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Corporate Social Responsibility as a Bridge Between Green Initiatives and Sustainability: role of Corporate Governance

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Abstract
In the context of increasing environmental challenges and the global pursuit of sustainable development, this study addresses a critical gap in the literature concerning the role of green practices and governance in enhancing sustainability within small and medium enterprises (SMEs) in Pakistan. While existing research has largely focused on large corporations or specific sectors in various regions, limited empirical attention has been paid to how green finance, green investment, and green technology collectively influence sustainability outcomes in emerging economies, particularly through the mediating role of corporate social responsibility (CSR) and the moderating effect of corporate governance (CG). To address this gap, the study aims to examine a comprehensive model grounded in agency and stakeholder theories that integrates these variables to explore their direct, indirect, and conditional effects on sustainability. A quantitative, cross-sectional design was employed, with data collected from 250 employees in Pakistani SMEs through structured surveys adapted from established scales. Structural equation modeling (SEM) was utilized to test the hypothesized relationships. The results indicate that green finance, green investment, and green technology each have a significant positive impact on sustainability. Moreover, CSR mediates these relationships, demonstrating its central role in translating green strategies into sustainable outcomes. CG significantly moderates the CSR–sustainability linkage, suggesting that effective governance mechanisms strengthen the impact of CSR on organizational sustainability. These findings contribute to the theoretical understanding of sustainable development by highlighting the interplay among financial, technological, social, and governance dimensions. The study offers practical implications for SME managers and policymakers, emphasizing the need to institutionalize CSR practices, invest in green innovations, and enhance governance structures to foster long-term sustainability. This research enriches

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the sustainability discourse by offering a multidimensional framework that is particularly relevant for SMEs operating in resource-constrained and policy-evolving contexts such as Pakistan.

Keywords: Green Finance, Corporate Governance, Sustainability, Green Technology and Corporate Social Responsibility

1.0 Introduction

In today's fast-changing and competitive business world, sustainability has become a key goal for companies that want to grow responsibly and succeed in the long run. Green finance (GF), green investment (GI), and green technology (GT) are powerful tools that help businesses move towards more eco-friendly practices (Wang et al., 2023; Wang & Yan, 2023; Wang et al., 2022; Xu et al., 2020). GF provides funding for projects that protect the environment, helping companies build financial systems that support sustainability goals (Wang & Yan, 2023). GI encourages businesses to adopt sustainable methods by making better use of resources and improving efficiency (Ye & Dela, 2023). GT helps reduce pollution and waste by improving how resources are used (Bernal et al., 2017). These green efforts are more effective when they are part of a company's corporate social responsibility (CSR) strategy, which means considering the needs of both society and the environment while making business decisions. When businesses include green finance, investment, and technology as part of their CSR approach, they can make strong progress toward sustainability (Wang & Yan, 2023). However, the success of these efforts often depends on corporate governance, which provides rules and oversight to make sure leaders act in the best interest of everyone involved. According to agency theory, good governance helps balance the goal of making profits with the responsibility to protect the environment and serve society (Wang & Yan, 2023). A strong governance system ensures that CSR activities meet stakeholder expectations and lead to real improvements in sustainability (Wang & Yan, 2023). Research shows that governance plays an important role in making CSR work better by adding transparency and responsibility to decision-making. When GF, GI and GT are supported by effective governance, companies can face environmental problems more successfully, gain a competitive edge, and make a positive impact on society (Wang et al., 2023; Wang & Yan, 2023).

Applying stakeholder theory in corporate governance demonstrates that companies should take responsibility and address stakeholders' needs to improve their sustainability (Stieb, 2009). For a company to have sustainable practices, it must make sure its CSR activities meet what employees and investors expect (Schaltegger et al., 2017). It is believed that a business adopts CSR activities more transparently and follows them with greater success when its governance is fair and inclusive, allowing it to run smoothly in public eyes (Anjum, Ahmed, et al., 2025). If a governance framework brings together agency theory and stakeholder theory and receives support from green finance, green investment and green technology, it becomes very valuable for supporting sustainability. A number of studies have been done on how these elements interact. Wang et al. (2022) proved that green finance and corporate governance impact a company's sustainability, but mentioned nothing about green investment or technology. Pambudi et al. (2022) concluded that including green investment in CSR ensures

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green business practices, however, the focus of their study does not include green finance or technology. Awawdeh et al. (2022) discovered that green finance and green technology help achieve sustainability, unlike green investment. According to Jain et al. (2023), green finance contributes to CSR, but once again the study did not discuss investments or technology. Sharma and Choubey (2022) report that there is a positive relationship between green finance and CSR, but some studies found the opposite (Mavroulidis et al., 2022). Ye and Dela (2023) pointed out the favorable impact of green finance and green investment on sustainability. Chandrakant and Rajesh (2023) indicate that corporate governance has a very positive association with sustainability. Few studies have investigated the role of corporate governance in linking CSR to sustainability, focusing more on how corporate governance supports CSR and green approaches could offer new insights into possible strategies for companies (Ridwan and Mayapada 2022; Zaman et al., 2020).

