revealed the following insights:

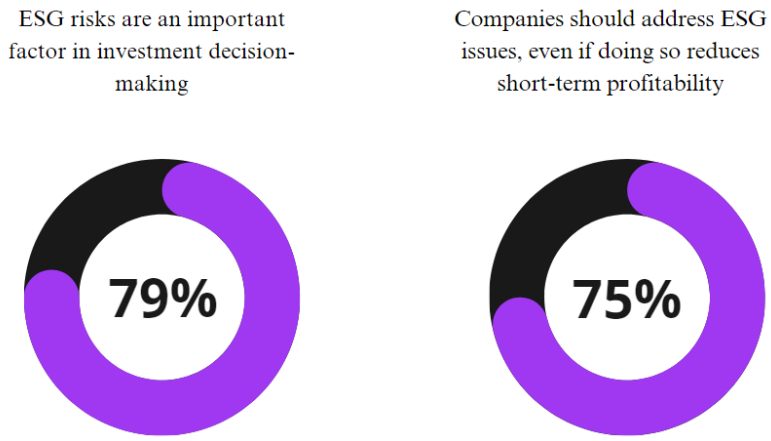

Figure 2. 4. *Attitudes Toward ESG Risks and Opportunities*

The data indicate that approximately 79% of investors, now view ESG risks as critical factors in investment decision-making. Furthermore, 75% of respondents believed that corporations should actively address ESG issues, even if it might temporarily delay their short-term profitability. These findings underscore an evolving investment landscape that increasingly integrates ESG considerations, reflecting the growing importance of sustainability and corporate responsibility in modern investment paradigms.

Since, ESG is becoming more integrated into investment decision making, with a significant majority of respondents wanting companies to embed ESG into corporate strategy. When PwC (2021) Global investor survey asked whether companies should embed ESG directly into their corporate strategy, a substantial majority of respondents, standing at 82%, opine that ESG should be directly integrated into companies' corporate strategy. Approximately 11% disagreed with this notion, while 7% remained neutral. These statistics set the consensus that ESG considerations should not be mere afterthoughts but central components of strategic corporate decision-making processes, thus reflecting an evolution towards more sustainable and responsible investment and corporate practices. The survey response depicted in Figure 2. 5.

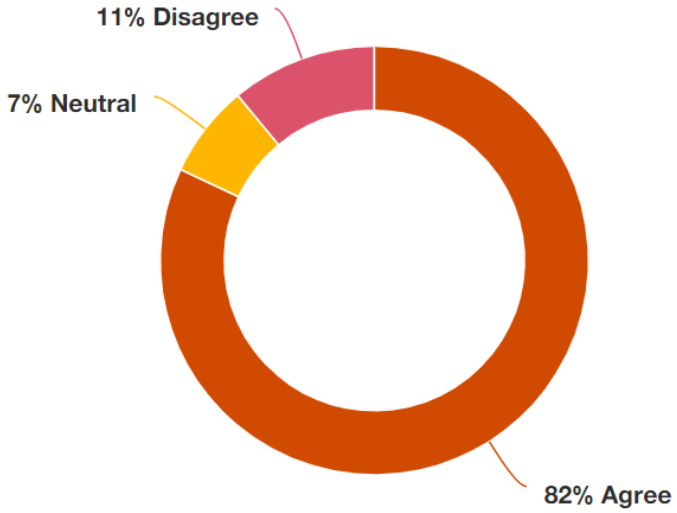

Figure 2. 5. *ESG on Corporate Strategy, Survey Response (%)*

2.4.4. ESG Initiatives

Both investors and corporations are creating coalitions and cross-sector partnership to continue advance their ESG's implementations and standardizations. Some examples of these initiatives are:

2.4.4.1 Initiatives by Investors

2.4.4.1.1 PRI (Principles for Responsible Investment)

The Principles for Responsible Investment (PRI) is a leading global network of asset managers, owners, and service providers committed to incorporating environmental, social, and governance (ESG) considerations into their investment decisions. Developed in partnership with the UNEP Finance Initiative and the UN Global Compact, PRI was officially launched in 2006 and is considered one of the most influential initiatives in the ESG investment sphere (PRI, 2021). PRI operates under the conviction that ESG factors can affect the performance of investment portfolios to varying degrees across companies, sectors, regions, and asset classes. By applying the six principles, signatories to the PRI can better align their investment activities with the broader societal objectives. The six principles are as follows:

- Integrate ESG factors into investment evaluations and decision-making stages.
- Take on a proactive role as owners by embedding ESG considerations in their strategies and actions.
- Advocate for transparent ESG disclosures from their investment targets.

- Champion the adoption and execution of these guidelines within the financial sector.
- Collaborate to improve the practical application of these guidelines.
- Periodically share updates and advancements in the adherence to these principles, as suggested by UN PRI in 2021.

In pursuit of these principles, the signatories to the PRI make a series of commitments, including enhancing their capabilities to manage risk and generate sustainable, long-term returns (Clark et al., 2015). By participating in the PRI, investors can engage with companies to improve their ESG performance, vote on shareholder resolutions that promote ESG issues, and even divest from companies that do not meet their ESG standards. The adoption of PRI has been accelerating, reflecting the growing acceptance of ESG principles in the investment community. As of 2021, the initiative boasts over 3,000 signatories, collectively managing over $100 trillion in assets (PRI, 2021).

PRI's impact has been significant. According to a 2020 report from the CFA Institute, signatories to the PRI have reported enhanced risk management and improved investment performance through their ESG activities. The PRI has also helped raise awareness of the materiality of ESG issues and facilitated their integration into mainstream investment practices (Institute, 2019). Furthermore, the initiative has played a pivotal role in fostering investor collaboration. Through its collaborative engagement platform, the PRI allows investors to join forces to engage with companies on various ESG issues. The platform also provides signatories with tools and resources to track and report their ESG activities, contributing to increased transparency in the industry (PRI, 2021).

However, despite these achievements, challenges remain. Some critics argue that PRI needs to do more to hold its signatories accountable for their commitments. There is also a need for more precise standards and metrics to accurately measure and report ESG performance. PRI has substantially contributed to advancing ESG investing worldwide. By fostering a global network of investors committed to integrating ESG considerations into their investment decisions, it has helped to mainstream ESG investing and promote sustainable business practices. As ESG investing evolves, initiatives like the PRI will be even more critical in guiding investors toward sustainable and responsible investment strategies.

2.4.4.1.2 Climate Action 100+

Climate Action 100+ is an investor initiative launched in 2017 to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. Backed by more than 575 investors with more than $54 trillion in assets under management, Climate Action 100+ is arguably one of the most potent investor-led initiatives on climate change today (100+, 2023). The main goal of Climate Action 100+ is to curtail global greenhouse gas emissions and improve governance on climate change by focusing on systemically important emitters and other companies across the global economy that have significant opportunities to drive the clean energy transition. It aims to accomplish these through three key objectives: to ensure companies implement a robust governance framework, to reduce emissions in alignment with the Paris Agreement, and to provide enhanced corporate disclosure (100+, 2023).

A crucial component of the Climate Action 100+ initiative is engaging with the management of targeted companies to encourage developing and implementing business strategies consistent with the transition towards a low-carbon economy. In effect, it utilizes the power of its investor base to leverage change (Climate Action 100+, 2023). The influence of Climate Action 100+ has been notable. According to a report from the initiative, they have made substantial progress, with over half of the targeted companies making net-zero commitments, aligning their goals with the 1.5-degree Celsius target set in the Paris Agreement (100+, 2022). However, the initiative also faces significant challenges. While many companies have committed, their implementation strategies often need more specificity and credibility. Also, the process of tracking and verifying the actions taken by companies to reduce emissions is complex and fraught with difficulties. Thus, there is a need for standardized, comprehensive, and transparent disclosure practices (100+, 2022).

Climate Action 100+ exemplifies investors' power in influencing corporate behavior to tackle climate change. Fostering engagement between investors and high-emitting companies has helped create momentum towards reducing greenhouse gas emissions and transitioning towards a low-carbon economy. The initiative's future will be instrumental in the global fight against climate change, requiring continued effort to increase transparency and hold companies accountable for their climate commitments.

2.4.4.1.3 We Mean Business Coalition

The We Mean Business Coalition is a multinational nonprofit group that works with the most powerful corporations in the world to address climate change. Established in 2014 and adhering to the Paris Agreement, the Coalition is a prime example of how private-sector businesses may support efforts to keep global warming below 2 degrees Celsius (Business, 2023). The We Mean Business Coalition promotes various initiatives to make companies more sustainable and contribute to a low-carbon economy. The Coalition helps companies commit to bold climate actions through its "Take Action" campaign, providing a platform for companies to join initiatives on renewable electricity, electric vehicles, energy productivity, and more (Business, 2023). The Coalition, working with companies worldwide, has had a significant impact.

We Mean Business Coalition Report (2022) demonstrated that through the coalition's activities, more than 1,500 corporations representing over $11.4 trillion in market capitalization had made more than 3,000 pledges to climate action (Business, 2021). The Coalition has been instrumental in driving corporate commitments to reduce emissions, encouraging the development of innovative low-carbon and climate-resilient solutions, and promoting greater transparency in the reporting of data on climate change. As a result, it has stimulated businesses to commit to establishing science-based targets, which are emissions reduction goals that align with the degree of decarbonization needed to keep global warming well below 2°C compared to pre-industrial temperatures (Targets, 2021).

Although there are challenges to overcome. Notably, while many companies have made commitments, the pace of progress toward these goals varies, and some have yet to implement their obligations fully. Additionally, the Coalition's success ultimately hinges on whether member companies can successfully transition to a low-carbon economy without compromising their profitability or competitiveness (Barkemeyer et al., 2014). The We Mean Business Coalition is a vital force driving corporate climate action. It showcases the business community's role in transitioning to a low-carbon economy and underscores the potential profitability of sustainable business models. As we grapple with the pressing issue of climate change, initiatives like the We Mean Business Coalition will be vital in mobilizing corporate action toward a more sustainable future.

2.4.4.2 Initiatives by Corporates

2.4.4.2.1 RE 100

RE100 is a global corporate leadership initiative that brings together influential businesses committed to achieving 100% renewable electricity. Launched at Climate Week NYC in 2014 by The Climate Group in partnership with CDP (formerly the Carbon Disclosure Project), as of 2023, the initiative comprises over 300 of the world's most significant and ambitious companies (100, 2023). Companies joining RE100 make a public commitment to source 100% of their global electricity consumption from renewable sources by a specific year. The target year varies from company to company, but many aim to achieve this by 2050 or earlier. The goal is to increase the demand for significant - and delivery of - renewable energy (100, 2023). In its commitment to creating a low-carbon economy, RE100 has achieved notable results. A report by RE100 found that the collective electricity demand of members is over 315 terawatt-hours per year - more than enough to power a country the size of Poland. If RE100 were a country, it would rank 23rd in the world for electricity consumption (100, 2022). The impact of RE100 extends beyond the direct benefits of increased renewable energy use. By making a public commitment to 100% renewable electricity, RE100 members demonstrate the business case for renewables and influence the energy market's dynamics by driving up demand. RE100 members are critical in stimulating the broader systemic change needed to realize the global transition to a renewable-powered economy (IRENA, 2018).

Despite its success, RE100 faces challenges. While many companies have made commitments, not all are on track to meet their goals, with some struggling with regulatory barriers and market structures in certain regions. Furthermore, some critics argue that without rigorous monitoring and verification, companies risk overstating their use of renewables. RE100 is a powerful initiative driving the transition to renewable energy in the corporate world. It demonstrates that a shift to 100% renewable electricity is environmentally responsible and makes good business sense. As the initiative continues to grow and evolve, its role in accelerating the global transition to renewable energy will be crucial.

2.4.4.2.2 United Nations Global Compact

The United Nations Global Compact is a voluntary initiative launched in 2000 that encourages businesses worldwide to adopt sustainable and socially responsible

policies and to report on their implementation. It is the largest corporate sustainability initiative in the world, with more than 12,000 corporate participants and other stakeholders from over 160 countries (Compact, 2023). The initiative is underpinned by ten principles in human rights, labour, environment, and anti-corruption. These principles aim to ensure businesses operate in ways that meet fundamental responsibilities. Companies participating in the UN Global Compact are expected to integrate these principles into their strategies, policies, and procedures and establish a culture of integrity (Compact, 2023). A notable contribution of the UN Global Compact has been its ability to mainstream critical environmental, social, and governance (ESG) issues into the core business operations of its participants. It has created a global platform that allows companies to share best practices, challenges, and learning experiences. As of 2023, over 80% of the participating companies report that they have human rights, labour, environment, and anti-corruption policies in line with the UN Global Compact's principles (Compact, 2021).

The UN Global Compact also fosters multi-stakeholder partnerships, bringing together corporations, governments, civil society, labour, and the United Nations to advance broad societal goals such as the UN Sustainable Development Goals (SDGs) (Rasche, 2010). Despite these successes, the UN Global Compact faces challenges. Critics have raised concerns about the need for enforcement mechanisms to ensure compliance with its principles, making it possible for companies to use their participation for public relations purposes without substantial changes in business practices (Voegtlin & Pless, 2014).

The United Nations Global Compact represents a significant effort to engage the business community in addressing critical sustainability challenges. Its principles promote a comprehensive approach to corporate sustainability that brings together different stakeholders to advance common objectives. As we achieve the Sustainable Development Goals, the UN Global Compact's role in fostering corporate sustainability will likely remain vital.

2.4.4.2.3 Sustainable Purchasing Leadership Council

The Sustainable Purchasing Leadership Council (SPLC) is a non-profit organization founded in 2013. It promotes sustainable procurement by providing guidelines, measurement tools, and resources to enable all organizations to embed

sustainability into their purchasing practices (Council, 2023). The SPLC aims to support and recognize purchasing leadership, accelerating the transition to a prosperous and sustainable future. The organization works by convening buyers, suppliers, and public interest advocates to develop programs that simplify and standardize sustainable purchasing efforts by large organizations. It does this through sharing best practices, developing metrics for evaluating sustainable purchasing, and providing education and training materials (Council, 2023).

The SPLC has significantly impacted how organizations purchase goods and services. By providing a robust framework for sustainable purchasing, the SPLC has helped many organizations better understand their purchasing decisions' environmental, social, and economic impacts. This framework has also facilitated a significant increase in purchasing environmentally preferable products and services (Zaag, 2022). The SPLC also hosts the annual SPLC Summit. In this event, leading procurement and sustainability professionals gather to share, simplify, and spread the best sustainable purchasing practices across the economy (SPLC, 2023).

However, the SPLC faces challenges. Implementation of sustainable procurement practices can be complex and requires commitment at all organizational levels. There can be resistance due to misconceptions about the costs or benefits of sustainable products and services. The SPLC works to dispel these misconceptions and provide clear, practical guidance to facilitate the adoption of sustainable purchasing practices. The Sustainable Purchasing Leadership Council promotes and facilitates sustainable procurement. By providing guidance, tools, and a platform for sharing best practices, the SPLC helps organizations to align their purchasing practices with their sustainability goals, driving a significant shift toward a more sustainable economy.

2.4.5. ESG Controversies

Plentiful dramatic business scandals shaking the corporate world have occurred throughout history. In recent decades, several critical corporate controversies, such as Enron, HealthSouth, Parmalat, Shell, Siemens AG, Tyco, and WorldCom, have attracted intense media attention, generating extensive consequences for various stakeholders (Alda, 2022). These consequences include diminished goodwill of the company, lowered market value, and escalated business risks, mainly because controversies lead to a weakened corporate reputation through adverse media reporting (Kim et al., 2014). Thus,

corporate controversies and their reflective effects have become a hot research topic for academicians.

Annual reports, company websites, NGO websites, CSR reports, and media news provide detailed information about corporate controversies. During controversies, firms are exposed to intense media limelight and catch investors' attention more (Cai et al., 2012; Carroll, 1979; Klein & Dawar, 2004). A firm's visibility is an essential factor determining the severity of controversies' impact on the firm. Firms operating in countries with a higher degree of press freedom, receiving more searches on the internet, getting more analyst following, and having a better corporate social reputation will be more vulnerable to controversies, as they tend to have higher visibility (Aouadi & Marsat, 2018). ESG controversies affect firms' reputations in public (Melinda & Wardhani, 2020). This is related to legitimacy theory, where legitimacy is essential for companies to ensure long-term welfare (Suchman, 1995). Hence, there is an expectation that the firms' ESG controversy is associated with a low firm value (Fombrun & Shanley, 1990; Weigelt & Camerer, 1988).

To understand the impacts of ESG controversies, various attempts have been made. There are a lavish number of studies found a negative relationship between ESG controversies and firms' financial performance (Brinette et al., 2023; Cui & Docherty, 2020; DasGupta, 2022; De Winne & Petkeviciute, 2022; Dogru et al., 2022; Mariia, 2022; Mendiratta et al., 2023). For instance, Nirino et al. (2021) examined the influence of corporate controversies on corporate financial performance with 365 European listed companies. The study found a negative and significant relationship between corporate controversies and financial performance. Similarly, DasGupta (2022) argues that high ESG controversies can significantly negatively affect managerial decisions, which might exacerbate financial performance shortfalls, undermine the company's legitimacy, and reduce its chances of survival.

ESG controversies negatively influence market value of firms especially, in developed markets with high press freedom. For instance, investors tend to react strongly to negative ESG news related to the community and workforce (Mariia, 2022). Besides, Dogru et al. (2022) investigated the effect of ESG risks on the value of firms during COVID-19. The study found that news related to ESG controversies has negatively affected firm value and the effect doubled or tripled throughout the post-COVID-19 period. Although, such controversies may be overlooked during normal times,

shareholders emphasize ESG controversies more in major external shocks like COVID-19.

Similarly, government effectiveness moderates the relationship between ESG controversies and firm performance. As government effectiveness increases, ESG controversies negatively influence performance (Mendiratta et al., 2023). ESG controversies hurt both financial markets and individual investors, as investors usually reduce their investment in companies that face ESG controversies. They also decrease their investment in other companies in the same industry to protect themselves from similar problems (De Winne & Petkeviciute, 2022). Firms involved in controversial activities may encounter legitimacy threats, leading to lower firm value. Eventually, firms may need to participate in ESG activities to rebuild firms' reputations and legitimize their activities (Brinette et al., 2023).

The study of Klassen and McLaughlin (1996) which analyzed companies listed on the NYSE or the Amex between 1985–1991, considering 22 negative environmental events (oil spill, gas leak, explosion, and other incidental pollution) and 140 positive ones (environmental awards) demonstrated that negative incidents result in abnormal returns of -1.5% ($0.70 per share) on average, while positive events result in abnormal returns of 0.82% ($0.37 per share). Similarly, Flammer (2013) stated that announcements against ecological corporate behavior generate abnormal returns (-0.65%), and eco-friendly corporate initiatives bring abnormal returns (0.84%). The study also emphasized that companies had been aggressively penalized for being irresponsible toward environmental issues. Poor environmental performance may even lead to divestment campaigns, which trigger a significant decrease in stock value, i.e., 8–10% (Choi et al., 2022). For example, the market value of the Italian luxury outerwear business Moncler fell by 6% in November 2014, when a television program revealed that geese were mistreated while being plucked by garment producers (Capelle-Blancard & Petit, 2019).

In contrast, a few studies suggest ESG controversies may lead to higher firm value. For example, Melinda and Wardhani (2020) examined 1356 companies from 22 countries in Asia between 2014 to 2018. The results revealed that the ESG controversy score positively correlated with firm value. Similarly, Aouadi and Marsat (2018) found a surprisingly significant and positive impact of ESG controversies on firm market value. This may be because controversies send a positive signal to investors. The positive signal

may stem from the potential of controversies to enhance transparency and accountability of the company involved in the controversies.

