

THE IMPACT OF SUSTAINABLE DEVELOPMENT GOALS DISCLOSURES ON FIRM'S FINANCIAL PERFORMANCE: A MODERATION ROLE OF FIRM AGE AND FIRM SIZE

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Abstract

This study aims to examine the association between corporate sustainability initiatives and financial performance within the textile sector of Pakistan. It represents a distinctive effort to evaluate sustainability practices in a context where mandatory sustainability reporting is limited, particularly within emerging Asian markets. The study explores how textile firms engage in sustainability initiatives despite the absence of strict reporting requirements and assesses the implications of these practices for firm performance. The analysis is based on data collected from 120 textile firms listed on the Pakistan Stock Exchange (PSX) over the period 2020 to 2025. Data were compiled from multiple sources, including sustainability reports, annual reports, and publicly available disclosures on company websites, ensuring a comprehensive assessment of firms' sustainability practices and financial outcomes. A Sustainability Reporting Index was constructed using content analysis based on 42 indicators derived from the Global Reporting Initiative (GRI) framework. The index comprises four sub-indices—environmental, social, economic, and governance—along with an overall composite sustainability index. Panel regression models were employed to analyse the impact of individual sustainability indicators and the composite index on firm financial performance. Additionally, the moderating roles of firm size and firm age were examined using the Hayes Process Model 2. The results indicate a positive and significant relationship between sustainability indicators, including the composite sustainability index, and firm financial performance. These findings highlight the importance of integrating sustainability practices into corporate strategies. The study offers valuable insights for management by emphasizing the role of sustainability in enhancing firm value and long-term performance. Furthermore, the findings provide useful implications for policymakers seeking to promote sustainable economic development through improved corporate sustainability practices.

Keywords: Corporate Sustainability, Sustainable Development Goals (SDGs), Non-Financial Firms

INTRODUCTION

A complicated paradigm, sustainability evokes images of humans coexisting harmoniously with the natural world (Henderson & Loreau, 2023). It represents a system prioritizing the well-being of people, the planet, and economic prosperity. The most comprehensive definition refers to practices enabling the present generation to meet basic needs while safeguarding future generations. On the global platform, Corporate Sustainability (CS) reflects a forward-looking approach aimed at achieving sustainability objectives for nations and the world (Zahid et al., 2020). In this context, the (UNDP) has engaged societies worldwide in adopting the 17 Sustainable Development Goals for 2030. Achieving these goals requires proactive collaboration among governments, businesses, communities, and non-governmental organizations. As noted by Shad et al. (2020), the 17 Sustainable Development Goals represent humanity's ambitious aspirations. The UN established these 17 goals, further divided into 169 targets (Martínez-Falcó et al., 2023). They compel corporations to address poverty, inequality, environmental protection, and the promotion of peace and prosperity (Lassala Navarré et al., 2021). A defining feature of these goals is their interdependence; progress in one area necessitates advancement in others. Collectively, they unite society and promote planetary sustainability.

The Sustainable Development Goals provide global directives for addressing pressing challenges and securing a future where coming generations enjoy dignity, peace, and prosperity through effective environmental stewardship (Sadiq et al., 2023). They rest on three pillars: social development, environmental protection, and economic advancement, centered on people, planet, peace, prosperity, and partnership (Chien et al., 2022; Marc & Ali, 2023; Khalid et al., 2025). At its foundation, Corporate Sustainability is closely linked to corporate social responsibility, referring to corporate initiatives that enhance stakeholder welfare and firm value (Orazalin & Baydauletov, 2020; Siddique et al., 2025). However, Corporate Sustainability extends beyond this to address global challenges.

Proactive sustainability engagement equips firms with capabilities to manage such challenges, yielding tangible advantages (Meyer et al., 2020; Abbasi et al., 2025). Sustainable practices enhance operational efficiency and create market opportunities. Firms demonstrating strong ethical sustainability practices strengthen market positioning, increase earnings, and enhance shareholder and stakeholder value, aligning with organizational objectives (Alsayegh et al., 2020; Arshad et al., 2025). Thus, sustainable practices contribute to increased market value, encompassing economic, environmental, social, and governance dimensions to improve long-term firm value (Rezaee, 2016; Marc et al., 2022; Ammar et al., 2025). Extensive research confirms that these dimensions shape corporate strategy and support effective firm value management (Kocmanová et al., 2016; Amir et al., 2025). Liu et al. (2023) and Farras et al. (2025) emphasize that sustainability positively influences corporate performance and society, enhancing firm image (Yeh, 2021).

Nevertheless, sustainability reporting remains less developed in many emerging regions due to limited regulatory frameworks (Petrescu et al., 2020; Arshi et al., 2025). Adoption of sustainable practices improves market efficiency, profitability, and investor attraction. However, limited sustainability reporting can constrain investors' ability to evaluate corporate sustainability (Gnanaweera & Kunori, 2018; Batool et al., 2025). Although certain regulations indirectly emphasize sustainability disclosure, reporting levels may still restrict informed investment decisions. Such disclosures provide stakeholders with insights into corporate accountability and environmental impact (Kim et al., 2021; Zahid et al., 2025). By adopting sustainable practices, nations foster development through reduced emissions and pollutant control while preserving natural resources for future generations (Hongming et al., 2020; Rafique et al., 2025).