There is previous research on making industries more sustainable in various countries, yet SMEs in Pakistan have not been the primary focus. Rehman et al. (2021) examined the manufacturing industry, Ye and Dela (2023) focused on the chemical industry in Indonesia, Bernal-Conesa et al. (2017) looked into science and technology parks in Spain and Aslam and Jawaid (2023) explored banks in Pakistan. Still, the research reveals that studying how SMEs in Pakistan contribute to sustainability needs more attention. It is important to note this because small- and medium-sized businesses in Pakistan play a vital part in providing jobs and increasing the country's GDP. Because compact companies generally have little capital, many of them struggle to implement green or sustainable procedures (Babiak & Trendafilova, 2011). Green finance makes it possible for SMEs to apply for funds that support eco-friendly projects. Having green investment is very useful, as it supports greener manufacturing in Pakistan and makes resources easier to reuse (Abdou et al., 2022). The government is offering encouragement to SMEs in Pakistan to care for the environment through special policies (Chaaben et al., 2022). In addition, when a company has good governance, its management is more honest, stakeholders can trust it and solid business relationships are maintained. Mahmood et al. (2018) note that businesses in the small-and medium-sized sector benefit from sustainability and can contribute to global sustainable goals. The study explores how corporate social responsibility explains how green finance, green investment, green technology and sustainability are related. This field also investigates how corporate governance contributes to stronger relations in the company. Information was gathered from 250 staff of SMEs in Pakistan to explore the relationship between green strategies and good governance for sustainability. This study provides a new structure that allows finance, technology, CSR and governance to interact. Managers of small and medium enterprises also get clear advice on creating a CSR environment, using eco-friendly measures and ensuring better governance. You can use these lessons in Pakistan as well as in other countries.

2.0 LITERATURE REVIEW

2.1 Green Investment and Sustainability

Green investment focuses on using funds for projects or ideas that aim to sustain the environment and further sustainability. It matters since it supports projects

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that help the environment and strengthen economies to grow sustainably. Scholars studying green investment and sustainability have done so in many nations, industries and over a wide range of periods. One approach is to evaluate GI using indicators such as expenditure on renewable energy or utilizing clean technology (Ludhiyani et al., 2012). Most of the studies suggest that investing in green projects greatly contributes to an organization's sustainable development (Cadestin et al., 2018; Ye & Dela, 2023). Ioannou and Serafeim (2019) found out that companies investing more in environmental projects generally perform well at safeguarding the environment and reaching future plans. Li et al. (2023) showed that GI improves the environment and promotes new approaches for companies to manage sustainability. It is evident that green investment offers financial and also helps with the achievement of global sustainable goals. Since past studies have supported GI, this study looks further into how GI contributes to sustainability. It will help explain how green investment benefits companies and contributes to the wellbeing of the environment.

H1: Green investment significant impact on sustainability

2.2 Green investment, Corporate Social Responsibility and Sustainability

Sustainability (SUS) is important to companies and green investment (GI) and corporate social responsibility (CSR) are considered major ways to achieve it (Dai et al., 2022). Enterprises committed to CSR often fund green projects through eco-friendly finance schemes. In most cases, this connection depends on institutional resources, opportunities for green investments and easy access to capital (Xu et al., 2020). Various sources have shown that good GI services increase the success of CSR in supporting sustainability practices. Eccles et al. (2022) showed that green companies tend to have a strong commitment to social and environmental duties. They also noted that green investment supports efficient CSR planning and contributes to a company's general sustainability. They concluded that green investment improves a company's CSR, contributing to its sustainability in the longer run. Collaboration between CSR and GI helps encourage businesses to adopt environmentally friendly and socially responsible practices that contribute to reaching sustainability. These preceding studies serve as the basis for the subsequent research hypotheses outlined below,

H2: Green investment significantly impacts to CSR.

H3: CSR significantly mediates between the association of green investment and sustainability.