On the other hand, few studies found inconclusive evidence of the impact of ESG on firm value. For example, Anita et al. (2023) found that simple media coverage of ESG controversies does not lead to consequences for stakeholders. Therefore, sanctions and valuation effects on stakeholders are not directly caused by the media's reporting on ESG controversies. Moreover, according to Fama (1991), since stock prices accurately reflect the information that is currently available about news relating to ESG controversies within the framework of Efficient Market Hypothesis, controversial news does not result in abnormal stock returns. Similarly, Friedman (1970) inferred that controversial ESG-related news has little impact on a company's value since it is not relevant to the core objective of shareholders, which is to maximize their wealth. When there is positive news related to ESG, the prices of stocks tend to go up. However, negative news about ESG only affects stock prices if it receives significant media attention or involves social capital issues (Serafeim & Yoon, 2022). Investors are optimistic when they learn good news about companies with better ESG scores but pessimistic when they meet bad news about companies with lower ESG scores. Thus, they respond positively to the good news about a company with superior ESG performance but respond negatively to bad news about a company with inferior ESG performance due to controversies or weak ESG diligence (Chen & Yang, 2020). This may be due to the ‘negativity effect’ which implies that investors assign a higher value to negative information than positive information (Sabbaghi, 2022).

De Franco (2020) investigated the influence of ESG controversies on stock returns in regions such as the US, Europe, and Asia. The study demonstrated that ESG controversies significantly negatively impacted stock returns in US and European stocks. Meanwhile, in stocks in the Asia-Pacific region, there is only a little evidence that ESG controversies negatively impact stock returns. Negative events make investors act out strongly, causing the market to fall significantly. On the other hand, positive events do not excite them as much, and despite being positive, it still leads to a slight decline in the market. More precisely, CSR news with established legal and economic content creates strong investor reactions (Krüger. 2015). Hence, a company acting socially responsibly and following legal frameworks enhances shareholder value (Frooman, 1997). Similarly,

the participation of companies in illegal practices can impact their financial performance (Damette & Kouki, 2022; DasGupta, 2022; Johnson, 2003).

2.4.6. Greenwashing

Greenwashing, a topic with increasing relevance in today's world, involves the act of misleading consumers and investors regarding an organization's environmental practices or the environmental benefits of its products or services (Delmas & Burbano, 2011). This deceptive strategy, also known as "corporate disinformation," has been discussed extensively in the literature (Berrone, 2016; Laufer, 2003; Ramus & Montiel, 2005). Over time, literature have identified three distinct types of greenwashing. The first type of misconduct is manipulating disclosure to inflate a company's valuation artificially. Organizations exaggerate their environmental performance in this case, a practice termed "greenwashing Strategy" (Lyon & Maxwell, 2011; Lyon & Montgomery, 2015). These firms tend to present extensive environmental data to divert attention from their dull environmental performance (Yu et al., 2020). The second greenwashing variant is selective disclosure, which aims to mislead investors. Firms following this approach selectively report positive environmental information while suppressing adverse details (Kim & Lyon, 2015; Lyon & Maxwell, 2011). Lastly, the third type emphasizes product-level greenwashing, where companies exaggerate the environmental benefits of their products to drive sales (Cho & Baskin, 2018; Delmas & Burbano, 2011; Majid & Russell, 2015; Testa et al., 2018).

The increasing prevalence of greenwashing can severely grind down consumer and investor confidence in green products, compounded by the challenge of limiting this practice amidst limited and uncertain regulation (Delmas & Burbano, 2011). Greenwashing is voluntarily spreading environmentally misleading or even false information perceived by the public as deceptive (Ferrón-Vílchez et al., 2021). The implications of greenwashing extend beyond a company's financial performance. Studies have shown that greenwashing hurts financial returns (Du, 2015; Walker & Wan, 2012) it can also lead to ethical harm, given that not all green marketing claims reflect the firm's environmental conduct (Szabo & Webster, 2021).

Additionally, it can lead to adverse judgments about a company's communication integrity, despite generating an environmental performance impression between green and brown organizations (De Jong et al., 2018).

However, some studies have suggested that greenwashing can positively affect corporate financial performance (CFP), though this effect is contingent on stringent environmental regulations and media favorability (Li et al., 2022). It is important to note that choosing not to communicate a firm's environmental commitment properly can lead to lower financial performance. The tendency to greenwash has been found more in firms with low ESG performance (Lee & Raschke, 2023) and those with higher debt levels, primarily due to anticipated demand for investment and financing (Xia et al., 2023). Stringent green financial regulation can impose financial constraints on heavily polluting firms, complicating renewable energy financing and prompting greenwashing (Zhang, 2022). Despite its negative connotations, greenwashing has been seen to improve firm value by enhancing disclosure quality, addressing stakeholder concerns, and easing financing constraints (Chen & Dagestani, 2023). With its diverse methods and varying impacts, greenwashing is a multifaceted issue at the intersection of business, the environment, and ethics. Its rise calls for an urgent, comprehensive response from regulators, businesses, and consumers alike.

2.4.7. ESG and Financial Performance

The literature on the relationship between ESG and financial performance presents two opposing arguments. The first perspective, the value creation perspective, asserts that ESG practices can be utilized to generate a competitive advantage and improve financial performance. Conversely, the second perspective argues that investing in ESG initiatives increases costs and economic consequences, leading to lower values. As a result of these divergent viewpoints, there are mixed findings in the literature regarding the relationship between ESG and financial performance (Gillan et al., 2021).

There are mainly two views regarding the impact of ESG performance on financial performance. The first category of empirical studies suggests a positive relationship between ESG and financial performance (Aboud & Diab, 2018; Aouadi & Marsat, 2018; Chouaibi et al., 2022; Li et al., 2018; Saini et al., 2022; Sandberg et al., 2022; Triyani et al., 2020; Zhou et al., 2022). These findings support that Corporate Social Performance contributes positively to Corporate Financial Performance (Peiris & Evans, 2010). According to these studies, sustainability initiatives can assist businesses in better meeting stakeholder interests. For example, Saini et al. (2022) argued that companies that address ESG concerns are valued by investors, customers, regulators, and the public.

Hence, ESG-rated companies are more likely to have higher profitability because their large customer base values loyalty and value creation. Similarly, individual and institutional investors from across the globe can pursue attractive financial returns by investing in sustainable companies, which may also generate a positive impact on communities and the environment (Ahmad et al., 2021).

However, the second category of empirical studies suggests a negative relationship may exist between ESG and financial performance (Buallay, 2019; Duque-Grisales & Aguilera-Caracuel, 2021; Saygili et al., 2022)**.** The negative direction may be due to the costs associated with implementing these initiatives, which are not reflected in a company's financial performance. In addition, these practices may not be performed correctly or lack sufficient institutional support, rendering them invisible to stakeholders and hindering their approval. On the other hand, when companies invest heavily in ESG, they may have to sacrifice their cash flows required for their operations, leading to decreased financial performance. Finally, several studies claim ambiguous, inconclusive, or contradictory results (Aupperle et al., 1985; Griffin & Mahon, 1997; Kalia & Aggarwal, 2023; Revelli & Viviani, 2015; Rowley & Berman, 2000). Some of these studies propose that the costs involved in ESG activities will be offset by their benefits over time. Overall, the relationship between ESG and financial performance is multifaceted and influenced by various factors.

2.4.8. Environmental Performance and Financial Performance

Due to naturally constrained resources and socio-environmental pressures, eco-friendly practices have steadily risen to the top of corporate agendas in an era of climate change. Good environmental performance is significantly associated with "good" economic performance (Al-Tuwaijri et al., 2004). In fact, companies are primarily held responsible for the rising trends in Greenhouse Gases (GHG) emissions due to firms' energy consumption practices (Alam et al., 2019). Thus, corporations explore ways to lower their environmental footprint by minimizing pollution and increasing energy efficiencies in response to increasing ecological pressure from international organizations and governments (Porter et al., 2007). Companies' compliance with environmental regulations by implementing eco-friendly operations can result in competitive advantages and a help increase their financial value (Ardillah & Chandra, 2021; Firmansyah et al., 2021; Fuadah et al., 2018; Yadav et al., 2016).

Poor environmental performance has an inverse association with the intangible asset value of companies. Legally emitted toxic chemicals considerably impact the intangible asset value of publicly traded firms. For instance, a 10% reduction in emissions of toxic chemicals was found to increases the market value of firms in the S&P 500 by $34 million (Konar & Cohen, 2001). Similarly, the establishment of solid environmental policies and penalties for violating environmental norms have a significant explanatory power in terms of excess stock returns (Thomas, 2001). Better corporate environmental performance not only reduces firms' capital expenditures, but also results in (i) more significant tax savings associated with the ability to utilize financial leverage and (ii) a move from equity-based to debt-based financing (Sharfman & Fernando, 2008). A study conducted by Belkaoui (1976) illustrated that 50 US companies whose annual reports included information on pollution control outperformed the 50 randomly selected US companies from the same industry who does not have environmental information on their reports.

Maintaining environmental disclosure has mainly been motivated by a company's efforts to enhance its reputation. For instance, according to Khanifah (2020), there are positive and statistically significant impacts of environmental performance on corporate reputation, whereas there are significant and negative impacts on firm value. In addition, corporate reputation may also act as a crucial mediator between environmental performance and firm value (Khanifah, 2020; Orlitzky et al., 2003). Environmental and social disclosures involve costs, yet large publicly traded companies are improving the availability of their disclosures. As a result, enterprises with significant social disclosures tend to have greater market values. This correlation is explained by the increases in the expected cash flow growth rates (Qiu et al., 2016). Likewise, disclosure of greenhouse gas emissions and environmental performance positively impacts firm value (Toly, 2019). In the context of the United Kingdom, eco-efficient companies have better market values than those that do not have environmental initiatives. Therefore, it suggested that businesses participate in environmental policies, as implementing them will positively impact the firm's value (Al-Najjar & Anfimiadou, 2012). Similarly, a study on Clean Water Act regulations in chemical manufacturing industries demonstrated increases in financial performance in the short and long term, with the long-term impact being more significant (Rassier & Earnhart, 2011)

Environmental performance-to-firm value research needs to be more conclusive. Recent literature emphasizes the win-win environmental policy idea that investment in eco-friendly activities will benefit corporations financially and ecologically (Alam et al., 2019; Banerjee & Gupta, 2017; Churchill et al., 2019). However, (Hassel et al., 2005) argue that investors believe environmentally responsible actions reduce earnings without reducing risk; thus, sensible investors react negatively. Furthermore, investors do not evaluate long-term environmental information because the market is short-term. Thus, investors do not reward green enterprises rated highly in terms of environmental performance. Likewise, (Alam et al., 2019) state that investing in environmental issues may increase costs without yielding financial gains. Thus, managers' primary focus should be reducing their firms' environmental consequences without lowering firm value.

2.4.9. Social Performance and Financial Performance

Friedman (1970) asserts that the sole social obligation of a business is to generate profit. However, Davis (1973) believes that Corporate Social Responsibility (CSR) contains broader concerns, including a company's economic, technological, and legal aspects. These present two distinct perspectives on CSR. Some believe social initiatives divert a business's primary focus from profit generation. In contrast, others claim CSR is only a feel-good initiative to serve as a watchdog over large, influential firms (Foote et al., 2010). The competitive advantage of CSR has been discussed widely in the literature. For example, (Awaysheh et al., 2020; Boubaker et al., 2022; Godfrey et al., 2009; Jones et al., 2000; Porter & Kramer, 2006; Rais & Goedegebuure, 2009; Wang et al., 2015) Claimed that adopting CSR enhances a company's image and provides a buffer during economic downturns. Moreover, firms that engage in CSR often display greater transparency in their operations. Transparency reduces information asymmetry and increases the investor base by attracting financing from socially aware investors (Cheng et al., 2014; Dhaliwal et al., 2011; El Ghoul et al., 2011; Halme & Laurila, 2009; Lamont et al., 2001; McWilliams & Siegel, 2000).

Various studies also claim that CSR has a positive effect on the operations, financial valuation, and financing costs of companies (Aktas et al., 2011; Cheng et al., 2014; Deng et al., 2013; Derwall et al., 2005; El Ghoul et al., 2011; Goss & Roberts, 2011; Hart & Ahuja, 1996; Hong & Kacperczyk, 2009; Pil & Rothenberg, 2003). Yet,

rather than serving as an effective mechanism, CSR may in fact make capital markets more volatile because it intensifies noise in stock markets (Orlitzky, 2013). Similarly, few studies suggest that there is a negative or lack of association between CSR and financial or market performance (e.g., (Hamilton et al., 1993; McWilliams & Siegel, 2000).

In short, CSR has direct and indirect positive effects on a firm boosting competitive advantage and shareholder value. The benefits a company could obtain from CSR activities include increased operating efficiency (Brammer & Millington, 2005; Porter & Kramer, 2002), improvement in corporate reputation (Menon & Kahn, 2003), rise in employee productivity (Valentine & Fleischman, 2008), capital market benefits (Dhaliwal et al., 2011; Godfrey, 2005), enhanced risk management (Dhaliwal et al., 2012) and positive effects over total factor productivity (TFP) (Hasan et al., 2018). However, the literature on the relationship between CSR and firm value remains unclear. Given the wide range of conflicting views, it can be inferred that CSR's role varies depending on the specific characteristics of the firms as well as the stakeholders.

2.4.10. Corporate Governance Performance and Financial Performance

With its mechanisms and frameworks, corporate governance plays an essential role in enhancing a firm's financial performance (Buallay et al., 2017; Fallatah & Dickins, 2012; Pucheta-Martínez & Gallego-Álvarez, 2020) by bringing robust, short-term, and long-term benefits (Stanwick & Stanwick, 2002). While the overall impact of corporate governance on financial performance is well-established, the relationships between specific governance mechanisms and performance outcomes have been the subject of extensive debate and research. Companies rely on various governance mechanisms such as board independence, board compositions, audit committee, internal auditing, compensation schemes and shareholder rights to guide their strategies and financial decisions.

Regarding specific corporate governance mechanisms, the role of independent directors emerges as one of the most debated. Independent directors provide diverse perspectives, which is invaluable for strategic decision-making (Fuzi et al., 2016). However, views about the relationship between board independence and firm performance is polarized. While some studies (Bhagat & Bolton, 2013; Javeed & Azeem, 2014; Mura, 2007) document a positive relationship, others (Agrawal & Knoeber, 1996; Bansal, 2022) suggest a negative one.

Board composition, especially regarding gender diversity, is another relevant aspect of corporate governance. There has been increasing regulatory pressure on firms to address the lack of female board representation (Chapple & Humphrey, 2014). Despite the recent trend of more women taking board roles, male directors still make up the majority (Torchia et al., 2011). Several studies have examined the relationship between female representation on boards of directors and financial performance. However, there seems to be no consensus on the relationship between female board participation and firm performance. For example, some studies found that having board gender diversity can provide benefits on firm-level financial performance (Arun et al., 2015; Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Kılıç & Kuzey, 2016; Kim & Starks, 2016; Terjesen et al., 2016). In contrast, some studies have found a negative link between board female representation and financial performance (Adams & Ferreira, 2009; Zahra & Stanton, 1988).

The audit committees (AC), another pillar of corporate governance, reflects transparency and financial reporting integrity. Various studies have shown that internal auditing has a positive impact on firm performance by promoting firm internal control quality (Chen et al., 2020). Whether ACs should be composed solely of independent directors has been debated. Current research offers various conclusions. While some studies advocate for including independent directors in the AC (Abbott et al., 2000; Beasley, 1996; Carcello & Neal, 2003). However, other studies suggest that including independent directors is irrelevant regarding committee effectiveness (Felo et al., 2003; Klein, 2002).

While Alzeban (2020) suggests internal auditor independence and expertise leads to better financial performance, Hutchinson and Zain (2009) claim that the positive association between internal audit quality and firm performance seems to weaken as audit committee independence increases.

Regarding compensation scheme for executives, agency theory Jensen and Meckling (1976) suggests that agents cannot make optimal decisions for principals at zero cost. As a result, governance structures aim to motivate managers to align with shareholders' best interests, using effective compensation strategies. In this regard, executive compensation plans serve as a critical tool in mitigating agency disputes (Salim et al., 2016). Several studies have revealed a positive relationship between board compensation and firm performance (Almarayeh, 2021; Andreas et al., 2012; Handa,

2018; Lemma et al., 2020; Molonko, 2004; Müller et al., 2014; Watson & Wilson, 2005; Yahya & Ghazali, 2017). Moreover, specific compensation types such as bonuses and non-equity can positively affect firm performance (Dalbor et al., 2010), compensation in the form of a salary can negatively impact firm performance (Demirer & Yuan, 2013).

Better rights for shareholders can diminish agency expenses by inhibiting management from pursuing actions that serve their personal interests (Cheng et al., 2006). Therefore, strong shareholder can lead to an increase in company valuation, accelerated sales growth, elevated profit margins, more strategic corporate acquisitions, and reduced capital outlays. (Gompers et al., 2003). Moreover, companies with limited shareholder rights tend to exhibit poor operational performance (Core et al., 2006). Similarly, restrictions on shareholder rights can negatively impact the financial performance of firms (Cremers & Ferrell, 2014).

Corporate governance involves a set of rules, practices, and processes by which a company is directed and controlled. These rules encompass the balance of interests among a company's stakeholders and guide the decision-making process within the corporation (Tricker & Tricker, 2015). As part of the broader concept of corporate governance, firms increasingly recognize the importance of implementing rigorous Anti-Money Laundering (AML), Anti-Bribery Corruption (ABC), and whistleblowing policies. These aspects of corporate governance aim to foster a culture of ethical conduct, promote financial transparency, and deter illicit activities, ultimately enhancing the company's reputation and performance (Aguilera & Cuervo-Cazurra, 2004). These AML, ABC, and whistleblowing themes are critical subsets of corporate governance intertwined with the broader business ethics landscape and corporate social responsibility. Each provides distinct yet interconnected avenues to explore and understand the complexities and challenges of contemporary corporate governance.

In recent years, money laundering has emerged as a significant concern for financial institutions globally (Unger & Ferwerda, 2011). Money laundering, the process of making illegally gained money appear legal, threatens the integrity of financial markets (Zdanowicz, 2009). Several measures have been implemented to combat money laundering, including the policies developed by the Financial Action Task Force (FATF). These policies mandate member states to adopt robust AML strategies (FATF, 2023). However, the effectiveness of these policies is a topic of academic debate (Takats, 2011). Significant efforts have been made to measure the scale of money laundering.

Other research focuses on the impact of AML policies on financial crime, with mixed results. Some scholars argue that AML policies deter financial crime (Barth et al., 2004), while others suggest that these policies have limited effectiveness (Ferwerda, 2009). The enforcement of AML policies often relies on the cooperation of various global financial entities, yet compliance still needs to be solved. The complexity of these policies and the difficulty in tracing laundered funds have been cited as factors contributing to this issue (Sharman & Mistry, 2008; Zdanowicz, 2009).

Corruption is a pervasive issue that affects economies and societies at large. Anti-Bribery Corruption (ABC) efforts aim to reduce this adverse impact. Transparency International's Corruption Perceptions Index highlights the global extent of corruption (International, 2020). Bribery, a form of corruption, has received much academic attention. Søreide (2009) suggests it disrupts market mechanisms, while Fisman and Miguel (2007) link it to poorer societal outcomes. Legislation such as the US's Foreign Corrupt Practices Act (FCPA) and the UK's Bribery Act aims to combat bribery (Lord, 2013). Scholars have investigated the effectiveness of ABC policies, but findings are mixed. Some suggest that robust ABC legislation can lead to decreased corruption levels (Treisman, 2007), while others argue that it has been insufficient due to a lack of enforcement (Argandoña, 2005).

Whistleblowing, the act of reporting illicit activities within an organization, is essential for uncovering malpractices, including money laundering and bribery. This area is receiving more regulatory attention. Studies highlight whistleblowers' ethical and psychological complexities (Dyck et al., 2010). There is an ongoing debate about whether whistleblowers should be rewarded or protected, with mixed views (Dworkin & Baucus, 1998; Near & Miceli, 1985). Recent legislative developments like the Sarbanes-Oxley Act in the US and the Public Interest Disclosure Act in the UK aim to protect whistleblowers from retaliation. However, their effectiveness remains under scrutiny (Johnson, 2003).