Beyond environmental concerns, embracing Environmental, Social, and Governance dimensions can generate significant economic and stakeholder benefits. The Global Reporting Initiative (GRIS, 2006) supports corporations with guidance on sustainable production and resource management. A critical question requiring deeper investigation is whether Environmental, Social, and Governance disclosure enhances corporate performance. Current evidence remains inconclusive. Addressing this issue is essential for firms' long-term viability and for stakeholders such as investors, suppliers, and customers who depend on firm performance. Drawing on Agency and Signaling theories, this research examines the impact of Sustainable Development Goals disclosure on corporate performance. By concentrating on firm performance, the study links Sustainable Development Goals disclosure directly to operational outcomes. It also evaluates not only overall Environmental, Social, and Governance scores but their individual components, as each may exert distinct effects on performance.

The textile industry holds global importance, employing millions and meeting essential human needs, often regarded as second only to food and water. In 2021, its global value was projected to exceed USD 1.04 trillion (Grand View Research, 2021-2028). Despite pandemic-related disruptions, demand is expected to grow, supported by digitization, e-commerce expansion, and diverse consumer preferences. While the industry significantly contributes to economic growth, it faces serious environmental and social sustainability challenges (Harsanto et al., 2023; Umair et al., 2025). Prior research has explored sustainability in textiles through product design (Salo et al., 2020; Shaukat et al., 2025), pollutant treatment (Pattnaik et al., 2018; Naeem et al., 2025), implementation barriers (Kazancoglu et al., 2020), circular economy practices (Jia et al., 2020), production processes (Rahman et al., 2020; Ali et al., 2025; Zafar et al., 2025), and corporate social responsibility (Luque & Herrero-García, 2019). However, limited studies analyze sustainability in industrial textiles from a sustainability-driven innovation perspective, despite the sector's constant need for innovation. Sustainability is increasingly recognized as a driver of present and future innovation (Harsanto et al., 2023; Ali et al., 2025). This study investigates Sustainable Development Goals disclosure in Pakistan's textile sector and evaluates how sustainable financial reporting influences firm performance. The findings will assist stakeholders, policymakers, and scholars in understanding how Sustainable Development Goals disclosure shapes firm outcomes. By demonstrating its positive association with performance, the study may encourage greater investment in Corporate Social Responsibility initiatives and support policy advocacy for sustainability, ultimately enhancing firm-level value and societal awareness.

LITERATURE REVIEW

Sustainable development has become a widely adopted framework for addressing developmental challenges (Martínez-Falcó et al., 2023). Its prominence increased after the 1987 Brundtland Commission report, "Our Common Future" (Mutale et al., 2019), which defined sustainable development as meeting present needs without compromising future generations' ability to meet theirs. Achieving this objective requires integrating economic,

environmental, governance, and social dimensions into all decision-making processes. The literature on Corporate Sustainability has expanded considerably (Muhmad & Muhamad, 2021). Research on Corporate Social Responsibility and Corporate Sustainability increasingly links them to operational efficiency, risk management, and profitability (Orazalin & Mahmood, 2021). Although prior studies on Corporate Social Responsibility and Corporate Sustainability provide foundations for discussing Sustainable Development Goals, a distinction exists. Sustainable Development Goals address global challenges from a macro-level perspective (Fallah Shayan et al., 2022; Karim et al., 2025), whereas Corporate Social Responsibility and Corporate Sustainability operate at the organizational level (Abbas, 2020), generating direct corporate benefits. Integrating Sustainable Development Goals requires aligning corporate strategy with broader global objectives and promoting equitable and inclusive practices (Martínez-Falcó et al., 2023; Ali et al., 2025), thereby supporting long-term societal and environmental well-being alongside business goals.

In 2015, the United Nations introduced the Sustainable Development Agenda as a globally relevant initiative grounded in human rights principles (Mutale et al., 2019). It reflects the interdependence of environmental integrity, social equity, and development. Its 17 Sustainable Development Goals present a broader framework than the Millennium Development Goals implemented from 2000 to 2015 (Barbier & Burgess, 2017; Khalid et al., 2025; Ali et al., 2025; Tsalis et al., 2020; Ali et al., 2025). Corporate Sustainability has emerged as a means of strengthening reputation and stakeholder relations. Various theories explain its influence on firm value. Stakeholder Theory emphasizes stakeholder value maximization through efficient resource management and addresses environmental protection, climate change, and infrastructure development (Razak et al., 2022; Ali et al., 2025).

Stakeholder Theory suggests that the impact of Corporate Social Responsibility on firm performance may vary; while some firms benefit from stakeholder support, associated costs may offset gains. To secure public trust, firms prioritize Social Responsibility. Legitimacy Theory complements this by emphasizing strategic resource management to ensure continued access to essential resources. Long-term survival depends on sustaining this social contract. Through transparent disclosure of economic, environmental, and social information, firms align operations with societal expectations (Nobance & Ellili, 2016). Legitimacy concerns often motivate sustainability reporting (Deegan, 2019; Ali et al., 2025; Aziz et al., 2025). Social Responsibility engagement enhances reputation, while ethical conduct strengthens perceived legitimacy (Kanwal et al., 2025; Saim et al., 2025).

Prior studies indicate that disclosure regulations positively affect firm value and long-term value creation (Ioannou & Serafeim, 2017). This aligns with Stakeholder Theory and the resource-based perspective, which emphasize the strategic importance of scarce resources for building trust (Jung et al., 2020; Longston et al., 2025; Ali et al., 2025). Efficient resource allocation through sustainable practices enhances profitability and demonstrates operational effectiveness. Resource-Based Theory considers Environmental, Social, and Governance performance a valuable asset that can improve productivity, financial outcomes, and reduce environmental risks (Bhandari et al., 2022; Ali et al., 2025). Information Asymmetry Theory further explains how Environmental, Social, and Governance performance disclosure can enhance financial outcomes by reducing information gaps.