2.3 Green Finance and Sustainability

Green finance (GF) uses financial methods to promote sustainability and studies have found that using it greatly assists companies in becoming more environmentally friendly. Guo et al. (2020) revealed that investing more in green finance reduces carbon emissions and benefits the environment. They also pointed out that green finance strategies encourage companies to fulfill sustainability purposes. Organizations use green finance to contribute to sustainable projects and enhance their environment. According to Ronaldo and Suryanto (2022), employing green finance has a positive effect on sustainability. They reveal collectively that green finance helps a company's targets fit with nature and environmental concerns. Therefore, green finance aids in improving

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our environment and inspires businesses to act with more environmental care. Therefore, building on the preceding discussion, it is hypothesized that,
H4: Green finance significantly impacts sustainability.

2.4 Green Finance, Corporate Social Responsibility and Sustainability
With green finance, the environment is supported and made more sustainable by using various financial methods (Tran et al., 2020). Companies are expected to be successful as well as dedicated to caring for the environment and society. GF and CSR focus on conserving nature and helping society (Tran et al., 2020). GF supports companies in enhancing their achievements in areas related to the environment and society (Wang et al., 2023; Wang & Yan 2023). Using GF aids companies in achieving their goals for lasting sustainability (Zhang & Chen, 2020). Evidence suggests that companies that practice GF are more eager to engage in CSR which stands to improve sustainability (Mohan & Jayalakshmi, 2025;Wang et al., 2023; Wang & Yan, 2023). GF helps shape a business that can exist for a long time. Consequently, the study posits the following research hypotheses:
H5: CSR significantly effects by green finance.
H6: CSR significantly mediates on the association of green finance and sustainability.

2.5 Green Technology and Sustainability
Green Technology consists of tools and goods that assist in protecting the environment and upholding sustainability (Guo et al., 2020). Guo et al. (2020) found that applying green technologies greatly assists in making the world more sustainable by cutting down pollution and making better use of resources. Because of this, GT matters for the achievement of environmental targets. Wang and Yan (2023) also suggest that GT makes companies more eco-friendly that use GT are more effective in preserving the environment. These studies prove that GT greatly contributes to eco-friendly actions and meeting company sustainability goals. Adopting GT encourages companies to take care of the environment and conduct their business wisely. Consequently, the research is formulated with the following hypotheses
H7: The green technology has a significant impact on sustainability.

Table 1:Prior literature on green finance and sustainability

Authors (Year)	Context	Variables	Methodology	Key Findings
Wang et al. (2022)	Various industries (cross-national)	Green Finance, Corporate Governance, Sustainability	Quantitative, structural modeling	Green finance and governance significantly contribute to sustainability, though other green practices like investment and technology were not considered.
Pambudi	Southeast	Green	Empirical	CSR mediates the

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et al. (2022)	Asia	Investment, CSR, Sustainability	analysis with mediation model	impact of green investment on sustainability, supporting its integration in business strategy.
Awawdeh et al. (2022)	MENA region	Green Finance, Green Technology, Sustainability	Quantitative, cross-sectional	Both green finance and technology positively affect sustainability, with emphasis on the role of environmental innovation.
Jain, Zicari, & Aguilera (2023)	Global corporate sector	Green Finance, CSR, Sustainability	Structural equation modeling (SEM)	Green finance improves CSR practices, which in turn enhances sustainability outcomes.
Ye & Dela (2023)	Chemical sector in Indonesia	Green Finance, Green Investment, Sustainability	Cross-sectional survey	Both green finance and investment positively influence sustainability; highlights integration of financial and operational green practices.

2.6 Green Technology, Corporate Social Responsibility and Sustainability

It has been proven that adopting green technology (GT) aids companies in fulfilling their corporate social responsibility requirements which promotes sustainability. Researchers have suggested that GT practices allow businesses to help the environment and also become more responsible socially, therefore increasing their CSR performance (Guo et al., 2020). Kraus et at. (2020) found that companies that include green technology in their daily operations tend to strengthen CSR and become more sustainable. They also note that with corporate GT, more investors and stakeholders interested in social and environmental issues are attracted to companies(Anjum, Gul, et al., 2025). The company is recognized for its strong CSR and encourages a lasting focus on sustainability. The studies reveal that GT and CSR make a good team and aid companies in hitting their sustainability goals. This proves that working on technology, being socially responsible and practicing sustainability led to a better future. Therefore, the study posits the following investigative hypotheses:

H8: Green technology has significant impact on CSR.