3. DATA AND METHODS

3.1. Data

We examine the 5450 firms from 74 countries of five regions for 10 economic sectors between the 2018 and 2022 fiscal years. The corporate sustainability data for this study were collected from the Refinitiv ESG Database. While the financial performance data for this study were collected from the Refinitiv EIKON database. Table 3. 1 showcases the sample selection process with our two-step filtration process with an initial pull of 31,373 firms across ten economic sectors. First, firms lacking ESG data were excluded. Then, firms with missing financial measures, namely Market Capitalization, Return on Assets, and Total Revenue were removed. To mitigate the effect of outliers, we transformed the data for Market Capitalization and Total Revenue by taking their logarithm. Post-filtration, the dataset comprised 5,450 firms from 74 countries across 5 regions. Detailed distribution of firms by sector and their respective participation percentages are demonstrated in Table 3. 2. The Industrials sector has the highest representation with 1,038 firms (19%). Table 3. 3 shows the regional breakdown of the total sample, with Asia having 2,119 firms (39%). Regarding country-wise distribution, the United States of America stands out with 1,177 or 21.60% of the overall sample (See appendix 1).

Table 3. 1. *Sample Selection Process*

Economic Sector	Initial Samples	(-) Firms with Missing ESG Data	(-) Firms with Missing Financial Data	Final Sample
Basic Materials	3417	(2320)	(379)	718
Consumer Cyclicals	4364	(2870)	(495)	999
Consumer Non-Cyclicals	2166	(1411)	(209)	546
Energy	1159	(608)	(231)	320
Financials	4788	(3125)	(1620)	43
Healthcare	2765	(1627)	(633)	505
Industrials	5123	(3510)	(575)	1038
Real Estate	2101	(1327)	(545)	229
Technology	4647	(3200)	(643)	804
Utilities	843	(475)	(120)	248
Total	**31373**	**(20473)**	**(5450)**	**5450**

Table 3. 2. *Count of Firms and % of Participation: Sector wise*

Sector	Count of Firms	% of Participation
Basic Materials	718	13%
Consumer Cyclicals	999	18%
Consumer Non-Cyclicals	546	10%
Energy	320	6%
Financials	43	1%
Healthcare	505	9%
Industrials	1038	19%
Real Estate	229	4%
Technology	804	15%
Utilities	248	5%
Total	**5450**	**100%**

Table 3. 3. *Count of Firms and % of Participation: Region Wise*

Region	Count of Company	% of Participation
Africa	76	1%
Americas	1587	29%
Asia	2119	39%
Europe	1452	27%
Oceania	216	4%
Grand Total	**5450**	**100%**

In this study, the measure of corporate sustainability performance is based on ESG scores from the Refinitiv database. This score offers a comprehensive view of a company's sustainability practices and principles performance. We considered both overall ESG score, as well as the individual ESG dimensions measured by individual ESG pillar scores, i.e., environmental, social, and governance performance scores. For financial performance, we focused on a company's market value, which we identified using the Company Market Capitalization data from the Refinitiv Eikon Database. This value gives us the total market worth of a company's outstanding shares, representing its current market valuation.

An essential part of our study pivots around understanding the role of Total Revenue. This variable acts as our mediating variable, bridging the relationship between corporate sustainability variables and the market value of firms. Total Revenue reflects the total income from a company's primary operations after accounting for deductions like sales adjustments.

Lastly, to explore the effects of profitability on our primary relationships, we introduced Return on Assets (ROA) as a moderating variable. Using ROA, we aim to explore how profitability might influence corporate sustainability variables' direct and indirect impacts on firms' market values, especially through the mediating effect of revenues. In our study, ROA is computed as the ratio of income before tax to the average total assets for the same period, expressed as a percentage.

For corporate sustainability performance measures, we utilized ESG scores from Refinitiv database as a proxy for corporate sustainability performance. Refinitiv possesses a vast ESG content-gathering operation powered by more than 700 dedicated research analysts. These analysts filter through many public information sources, are

proficient in multiple languages, and are based in various global locations. Their goal is to offer timely, unbiased, and exhaustive coverage (Refinitiv, 2022).

The ESG scores are divided into three primary pillars: environmental, social, and corporate governance. These pillars are weighted and adjusted to percentages ranging from 0 to 100. Figure 3. 1 demonstrates the categories of ESG scores while Appendix 4 and Appendix 5 lists the individual ESG pillars, categories, themes, and definitions.

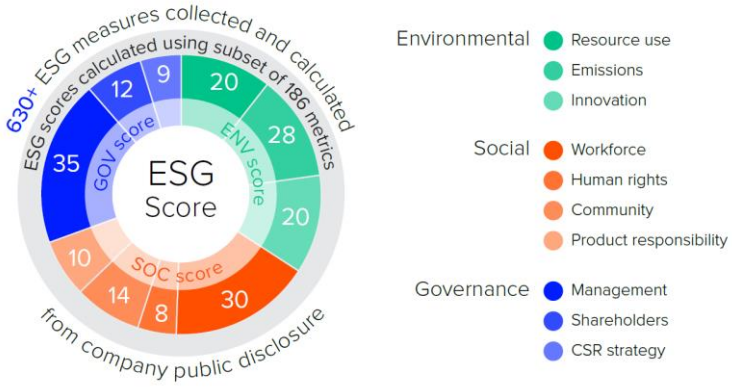

Figure 3. 1. *Categories of ESG Score*[3]

3.1.1. Total Revenue as a Mediator

Revenue represents a company's total income from its primary activities before deducting expenses, while sales refer to the income generated from selling products or services. However, for many firms, these terms are synonymous, although some firms may earn extra revenue beyond their sales (Ross, 2021). Total revenue is significant in firms' financial statements because it is the main driver behind shareholder value (Ghosh et al., 2005; Penman & Penman, 2010; Srivastava, 2014; Zhang, 2005). Companies that meet revenue forecasts are often given a clear premium in the stock market (Rees & Sivaramakrishnan, 2004). Moreover, when earnings are announced, the stock market's response is closely tied to recent and past revenue surprises (Jegadeesh & Livnat, 2006). Especially when companies face losses or have negative cash flows, the market puts relatively more weight on revenues and growth. For this reason, analysts often use the price-to-sales ratio as a key measure for such firms (Huang et al., 2015).

[3]https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/esg-scores-methodology.pdf.

It is expected that the revenues of companies with superior corporate sustainability performance will outgrow others and sales growth will be reflected on the market value of sustainable firms. Hence, introducing total revenue as a mediating variable in the study can offer detailed insights and potential benefits. By assessing the relationship between corporate sustainability variables and market value through the lens of total revenue, we can deeply explore how sustainability performance influences a company's financial performance before affecting the overall market value. Additionally, using total revenue as a mediating variable in this study helps in several ways. It lets us see how corporate sustainability affects a company's revenues before influencing its overall market value. This is important because revenue is a basic and well-understood measure in business. By looking at revenue, we can also compare companies better. For example, two companies have good sustainability practices, but if one has higher revenue than the other, it might be valued more in the market. So, using revenue as a mediator may provide a clearer picture of how sustainability scores might affect a company's value in the market.

3.1.2. ROA as a Moderator

Return on Assets (ROA) has long been a key financial measure widely used by businesses and researchers. Its history goes back to 1919 when the DuPont Company started using it in their system, referring to it as 'return on investment' (Jewell & Mankin, 2011). They computed it as Profit divided by Total Assets. Later, DuPont further detailed ROA by considering the Profit Margin and the Capital Turnover Ratio (Horrigan, 1968). Its importance can be seen in different ways. For example, ROA was the third most mentioned financial ratio in empirical studies (Jewell & Mankin, 2011). Also, it is a go-to measure in studies predicting business success or failure. Altman's 1968 study notably used a version of ROA as a key factor in his Z-Score model (Jewell & Mankin, 2011). Similarly, Beaver (1966) study used a ROA version to predict business outcomes. When Hossari and Rahman (2005) reviewed empirical studies from 1966 to 2002, they found the ROA version, which used Net Income divided by Total Assets, to be the most common in business failure prediction studies. Additionally, when professionals like financial analysts want to understand a company's financial health and outlook, they often resort to ROA. In a study conducted by Gibson (1987), nearly all the Chartered Financial Analysts

surveyed said that they used at least one version of ROA to help judge a company's profitability.

In our study, we have used ROA to measure a firm's profitability. When investigating how corporate sustainability affects a firm's market value, ROA may help reveal if more profitable companies will face a bigger or smaller change in the market value due to their sustainability performance. Similarly, when we examine the impact of corporate sustainability performance on a firm's total revenue, ROA can give insights into whether profitability changes the strength of this relationship. Lastly, regarding the link between total revenue and market value, ROA can help us see if more profitable companies have a different relationship between their total revenue and overall market value compared to less profitable ones. Hence, using ROA as a moderating variable provides a better understanding of the relationship between corporate sustainability, revenue, and market value. Appendix 6 describes the variables used for financial performance measures.

3.2. Methodology

3.2.1. Mediation Analysis

Mediation analysis investigates a hypothetical causal pathway where one variable, X, influences another variable, M, which impacts a third variable, Y. This method is used to determine the mechanism or process underlying the relationship between the independent and the dependent variable. Specifically, when X affects M, it sheds light on how the independent variable impacts the mediator. When M affects Y, it illustrates the mediator's effect on the dependent variable. There is also a direct path in which X affects Y directly, termed as the direct effect. Furthermore, the pathway where X impacts Y through the mediator, M, represents the indirect effect. The mediator, or the intermediary variable, provides insight into the process or mechanism of the independent variable's influence on the dependent variable. Mediation analysis has been a widely used tool in the previous research (Ohrnberger et al., 2017; Rucker et al., 2011; Shrout, 2011).

3.2.2. Moderated Mediation Analysis

Moderated mediation analysis offers a rigorous statistical framework to dig deeper into the interaction between variables. It examines the impact of a fourth (or more)

variable on the mediated relationship between X and Y. This analytical approach provides a route to test how another variable modulates the effect of the mediator, often represented as X -> M -> Y (depending on W). The peculiarity of this methodology is highlighted in its adaptability. The moderation can occur on any path within the mediation model, be it a path, b path, or c path, or even a combination of these. Moderated mediation occurs when the strength of an indirect effect depends on the level of some variable (Preacher et al., 2007). In simpler terms, it is when mediation relations are contingent on the level of a moderator. While moderation concerns how subgroups influence the strength of the relationship from X to Y, mediation attempts to ascertain the intermediating factors involved in transitioning from X to Y. In a moderated-mediated relationship, the effect of the mediator is itself moderated.

This study explores the conditional direct and indirect effect of overall ESG and its sub-dimensions Environmental (E), Social (S), and Governance (G) on Market Capitalisation (LogMCap) through the mediating effect of Revenues (LogTR) and moderating effect of Return on Assets (ROA). This intricate analytical structure can be represented as ESG (or E, S, G) -> LogTR -> LogMCap (moderated by ROA). The moderated mediation analysis has been explored in various studies (Al-Hakimi et al., 2022; Deery et al., 2014; Einarsen et al., 2018; Ivanova et al., 2020; Wang & Preacher, 2015; Wang & Hsieh, 2014).

Traditional approaches for examining mediation and moderated mediation have several conceptual and mathematical limitations (Hayes, 2009). To avoid these challenges, Hayes Process Model emerges as a contemporary tool that enhances the understanding and analysis of these complex relationships (Hayes, 2013). We used Hayes Process model since we aimed to examine the underlying mechanisms of the relationship between corporate sustainability performance and the market value of firms. More specifically, the current study applies conditional process analysis to describe the conditional nature of the mechanisms by which a predictor variable exerts its effect on other variables (Hayes, 2013). After considering various Hayes Process Models, we have selected Model 4 to test the mediation effect and Model 59 for testing the moderated mediation.

Hayes Process Model 4 overcomes several limitations of traditional approaches for examining mediation, such as the Baron and Kenny method, by allowing for the testing of indirect effects without a significant direct effect (Hayes, 2009). In the academic

field, Hayes Process Model 4 has gained traction for its rigorous approach to mediation. Several researchers have opted for this model to interpret the complex interplay of variables and their relationships (Chi et al., 2019; Hayes et al., 2015; Mensah, 2021; Wang et al., 2019; Wang et al., 2018). Figure 3. 2 and Figure 3. 3 portrays the Hayes Process Model 4's conceptual and statistical diagram.

Model 59 is suitable for instances where the mediator and the outcome's relation with the mediator and the independent variable are moderated. Through Hayes Process Model 59, we investigate how overall ESG scores and individual ESG scores might impact the Market Capitalisation (LogMCap) through Revenues (LogTR) and how this mediation could be contingent upon the moderating influence of Return on Assets (ROA). The Hayes Process Model 59's relevance and accuracy in addressing such moderated mediation effects were confirmed by several empirical studies, including, (Aksoy et al., 2023; Burnasheva & Suh, 2021; Jia et al., 2018); Palmer et al. (2016); (Wang et al., 2018). Figure 3. 4 and Figure 3. 5 portrays the Hayes Process Model 59's conceptual and statistical diagram.

The moderated mediation model, which is model 59; as well as the mediation model, which is model 4 were employed with SPSS macro-PROCESS developed by Hayes (2013). SPSS macro-PROCESS has been widely utilized to test complex models of the observed variables, such as the moderated mediation model and the mediated moderation model (Hayes, 2017; Liu et al., 2017; Wang et al., 2018). We employed the bootstrapping technique, as described by Hayes (2013), to evaluate the significance of the observed effects and achieve sturdy standard errors for our parameter calculations. We generated 95% bias-adjusted confidence intervals using this method based on 5000 data resamples. If the confidence intervals exclude zero, it indicates that the effects are statistically significant at an α level of 0.05.

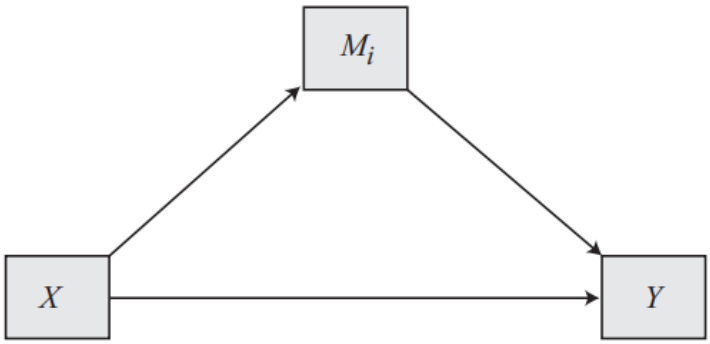

Figure 3. 2. *Model 4 Conceptual Diagram*

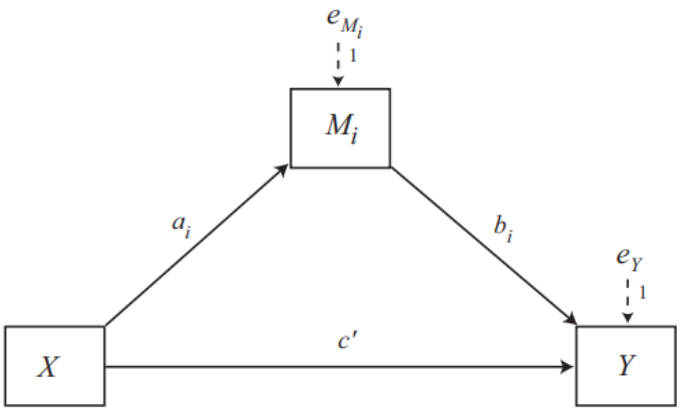

Figure 3. 3. *Model 4 Statistical Diagram*

Indirect effect of X on Y through M_i = a_i b_i

Direct effect of X on Y = c'

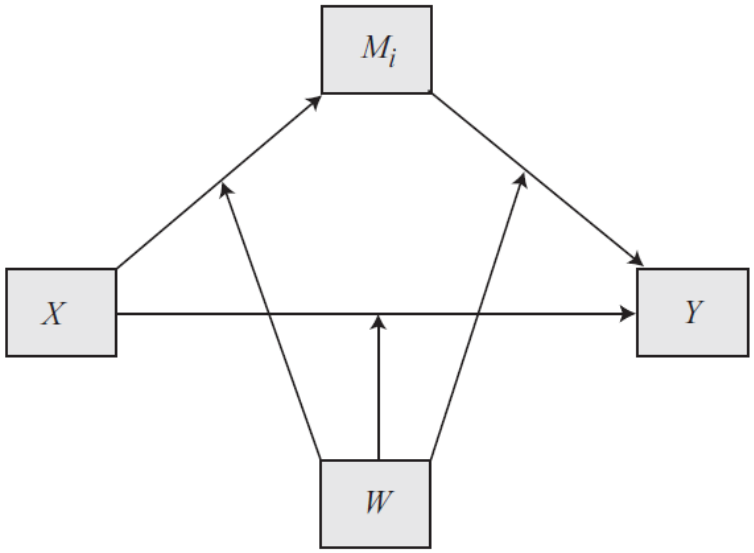

Figure 3. 4. *Model 59 Conceptual Diagram*

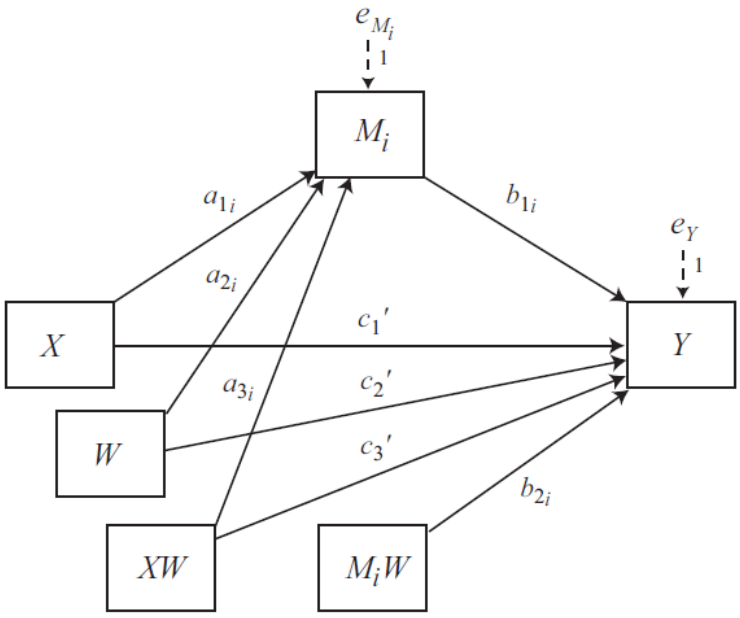

Figure 3. 5. *Model 59 Statistical Diagram*

Conditional indirect effect of *X* on *Y* through M_i = $(a_{1i} + a_{3i}W)$ $(b_{1i} + b_{2i}W)$

Conditional direct effect of *X* on *Y* = $c_1' + c_3'W$

3.2.3. Research Model and Hypotheses

In this research, we have two main areas of focus. First, we examine how the overall ESG scores affect a firm's market value. At the same time, we are also studying the impact of individual pillars within ESG, specifically the Environmental (E), Social (S), and Governance (G). By doing this, we aim to understand how a firm's overall sustainability efforts influence its market value and how each aspect of sustainability influences the market value of firms. Additionally, our study explores the direct and indirect impacts of revenues (LogTR) and return on assets (ROA) when considering the relationship between sustainability performance and market performance. Based on this approach, we have formulated our research model and hypotheses as follows:

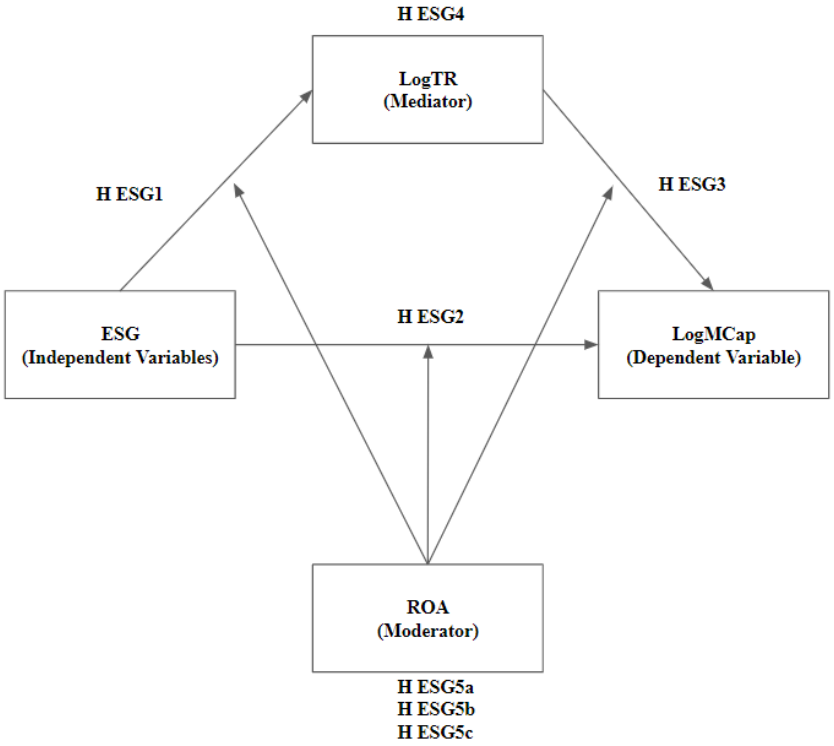

Figure 3. 6. *Research Model (ESG)*

i. *Hypothesis ESG1:* ESG will positively affect revenues (LogTR).
ii. *Hypothesis ESG2:* ESG will positively affect the market value of firms (LogMCap).
iii. *Hypothesis ESG3:* Revenues (LogTR) will positively affect the market value of firms (LogMCap).

iv. *Hypothesis ESG4:* Revenues (LogTR) will mediate the association of ESG with the market value of firms (LogMCap).

v. *Hypothesis ESG5a:* Profitability will moderate the association of ESG with the market value of firms (LogMCap*).*

vi. *Hypothesis ESG5b:* Profitability will moderate the association of ESG with revenues (LogTR).

vii. *Hypothesis ESG5c:* Profitability will moderate the association of revenues (LogTR) with the market value of firms (LogMCap).