Agency theory highlights conflicts between principals and agents within firms (Calvo & Calvo, 2018). Integrating Corporate Sustainability at senior management levels aligns managerial objectives with stakeholder interests, improving financial outcomes. Effective corporate governance fosters sustainable practices and leadership alignment (Bae et al., 2018; Ali et al., 2025). Sustainability disclosures are increasingly viewed as essential for attracting investors and evaluating financial performance. Agency theory underscores the value relevance of Social Responsibility disclosures for market valuation, guiding investor decisions (Abdullah et al., 2025; Ali et al., 2025). Consistent with Ioannou & Serafeim (2017), disclosure regulations enhance firm value and support long-term growth. Signaling theory explains how Environmental, Economic, and Social risks and opportunities are communicated through Sustainability Reporting. Transparent reporting of both positive and negative impacts influences stock prices and investment behavior. Signaling theory emphasizes the role of information in reducing asymmetry (Friske et al., 2023). Managers mitigate information gaps by disclosing sustainability efforts (Harmadji et al., 2018; Arshad et al., 2025; Khan et al., 2025). Empirical research generally finds that integrating Sustainable Development Goals positively affects firm performance and sustainability outcomes (Hongming et al., 2020; Shahi et al., 2025; Kanwal et al., 2025; Ahmad et al., 2025; Sabir et al., 2025).

Environmental sustainability has gained prominence in operational management research (Dai et al., 2017; Niaz et al., 2025). Studies often report a positive association between Environmental Performance and financial performance (Zhou et al., 2022; Khan et al., 2025). Emphasizing Environmental Performance enhances reputation and stakeholder recognition, strengthening supply chain relationships and financial outcomes. Firms improve economic performance by effectively managing sustainability initiatives and meeting stakeholder expectations. Such strategies enhance global competitiveness in line with Competitive Advantage Theory (Shad et al., 2020). To strengthen competitiveness, firms increasingly adopt recognized sustainability frameworks such as the Global Reporting Initiative (GRIS, 2006). This framework guides reporting on economic, environmental, social, and governance initiatives. Effective implementation enhances firm reputation and economic performance (Zahid et al., 2020; Ghauri et al., 2025; Qaisrani et al., 2025). Sustainable strategies improve efficiency and productivity, increasing firm value (Wijethilake et al., 2018; Ali et al., 2025; Ahmad et al., 2025; Khalil et al., 2025). Social engagement links Corporate Social Responsibility with financial performance through various organizational mechanisms (Kalaitzoglou et al., 2020; Ashrafi et al., 2020; Nasir et al., 2025; Anus et al., 2025). Sustainability disclosures and community involvement contribute to market value creation (Yeh, 2021; Marc, 2024). Choi et al. (2021) found that socially responsible firms exhibit greater transparency in financial reporting, enhancing financial performance. Robust corporate governance is essential for optimal performance, connecting shareholders, managers, and investors to ensure effective resource allocation (Al-Ahdal et al., 2020; Marc & Al Masri, 2024). Evidence suggests governance performance exerts a stronger influence on financial outcomes than environmental or social dimensions. Studies by Crifo et al. (2019) and Lu (2021) demonstrate that strong governance correlates with sustainability performance and value creation.

Manning et al. (2019) showed that corporate governance mechanisms support sustainability and overall performance. Active stakeholder engagement fosters sustainable business practices and enhances performance (Manning et al., 2019; Marc et al., 2021). Firm growth requires integrated sustainability strategies rather than reliance on a single measure. Existing literature largely focuses on aggregate Environmental, Social, and Governance scores or selected components (Carnini Pulino et al., 2022; Han et al., 2016; Marc et al., 2022), with limited emphasis on detailed pillar-level analysis.

Research examining the relationship between Environmental, Social, and Governance and Environmental, Economic, and Social reporting indicates that strong governance enhances sustainability performance (Alsayegh et al., 2020). Environmental and social performance also positively affect economic sustainability, linking economic and community value creation (Signori et al., 2021). Weston and Nnadi (2021) associate Corporate Social Responsibility initiatives with financial performance using Environmental, Social, and Governance principles in investment decisions. Firms adopting proactive sustainability strategies anticipate long-term growth (Ashrafi et al., 2020; Marc et al., 2025), whereas neglecting sustainability may reduce market value (Lin et al., 2021). Each Environmental, Social, and Governance dimension may exert distinct effects on corporate efficiency and market valuation.

RESEARCH METHODOLOGY

The research investigates the association between sustainability indicators and firm financial performance in Pakistan, employing both market-based and accounting-based measures. Secondary data spanning six years from 2020 to 2025 were used to estimate the models. Qualitative information on environmental, economic, social, and governance indicators was obtained from annual reports, sustainability reports, and company websites. The independent variables were coded as dummy variables, where '1' denoted disclosure of a specific indicator and '0' indicated non-disclosure. Financial performance data, including Return on Assets, Tobin's Q, and the Market-to-Book ratio, were sourced from annual reports and the Pakistan Stock Exchange website.