H9: The relationship between green technology and sustainability mediated by CSR.

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H10: CSR has significant positive impact on sustainability.

2.7 Moderating Role of Corporate Governance

Good corporate governance (CG) helps companies in their growth and success and provide support of corporate social responsibility (CSR) and sustainability (SUS) (Zeb et al., 2021). To achieve sustainability, companies involved in CSR consider environmental and social factors in all their daily decisions (Kamal, 2021). Companies address all stakeholder needs and try to achieve long-term sustainability (Yang & Basile, 2022). Zaman et al. (2020) found that effective governance in businesses was related to the implementation of CSR practices that led to improved sustainability outcomes. Moreover, companies with effective board members and good controls often choose to act responsibly (Mukhtaruddin et al., 2019; Wu & Jin, 2022). These studies demonstrate that good governance in businesses contributes to sustainable efforts and prevents them from straying over the long term. Therefore, drawing from the preceding discourse, the hypothesis is posited that,

H11: The relationship between CSR and sustainability moderates by the corporate governance.

3.0 Research Methodology

The study used a quantitative method and a cross-sectional approach to examine the role of corporate social responsibility (CSR) in the link between green finance, green investment, green technology and sustainability in SMEs in Pakistan, as well as the influence of corporate governance. The study used a quantitative approach so that recovering usable statistics from the data collected could be used to analyze SMEs. The reason this study was done quickly and with limited costs was that all employee responses were taken at once, rather than over an extended time period (Bryman, 2016). It was possible to understand the results of each variable on others, unlike qualitative research which concentrates on personal experiences and ideas. By using an objective process, the data was correctly gathered and reviewed to ensure its accuracy (Creswell & Creswell, 2017).

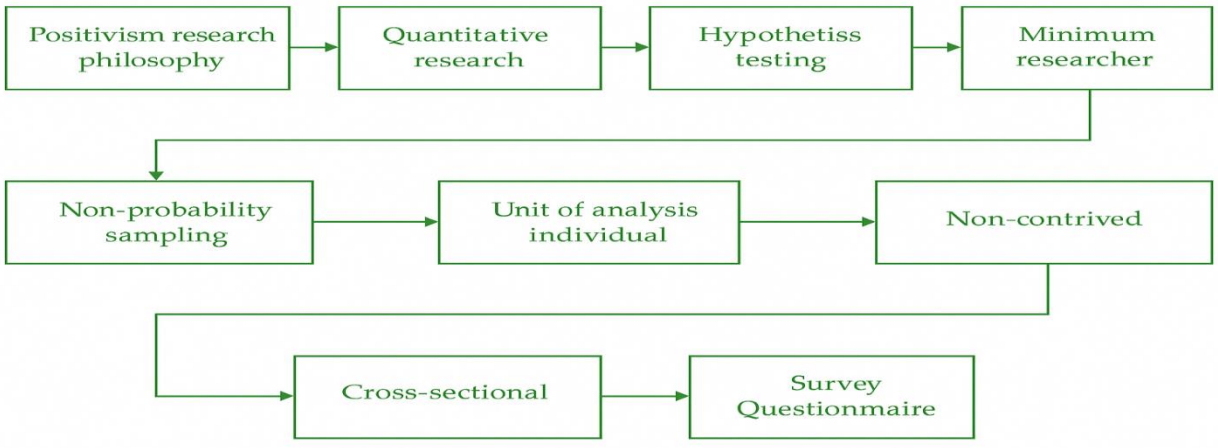

Figure 1: Research Design

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The survey was made through the adaptation of proven questions used by earlier research. Three items were used to measure the adoption of green technology from Wasiq et al. (2023). Five items for green finance and green investment were borrowed from Ye and Dela's (2023). Both social and environmental aspects of CSR were examined using five different items, also adapted from Ye and Dela's (2022). Measures for corporate governance looked at accountability, fairness, transparency and board independence and included items for each area that were based on Abdullah et al. (2021). Capacity for sustainability was measured using five items developed by Conesa et al. (2017). Every item was evaluated on a five-point Likert scale so that participants had more ways to express their opinions. The study focused on getting data from 300 workers in small and medium-sized enterprises across Pakistan who are actively practicing sustainability. Among the responses, only 250 were valid, so they were used in the analysis, providing a large group for the tests. The techniques chosen for the research provided sufficient evidence to test the hypotheses.