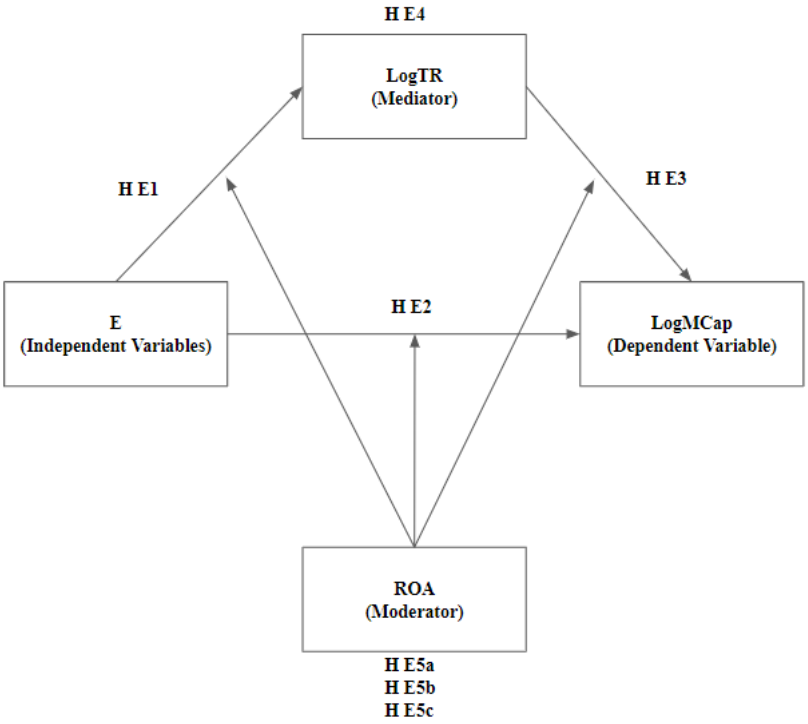

Figure 3. 7. *Research Model (E)*

i. *Hypothesis E1:* Environmental performance (E) will positively affect revenues (LogTR).

ii. *Hypothesis E2:* Environmental performance (E) will positively affect the market value of firms (LogMCap).

iii. *Hypothesis E3:* Revenues (LogTR) will positively affect the market value of firms (LogMCap).

iv. *Hypothesis E4:* Revenues (LogTR) will mediate the association of environmental performance (E) with the market value of firms (LogMCap).

v. *Hypothesis E5a:* Profitability will moderate the association of environmental performance (E) with market value of firms (LogMCap).

vi. *Hypothesis E5b:* Profitability will moderate the association of environmental performance (E) with revenues (LogTR).

vii. *Hypothesis E5c:* Profitability will moderate the association of revenues (LogTR) with the market value of firms (LogMCap).

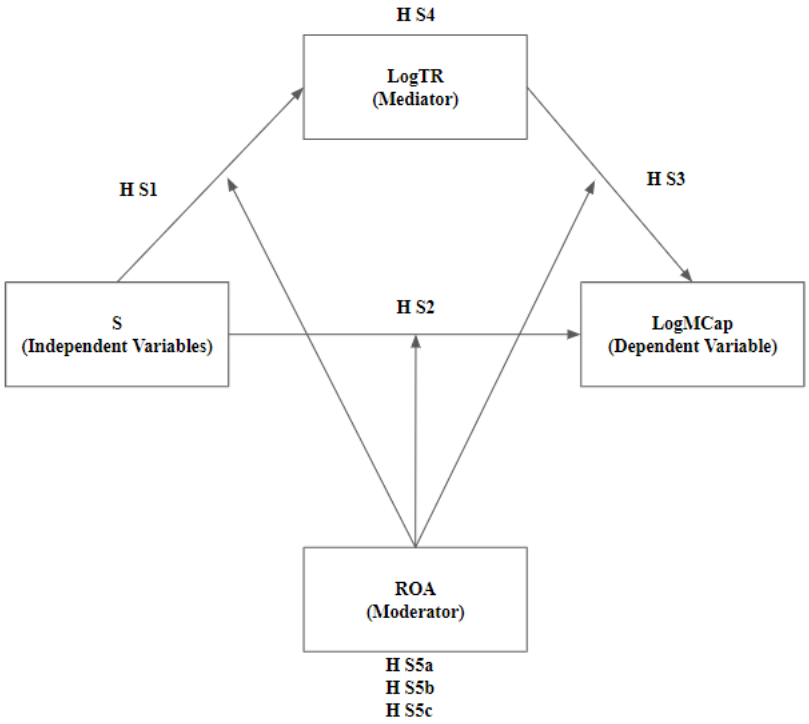

Figure 3. 8. *Research Model (S)*

i. *Hypothesis S1:* Social performance (S) will positively affect revenues (LogTR).

ii. *Hypothesis S2:* Social performance (S) will positively affect the market value of firms (LogMCap).

iii. *Hypothesis S3:* Revenues (LogTR) will positively affect the market value of firms (LogMCap).

iv. *Hypothesis S4:* Revenues (LogTR) will mediate the association of social performance (S) with the market value of firms (LogMCap).

v. *Hypothesis S5a:* Profitability will moderate the association of social performance (S) with the market value of firms (LogMCap).

vi. *Hypothesis S5b:* Profitability will moderate the association of social performance (S) with revenues *(LogTR).*

vii. *Hypothesis S5c:* Profitability will moderate the association of revenues (LogTR) with market value of the firm (LogMCap).

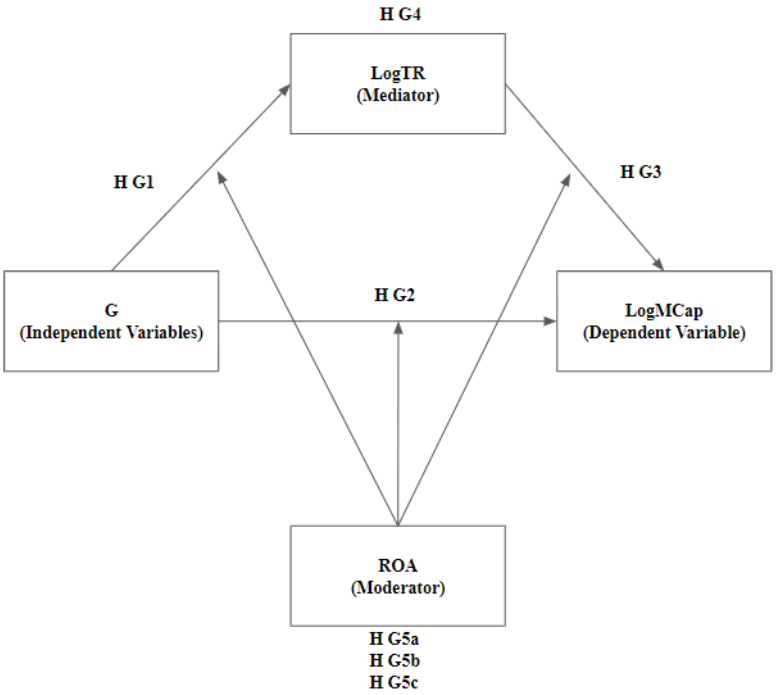

Figure 3. 9. *Research Model (G)*

i. *Hypothesis G1:* Governance performance (G) will positively affect revenues (LogTR).
ii. *Hypothesis G2:* Governance performance (G) will positively affect the market value of firms (LogMCap).
iii. *Hypothesis G3:* Revenues (LogTR) will positively affect the market value of firms (LogMCap).
iv. *Hypothesis G4:* Revenues (LogTR) will mediate the association of governance performance (G) with the market value of firms (LogMCap).
v. *Hypothesis G5a:* Profitability will moderate the association of governance performance (G) with the market value of firms (LogMCap).
vi. *Hypothesis G5b:* Profitability will moderate the association of governance performance (G) with revenues (LogTR).
vii. *Hypothesis G5c:* Profitability will moderate the association of revenues (LogTR) with the market value of firms (LogMCap).

4. FINDINGS

4.1. Preliminary Analysis

This section presents the descriptive statistics of the study variables and examines the correlations between them to identify potential relationships.

4.1.1. Descriptive Statistics

Table 4. 1 provides the summary statistics of the variables used in the analysis. The ESG score averages at 47.296, with notable variance (σ = 19.394) across its sub-dimensions: Environmental (E) (mean = 40.610, σ = 25.882), Social (E) (mean = 48.149, σ = 22.944), and Governance (G) (mean = 51.850, σ = 19.800). Financial performance measures, Market Capitalization (LogMCap), and Revenues (LogTR) average at 21.744 (σ = 1.548) and 9.254 (σ = 0.720), while the Return on Assets remains modest, with a mean of 0.070 (σ = 0.084).

Table 4. 1. *Descriptive Statistics*

Descriptive Statistics							
	N	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
ESG	5450	1.653	94.583	47.296	19.394	0.056	-0.803
E	5450	0.000	98.124	40.610	25.882	0.144	-1.041
S	5450	0.456	97.418	48.149	22.944	0.036	-0.918
G	5450	2.010	98.635	51.850	19.800	-0.093	-0.810
LogMCap	5450	17.712	28.247	21.744	1.548	0.171	0.095
LogTR	5450	5.664	11.745	9.254	0.720	0.026	0.130
ROA	5450	-1.617	0.688	0.070	0.084	-1.315	37.334

4.1.2. Correlation Analysis

The results of the correlation analysis are presented in Table 4. 2. The overall ESG score strongly correlates with its components, particularly E and S. Notably, among the ESG components, the Environmental performance (E) most strongly correlates with both market capitalization (LogMCap) and total revenue (LogTR). Market capitalization and total revenue exhibit a very strong positive relationship. Interestingly, while the overall ESG score and its components show positive relationships with market capitalization and total revenue, their correlations with return on assets (ROA) are weak. The moderate correlation between market capitalization and ROA indicates that market value tends to increase as profitability marginally rises.

Table 4. 2. *Correlation Matrix*

		ESG	E	S	G	LogMCap	LogTR	ROA
ESG	Pearson Correlation	1						
E	Pearson Correlation	**.877*****	1					
S	Pearson Correlation	**.921*****	**.762*****	1				
G	Pearson Correlation	**.671*****	**.405*****	**.445*****	1			
LogMCap	Pearson Correlation	**.450*****	**.463*****	**.387*****	**.258*****	1		
LogTR	Pearson Correlation	**.496*****	**.538*****	**.415*****	**.286*****	**.746*****	1	
ROA	Pearson Correlation	**.028****	.025	.024	**.028****	**.215*****	.025	1

***Correlation is significant at the 0.01 level (2-tailed).

**Correlation is significant at the 0.05 level (2-tailed).

4.2. ESG Performance and Market Value

In this section, we are looking at the ESG score for testing the mediation effect and moderated mediation effect.

4.2.1. Testing for the Mediation Model (ESG)

In this section, we are looking at the overall corporate sustainability performance by taking the ESG score for testing the mediation model, which is related to the ESG performance and market value based on the hypotheses given below and as shown in Figure 3. 6:

i. *Hypothesis ESG1:* ESG will positively affect revenues (LogTR).
ii. *Hypothesis ESG2:* ESG will positively affect market value of the firm (LogMCap).
iii. *Hypothesis ESG3:* Revenues (LogTR) will positively affect market value of the firm (LogMCap).
iv. *Hypothesis ESG4:* Revenues (LogTR) will mediate the association of ESG with market value of the firm (LogMCap).

For this purpose, we applied Hayes Process Model 4 suggested by Hayes, (2013) in SPSS 28. We expected that revenues would mediate the relationship between ESG performance and market value of firms in Hypothesis ESG4. To test this hypothesis, we conducted a four-step procedure to frame the mediation effect (Baron & Kenny, 1986). These steps include:

i. testing whether a significant association between ESG and the market value of firms exist.
ii. testing whether a significant association between ESG and revenues exist.
iii. testing whether a significant association between revenues and the market value of firms after controlling for ESG exist.
iv. testing whether the coefficient for the indirect path between ESG and the market value of the firms through revenues is significant.

The bias-corrected percentile bootstrap approach is used to detect whether the last condition i.e., whether the coefficient for the indirect path is satisfied. The present study

generated 5000 bootstrapping samples from the standardized data (N = 5450) through random sampling.

The first step regression analysis results showed that, there is a significant positive relationship between ESG performance and market value of firms, β = .008, p < 0.001 (see Model 1 of Table 4. 3). Hence, this supports the Hypothesis ESG2.

In the second step, we found a significant positive relationship between ESG performance and revenues, β = .018, p < 0.001 (see Model 2 of Table 4. 3). Hence, this supports the Hypothesis ESG1.

In the third step, a significant positive relationship between revenues and market value of firms has been found, β = 1.493, p < 0.001 (see Model 3 of Table 4. 3). Hence, this supports the Hypothesis ESG3.

In the fourth step, the bias-corrected percentile bootstrap method showed that the indirect effect of ESG performance on market values of the firms through revenues was significant, ab = .027, SE = .001, 95% CI= [.007 - .010]. The empirical 95% confidence interval did not overlap with zero, which means the mediation effect was significant. Hence, this supports the Hypothesis ESG 4. Overall, the criteria for establishing the mediation effect were satisfied.

Table 4. 3. *Mediation Effect of ESG on Market Value*

Predictors	Model 1 (ESG→LogMCap)		Model 2 (ESG→ LogTR)		Model 3 (LogTR→LogMCap ESG→LogMCap)	
	b	t	b	t	b	t
ESG	.008***	10.266	.018***	42.140	.008***	10.266
CI [BootLLCI- BootULCI]			.017	.019	.007	.010
LogTR					1.493***	67.432
CI [BootLLCI- BootULCI]					1.444	1.538
R^2			.246		.565	
F			1775.815		3539.576	
p	<0.001		<0.001		<0.001	

N = 5450

∗∗∗ p < 0.001

4.2.2. Testing for the Moderated Mediation Model (ESG)

We tested the moderated mediation model, which is related with the ESG performance and market value based on the hypotheses given below and as shown in Figure 3. 6.

i. *Hypothesis ESG5a:* Profitability will moderate the association of ESG with the market value of firms (LogMCap*).*

ii. *Hypothesis ESG5b:* Profitability will moderate the association of ESG with revenues (LogTR).

iii. *Hypothesis ESG5c:* Profitability will moderate the association of revenues (LogTR) with the market value of firms (LogMCap).

For this purpose, we estimated parameters for three regression models with PROCESS Macro Model 59 suggested by Hayes (2013) in SPSS 28. The current study considered the moderating effect of ROA on:

i. the relationship between ESG and market value of firms.

ii. relationship between ESG and revenue.

iii. the relationship between revenue and market value of firms.

The outcomes of the moderated mediation analysis were summarized in Table 4. 4. Moderated mediation will be established if either or both of two patterns exist (Hayes, 2013). In this study, those two patterns are the path between ESG performance and revenues moderated by ROA, and/or the path between revenues and market value of firms moderated by ROA.

As mentioned in Table 4. 4, there was a significant positive relationship between ESG and market value of firms, $\beta = .008$, $p < 0.001$. Yet, this effect was not moderated by ROA, $p > 0.05$. Hence, it rejects the Hypothesis ESG5a.

The relationship between ESG and revenues was positively significant, $\beta = .018$, $p < 0.001$, and this effect was moderated by ROA, $\beta = -.031$, $p < 0.001$. Hence, this supports the Hypothesis ESG5b. However, the interaction between ESG performance and ROA was negatively correlated with revenues.

At last, there is a significant positive relationship between revenues and market value of firms, $\beta = 1.534$, $p < 0.001$, and more crucially, the effect was moderated by ROA, $\beta = 3.193$, $p < 0.001$. Therefore, this supports the Hypothesis ESG5c.

These results shows that relationship between both ESG and revenues as well as revenues and market value of firms are moderated by ROA (see Figure 4. 1 and Figure 4. 2). To understand more about the moderating effect of ROA, Figure 4. 1 describes the relationship between ESG and revenue at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It reveals that as ROA increases, the positive impact of ESG on revenues gets weaker. In other words, low ROA increases the impact of ESG on

revenues. Furthermore, Figure 4. 2, explains the relationship between revenues and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It indicates that, as ROA increases, the positive impact of revenues on market value of firms gets stronger. In other words, high ROA increases the impact of revenues on market value of firms.