Panel regression analysis was applied to examine the combined time-series and cross-sectional dataset, helping to reduce collinearity concerns (Hongming et al., 2020). Furthermore, the moderating effects of firm size and firm age were analyzed using the Hayes Process Model 2 to assess their impact on the relationship between sustainability disclosure and firm performance. The study concentrates on textile firms listed on the Pakistan Stock Exchange. The initial sample included 100 non-financial textile companies drawn from the total listed firms. However, complete data for the entire six-year period from 2020 to 2025 were available for only 75 companies, resulting in 450 firm-year observations for empirical analysis. The comprehensive sample selection procedure is outlined below:

Table 1: Sample Selection Procedure

Sample Selection Procedure	No. of Companies	No. of Years	No. of Observation
Initial Sample from 2017-2022	100	6	600
Less: Firms years with insufficient or missing data	25	6	150
Less: Financial Companies	0	6	0
Final Sample	75	6	450

To analyze the results, statistical software including SPSS-25 and STATA-16 was employed. SPSS-25 was used to examine the normality of the dependent variables. STATA-16 was subsequently applied to implement Hayes Model 2 and generate results for the moderating variables. The remaining analyses were also conducted in STATA-16 to verify panel regression assumptions and produce the final output for comprehensive interpretation of the findings.

CONCEPTUAL FRAMEWORK

The conceptual framework of this research is grounded in an extensive literature review, providing a theoretical foundation for the variables analyzed. The study focuses on evaluating corporate sustainability disclosures of textile firms listed on the Pakistan Stock Exchange (PSX). The primary aim is to investigate the impact of these sustainability disclosures on the financial performance of the listed firms. Within this framework, various variables are systematically analyzed to examine the relationship between each sustainability indicator and firm financial performance. This approach allows for a detailed understanding of how sustainability practices influence the performance of textile companies in Pakistan

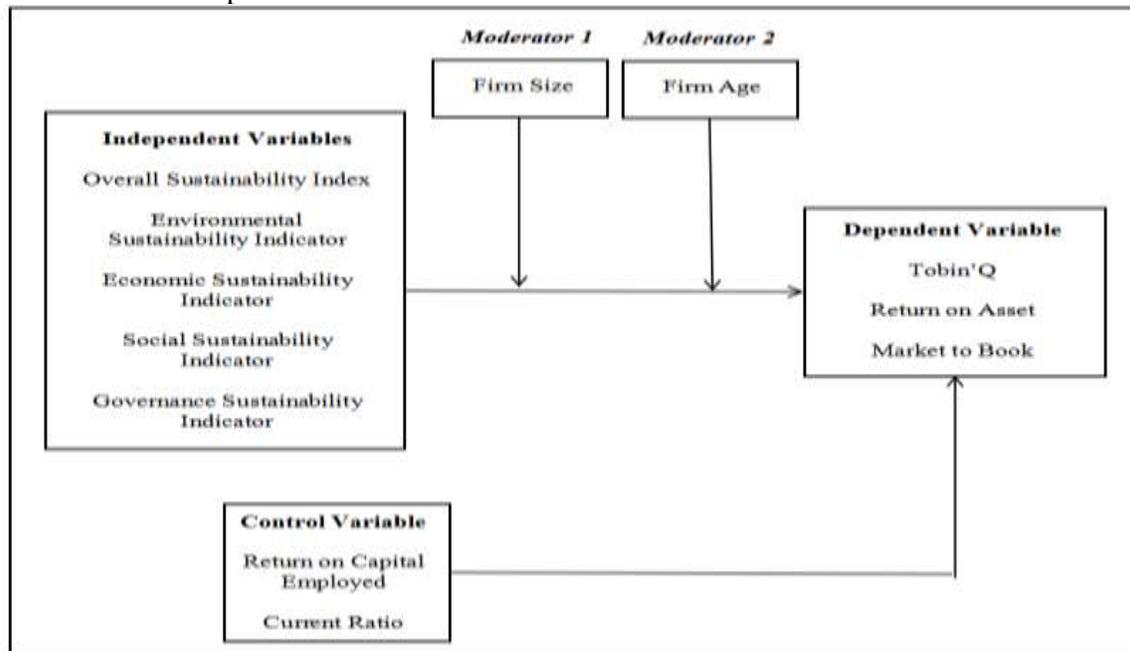


Figure 1: Conceptual Framework

ECONOMETRIC MODEL

Model 1

$$TQ_{it} = \alpha_{it} + \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 ECO_{it} + \beta_4 GOV_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 ROCE_{it} + \beta_8 CR_{it} + \epsilon_{it}$$

Model 2

$$ROA = \alpha_{it} + \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 ECO_{it} + \beta_4 GOV_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 ROCE_{it} + \beta_8 CR_{it} + \epsilon_{it}$$

Model 3

$$MB = \alpha_{it} + \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 ECO_{it} + \beta_4 GOV_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 ROCE_{it} + \beta_8 CR_{it} + \epsilon_{it}$$

Here, 'i' refers to the company and 't' refers to the time. TQ is the Tobin's Q, ROA is the Return on Asset and the MB is the Market to Book where independent variables includes; ENV is the Environmental Sustainability Indicator, SOC is the Social Sustainability Indicator, ECO is the Economic Sustainability Indicator, GOV is the Governance Sustainability Indicator, SIZE is the Firm Size, AGE is the Firm Age and ROCE is the Return on Capital Employed and CR is the Current Ratio.