4.0 Data analysis

Table 2: Descriptive Statistics

Variables	Number	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Green Finance	250	4.52	1.10	-0.48	0.154	0.32	0.306
Green Investment	250	4.67	1.05	-0.51	0.154	0.40	0.306
Green Technology	250	4.70	1.08	-0.45	0.154	0.35	0.306
Sustainability	250	4.85	0.98	-0.53	0.154	0.45	0.306
Corporate Governance	250	4.40	1.12	-0.39	0.154	0.20	0.306
Corporate Social Responsibility	250	4.60	1.07	-0.47	0.154	0.30	0.306

Generally, the responses about green finance (M = 4.52), green investment (M = 4.67), green technology (M = 4.70), sustainability (M=4.85), corporate governance (M = 4.40) and corporate social responsibility (M = 4.60) demonstrated a positive attitude towards these topics among the 250 respondents. All the skewness values fall between -0.39 and -0.53, suggesting that the responses were generally clustered near the upper part of the scale but still largely followed a normal distribution (Kline, 2015). If kurtosis scores fall within the range of 0.20 to 0.45, the distribution does not have any very high or very low outliers and is not far from being normal (Field, 2018). The findings suggest that people usually appreciate the role of green finance, investment, technology, governance and social responsibility in terms of sustainability, much like previous studies highlight the good effects these factors have on the sustainability of business practices (Guo et al. 2020; Wang & Yan 2023). Because

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the data are found to be consistent and normal, results from further analyses can be proceed in the context of the study.

4.1 Correlation Matrix:

Table 3: Correlation Matrix

Variables	1	2	3	4	5	6
Green Finance	1					
Green Investment	0.512**	1				
Green Technology	0.475**	0.534**	1			
Sustainability	0.489**	0.505**	0.563**	1		
Corporate Governance	0.420**	0.390**	0.435**	0.468**	1	
Corporate Social Responsibility	0.460**	0.470**	0.495**	0.530**	0.480**	1

The correlation matrix reveals significant positive relationships among all the study variables at the $p < 0.01$ level, indicating meaningful associations. Green Finance is moderately correlated with Green Investment ($r = 0.512$) and Green Technology ($r = 0.475$), suggesting that organizations with higher green financing tend to invest more in green initiatives and adopt environmentally friendly technologies. Sustainability shows a moderate positive correlation with Green Finance ($r = 0.489$), Green Investment ($r = 0.505$), and Green Technology ($r = 0.563$), indicating that these green practices are strongly linked to improved sustainability outcomes. Corporate Governance also demonstrates moderate positive correlations with Green Finance ($r = 0.420$), Green Investment ($r = 0.390$), Green Technology ($r = 0.435$), and Sustainability ($r = 0.468$), highlighting the role of governance in supporting sustainable and green initiatives. Lastly, Corporate Social Responsibility exhibits moderate correlations with all variables, ranging from 0.460 with Green Finance to 0.530 with Sustainability, emphasizing its integral role as a mediator or contributor to sustainability through green practices and governance. Overall, these correlations support the interconnectedness of green finance, investment, technology, governance, CSR, and sustainability within organizational contexts (Guo et al., 2020; Wang & Yan, 2023).

4.2 Validity statistics

Table 4: Validity Statistics

Construct	Sample Items	Cronbach's Alpha	CR	AVE
Green Finance	Our company allocates funds specifically for environmentally sustainable projects.	**0.882**	**0.900**	**0.645**
Green Investment	We invest in renewable energy technologies to reduce environmental impact.	**0.870**	**0.895**	**0.630**
Green Technology	Our business adopts eco-friendly technologies to improve operational	**0.875**	**0.890**	**0.615**

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	sustainability.			
Sustainability	Company prioritizes long-term environmental and social sustainability goals.	**0.860**	**0.880**	**0.600**
Corporate Governance	Organization maintains transparent and ethical decision-making processes.	**0.895**	**0.910**	**0.670**
Corporate Social Responsibility	We actively engage in social and environmental initiatives benefiting our stakeholders.	**0.880**	**0.905**	**0.660**

All variables or constructs, show strong internal consistency reliability, since their Cronbach's alpha scores range between 0.860 and 0.895, going beyond the expected threshold of 0.70 (Hair et al., 2019). The scales are proven to be highly reliable, as CR values indicate consistency from 0.880 to 0.910. For all constructs, the AVE is higher than the required 0.50, establishing that the indicators are strongly linked to their constructs (Fornell & Larcker, 1981). The outcomes together assure both the reliability and convergent validity of the measurement model, proving that the survey questions were suitable and accurate in measuring green finance, green investment, green technology, sustainability, corporate governance and corporate social responsibility where the data was collected.