Table 4. 4. *Moderated Mediation: ESG on Market Value*

Predictors	Model 1 (LogTR)		Model2 (LogMCap)	
	b	t	b	t
ESG	.018***	42.215	.008***	10.194
ROA	-.112	-1.052	5.274***	29.672
ESG x ROA	-.031***	-5.813	-.004	-.447
LogTR			1.534***	74.184
LogTR x ROA			3.193***	15.703
R^2	.251		.627	
F	607.024		1826.872	
p	<0.001		<0.001	

N = 5450

*** p < 0.001

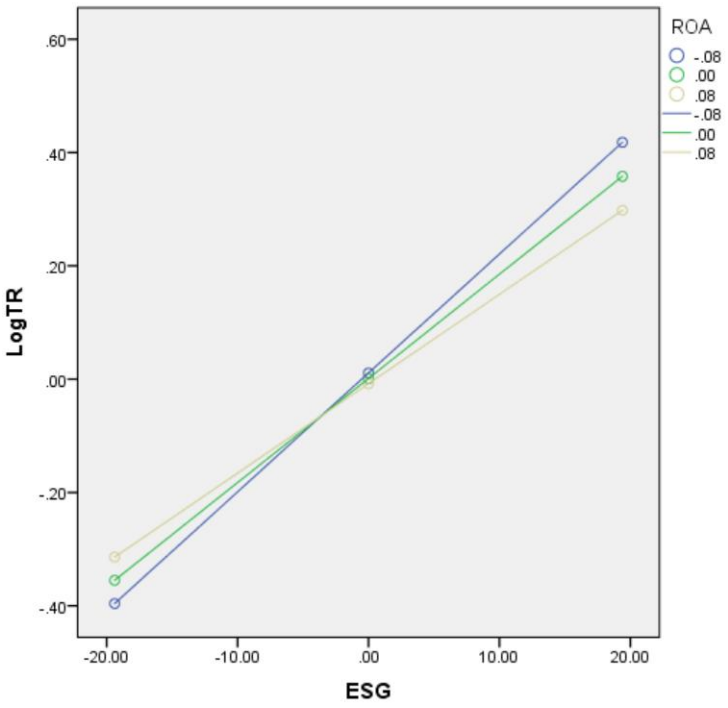

Figure 4. 1. *ROA's Moderation: ESG and Revenue*

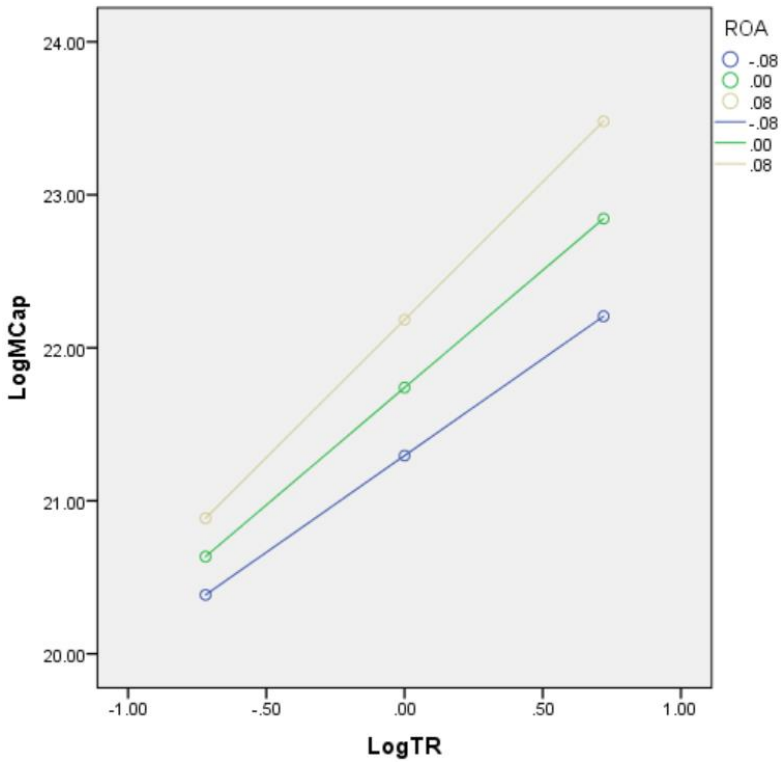

Figure 4. 2. *ROA's Moderation: Revenue and Market Value*

4.3. Environmental Performance and Market Value

In this section, we are looking at the environmental performance (E) score for testing the mediation effect and moderated mediation effect.

4.3.1. Testing for the Mediation Model (E)

In this section, we are looking at one of the three dimensions of ESG i.e., environmental performance (E) for testing the mediation effect of revenues. We tested the mediation model, which is related with the environmental performance (E) and the market value based on hypotheses given below and as shown in Figure 3. 7:

i. *Hypothesis E1:* Environmental performance (E) will positively affect revenues (LogTR).
ii. *Hypothesis E2:* Environmental performance (E) will positively affect the market value of the firm (LogMCap).
iii. *Hypothesis E3:* Revenues (LogTR) will positively affect the market value of firm (LogMCap).

iv. *Hypothesis E4:* Revenues (LogTR) will mediate the association of environmental performance (E) with the market value of firm (LogMCap).

For this purpose, we applied Hayes Process Model 4 suggested by Hayes (2013) in SPSS 28. We expected that revenues would mediate the relationship between ESG performance and market value of firms in Hypothesis E4. To test this hypothesis, we conducted a four-step procedure to frame the mediation effect (Baron & Kenny, 1986). These steps include:

i. testing whether a significant association between environmental performance (E) and market value of the firms exist.
ii. testing whether a significant association between environmental performance (E) and revenues exist.
iii. testing whether a significant association between revenues and market value of firms after controlling for environmental performance (E) exist.
iv. testing whether the coefficient for the indirect path between environmental performance (E) and market value of the firms through revenues is significant.

The bias-corrected percentile bootstrap approach determines whether the last condition is satisfied. The present study generated 5000 bootstrapping samples from the standardized data (N = 5450) via random sampling.

In the first step regression analysis showed that, there is a significant positive relationship between environmental performance (E) and market value of the firms, β = .005, $p < 0.001$ (see Model 1 of Table 4. 5). Hence this supports the Hypothesis E2.

In the second step, we found a significant positive relationship between environmental performance (E) and revenues, β = .015, $p < 0.001$ (see Model 2 of Table 4. 5). Hence this supports the Hypothesis E1.

In the third step, a significant positive relationship between revenues and the market value of firms has found, β = 1.505, $p < 0.001$ (see Model 3 of Table 4. 5). Hence, that supports the Hypothesis E3.

In the fourth step, the bias-corrected percentile bootstrap method showed that the indirect effect of environmental performance (E) on market values of the firms through revenues was significant, ab = .023, SE = .001, 95% CI= [.004 - .006]. The empirical 95% confidence interval did not overlap with zero, which means the mediation effect was significant. Hence, it supports the Hypothesis E4. Overall, the criteria for establishing the mediation effect were satisfied.

Table 4. 5. *Mediation Effect of Environmental Performance on Market Value*

Predictors	Model 1 (E→LogMCap)		Model 2 (E→ LogTR)		Model 3 (LogTR→LogMCap E→LogMCap)	
	b	t	b	t	b	t
E	.005***	8.188	.015***	47.135	.005***	8.188
CI [BootLLCI- BootULCI]			.014	.016	.004	.006
LogTR					1.505***	65.732
CI [BootLLCI- BootULCI]					1.455	1.553
R^2			.290		.562	
F			2221.694		3496.318	
p	<0.001		<0.001		<0.001	

N = 5450

∗∗∗ p < 0.001

4.3.2. Testing for the Moderated Mediation Model (E)

We tested the moderated mediation model, which is related with the environmental performance (E) and the market value based on the hypotheses given below and as shown in Figure 12.

i. *Hypothesis E5a:* Profitability will moderate the association of environmental performance (E) with market value of the firm (LogMCap).
ii. *Hypothesis E5b:* Profitability will moderate the association of environmental performance (E) with revenues (LogTR).
iii. *Hypothesis E5c:* Profitability will moderate the association of revenues (LogTR) with market value of the firm (LogMCap).

For this purpose, we estimated parameters for three regression models with PROCESS Macro Model 59 suggested by Hayes (2013) in SPSS 28. The current study considered the moderating effect of ROA on:

i. the relationship between environmental performance (E) and market value of firms.
ii. the relationship between environmental performance (E) and revenues.
iii. the relationship between revenues and market value of firms.

The outcomes of the moderated mediation analysis were summarized in Table 4. 6. Moderated mediation will be established if either or both of two patterns existed (Hayes, 2013). In this study, those two patterns are the path between environmental performance (E) and revenues moderated by ROA, and/or the path between revenues and market value of firms moderated by ROA.

As mentioned in the Table 4. 6, there was a significant positive relationship between environmental performance (E) and market value of firms, $\beta = .005$, $p < 0.001$, and this effect was moderated by ROA, $\beta = .016$, $p < 0.05$. Hence, it confirms the Hypothesis E5a.

The relationship between environmental performance (E) and revenues were positively significant, $\beta = .015$, $p < 0.001$, this effect was moderated by ROA, $\beta = -.021$, $p < 0.001$. Hence, it accepts the Hypothesis E5b. However, the interaction between environmental performance (E) and ROA were negatively correlated with revenues.

At last, there is a significant positive relationship between revenues and market value of firms, $\beta = 1.534$, $p < 0.001$, and more importantly, the effect was moderated by ROA, $\beta = 2.880$, $p < 0.001$. Therefore, this supports the Hypothesis E5c.

These results shows that relationship between all the three paths such as environmental performance (E) and revenues, environmental performance (E) and market value of firms as well as, revenues and market value of firms are moderated by ROA (see Figure 4. 3, Figure 4. 4 and Figure 4. 5). To understand more about the moderating effect of ROA, Figure 4. 3 describes the relationship between environmental performance (E) and revenue at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). The figure explains that as ROA increases, the positive impact of environmental performance (E) on revenues gets weaker. In other words, low ROA, increases the impact of environmental performance (E) on revenues. Figure 4. 4 portrays the relationship between environmental performance (E) and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). The figure shows that, as ROA increases, the positive impact of environmental performance (E) on market value of firms gets stronger. In other words, high ROA increases the impact of environmental performance (E) on market value of firms.

Furthermore, Figure 4. 5, explains the relationship between revenue and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It indicates that, as ROA increases, the positive impact of revenue on market value of firms gets stronger. In other words, high ROA increases the impact of revenue on market value of firms.

Table 4. 6. *Moderated Mediation: Environmental Performance on Market Value*

Predictors	Model 1 (LogTR)		Model2 (LogMCap)	
	b	t	b	t
E	.015***	46.940	.005***	8.413
ROA	-.170	-1.580	5.343***	29.840
E x ROA	-.021***	-5.672	.016**	2.093
LogTR			1.543***	72.321
LogTR x ROA			2.880***	12.943
R^2	.294		.625	
F	755.817		1811.793	
p	<0.001		<0.001	

N = 5450

*** p < 0.001, ** p < 0.05

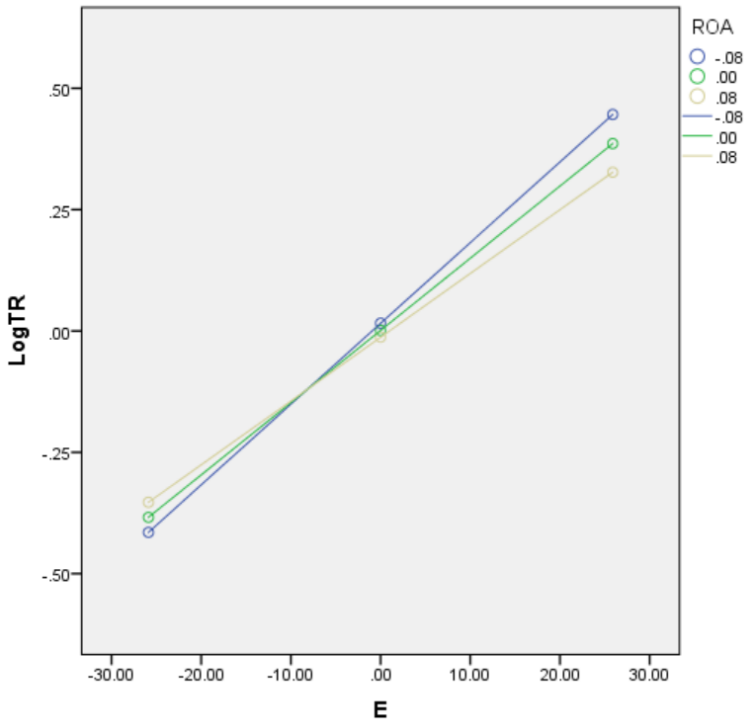

Figure 4. 3. *ROA's Moderation: Environmental Performance and Revenues*

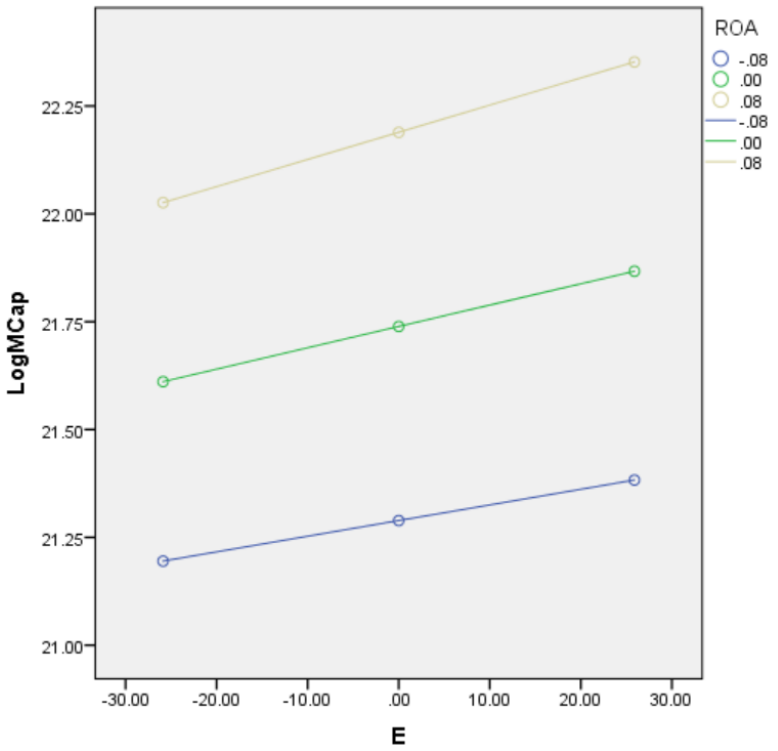

Figure 4. 4. *ROA's Moderation: Environmental Performance and Market Value*

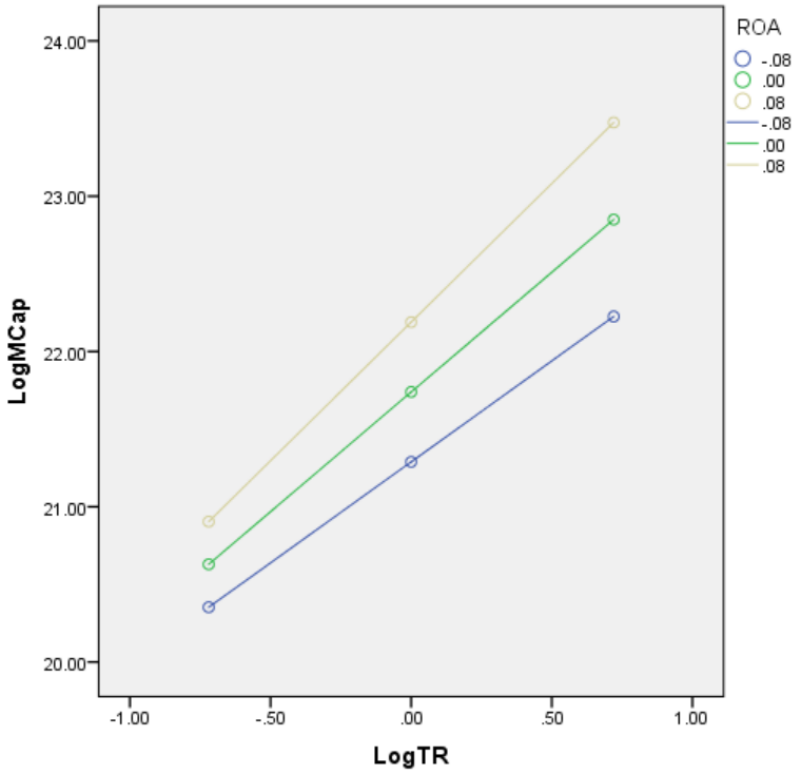

Figure 4. 5. *ROA's Moderation: Revenue and Market Value*

4.4. Social Performance and Market Value

In this section, we are looking at the social performance (S) score for testing the mediation effect and moderated mediation effect.

4.4.1. Testing for the Mediation Model (S)

In this section, we are looking at the second components of ESG scores i.e., social performance (S) for testing the mediation effect of revenues. We tested the mediation model, which is related with the social performance (S) and the market value based on hypotheses given below and as shown in Figure 3. 8:

i. *Hypothesis S1:* Social performance (S) will positively affect revenues (LogTR).
ii. *Hypothesis S2:* Social performance (S) will positively affect the market value of firms (LogMCap).
iii. *Hypothesis S3:* Revenues (LogTR) will positively affect the market value of the firms (LogMCap).
iv. *Hypothesis S4:* Revenues (LogTR) will mediate the association of social performance (S) with the market value of firms (LogMCap).

For this purpose, we applied Hayes Process Model 4 suggested by Hayes, (2013) in SPSS 28. We expected that the revenues would mediate the relationship between social performance (S) and market value of the firms in Hypothesis S4. To test this hypothesis, we conducted a four-step procedure to frame the mediation effect (Baron & Kenny, 1986). These steps include:

i. testing whether significant association between social performance (S) and market value of the firms exist.
ii. testing whether a significant association between social performance (S) and revenues exist.
iii. testing whether a significant association between revenues and market value of firms after controlling for social performance (S) exist.
iv. testing whether the coefficient for the indirect path between social performance (S) and the market value of the firms through revenues is significant.

The bias-corrected percentile bootstrap approach determines whether the last condition is satisfied. The present study generated 5000 bootstrapping samples from the standardized data (N = 5450) via random sampling.

In the first step regression analysis showed that, there is a significant positive relationship between social performance (S) and market value of the firms, $\beta = .006$, $p < 0.001$ (see Model 1 of Table 4. 7). Hence this supports the Hypothesis S2.

In the second step, we found a significant positive relationship between social performance (S) and revenues, $\beta = .013$, $p < 0.001$ (see Model 2 of Table 4. 7). Hence this supports the Hypothesis S1.

In the third step, a significant positive relationship between revenues and market value of the firm has found, $\beta = 1.522$, $p < 0.001$ (see Model 3 of Table 4. 7). Hence, that accepts the Hypothesis S3.

In the fourth step, the bias-corrected percentile bootstrap method showed that the indirect effect of social performance (S) on market values of the firms through revenues was significant, ab = .020, SE = .001, 95% CI= [.005- .008]. The empirical 95% confidence interval did not overlap with zero, which means the mediation effect was significant. Hence, it supports the Hypothesis S4 as criteria for establishing a mediation effect were satisfied.

Table 4. 7. *Mediation Effect of Social Performance on Market Value*

Predictors	Model 1 (S→LogMCap)		Model 2 (S→ LogTR)		Model 3 (LogTR→LogMCap S→LogMCap)	
	b	t	b	t	b	t
S	.006***	9.525	.013***	33.706	.006***	9.525
CI [BootLLCI- BootULCI]			.012	.014	.005	.008
LogTR					1.522***	71.906
CI [BootLLCI- BootULCI]					1.478	1.565
R^2			.173		.564	
F			1136.116		3523.034	
p	<0.001		<0.001		<0.001	

N = 5450

*** p < 0.001

4.4.2. Testing for the Moderated Mediation Model (S)

We tested the moderated mediation model, which is related with the social performance (S) and the market value based on the hypotheses given below and as shown in Figure 3. 8.

i. *Hypothesis S5a:* Profitability will moderate the association of social performance (S) with the market value of firms (LogMCap).

ii. *Hypothesis S5b:* Profitability will moderate the association of social performance (S) with revenues *(LogTR).*

iii. *Hypothesis S5c:* Profitability will moderate the association of revenues (LogTR) with market value of the firm (LogMCap).

For this purpose, we estimated parameters for three regression models with PROCESS Macro Model 59 suggested by Hayes (2013) in SPSS 28. The current study considered the moderating effect of ROA on:

i. the relationship between social performance (S) and market value of firms.
ii. the relationship between social performance (S) and revenues.
iii. the relationship between revenues and market value of firms.

The outcomes of the moderated mediation analysis were summarized in Table 4. 8. Moderated mediation will be established if either or both of two patterns existed (Hayes, 2013). In this study, those two patterns are the path between social performance (S) and revenues moderated by ROA, and/or the path between revenues and market value of firms was moderated by ROA.

As mentioned in the Table 4. 8, there was a significant positive relationship between social performance (S) and market value of firms, $\beta = .006$, $p < 0.001$, and this effect was moderated by ROA, $\beta = -.020$, $p < 0.05$. Hence, it confirms the Hypothesis S5a. More importantly, the interaction between social performance (S) and ROA is negatively correlated with the market value of firms.