Table 2: Variables and Their Measurement

Variables	Proxies	Measurements	References
Dependent Variables	Tobin's Q	$TQ = \text{Market Capitalization} / \text{Total Assets}$	(Zhou et al., 2022)
	Return on Assets	$ROA = \text{Net Income} / \text{Total Assets}$	(Hongming et al., 2020).
	Market to Book Ratio	$MB = \text{Market Capitalization} / \text{Book Value}$	(Qureshi et al., 2021)
Independent Variables	Environmental Sustainability Indicator	If the particular sub-indicator is disclosed by the company then it is mentioned as "1" otherwise "0".	(Hongming et al., 2020).
	Economic Sustainability Indicator	If the particular sub-indicator is disclosed by the company then it is mentioned as "1" otherwise "0".	(Hongming et al., 2020).
	Social Sustainability Indicator	If the particular sub-indicator is disclosed by the company then it is mentioned as "1" otherwise "0".	(Hongming et al., 2020).
	Governance Sustainability Indicator	If the particular sub-indicator is disclosed by the company then it is mentioned as "1" otherwise "0".	(Hongming et al., 2020).
Moderating Variable	Firm Size	Natural logarithm of total assets	(Abdi et al., 2022)
	Firm Age	Natural Log of Established Year	(Abdi et al., 2022)
Control Variables	Return on Capital Employed	$ROCE = \text{Capital Employed} / \text{Operating Profit} \times 100$	(Lazarus et al., 2021)
	Current Ratio	$\text{Current Ratio} = \text{Current Liabilities} / \text{Current Assets}$	Lazarus et al., 2021)

RESULTS

Table 1 reports the descriptive statistics for the panel dataset applied in this study. The final sample consists of 450 observations for Pakistani firms, restricted to companies with complete information throughout the study period. Financial performance, the dependent variable, is assessed through the Market-to-Book Ratio, Return on Assets, and Tobin's Q. The mean market-to-book ratio of 65.6 reflects investors' valuation of equity relative to its book value. Negative minimum values indicate periods of weak market perception, whereas positive maximum values suggest favorable investor sentiment in specific years. Return on Assets records an average of 2.964, signifying moderate profitability, although the dispersion highlights differences in operational efficiency among firms. Tobin's Q similarly shows variation, with lower and higher values across years, indicating fluctuations in market-based performance. The control variables include Return on Capital Employed and the Current Ratio. The average Return on Capital Employed of 62.38 demonstrates firms' capacity to generate returns from capital investments, though considerable variation indicates uneven outcomes. The Current Ratio captures short-term liquidity and reflects firms' ability to meet immediate obligations.

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROCE	450	62.378	942.208	-269.182	18456.619
Current Ratio	450	2.425	8.429	.044	99.15
Firm Size	450	19	3.364	6.58	24.407
Firm Age	450	3.714	.371	2.639	4.644
Environment	450	4	3.785	0	16
Social	450	.846	1.213	0	6
Economic	450	1.526	.757	0	4
Governance	450	4.474	1.232	0	7
Market to Book Ratio	450	65.65	616.599	-55.958	7852.501
ROA	450	2.964	11.88	-54.29	122.259
Tobin's Q	450	146.812	1268.603	-.075	20751.475

The moderating variables are firm size and firm age. Firm size, proxied by total assets, has a mean value of 19, suggesting the inclusion of relatively large firms. Firm age averages 3.714 years, ranging from 2.6 to 4.6 years, indicating that most sampled firms remain in early development stages. The independent variable, Sustainable Development Goals disclosure, is measured through Environmental, Social, Economic, and Governance scores. Environmental scores reveal room for improvement through greater adoption of environmentally responsible practices. Social scores indicate limited engagement in areas such as education, healthcare, and welfare, emphasizing the need for stronger social responsibility initiatives. Economic scores display low variation, suggesting relatively consistent economic contributions. Governance scores are comparatively stronger, implying that governance mechanisms play a significant role in advancing sustainable practices among Pakistani firms.

Table 4: Correlation Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) tq	1.000								
(2) env	-0.018 (0.731)	1.000							
(3) soc	0.031 (0.538)	0.593* (0.000)	1.000						
(4) eco	-0.140* (0.006)	0.504* (0.000)	0.438* (0.000)	1.000					
(5) gov	-0.059 (0.250)	0.212* (0.000)	0.199* (0.000)	0.227* (0.000)	1.000				
(6) size	-0.359* (0.000)	-0.107* (0.036)	-0.150* (0.003)	-0.099 (0.053)	-0.060 (0.239)	1.000			
(7) age	0.033 (0.522)	0.068 (0.183)	0.025 (0.628)	0.037 (0.466)	0.111* (0.029)	-0.104* (0.041)	1.000		
(8) roce	-0.007 (0.899)	-0.009 (0.864)	-0.031 (0.542)	0.037 (0.474)	0.027 (0.601)	0.059 (0.246)	0.074 (0.149)	1.000	
(9) cr	0.281* (0.000)	-0.061 (0.234)	-0.065 (0.203)	-0.131* (0.010)	0.046 (0.366)	-0.253* (0.000)	0.065 (0.203)	-0.010 (0.841)	1.000

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

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) roa	1.000								
(2) env	0.135* (0.008)	1.000							
(3) soc	0.163* (0.001)	0.593* (0.000)	1.000						
(4) eco	0.307* (0.000)	0.504* (0.000)	0.438* (0.000)	1.000					
(5) gov	0.064 (0.213)	0.212* (0.000)	0.199* (0.000)	0.227* (0.000)	1.000				
(6) size	-0.139* (0.006)	-0.107* (0.036)	-0.150* (0.003)	-0.099 (0.053)	-0.060 (0.239)	1.000			
(7) age	0.048 (0.346)	0.068 (0.183)	0.025 (0.628)	0.037 (0.466)	0.111* (0.029)	-0.104* (0.041)	1.000		
(8) roce	0.007 (0.888)	-0.009 (0.864)	-0.031 (0.542)	0.037 (0.474)	0.027 (0.601)	0.059 (0.246)	0.074 (0.149)	1.000	
(9) cr	0.041 (0.418)	-0.061 (0.234)	-0.065 (0.203)	-0.131* (0.010)	0.046 (0.366)	-0.253* (0.000)	0.065 (0.203)	-0.010 (0.841)	1.000