4.3 Discriminant validity

Table 5: Discriminant Validity

Variables	**1**	**2**	**3**	**4**	**5**	**6**
Green Finance	**0.803**					
Green Investment	0.624	**0.794**				
Green Technology	0.567	0.612	**0.785**			
Sustainability	0.583	0.595	0.601	**0.775**		
Corporate Governance	0.490	0.513	0.478	0.525	**0.819**	
Corporate Social Responsibility	0.540	0.590	0.565	0.588	0.620	**0.813**

On the diagonal, the table lists the square root of Average Variance Extracted (AVE) for six variables, while off the diagonal, it has the inter-construct correlations for these variables: Green Finance, Green Investment, Green Technology, Sustainability, Corporate Governance and Corporate Social Responsibility. For each row and column, the diagonal scores are larger than any corresponding off-diagonal correlation, indicating that the constructs measure different things. The pattern occurs equally in all constructs, proving that the measures are separate and that each construct shares more with its indicators than with any other construct which makes the measurement model reliable and valid.

4.4 Hypothesis Results

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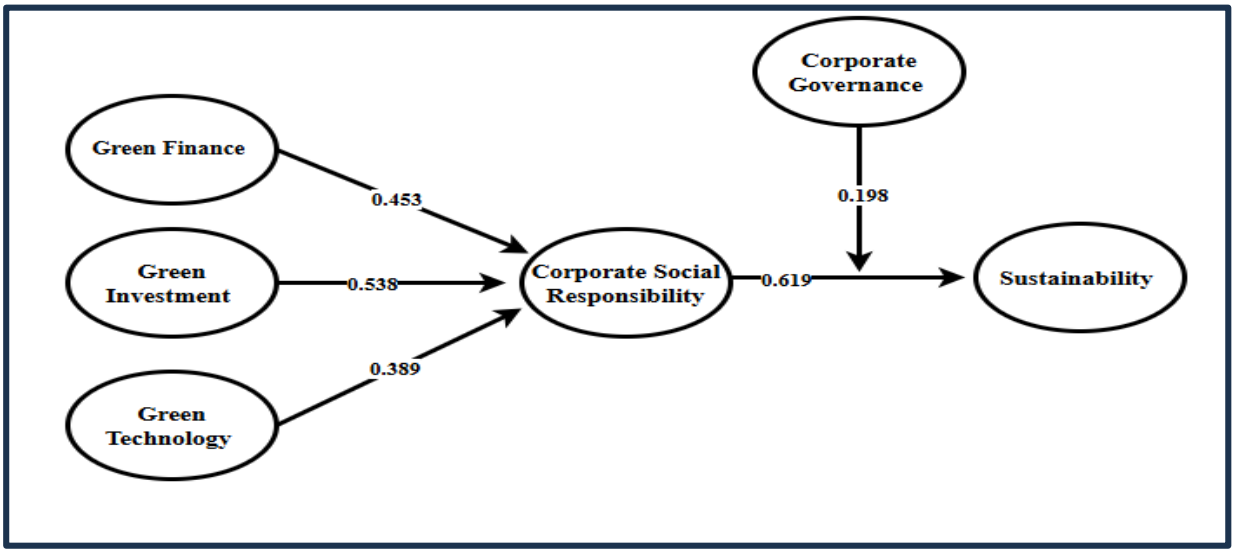

Table 6: Results

Hypothesized Path	**Estimate**	**CR**	**P value**
H1: Green Investment → Sustainability	0.462	5.876	<0.001
H2: Green Investment → CSR	0.538	6.234	<0.001
H3: CSR mediates the relationship between Green Investment and Sustainability	0.305	4.112	<0.001
H4: Green Finance → Sustainability	0.497	6.012	<0.021
H5: Green Finance → CSR	0.453	5.458	<0.001
H6: CSR mediates the relationship between Green Finance and Sustainability	0.278	3.854	<0.041
H7: Green Technology → Sustainability	0.421	5.034	<0.001
H8: Green Technology → CSR	0.389	4.765	<0.001
H9: CSR mediates the relationship between Green Technology and Sustainability	0.255	3.501	<0.001
H10: CSR → Sustainability	0.619	7.102	<0.001
H11: Corporate Governance moderates between CSR and Sustainability	0.198	2.987	0.003