The relationship between social performance (S) and revenues were positively significant, $\beta = .013$, $p < 0.001$, this effect was moderated by ROA, $\beta = -.021$, $p < 0.001$. Hence, it accepts the Hypothesis S5b. However, the interaction between social performance (S) and ROA is negatively correlated with revenues.

At last, there is a significant positive relationship between revenues and market value of firms, $\beta = 1.563$, $p < 0.001$, and more importantly, the effect was moderated by ROA, $\beta = 2.880$, $p < 0.001$. Therefore, this supports the Hypothesis S5c.

These results shows that relationship between all the three paths such as social performance (S) and revenues, social performance (S) and market value of firms as well as, revenues and market value of firms are moderated by ROA (see Figure 4. 6, Figure 4. 7 and Figure 4. 8). To understand more about the moderating effect of ROA, Figure 4. 6 describes the relationship between social performance (S) and revenue at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It explains that as ROA

increases, the positive impact of social performance (S) on revenues gets weaker. In other words, low ROA, increases the impact of social performance (S) on revenues. Figure 4. 7 describes the relationship between social performance (S) and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). The figure shows that, as ROA increases, the positive impact of social performance (S) on market value of firms gets weaker. In other words, low ROA increases the impact of social performance (S) on market value of firms.

Furthermore, Figure 4. 8, explains relationship between revenues and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It indicates that, as ROA increases, the positive impact of revenues on market value of firms gets stronger. In other words, high ROA increases the impact of revenue on market value of firms.

Table 4. 8. *Moderated Mediation: Social Performance on Market Value*

Predictors	Model 1 (LogTR)		Model2 (LogMCap)	
	b	t	b	t
S	.013***	33.887	.006***	9.304
ROA	.004	.040	5.283***	29.680
S x ROA	-.021***	-4.387	-.020**	-2.548
LogTR			1.563***	78.975
LogTR x ROA			3.357***	17.363
R^2	.176		.626	
F	386.889		1819.984	
p	<0.001		<0.001	

N = 5450

*** p < 0.001, ** p < 0.05

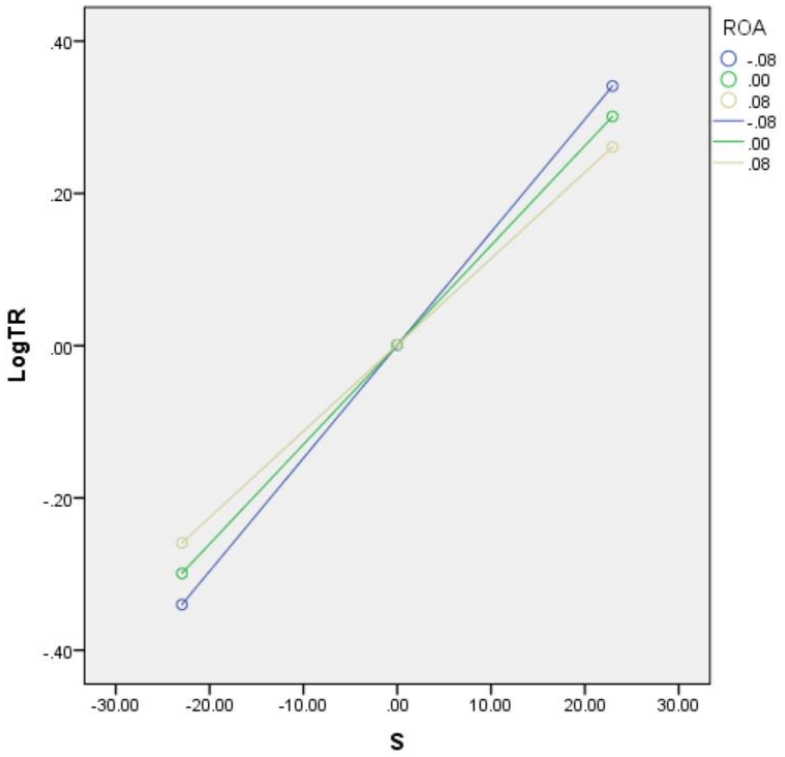

Figure 4. 6. *ROA's Moderation: Social Performance and Revenue*

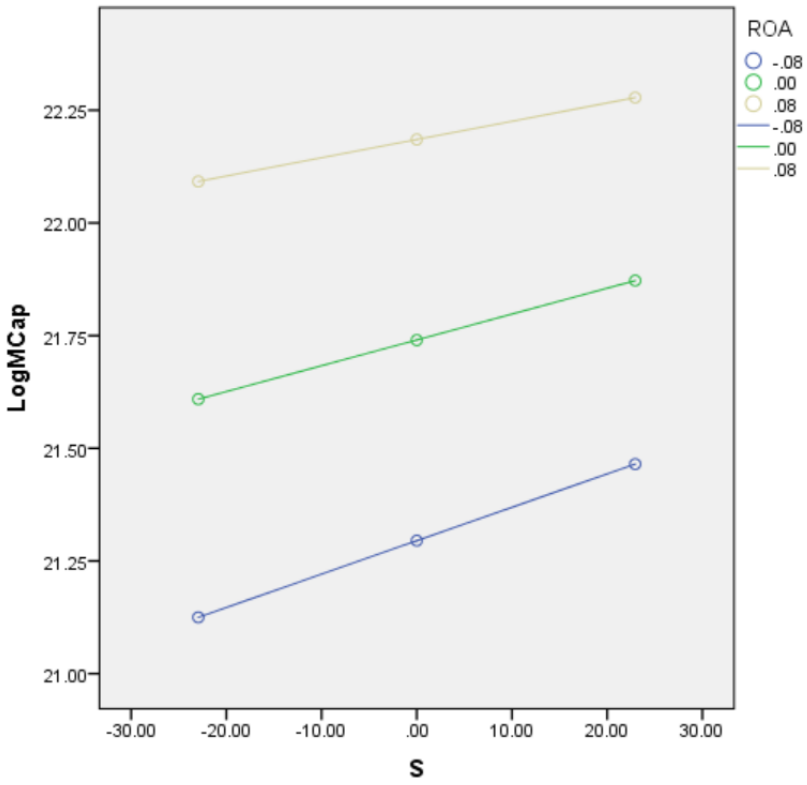

Figure 4. 7. *ROA's Moderation: Social Performance and Market Value*

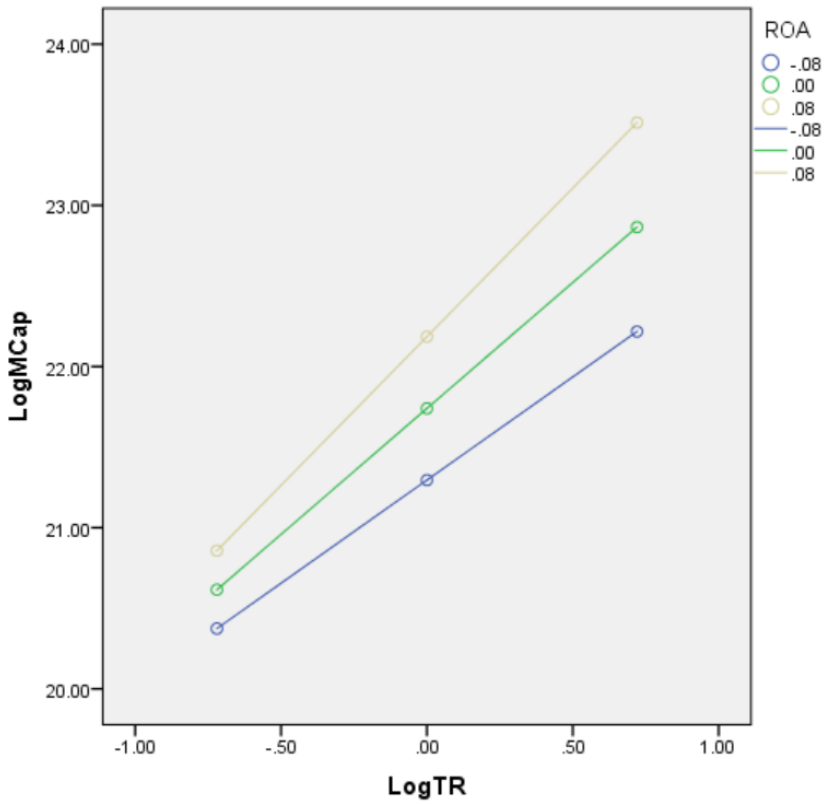

Figure 4. 8. *ROA's Moderation: Revenue and Market Value*

4.5. Governance Performance and Market Value

In this section, we are looking at the governance performance (G) score for testing the mediation effect and moderated mediation effect.

4.5.1. Testing for the Mediation Model (G)

In this section, we are looking at the last components of ESG scores i.e., governance performance (G) for testing the mediation effect of revenues. We tested the mediation model, which is related with the governance performance (G) and the market value based on the hypotheses given below and as shown in Figure 3. 9:

i. *Hypothesis G1:* Governance performance (G) will positively affect revenues (LogTR).
ii. *Hypothesis G2:* Governance performance (G) will positively affect the market value of firms (LogMCap).
iii. *Hypothesis G3:* Revenues (LogTR) will positively affect the market value of firms (LogMCap).

iv. *Hypothesis G4:* Revenues (LogTR) will mediate the association of governance performance (G) with the market value of firms (LogMCap).

For this purpose, we applied Hayes Process Model 4 suggested by Hayes, (2013) in SPSS 28. We expected that revenues would mediate the relationship between governance performance (G) and market value of firms in Hypothesis G4. To test this hypothesis, we conducted a four-step procedure to frame the mediation effect (Baron & Kenny, 1986). These steps include:

v. testing whether a significant association between governance performance (G) and the market value of firms exist.

vi. testing whether a significant association between governance performance (G) and revenues exist.

vii. testing whether a significant association between revenues and the market value of firms after controlling for governance performance (G) exist.

viii. testing whether the coefficient for the indirect path between governance performance (G) and the market value of the firms through revenues is significant.

The bias-corrected percentile bootstrap approach is used to detect whether the last condition i.e., whether the coefficient for the indirect path is satisfied. The present study generated 5000 bootstrapping samples from the standardized data (N = 5450) through random sampling.

The first step regression analysis results showed that, there is a significant positive relationship between governance performance (G) and market value of firms, $\beta = .004$, $p < 0.001$ (see Model 1 of Table 4. 9). Hence, this supports the Hypothesis G2.

In the second step, we found a significant positive relationship between governance performance (G) and revenues, $\beta = .010$, $p < 0.001$ (see Model 2 of Table 4. 9). Hence, this supports the Hypothesis G1.

In the third step, a significant positive relationship between revenues and market value of firms has been found, $\beta = 1.576$, $p < 0.001$ (see Model 3 of Table 4. 9). Hence, this supports the Hypothesis G3.

In the fourth step, the bias-corrected percentile bootstrap method showed that the indirect effect of governance performance (G) on market values of the firms through revenues was significant, ab = .016, SE = .001, 95% CI= [.002- .005]. The empirical 95% confidence interval did not overlap with zero, which means the mediation effect was

significant. Hence, this supports the Hypothesis G4. Overall, the criteria for establishing the mediation effect were satisfied.

Table 4. 9. *Mediation Effect of Governance Performance on Market Value*

Predictors	Model 1 (G→LogMCap)		Model 2 (G→ LogTR)		Model 3 (LogTR→LogMCap G→LogMCap)	
	b	t	b	t	b	t
G	.004***	5.072	.010***	22.072	.004***	
CI [BootLLCI- BootULCI]			.009	.011	.002	.005
LogTR					1.576***	77.979
CI [BootLLCI- BootULCI]					1.533	1.619
R^2			.082		.559	
F			487.165		3449.716	
p	<0.001		<0.001		<0.001	

N = 5450

*** p < 0.001

4.5.2. Testing for the Moderated Mediation Model (G)

We tested the moderated mediation model, which is related with the governance performance (G) and the market value based on the hypotheses given below and as shown in Figure 3. 9.

i. *Hypothesis G5a:* Profitability will moderate the association of governance performance (G) with the market value of firms (LogMCap).
ii. *Hypothesis G5b:* Profitability will moderate the association of governance performance (G) with revenues (LogTR).
iii. *Hypothesis G5c:* Profitability will moderate the association of revenues (LogTR) with the market value of firms (LogMCap).

We estimated parameters for three regression models with PROCESS Macro Model 59 suggested by Hayes (2013) in SPSS 28. The current study considered the moderating effect of ROA on:

i. the relationship between governance performance (G) and market value of firms.
ii. relationship between governance performance (G) and revenues.
iii. the relationship between revenues and market value of firms.

The outcomes of the moderated mediation analysis were summarized in Table 4. 10. Moderated mediation will be established if either or both of two patterns exist (Hayes, 2013). In this study, those two patterns are the path between governance performance (G) and revenues moderated by ROA, and/or the path between revenues and market value of firms moderated by ROA.

As mentioned in Table 4. 10, there was a significant positive relationship between governance performance (G) and the market value of firms, $\beta = .003$, $p < 0.001$ Yet, this effect was not moderated by ROA, $p > 0.05$. Hence, it rejects the Hypothesis G5a.

The relationship between governance performance (G) and revenues was positively significant, $\beta = .010$, $p < 0.001$, and this effect was moderated by ROA, $\beta = -.026$, $p < 0.001$. Hence, this supports the Hypothesis G5b. However, the interaction between ESG performance and ROA was negatively correlated with revenues.

At last, there is a significant positive relationship between revenues and the market value of firms, $\beta = 1.613$, $p < 0.001$, and more crucially, the effect was moderated by ROA, $\beta = 3.134$, $p < 0.001$. Therefore, this supports the Hypothesis G5c.

These results shows that relationship between the two paths such as governance performance (G) and revenues, governance performance (G) and revenues and market value of firms are moderated by ROA (see Figure 4. 9 and Figure 4. 10). To understand more about the moderating effect of ROA, Figure 4. 9 describes the relationship between governance performance (G) and revenue at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It explains that as ROA increases, the positive impact of governance performance (G) on revenues gets weaker. In other words, low ROA, increases the impact of governance performance (G) on revenues.

Furthermore, Figure 4. 10, explains relationship between revenue and market value of firms at two levels of ROA (i.e., 1 SD below the mean and 1 SD above the mean). It indicates that, as ROA increases, the positive impact of revenue on market value of firms gets stronger. In other words, high ROA increases the impact of revenue on market value of firms.

Table 4. 10. *Moderated Mediation: Governance Performance on Market Value*

Predictors	Model 1 (LogTR)		Model2 (LogMCap)	
	b	t	b	t
G	.010***	22.022	.003***	4.822
ROA	.040	.356	5.309***	29.659
G x ROA	-.026***	-4.374	.007	.790
LogTR			1.613***	85.384
LogTR x ROA			3.134***	17.343
R^2	.293		.621	
F	169.858		1784.823	
p	<0.001		<0.001	

N = 5450

*** p < 0.001

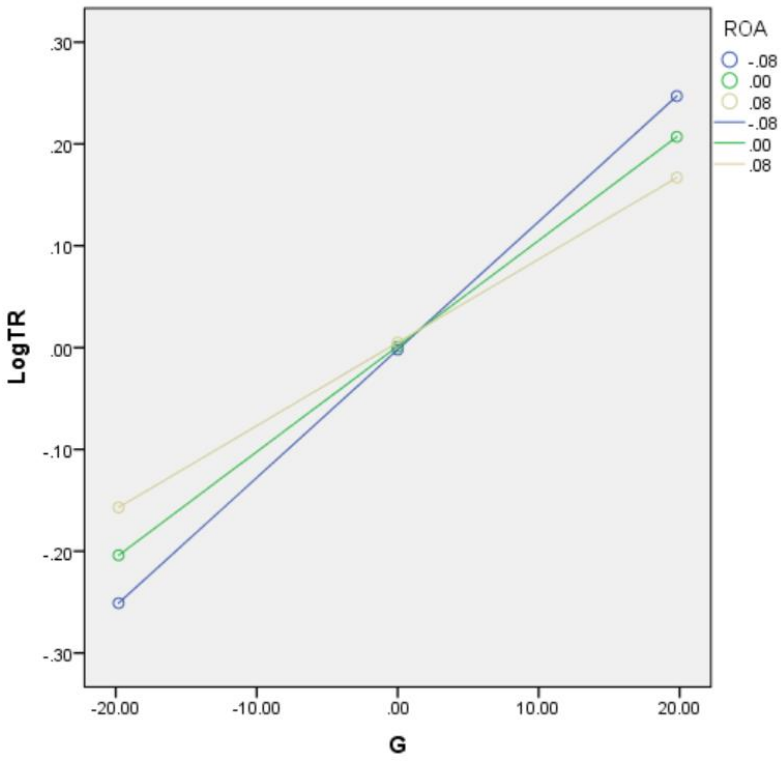

Figure 4. 9. *ROA's Moderation: Governance Performance and Revenues*

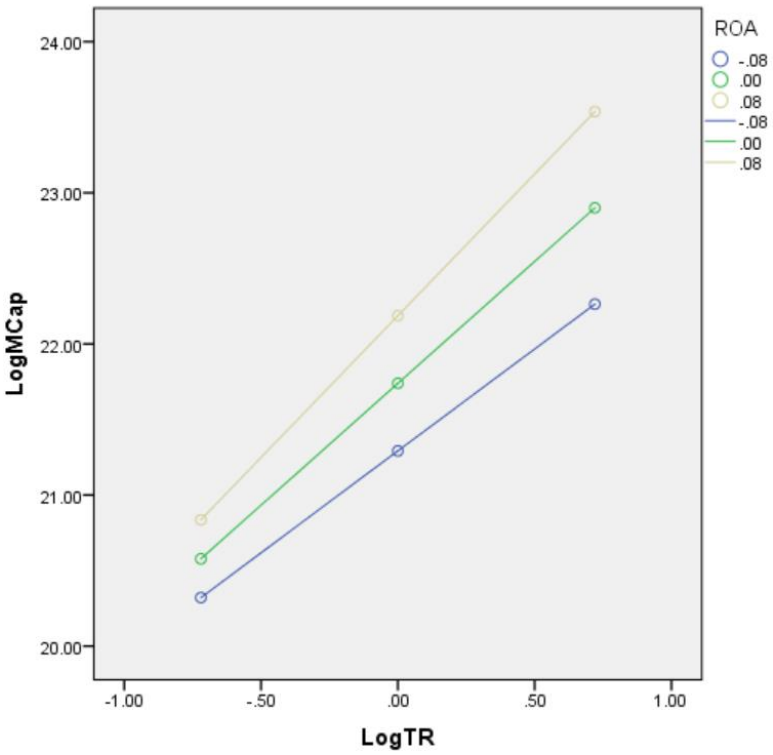

Figure 4. 10. *ROA's Moderation: Revenue and Market Value*

5. DISCUSSION

This study examined the underlying mechanisms between corporate sustainability performance measures and the market value of firms. We utilized ESG scores from the Refinitiv database as a proxy for corporate sustainability performance. We considered both the overall corporate sustainability performance, measured by ESG score, and the individual ESG dimensions measured by ESG pillar scores, i.e., environmental, social, and governance performance scores.

The ESG score gives us the big picture that tells us how a company is performing regarding overall corporate sustainability. However, the individual scores for environmental, social, and governance practices can tell us more about how a company is performing regarding specific dimensions of ESG. Understanding the strengths and weaknesses of companies in specific dimensions of ESG performance may help us identify how corporate sustainability performance in particular pillars of ESG may be reflected on the market value of firms. For example, a company might have better market values because it uses clean energy and reduces waste. However, they might have a lower market performance if they do not treat their employees well.