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

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) mb	1.000								
(2) env	-0.067 (0.193)	1.000							
(3) soc	-0.063 (0.215)	0.593* (0.000)	1.000						
(4) eco	-0.195* (0.000)	0.504* (0.000)	0.438* (0.000)	1.000					
(5) gov	0.045 (0.377)	0.212* (0.000)	0.199* (0.000)	0.227* (0.000)	1.000				
(6) size	-0.244* (0.000)	-0.107* (0.036)	-0.150* (0.003)	-0.099 (0.053)	-0.060 (0.239)	1.000			
(7) age	0.079 (0.123)	0.068 (0.183)	0.025 (0.628)	0.037 (0.466)	0.111* (0.029)	-0.104* (0.041)	1.000		
(8) roce	-0.007 (0.886)	-0.009 (0.864)	-0.031 (0.542)	0.037 (0.474)	0.027 (0.601)	0.059 (0.246)	0.074 (0.149)	1.000	
(9) cr	0.603* (0.000)	-0.061 (0.234)	-0.065 (0.203)	-0.131* (0.010)	0.046 (0.366)	-0.253* (0.000)	0.065 (0.203)	-0.010 (0.841)	1.000

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

The correlation tables present the associations between the dependent and independent variables for Pakistani firms across different significance levels. In general, most correlation coefficients are close to zero, reflecting a low overall degree of association among the variables.

Regarding Tobin's Q, economic sustainability and firm size show a significant negative relationship. This indicates that firms with larger asset bases and higher economic sustainability scores tend to record lower market-based financial performance. The remaining variables demonstrate weak or statistically insignificant associations with Tobin's Q.

For Return on Assets, firm size is significantly and negatively correlated, suggesting that increases in firm size are linked with reduced profitability. In contrast, environmental, social, and economic sustainability scores exhibit significant positive relationships with Return on Assets, implying that stronger sustainability engagement is

associated with improved accounting-based financial performance. Concerning the Market-to-Book ratio, the Current Ratio displays a significant positive association, indicating that firms with stronger short-term liquidity tend to achieve higher market valuation. This variable also reflects the strongest correlation coefficient in the table, while other variables show limited associations. Conversely, economic sustainability and firm size are negatively correlated with the Market-to-Book ratio, suggesting comparatively lower market performance among larger firms and those reporting higher economic sustainability scores.

MULTIPLE LINEAR REGRESSION ASSUMPTIONS

Multiple linear regression extends simple linear regression by incorporating more than one independent variable. Prior to examining the relationship between explanatory and response variables, it is essential to verify that regression assumptions are satisfied; otherwise, the estimates may be biased and population parameters inaccurately measured (Daoud, 2017).

One common violation of these assumptions is multicollinearity, which arises when independent variables are correlated with one another. In such cases, the distinct contribution of each predictor cannot be clearly identified. Although correlation analysis can provide preliminary indications, the Variance Inflation Factor is among the most widely applied diagnostic measures for detecting multicollinearity. Based on the benchmark proposed by Damodar N (2004), a Variance Inflation Factor value exceeding 5 suggests the presence of multicollinearity.

Table 5: Multicollinearity Detection (VIF)

Variables	VIF (Pakistan)
Env	1.76
Soc	1.64
Eco	1.45
Gov	1.09
Size	1.12
Age	1.03
ROCE	1.01
CR	1.11
Mean VIF	1.28

Since the mean Variance Inflation Factor values for the independent variables are below 5, there is no evidence of multicollinearity. Outliers refer to observations with large residuals in a regression model (Draper & John, 1981). These extreme values are not necessarily influential but may distort estimation results. Outliers can be identified visually through scatterplots, boxplots, or spike plots; however, the Z-score provides a quantitative method for detection. In this dataset, residuals were standardized, and observations with Z-scores greater than 3 or less than negative 3 were identified as outliers. These values were replaced with mean values to reduce their potential distortion.

Another key regression assumption is that residuals should follow a normal distribution with a mean of zero and a standard deviation of one (Tranmer & Elliot, 2008). Although normality can be visually assessed using histograms, the Shapiro–Wilk test offers a statistical approach by generating p-values. For residuals to be normally distributed, the p-values must exceed the 0.05 significance level. In this study, the residuals of Tobin’s Q, Return on Assets, and the Market-to-Book ratio were initially not normally distributed. Therefore, the Change distribution method was applied in SPSS to correct normality. The p-values before and after transformation are reported below:

Table 6: Normality (Shapiro-Wilk Test)

Variables	TQ	NTQ	ROA	NROA	MB	NMB
Pakistan						
P-values	0.0000	0.9423	0.0000	0.9999	0.0000	0.9999

Regression assumes that the variances of residuals are constant. However, if this assumption is violated, it means heteroscedasticity exists. If this is ignored, the standard errors will be biased (Kaufman, 2013). This usually occurs in cross-sectional data but as this is a panel study and employs a mix of cross-sectional and time-series data, heteroscedasticity can be found. In order to identify if there exists heteroscedasticity in the case of Pakistan, the

Breusch-Pagan / Cook-Weisberg test has been employed for all three dependent variables. The results of this test are as follows:

Table 7: Heteroskedasticity (BP Test)

	TQ	ROA	MB
Pakistan			
Chi-sq	0.39	0.46	11.41
P-value	0.5334	0.4957	0.0007

The p-values for Tobin's Q and Return on Assets in Pakistan exceed the 5 percent significance level, indicating no evidence of heteroscedasticity in these models. In contrast, the Market-to-Book ratio displays non-constant variance. To address this issue, robust regression techniques were applied to correct for heteroscedasticity.