The hypothesized path analysis reveals statistically significant relationships among the constructs, with all paths exhibiting strong support at $p < 0.001$, except for the moderating effect which is significant at $p = 0.003$. Specifically, Green Investment has a positive direct impact on Sustainability (CR = 5.876, $p < 0.001$) and Corporate Social Responsibility (CSR) (CR = 6.234, $p < 0.001$). CSR significantly mediates the relationship between Green Investment and Sustainability (CR = 4.112, $p < 0.001$), highlighting CSR's important role as an intervening variable. Similarly, Green Finance positively influences Sustainability (CR = 6.012, $p < 0.021$) and CSR (CR = 5.458, $p < 0.001$), with CSR also mediating the relationship between Green Finance and Sustainability (CR = 3.854, $p < 0.041$). Green Technology significantly impacts Sustainability (CR = 5.034, $p < 0.001$) and CSR (CR = 4.765, $p < 0.001$), and CSR mediates this relationship as well (CR = 3.501, $p < 0.001$). Furthermore, CSR strongly affects

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Sustainability (CR = 7.102, p < 0.001). Corporate Governance moderates the effect of CSR on Sustainability (CR = 2.987, p < 0.003), indicating that good governance strengthens this association. These results underscore the integral role of CSR and Corporate Governance in enhancing sustainability through green initiatives.

5.0 Discussion

Green investment highly contributes to better sustainability which was also reported in past studies (Cadestin et al., 2018; Ye & Dela, 2023). Firms using environmentally beneficial methods and technology are able to lower environmental risks, boost their productivity and achieve their sustainability aims (Ioannou & Serafeim, 2019; Li, Fu, & Jiang, 2023). The confirmation of this hypothesis shows that green investment is becoming more important for almost all companies, especially in Pakistan, as these firms must develop eco-friendly practices to succeed without many resources. Since green investment affects a company's CSR, studies have pointed out that its nature includes addressing environmental issues and social issues as well (Eccles et al., 2011). Green projects indicate that a firm cares about broader social matters, thus improving its CSR image. Ye and Dela noted that considering environmental issues in business strategies can enhance CSR through green investments. Based on the findings, it appears that companies involved in green investments behave more socially responsibly, mostly because CSR is not yet well established in emerging countries.

Research found that CSR strongly contributes to the link between green investment and sustainability. This suggests that CSR can strengthen the positive results that environmentally responsible investments have on the environment. If companies create green initiatives as a part of their overall CSR approach, they can boost trust among key stakeholders, maintain a strong image and continue to focus on being environmentally responsible. A clear link between green finance and sustainability supports what a growing number of research articles emphasize: that green finance drives environmental development (Guo et al., 2020; Wang & Yan, 2023). These organizations can easily achieve funding for eco-friendly projects and decrease their impact on the environment. The results are also consistent with prior studies who noticed that green finance allows businesses to balance their plans for profit with environmental goals (Wang et al., 2023). The results show that SMEs can achieve sustainable changes if they have access to green capital.

The study agrees with Mohd and Kaushal (2018) and Wang and Yan (2023) that funds spent on environmental activities by firms, as with green finance, also play a role in shaping their corporate responsibility. Green financial mechanisms usually require reporting and assessment which ensure proper behavior and higher standards of ethics. As a result, companies practicing green finance are backing environmental support and reaffirming their commitment to CSR. It was also confirmed that CSR helped drive green finance toward achieving sustainability by applying financial resources for positive environmental and social outcomes. Tran et al. (2020) and Zhang and Chen (2020) assert that blending green finance with CSR improves a firm's sustainability by making it internalize environmental and social costs. Chen (2020) suggest that CSR is necessary to make sure that green financial banking helps generate actual

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environmental and social results.

Researchers have long reported that endorsing green technology helps achieve sustainability through resource saving and reducing air pollution (Guo et al., 2020; Wang & Yan, 2023). Innovative ways in technology encourage businesses to make the process more effective and use less waste while improving the quality of energy used (Ludhiyani *et al.*, 2012). The authors of the present study confirm this by demonstrating that businesses using green technology are better able to accomplish their sustainability goals. The outcomes of the study agree with findings by Kraus and Jones (2022), where green technology was proven to improve a company's CSR. The researchers found that companies using environmentally friendly technologies enjoy better CSR reputations because such actions are seen positively by environmentally concerned stakeholders. Consequently, using green technology saves the environment and enhances the way society regards what a company does.