For companies, these insights derived from analyzing the impacts of sustainable performance metrics may provide key analytical and strategic tools to strengthen the market performance. They can pinpoint areas of excellence and spotlight where improvements are necessary to enhance the market value of firms. For instance, if environmental performance significantly influences a firm's market value, it sends a powerful signal to the stakeholders especially shareholders and potential investors. It emphasizes that environmental performance is not just a matter of ethics or compliance; but it is directly linked to companies' financial positioning in the market. When a company understands this link, it can tailor its corporate policies more precisely. Recognizing that solid environmental performance can boost market value might prompt companies to look closely at their practices and necessary actions to improve environmental performance to foster market performance. For instance, they could assess and scrutinize their resource consumption, their emission levels, their waste management processes, and promote innovations prioritizing environmental sustainability.

Furthermore, this understanding has budgetary implications. For example, when companies recognize the potential for increased market value resulting from better environmental practices, it provides a financial justification for environmental investments. Rather than seeing environmental initiatives as a cost, companies might view them as strategic investments, allocating budgets that foster improvements in environmental performance.

While we explored the relationship between corporate sustainability performance and the market value of firms, we constructed a moderated mediation model to analyze the mechanisms underlying the association between corporate sustainability performance and the market value of firms. The results showed that firms' revenue significantly mediated between corporate sustainability performance measures and market value, and ROA moderated the mediating effect.

5.1. Overall ESG Performance

Regarding the overall ESG scores, the results reveal a significant positive relationship with the market value of firms, which is line with previous studies (Aboud & Diab, 2018; Chang et al., 2022; Chouaibi et al., 2022; Fatemi et al., 2018; Li et al., 2018; Saini et al., 2022; Sandberg et al., 2022; Zhou et al., 2022). Several factors can explain the positive relationship between ESG performance and the market value of firms.

For example, good ESG performance boosts a firm's reputation, leading to economic gains (Saini et al., 2022). Higher ESG disclosure efforts build trust through transparency and accountability (Li et al., 2018). Moreover, strong ESG practices can give firms a competitive edge and lead to higher profits due to loyal customers and better firm value creation (Saini Neha, 2022).

At the same time, we found that firms' revenue mediates the relationship between ESG and the market value of firms. Hence, it can be inferred that a firm's commitment to ESG performance positively influences its revenues, which, in turn, significantly affects its market value.

In addition, we found that the direct effect of ESG performance on the market value of firms and the indirect effect of ESG performance on the market value of firms through firms' revenue is moderated by ROA. Firstly, the moderating effect of ROA on the relationship between ESG performance and total revenues was analyzed. The association between ESG performance and total revenues was positively significant, which is supported by the findings of (Nyame-Asiamah & Ghulam, 2020; Tran & Pham, 2022); Yannan et al. (2022). Moreover, the relationship between ESG and total revenues was moderated by ROA. However, the moderated effect of ROA is negative. This moderated effect suggests that, as ROA increases, the positive impact of ESG on total revenues gets slightly weaker. For example, for companies already making good profits, the financial benefits they gain from their ESG performance might be less noticeable and stand out less on firm’s revenues. It is like adding a cup of water to a full bucket; the impact is not as noticeable. On the other hand, for less profitable companies, every effort with ESG performance can make a clear difference on firm’s revenues. Hence, the negative coefficient captures this diminishing impact of ESG performance for highly profitable firms. Secondly, the moderating effect of ROA in the relationship between ESG performance and the market value of firms was analyzed. While the relationship between ESG performance and the market value of firms was found positively significant, the ROA, which we considered a measure of profitability, did not act as a moderating factor in this relationship. Therefore, while ESG practices play a significant role in influencing the market value of firms, the profitability of these firms does not strengthen or diminish this relationship. In simpler terms, whether a firm is highly profitable or not, its commitment to ESG performance holds consistent value in the eyes of the market.

5.2. Environmental Performance

In the environmental performance (E), which is the first individual pillar of the ESG scores, we found a significant positive relationship with the market value of firms. This finding has been supported in various empirical studies (Al-Najjar & Anfimiadou, 2012; Ardillah & Chandra, 2021; Endo, 2019; Firmansyah et al., 2021; Fuadah et al., 2018). At the same time, this finding contradicts with the arguments that environmentally responsible actions may reduce firms' earnings without reducing risk (Hassel et al., 2005) and investing in environmental issues may increase firms' costs without yielding financial gains (Alam et al., 2019). However, several factors can explain the positive relationship between environmental performance (E) and the market value of firms. For example, companies adopting eco-friendly operations often gain competitive edges, elevating their market value (Ardillah & Chandra, 2021; Firmansyah et al., 2021; Fuadah et al., 2018; Yadav et al., 2016). Transparent reporting of greenhouse gas emissions can further boost their market value (Toly, 2019). Moreover, environmental performance can drive market value via strengthening a firm's legitimacy (Berrone, 2016). Finally, by upholding superior environmental performance, firms may mitigate regulatory risks, potentially leading to market value (Li et al., 2017; Zhu & Sarkis, 2007).

At the same time, we found that firms' revenue mediates the relationship between environmental performance (E) and the market value of firms. This mediating role can be explained with an example. Imagine a company that invests in environmental innovations, emissions, and waste management. These environmental initiatives might attract a more extensive customer base that values sustainability, leading to increased sales and revenues. As revenues increase, potential investors might see the company as a more valuable and attractive investment, thus raising its market value.

In addition, we found that the direct effect of environmental performance (E) on the market value of firms and the indirect effect of environmental performance (E) on the market value of firms through firms' revenue is moderated by ROA. Firstly, the moderating effect of ROA in the relationship between environmental performance (E) and total revenues was analyzed. The association between environmental performance (E) and total revenues was positively significant. This finding is in line with (Dangelico & Pontrandolfo, 2015); Klassen and McLaughlin (1996); (Meier et al., 2023). Moreover, the relationship between environmental performance (E) and total revenues was

moderated by ROA. However, the moderated effect of ROA negatively impacts environmental performance on total revenues. This effect suggests that, as ROA increases, the positive impact of environmental performance (E) on revenues gets somewhat weaker. For example, the additional benefits from environmental performance might be less evident in total revenues for highly profitable firms. However, their environmental efforts can make a more tangible difference in revenues for less profitable firms. Secondly, the moderating effect of ROA in the relationship between environmental performance (E) and the market value of firms was analyzed. ROA moderated the significant positive relationship between environmental performance (E) and firms' market value. This finding suggests that, as ROA increases, the positive impact of environmental performance (E) on the market value of firms gets marginally stronger. In another words, if the firms' profitability increases, investors might think, "This company is not only doing good for the environment, but also managing its assets well to generate profits." This combined signal can enhance the company's market value even more.

5.3. Social Performance

Social performance (S), the second pillar of the ESG scores, was found to have a significant positive relationship with the market value of firms. This finding is consistent with previous studies (Hu et al., 2018; Jo & Harjoto, 2011; Koh et al., 2014; Tsang et al., 2020; Yoon et al., 2018). The positive impact of social performance (S) over the market value would be due to various reasons. For example, firms engaged with social activities tend to increase operating efficiency (Brammer & Millington, 2005; Porter & Kramer, 2002), improve corporate reputation (Menon & Kahn, 2003), rise employee productivity (Valentine, 2008), enhance risk management (Dhaliwal et al., 2012) and strengthen total factor productivity (Hasan et al., 2018).

At the same time, we found that firms' revenue mediates the relationship between social performance (S) and the market value of firms. This mediating effect suggests that if a company is known for its better human rights practices, safe working conditions, and community support, it can attract more customers and increase sales. Hence, good social practices tend to help increase revenues. As these revenues grow, the company's market value also goes up. The total revenue plays the mediating role connecting the company's social performance to its increased market value.

In addition, we found that the direct effect of social performance (S) on the market value of firms and the indirect effect of social performance (S) on the market value of firms through firms' revenue is moderated by ROA. Firstly, the moderating effect of ROA in the relationship between social performance (S) and total revenues was analyzed. The relationship between social performance (S) and total revenues was positively significant. This finding supports the results of previous empirical studies (Maury, 2022; Meier et al., 2023; Ruf et al., 2001; Tran & Pham, 2022). Importantly, the relationship between social performance (S) and total revenues was moderated by ROA. However, the moderated effect of ROA negatively impacts social performance (S) on total revenues. This effect indicates that, as ROA increases, the positive impact of social performance (S) on revenues gets mildly weaker. As a result, the benefits of social performance might stand out less for highly profitable firms. However, their social performance can have a more evident impact on revenues for less profitable firms. Secondly, the moderating effect of ROA in the relationship between social (S) and the market value of firms was analyzed. ROA moderated the significant positive relationship between social performance (S) and firms' market value. However, the interaction between social performance (S) and ROA is negatively correlated with the market value of firms. This buffering role of ROA suggests that as ROA increases, the positive impact of social performance (S) on market value of firms gets slightly weaker. In other words, when a firm has a higher ROA, indicating strong profitability, the positive influence of social performance on its market value slightly declines. Hence, social performance positively impacts market value, its effect is less distinct in firms with stronger profitability.

5.4. Governance Performance

Governance performance (G), the final pillar of the ESG scores, revealed a significant positive relationship with the market value of firms. This finding supports the results of previous studies (Buallay et al., 2017; Fallatah & Dickins, 2012; Javeed & Azeem, 2014; Mahrani & Soewarno, 2018; Pucheta-Martínez & Gallego-Álvarez, 2020). The positive impact of corporate governance on market value can be explained with previous studies which have supported that the various components of corporate governance can enhance firms value. For example, board independence (Bhagat & Bolton, 2013; Javeed & Azeem, 2014; Mura, 2007), gender diversity (Arun et al., 2015; Kılıç & Kuzey, 2016; Kim & Starks, 2016; Terjesen et al., 2016) and executive

compensations (Almarayeh, 2021; Handa, 2018; Lemma et al., 2020; Müller et al., 2014; Yahya & Ghazali, 2017) are found to impact financial performance and market performance.

At the same time, we found that firms' revenue mediates the relationship between governance performance (G) and the market value of firms. It suggests that when a firm has a better board structure, gender diversity, compensation schemes, shareholder rights, CSR strategy, and reporting transparency, it will experience a rise in sales and overall revenue. As revenues rise, driven by strong governance practices, market value is enhanced.

In addition, we found that the direct effect of governance performance (G) on the market value of firms and the indirect effect of governance performance (G) on the market value of firms through firms' revenue is moderated by ROA. Firstly, the moderating effect of ROA in the relationship between governance performance (G) and total revenues was analyzed. The relationship between governance performance (G) and total revenues was positively significant. This finding is consistent with previous studies (Colpan & Yoshikawa, 2012; Herring, 2009; Madhani, 2011; Onishi, 2013). Notably, the relationship between governance performance (G) and total revenues was moderated by ROA. However, ROA negatively impacts governance performance (G) on total revenues. This effect implies that, as ROA increases, the positive impact of governance performance (G) on revenues gets minimally weaker. In companies with higher profitability, the benefits they attain from good governance performance on their revenues are less evident. As a result, when a firm becomes more profitable, the positive impact of its corporate governance on its revenues diminishes. Secondly, the moderating effect of ROA in the relationship between governance (G) and the market value of firms was analyzed. Even though there was a significant positive relationship between governance performance (G) and firms' market value, this effect was not moderated by ROA. This result proposes that, whether a firm is highly profitable or not, its governance performance consistently contributes to its market value.

6. CONCLUSION AND IMPLICATIONS

We found that firms' revenue mediates the relationship between corporate sustainability measures and the market value of firms. Hence, it can be inferred that a firm's commitment to corporate sustainability performance positively influences its revenues, which, in turn, significantly affects its market value of firms. In addition, we found that the direct effect of corporate sustainability performance measures on the market value of firms and the indirect effect of corporate sustainability performance measures on the market value of firms through firms' revenue is moderated by ROA. It implies that profitability moderates the direct link between sustainability performance and market value and the indirect link that operates through a firm's revenue. In simpler terms, the impact of sustainability practices on a firm's market value, whether directly or through its revenue, can vary based on its profitability (ROA).

Our findings may provide various significant implications for companies and various stakeholders. First, we provided concrete evidence that corporate sustainability is not just a theoretical ‘concept’ but a solid issue, since sustainability performance seems to influence financial performance of companies, specifically market value through sales revenues. Firms' commitment to sustainability attracts potential customers and strengthens customer loyalty, which drives up revenues and consequently enhances market value. Second, profitability appears to regulate how sustainability performance is reflected on sales and market value. Our findings imply that relatively more profitable companies should focus more on their environmental performance for greater market value enhancement, whereas relatively less profitable companies should focus more on their social performance for greater market value enhancement.

In summary, Table 6. 1 demonstrates the conclusions about the hypothesis testing. Except the hypothesis H5a for ESG as well as for the governance performance (G) all other hypotheses are accepted. Major findings with supported studies and major rationale of the findings with the supporting studies are listed in Table 6. 2 and Table 6. 3 respectively.

Table 6. 1. *Conclusions about the Hypothesis Testing*

Hypothesis	ESG	E	S	G
H1	✓	✓	✓	✓
H2	✓	✓	✓	✓
H3	✓	✓	✓	✓
H4	✓	✓	✓	✓
H5a	X	✓	✓	X
H5b	✓	✓	✓	✓
H5c	✓	✓	✓	✓

X: Rejected

✓: Not Rejected (Accepted)

Table 6. 2. *Major Findings and Supporting Studies*

Major Findings	Supporting Studies
Overall ESG scores have a significant positive relationship with the market value of firms.	(Aboud & Diab, 2018; Chang, Fu, Jin, & Liem, 2022; Chouaibi et al., 2022; Fatemi, Glaum, & Kaiser, 2018; Li et al., 2018; Saini et al., 2022; Sandberg et al., 2022; Zhou et al., 2022).
Environmental performance (E) indicates a significant positive relationship with the market value of firms.	(Al-Najjar & Anfimiadou, 2012; Ardillah & Chandra, 2021; Endo, 2019; Firmansyah et al., 2021; Fuadah et al., 2018).
Social performance exhibits a significant positive relationship with the market value of firms	(Hu, Chen, Shao, & Gao, 2018; Jo & Harjoto, 2011; Koh, Qian, & Wang, 2014; Tsang, Hu, & Li, 2020; Yoon, Lee, & Byun, 2018).

Table 6. 3. *Major Rationale of the Findings and Supporting Studies*

Dimensions	Major Rationale of the Findings	Supporting Studies
Overall ESG Performance	Boosts a firm's reputation → market value	Saini et al., 2022
	Build trust through transparency and accountability → market value.	Li et al., 2018
Environmental Performance	Create loyal customers → market value	Saini Neha, 2022
	Eco-friendly operations often gain competitive edges → market value.	Ardillah & Chandra, 2021; Firmansyah et al., 2021; Fuadah et al., 2018; Yadav et al., 2016
	Reporting of greenhouse gas emissions → market value	Toly, 2019
	Firm's legitimacy → market value.	Berrone, 2016
	Mitigate regulatory risks → market value	Li et al., 2017; Zhu & Sarkis, 2007
Social Performance	Social performances bring operating efficiency → market value	Brammer & Millington, 2005; Porter & Kramer, 2002
	Corporate reputation → market value	Menon & Kahn, 2003
	Rise employee productivity → market value	Valentine, 2008
	Enhance risk management → market value	Dhaliwal et al., 2012
Governance Performance	Board independence → market value	Bhagat & Bolton, 2013; Javeed & Azeem, 2014; Mura, 2007
	Gender diversity in board → market value	Arun et al., 2015; Kılıç & Kuzey, 2016; Kim & Starks, 2016; Terjesen et al., 2016
	Executive compensations → market value	Almarayeh, 2021; Handa, 2018; Lemma et al., 2020; Müller et al., 2014; Yahya & Ghazali, 2017

7. LIMITATIONS AND SUGGESTIONS FOR FUTURE STUDIES

To the best of our knowledge, this study is one of the first comprehensive studies to utilize Refinitiv's overall ESG scores and the three dimensions of ESG scores to examine the impact of corporate sustainability performance over the market value of the firms. However, several limitations should be noted when interpreting the results of the current study. First, the number of firms examined has been reduced to 5450 due to data availability constraints, as explained by the sample selection process (See Table 3. 1). This is mainly due to the unavailability of ESG data throughout the years. However, as the trend of reporting ESG data has become popular and mandatory by various laws, future studies could employ extended datasets. Second, the study's time span was limited to 5 years (2018-2022), so expanding the time span would be recommended for future studies. Third, although Refinitiv is a reliable data source with one of the world's most extensive ESG content collection operations, Refinitiv ESG scores may only partially reflect the sustainability performance of the companies investigated in this study. Therefore, further studies can utilize various other databases such as Bloomberg, Global Reporting Initiative (GRI), Kinder lydenberg and Domini (KLD), Dow Jones Sustainability Indices (DJSI), and other databases. Given the growing inclusion of companies in ESG Databases over an extended period in the upcoming years, different methodologies such as dynamic time series analysis and dynamic panel data analysis can be employed in further studies with similar purposes. Finally, future studies may focus on sectoral or regional differences with respect to the impact of corporate sustainability on financial performance and consider alternative moderators such as GDP of each country or regional implementations such as the European Sustainability Reporting Standards.