Another regression assumption requires the absence of autocorrelation. As explained by Anderson (1954), autocorrelation arises when successive observations in a time series are correlated, meaning a residual is associated with its own lagged value. Although more common in time-series data, panel data combining cross-sectional and time dimensions may also exhibit this issue. Autocorrelation is typically tested using the Durbin-Watson statistic, which ranges from 0 to 4. A value of 2 indicates no autocorrelation, values below 2 suggest positive autocorrelation, and values above 2 imply negative autocorrelation. The results indicate the presence of positive autocorrelation across variables. To correct this, a time variable and sequential time identifier were generated, and an autoregressive model of order 1 was estimated due to the large sample size. Additionally, the Breusch-Godfrey Lagrange Multiplier test was conducted, with p-values below 0.05 confirming serial correlation. The Durbin-Watson statistics before and after treatment are presented below:

Table 8: Autocorrelation (Durbin Watson Test)

	TQ	ROA	MB
Pakistan			
Durbin Watson d-statistic (Before)	1.584	1.192	1.094
Durbin Watson d-statistic (After)	2.516	2.682	2.355

The regression outcomes are reported in Panel A, where three models are estimated using alternative proxies for firm financial performance.

Model 1 adopts Tobin's Q as the dependent variable. All Sustainable Development Goal disclosures—environmental, social, economic, and governance—show a positive and statistically significant effect at the 1 percent level. This suggests that Pakistani firms disclosing sustainability practices achieve stronger market valuation. Investors appear to value commitments to sustainable, socially responsible, and well-governed operations in their investment assessments. Firm size negatively moderates this association at the 5 percent level, indicating that the influence of disclosures on market value declines as firm size increases, possibly because larger firms face higher sustainability expectations. Firm age weakens the impact of environmental disclosures on Tobin's Q, implying that more mature firms may encounter higher environmental compliance costs. Control variables remain insignificant. Model 2 uses Return on Assets as the performance measure. Environmental, social, and economic disclosures are significant at the 0.1 percent level, while governance disclosures are insignificant. These findings indicate that sustainability disclosures, excluding governance, enhance profitability through improved asset utilization. The insignificant governance effect may reflect assumptions that firms already adhere to standard governance practices. Firm size negatively moderates this relationship at the 10 percent level, suggesting that stricter disclosure requirements may limit operational flexibility in larger firms and reduce profitability. Firm age shows no significant moderating effect, and control variables remain insignificant.

Model 3 examines the Market-to-Book ratio. Environmental, social, and economic disclosures are significant at the 1 percent level, whereas governance disclosures are significant at the 10 percent level. These results indicate that stronger sustainability disclosures contribute to improved market valuation. Firm size again negatively moderates this association, implying that insufficient sustainability efforts by larger firms may not appeal to investors. In contrast, firm age positively moderates the relationship, suggesting that more mature firms derive greater market benefits from sustainability reporting. Among the controls, Return on Capital Employed is insignificant, while the current ratio is significant at the 1 percent level. Overall, the findings indicate that sustainability disclosures significantly enhance the financial performance of Pakistani firms, particularly when measured through market-based indicators.

Table 9: Regression Results

	Model 1				Model 2				Model 3			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
env	127.063*** (9.632)				.597** * (.157)				73.535** * (7.027)			
soc		265.358*** (33.873)				1.697** * (.495)				128.301** * (24.152)		
eco			278.427*** (56.846)				4.792** * (.768)				199.793** * (38.855)	
gov				103.958*** (35.213)				.13 (.49)				45.793* (24.305)
size	-250.34*** (11.222)	- 251.418*** (12.669)	-259.34*** (13.178)	- 266.494*** (13.322)	-.262 (.183)	-.239 (.185)	-.194 (.178)	-.344* (.185)	- 27.441** * (8.187)	-29.658*** (9.033)	-31.425*** (9.008)	- 37.019** * (9.195)
age	-197.962** (98.126)	-131.246 (109.789)	-135.131 (114.821)	-153.442 (117.632)	1.12 (1.602)	1.41 (1.604)	1.198 (1.552)	1.452 (1.637)	129.204* (71.589)	169.095** (78.283)	163.16** (78.483)	159.897* (81.193)
roce	-.013 (.038)	-.008 (.043)	-.025 (.045)	-.019 (.046)	0 (.001)	0 (.001)	0 (.001)	0 (.001)	-.007 (.028)	-.006 (.031)	-.016 (.031)	-.011 (.032)
cr	2.099 (4.441)	.823 (4.985)	.791 (5.252)	-3.839 (5.285)	.045 (.072)	.047 (.073)	.092 (.071)	.019 (.074)	12.694** * (3.24)	11.553*** (3.555)	12.519*** (3.59)	9.318** (3.648)
_cons	5134.089** * (442.337)	5193.267** * (497.662)	5159.062** * (527.477)	5333.624** * (540.203)	1.252 (7.22)	.677 (7.272)	-5.356 (7.128)	3.442 (7.519)	-215.117 (322.712)	-132.934 (354.849)	-275.305 (360.544)	-49.461 (372.864)
Obs	384	384	384	384	384	384	384	384	384	384	384	384
R-square	.676	.593	.555	.537	.05	.044	.106	.014	.297	.156	.152	.101

Standard errors are in parentheses; *** $p < .01$, ** $p < .05$, * $p < .1$

MODERATION ANALYSIS

Process by Hayes Model 2 has been used to test the moderating role of firm age and firm size on firm performance – measured by Tobin’s Q, ROA, and market-to-book ratio. All the independent variables have been tested separately with the moderators to identify which particular sustainable development goal (environment, social, economic, or governance) interacts with the moderators and influence the dependent variable.