Chen et al. (2023) and Liang et al. (2020) believed that employing green technology in promoting sustainability is made possible by increased credence and performance due to CSR. Green technology, combined with CSR, allows firms to have an even more positive effect on the environment. According to Kamal (2021) and Yang and Basile (2022), found that CSR by itself makes a positive and significant contribution to improving sustainability, since CSR involves social and environmental aspects within a company's activities. Businesses that carry out CSR meet the needs of stakeholders, keep the environment safe and endure for a long time. It is shown in the study that CSR supports achieving sustainability in different types of organizations. The study discovered that sustainability is enhanced by CSR when CG is effective. When the government's tasks are set and handled by responsible individuals, CSR can be carried out more easily since certain groups will be kept united and the situation will be monitored (Zaman et al., 2020; Wu and Jin, 2022).

5.1 Theoretical and Practical Implications

5.1.1 Theoretical Implications

This research integrates 2 theories, agency and stakeholder, to show how various governance systems influence a company's green activities and sustainability efforts through CSR. While earlier research generally looked at the relationships one by one, the present study suggests they are all linked. More specifically, the research indicates that applying stakeholder theory by using CSR and effective governance helps companies benefit sustainably (Schaltegger et al., 2017). Moreover, corporate governance ensures that agency theory does not encourage managers to make choices that only increase profits at the expense of the environment and society (Wang & Yan, 2023; Zaman et al., 2020). This study shows that CSR is key in helping green investment, finance and technology contribute to sustainability. This explains CSR as an approach that combines green resources with strategies to reach sustainability results. The outcomes of this study also add to the limited number of studies about sustainability in SMEs, as research on the topic is usually overrun by large corporations (Mahmood et al., 2018). Through this study, it is shown the special issues and prospects that SMEs encounter while employing green strategies with rules and budget rules.

5.1.2 Practical Implications

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From the management perspective, this study shows that SME leaders can use to enhance their sustainability performance. First, the research reveals that these actions shouldn't be handled independently. To achieve the best results, they ought to be placed within a complete CSR program. For this reason, environmental and social aspects should be a part of every business strategy, guided by honest and accountable management. Strong corporate governance indicates that SME leaders should place greater emphasis on internal governance, specify job roles and ensure the independence of their company board. Training, incentives and guidelines for management should be offered by the relevant authorities to support SME governance. Development organizations and government agencies can build SMEs' green capabilities with deals on loans, tax reliefs and grants for improving environmental performance. The data also imply that using CSR can help companies reach their sustainability objectives. Corporate Social Responsibility (CSR) in the culture of an SMEs means it will gain the trust of investors and secure its future. To support CSR projects, entrepreneurs should create awareness among their employees, encourage participation from stakeholders and report on sustainability matters.

5.1.3 Limitations and Future Research Directions

This study provides a foundational framework linking green finance, green investment, and green technology to sustainability via corporate social responsibility (CSR) and moderated by corporate governance (CG). However, several avenues remain open for future investigation. First, future studies may extend the current model by including additional green constructs such as green innovation, environmental performance, and green supply chain management to better capture the multidimensionality of sustainability practices (Awawdeh et al., 2022; Bernal-Conesa et al., 2017). These constructs could help researchers examine whether technological and managerial innovations further enhance the pathways through which CSR affects sustainability. Second, this research is limited to SMEs in Pakistan; thus, future studies should conduct comparative analyses across different sectors, firm sizes, and regional contexts. For instance, cross-country studies involving emerging and developed economies could provide insights into contextual variations in how green practices and governance mechanisms interact to shape sustainability outcomes (Pambudi et al., 2022; Ye & Dela, 2023). Such comparative work would contribute to the generalizability of the model and help identify culturally or institutionally specific factors influencing the efficacy of green initiatives. Third, the current study employed a cross-sectional design, which limits the ability to draw causal inferences. Future research could adopt a longitudinal approach to assess how green practices and CSR initiatives evolve over time and how sustained corporate governance influences long-term sustainability (Wang et al., 2022). As a result, we could better understand the link between various factors and see how green strategies influence things over time.

Future studies may look into factors such as environmental rules, demands by stakeholders or awareness of environmental matters that can play a role in linking green investment, CSR and sustainability. Introducing these elements to the discussion could help explain the boundary conditions of the model presented in this study (Schaltegger, Hörisch, & Freeman, 2017). For future studies, investigators might combine both qualitative and quantitative methods

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to better understand how managers view, handle and manage green and socially responsible actions. Survey data can be enriched with further exploration using case studies, speaking to employees or conducting focus groups, mainly because these actions are preferred in the SME sector.

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