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APPENDICES

Appendix 1. *List of Sustainability Indicators in Literature*

Sustainability Indicator	Author(s)
Corporate social/environmental performance (CSP)	(Barnett & Salomon, 2012; Orlitzky et al., 2003)
Dow Jones Sustainability Indices (DJSI)	(Artiach et al., 2010; Chih et al., 2010; Lee & Faff, 2009; Lo & Sheu, 2007; López et al., 2007; Lourenço et al., 2012; Robinson et al., 2011; Searcy & Elkhawas, 2012; Wai Kong Cheung, 2011)
Global Reporting Initiative (GRI)	(Haryono & Iskandar, 2015; Laskar, 2018, 2019; Ortas et al., 2015; Perez-Batres et al., 2011; Plumlee et al., 2015)
Borsa Istanbul Sustainability Index	(Ates, 2020)
Human Development Index and the Environmental Performance Index	(Xiao et al., 2018)
Annual sustainability/ CSR reports	(Aras et al., 2018; Burhan & Rahmanti, 2012; Dobbs & Van Staden, 2016; Laskar et al., 2017; Laskar & Maji, 2016; Malik, 2015)
Kinder lydenberg and domini (KLD)	(Waddock & Graves, 1997; Wagner, 2010)
Bloomberg ESG score	(Fatemi et al., 2018; Jha & Rangarajan, 2020; Li et al., 2018)
Franklin Research and Development Corporation (FRDC) rating	(Russo & Fouts, 1997)
Domini Social Index Performance – MSCI	(Becchetti et al., 2008)
Council on Economic Priorities (CEP)	(Al-Tuwaijri et al., 2004; Pava & Krausz, 1996)
Sustainability Accounting Standards Board (SASB)	(Khan et al., 2016)
Covalence EthicalQuote	(Capelle-Blancard & Petit, 2019)
Ethical Investment Research Service (EIRIS)	(Brammer et al., 2006)
EGX100 (Egyptian ESG Index)	(Aboud & Diab, 2018)
MSCI ESG Database	(Dunn et al., 2018)

Appendix 2. *Industry Based Sustainability Studies*

Sector	Author(s)
Mining	Hilson Gavin, 2000; Fuisz-Kehrbach, 2015; Northey, 2019; Mutale, Inonge 2019; Blinova Ekaterina, 2022
Chemical	Leppelt, 2013; Iles, Alastair, 2013; de Faria, 2021; Cannatelli, 2017
Plastic	Nara, Elpidio, 202; Bachman, Bonnie, 2015
Oil and Gas	Ponomarenko, 2021; Lee, Jooh, 2011; Kirat Mohamed, 2015; Duttagupta, 2021; Arena Marika, 2022
Healthcare	Hussain Matloub, 2018; El Khoury, 2022; Kalia Deepali, 2022; Meiling, 2021
Construction	Afzal Fatima, 2017; Rahman Haseeb Ur, 2022; Jones Timothy, 2010; Adetunji, 2003
Information Technology (IT)	Deng Qi,2017; Jung Seonmin, 2018; Asadi Shahla, 2017; Khor Kuan-Siew, 2015; Junior Bokolo, 2018
Real Estate	Stibbe, 2014; Sardinha, 2011; Laposa 2010; Zahid Muhammad, 2015; Zahid Muhammad, 2016; Liang Jian, 2021; Kouaib Amel, 2021; THOMAS, 2020

Appendix 3. *Regional-Wise Studies on Corporate Sustainability Performance*

Region	Author(s)
Americas	(Araújo et al., 2022; Artiach et al., 2010; Correa-Garcia et al., 2020; Jennifer Ho & Taylor, 2007; Loor Alcívar et al., 2020; Lourenço et al., 2012; Márquez & Pérez, 2015; Orsato et al., 2015)
Europe	(Diebecker & Sommer, 2017; Engida et al., 2018; Rahi et al., 2023; Sempere-Ripoll et al., 2020; Sukitsch et al., 2015; Taliento et al., 2019)
Asia	(Das et al., 2020; Ketprapakorn, 2019; Laskar et al., 2017; Lenssen et al., 2017; Rezaee et al., 2019; Shahzad et al., 2020)
Africa	(Benson & Ganda, 2022; Labuschagne et al., 2005; Nwobu, 2017; Quartey & Oguntoye, 2020; Van Zyl, 2013; Visser, 2004; Visser, 2002)
Oceania	(de Villiers & van Staden, 2012; Klettner et al., 2014; Lim & Loosemore, 2017; Munir et al., 2019; Nadeem et al., 2017; Schrobback & Meath, 2020)

Appendix 4. *Themes of ESG Pillar Scores*

Pillars	Catagories	Themes	Data points	Weight method
Environmental	Emmission	Emissions	TR.AnalyticCO2	Quant industry median
		Waste	TR.AnalyticTotalWaste	Quant industry median
		Biodiversity*		
		Environmental management systems*		
	Innovation	Product innovation	TR.EnvProducts	Transparency weights
		Green revenues, research and development (R&D) and capital expenditures (CapEx)	TR.AnalyticEnvRD	Quant industry median
	Resource use	Water	TR.AnalyticWaterUse	Quant industry median
		Energy	TR.AnalyticEnergyUse	Quant industry median
		Sustainable packaging*		
		Environmental supply chain*		
Social	Community	Equally important to all industry groups, hence a median weight of five is assigned to all		Equally important to all industry groups
	Human rights	Human rights	TR.PolicyHumanRights	Transparency weights
	Product responsibility	Responsible marketing	TR.PolicyResponsibleMarketing	Transparency weights
		Product quality	TR.ProductQualityMonitoring	Transparency weights
		Data privacy	TR.PolicyDataPrivacy	Transparency weights
	Workforce	Diversity and inclusion	TR.WomenEmployees	Quant industry median
		Career development and training	TR.AvgTrainingHours	Transparency weights
		Working conditions	TR.TradeUnionRep	Quant industry median
		Health and safety	TR.AnalyticLostDays	Transparency weights
Governance	CSR strategy	CSR strategy	Data points in governance category and governance pillar	Count of data points in each governance category/all data points in governance pillar
		ESG reporting and transparency		
	Management	Structure (independence, diversity, committees)	Data points in governance category and governance pillar	Count of data points in each governance category/all data points in governance pillar
		Compensation		
	Shareholders	Shareholder rights	Data points in governance category and governance pillar	Count of data points in each governance category/all data points in governance pillar
		Takeover defenses		

Source: Refinitiv

Appendix 5. *ESG Category and Definition*

Score	Definition
Refinitiv ESG resource use score	The resource use score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
Refinitiv ESG emissions reduction score	The emission reduction score measures a company's commitment and effectiveness towards reducing environmental emissions in its production and operational processes.
Refinitiv ESG innovation score	The innovation score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products.
Refinitiv ESG workforce score	The workforce score measures a company's effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
Refinitiv ESG human rights score	The human rights score measures a company's effectiveness in terms of respecting fundamental human rights conventions.
Refinitiv ESG community score	The community score measures the company's commitment to being a good citizen, protecting public health and respecting business ethics.
Refinitiv ESG product responsibility score	The product responsibility score reflects a company's capacity to produce quality goods and services, integrating the customer's health and safety, integrity and data privacy.
Refinitiv ESG management score	The management score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
Refinitiv ESG shareholders score	The shareholders score measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices.
Refinitiv ESG CSR strategy score	The CSR strategy score reflects a company's practices to communicate that it integrates economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

Source: Refinitiv

Appendix 6. *Variable Description: Financial Performance Measures*

Variable Type	Variable Name	Symbol	Proxy measure
Dependent Variable	Market Capitalization	LogMCap	Company Market Capitalization represents the sum of market value for all relevant issue-level share types. The issue-level market value is calculated by multiplying the requested share type by the latest closing price. This item supports default, free float, and outstanding share types. The default share type is the most widely reported shares for a market and it is one of the most issued, outstanding, or listed shares.
Mediating Variable	Total Revenue	LogTR	Total revenues represent revenues from all of a company's operating activities after deducting any sales adjustments and their equivalents.
Moderating Variable	Return on Assets	ROA	Return on asset is proxied for the profitability of the firm. This item represents the return on assets before tax, which reflects operating profitability. It is calculated as the income before tax for the fiscal period divided by the average total assets for the same period, expressed as a percentage.

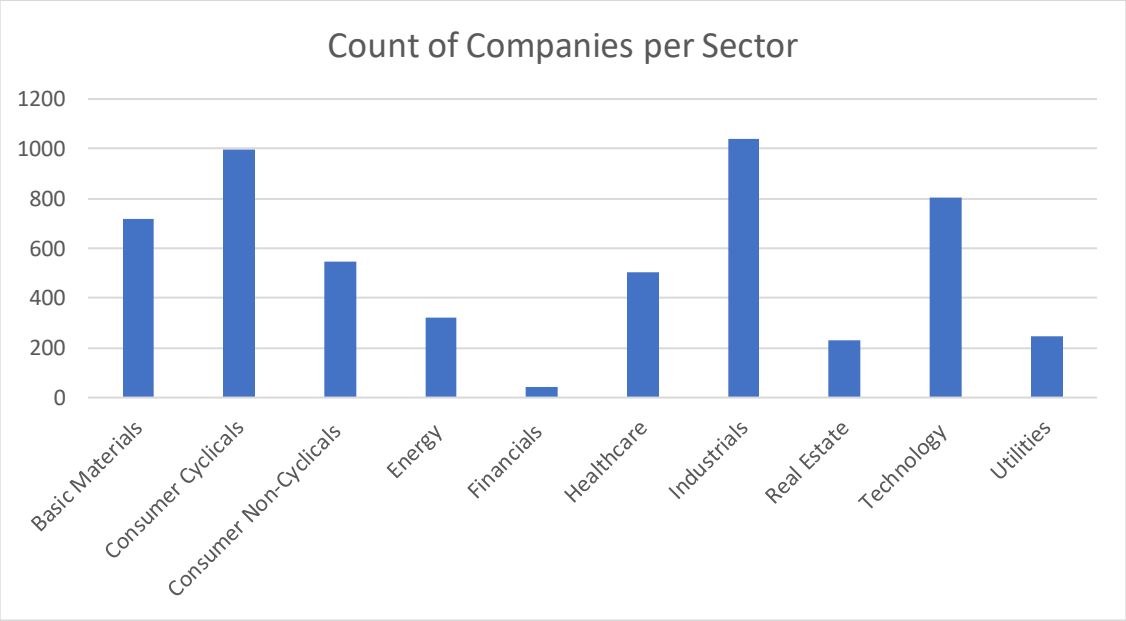
Appendix 7. *List of Countries*

No	Country	Count of Company
1	Argentina	11
2	Australia	185
3	Austria	29
4	Bahamas	1
5	Belgium	31
6	Bermuda	16
7	Brazil	77
8	Cambodia	1
9	Canada	213
10	Cayman Islands	5
11	Chile	26
12	China	716
13	Colombia	9
14	Cyprus	2
15	Czech Republic	1
16	Denmark	37
17	Egypt	10
18	Faroe Islands	1
19	Finland	57
20	France	134
21	Germany	188
22	Greece	11
23	Guernsey	2
24	Hong Kong	102
25	Hungary	4
26	Iceland	2
27	India	233
28	Indonesia	40
29	Ireland; Republic of	31
30	Isle of Man	2
31	Israel	16
32	Italy	87
33	Japan	397

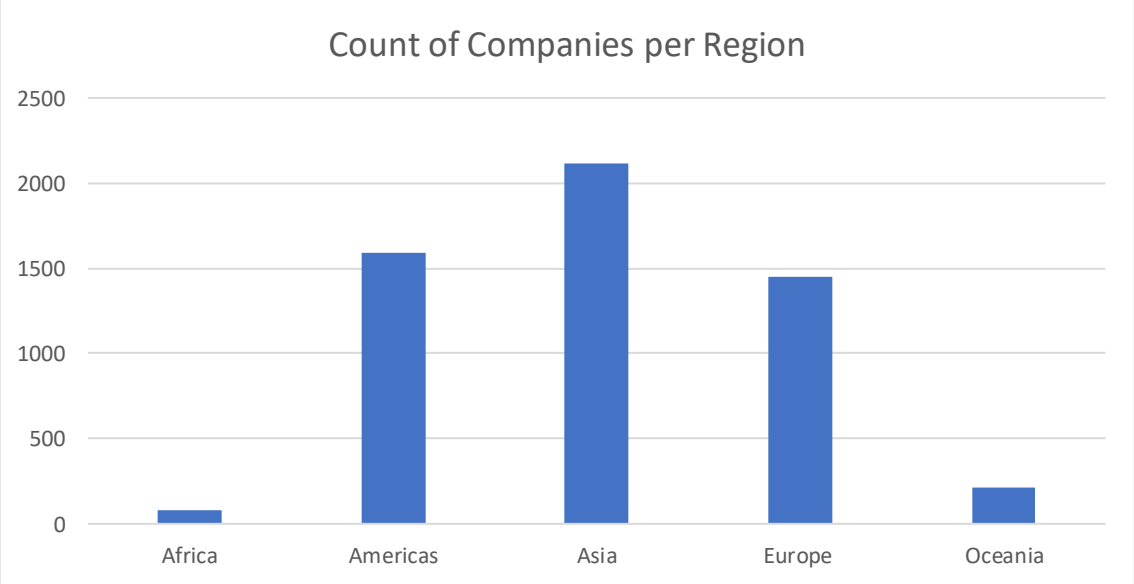
34	Jersey	7
35	Kenya	1
36	Korea; Republic (S. Korea)	118
37	Kuwait	4
38	Luxembourg	23
39	Macau	3
40	Malaysia	93
41	Mexico	38
42	Monaco	4
43	Mongolia	1
44	Morocco	3
45	Netherlands	40
46	New Zealand	31
47	Nigeria	1
48	Norway	49
49	Oman	3
50	Panama	1
51	Peru	11
52	Philippines	26
53	Poland	23
54	Portugal	12
55	Qatar	12
56	Romania	1
57	Russia	2
58	Saudi Arabia	22
59	Singapore	45
60	Slovenia	1
61	South Africa	61
62	Spain	52
63	Sri Lanka	1
64	Sweden	158
65	Switzerland	118
66	Taiwan	120
67	Thailand	100
68	Turkey	43
69	Ukraine	1

70	United Arab Emirates	8
71	United Kingdom	342
72	United States of America	1177
73	Uruguay	2
74	Vietnam	15
	Grand Total	**5450**

Appendix 8. *Count of Companies Per Sectors*



Appendix 9. *Count of Companies Per Regions*



Appendix 10. *An Example of Calculating of Overall ESG Score*

	Environmental			Social				Governance			
Industry group	Emission	Innovation	Resource use	Human rights	Product responsibility	Workforce	Community	Management	Shareholders	CSR strategy	ESG scores
Water and related utilities	0.15	0.13	0.15	0.05	0.04	0.13	0.09	0.17	0.05	0.03	
ABC	0.66	0.00	0.44	0.05	0.58	0.89	0.34	0.99	0.84	0.56	0.571146184
CBD	0.71	0.96	0.38	0.00	0.69	0.66	0.70	0.37	0.01	0.56	0.547913483
DEF	0.03	0.00	0.00	0.00	0.00	0.57	0.11	0.21	0.14	0.54	0.150536652
EFG	0.00	0.31	0.03	0.00	0.00	0.25	0.59	0.89	0.94	0.00	0.327824384
EMJ	0.87	0.31	0.68	0.20	0.86	0.84	0.98	0.33	0.87	0.68	0.639400132
EMQ	0.00	0.00	0.00	0.00	0.00	0.30	0.02	0.88	0.08	0.01	0.194782046
ENR	0.92	0.81	0.85	0.75	0.97	0.93	0.66	0.40	0.49	0.86	0.756319427
GPQ	0.24	0.31	0.00	0.00	0.17	0.02	0.16	0.56	0.56	0.00	0.223443757
HIJ	0.61	0.31	0.50	0.65	0.42	0.80	0.80	0.48	0.27	0.37	0.54145808
IBD	0.00	0.00	0.00	0.00	0.00	0.07	0.30	0.51	0.49	0.00	0.145398367
JKL	0.50	0.73	0.74	0.00	0.78	0.43	0.93	0.62	0.89	0.26	0.611504799
LMN	0.76	0.31	0.56	0.00	0.47	0.48	0.48	0.17	0.24	0.26	0.415151441
MNO	0.82	0.31	0.91	0.40	0.58	0.61	0.07	0.33	0.52	0.63	0.539888776
MSE	0.55	0.00	0.62	0.85	0.17	0.75	0.84	0.77	0.35	0.91	0.581805891
OPQ	0.29	0.00	0.32	0.00	0.17	0.16	0.48	0.15	0.42	0.08	0.212906948
PQR	0.45	0.65	0.79	0.55	0.78	0.52	0.75	0.76	0.76	0.16	0.640379494
PSF	0.97	0.88	0.97	0.95	0.92	0.98	0.89	0.15	0.73	0.34	0.776142465
RST	0.08	0.31	0.00	0.00	0.17	0.20	0.59	0.42	0.42	0.00	0.228111754
UVW	0.34	0.00	0.26	0.20	0.58	0.70	0.39	0.26	0.16	0.31	0.316400123
VPF	0.16	0.31	0.15	0.00	0.17	0.11	0.25	0.88	0.90	0.00	0.325828115
XYZ	0.39	0.00	0.21	0.40	0.17	0.39	0.48	0.95	0.73	0.51	0.429105164
YQM	0.16	0.00	0.09	0.00	0.36	0.34	0.20	0.69	0.34	0.00	0.25005416

Source: Refinitiv

For determining the comprehensive pillar and ESG scores, industry-specific category weights are utilized, rooted in a data-driven and unbiased approach. The consolidation of ESG scores is achieved using the weights from 10 categories, derived from the Refinitiv magnitude matrix.

Appendix 11. *Category Scores and Category weights of Calculating ESG of pillar score*

Pillar	Category	Category scores*	Category weights	Sum of category weights	Formula: sum of category weights	New category weights*	Formula: new category weights	Pillar scores	Formula: pillar scores
Environmental	Emissions	0.98	0.15			0.35	(0.15/0.44)		
Environmental	Resource use	0.97	0.15	0.44	(0.15+0.15+0.13)	0.35	(0.15/0.44)	0.94	(0.98*0.35)+ (0.97*0.35)+ (0.85*0.29)
Environmental	Innovation	0.85	0.13			0.29	(0.13/0.44)		
Social	Community	0.89	0.09			0.28	(0.09/0.31)		
Social	Human rights	0.95	0.05		(0.09+0.05+0.04+0.13)	0.17	(0.05/0.31)	094	(0.89*0.28)+ (0.95*0.17)+ (0.92*0.13)+ (0.98*0.43)
Social	Product responsibility	0.92	0.04	0.31		0.13	(0.04/0.31)		
Social	Workforce	0.98	0.13			0.43	(0.13/0.31)		
Corporate governance	Shareholders	0.73	0.05			0.20	(0.05/0.26)		
Corporate governance	CSR strategy	0.34	0.03	0.26	(0.05+0.03+0.17)	0.13	(0.03/0.26)	0.32	(0.73*0.20)+ (0.34* 0.13)+ (0.19*0.67)
Corporate governance	Management	0.19	0.17			0.67	(0.17/0.26)		

Source: Refinitiv

The ESG pillar scores represent the combined total of the category weights. The methodology used to compute these pillar scores can be found in Appendix 11.

Appendix 12. *ESG Pillar Scoring Example*

Water and related utilities				Illustration of calculation of pillar scores									
Industry group	Emission	Innovation	Resource use	Environmental pillar scores	Human rights	Product responsibility	Workforce	Community	Social pillar scores	Management	Shareholders	CSR strategy	Governance pillar scores
Pillar weights	0.35	0.29	0.35		0.17	0.13	0.43	0.28		0.67	0.20	0.13	
ABC	0.66	0.00	0.44	0.39	0.05	0.58	0.89	0.34	0.56	0.99	0.84	0.56	0.90
CBD	0.71	0.96	0.38	0.67	0.00	0.69	0.66	0.70	0.57	0.37	0.01	0.56	0.32
DEF	0.03	0.00	0.00	0.01	0.00	0.00	0.57	0.11	0.27	0.21	0.14	0.54	0.24
EFG	0.00	0.31	0.03	0.10	0.00	0.00	0.25	0.59	0.27	0.89	0.94	0.00	0.78
EMJ	0.87	0.31	0.68	0.64	0.20	0.86	0.84	0.98	0.77	0.33	0.87	0.68	0.48
EMQ	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.02	0.13	0.88	0.08	0.01	0.60
ENR	0.92	0.81	0.85	0.86	0.75	0.97	0.93	0.66	0.83	0.40	0.49	0.86	0.48
GPQ	0.24	0.31	0.00	0.17	0.00	0.17	0.02	0.16	0.08	0.56	0.56	0.00	0.49
HIJ	0.61	0.31	0.50	0.48	0.65	0.42	0.80	0.80	0.72	0.48	0.27	0.37	0.43
IBD	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.30	0.11	0.51	0.49	0.00	0.43
JKL	0.50	0.73	0.74	0.65	0.00	0.78	0.43	0.93	0.54	0.62	0.89	0.26	0.63
LMN	0.76	0.31	0.56	0.56	0.00	0.47	0.48	0.48	0.40	0.17	0.24	0.26	0.20
MNO	0.82	0.31	0.91	0.70	0.40	0.58	0.61	0.07	0.42	0.33	0.52	0.63	0.41
MSE	0.55	0.00	0.62	0.41	0.85	0.17	0.75	0.84	0.72	0.77	0.35	0.91	0.71
OPQ	0.29	0.00	0.32	0.22	0.00	0.17	0.16	0.48	0.22	0.15	0.42	0.08	0.20
PQR	0.45	0.65	0.79	0.63	0.55	0.78	0.52	0.75	0.62	0.76	0.76	0.16	0.68
PSF	0.97	0.88	0.97	0.95	0.95	0.92	0.98	0.89	0.94	0.15	0.73	0.34	0.29
RST	0.08	0.31	0.00	0.12	0.00	0.17	0.20	0.59	0.27	0.42	0.42	0.00	0.36
UVW	0.34	0.00	0.26	0.21	0.20	0.58	0.70	0.39	0.52	0.26	0.16	0.31	0.25
VPF	0.16	0.31	0.15	0.20	0.00	0.17	0.11	0.25	0.14	0.88	0.90	0.00	0.77
XYZ	0.39	0.00	0.21	0.21	0.40	0.17	0.39	0.48	0.39	0.95	0.73	0.51	0.85
YQM	0.16	0.00	0.09	0.09	0.00	0.36	0.34	0.20	0.25	0.69	0.34	0.00	0.53

Appendix 12, illustrated how pillar scores are calculated for the water and related utilities industry group, using the data available in the ESG Database.