Table 10: Model 1 - When TQ is the dependent variable:

	Firm Size	Firm Age
Environment	0.4352	0.9142
Social	0.0328	0.0983
Economic	0.4903	0.4524
Governance	0.9470	0.1005

In the case of Pakistani firms, the only interaction term that is significant at a 5% level of significance is Firm size. Its p-value is 0.03 which is less than 0.05. It implies that firm size significantly moderates the relationship between social sustainability and firm performance. However, the coefficient value is -3.42 and its negative sign depicts the direction of the effect. It can be deduced that the impact of social sustainability practices on financial performance diminishes as the company size grows. Larger firms might face several challenges as compared to smaller firms, that limit the implementation or effectiveness of social initiatives. Firm size does not significantly moderate any other path. Moreover, firm age does not play a moderating role between any SDG disclosure and firm performance. Hence, the impact of independent variables on Tobin’s Q is not affected by how new or mature a firm is.

Table 11: Model 2 - When ROA is the dependent variable:

	Firm Size	Firm Age
Environment	0.8663	0.2389
Social	0.7434	0.5820
Economic	0.2693	0.1382
Governance	0.2289	0.4427

In Model 2, neither firm size nor firm age moderates the relationship between independent variables and ROA. It implies that these direct relationships are not affected by whether the firm is large or small and neither by its maturity.

Table 12: Model 3 - When the Market-to-Book ratio is the dependent variable:

	Firm Size	Firm Age
Environment	0.2897	0.4425
Social	0.0000	0.3782
Economic	0.7760	0.3572
Governance	0.0163	0.6058

At a 5% level of significance, the impact of social disclosures and governance disclosures is moderated by firm size. The direction is opposite in the case of governance disclosures only. It means that larger firms tend to strengthen the relationship between social disclosures and the Market-to-book ratio. Hence, an improvement in market to book ratio can be seen resulting from increased social disclosures in larger firms. On the contrary, increased governance disclosures reduce market to market-to-book ratio in the case of firms with higher total assets.

Firm size significantly moderates the relationship between SDG disclosures and market-to-book ratio except for economic disclosures. However, the direction of the impact is negative implying that these disclosures do not lead to better firm performance, particularly in the case of larger firms.

When SDG – a composite variable consisting of Environment, Social, Economic and Governance disclosures all together gives the following results:

Table 13

Tobin Q	Firm Size	Firm Age
SDG	0.0000	0.4683

Firm size moderates the relationship between SDG and MB at 5% level of significance but Firm Age does not.

ROA	Firm Size	Firm Age
SDG	0.4805	0.0040

Firm age moderates the relationship between SDG and ROA at 5% level of significance but Firm size does not.

MB	Firm Size	Firm Age
SDG	0.0000	0.6538

Firm size moderates the relationship between SDG and MB at 5% level of significance but Firm Age does not.

Tobin Q	Firm Size	Firm Age
SDG	0.7730	0.2353

The whole model is insignificant because all three paths' p-values are above 0.05 implying that firm size and firm age do not moderate the relationship between SDG and TQ.

ROA	Firm Size	Firm Age
SDG	0.4937	0.4844

The whole model is insignificant because all three paths' p-values are above 0.05 implying that firm size and firm age do not moderate the relationship between SDG and ROA.

MB	Firm Size	Firm Age
SDG	0.1380	0.6888

DISCUSSION

This study aims to evaluate the existing research on sustainability innovation within the textile industry and to examine the impact of sustainability disclosure practices on firm performance (Tsalis et al., 2020). Corporate sustainability plays a crucial role in fostering a sustainable societal environment and significantly influences firms' market value as well as investors' decision-making. Accordingly, this study seeks to understand how corporate sustainability practices shape societal and market perceptions, thereby affecting stakeholders' investment behavior.

Modern firms are increasingly integrating the Sustainable Development Goals (SDGs) into their strategic frameworks, recognizing their importance for long-term survival and environmental responsibility (Al Lawati & Hussainey, 2022). However, the adoption of SDGs involves financial costs that may influence corporate performance. This has generated growing academic interest in understanding how firms can balance sustainability objectives with financial performance. Prior literature suggests that sustainability performance and disclosure practices are key determinants of firms' financial outcomes (Xie et al., 2019).

The findings of this study support this view, as sustainability disclosures significantly enhance firms' financial performance measured through Tobin's Q, Return on Assets (ROA), and the Market-to-Book ratio. These indicators reflect both market-based and accounting-based performance, indicating that firms engaging in meaningful sustainability practices benefit from improved valuation and profitability. The descriptive statistics presented in Table 4.1 provide comprehensive insights into the extent of sustainability reporting and practices among Pakistani firms.

Regression results further demonstrate a strong association between sustainability indicators—environmental, social, economic, and governance—and firm performance. Firms incorporating sustainability into their operations gain a broader valuation perspective beyond traditional performance measures. As global markets increasingly favor sustainable business models, firms that actively disclose sustainability practices are better positioned to attract investment. Conversely, firms relying solely on traditional economic metrics may face declining investor interest.

Analysis using Tobin's Q reveals that sustainability disclosures significantly improve firms' market valuation, highlighting the importance of transparent reporting and sustainable practices in enhancing investor confidence (Zhou et al., 2022; Pham et al., 2021). Similarly, ROA results indicate that environmental, social, and economic disclosures positively influence profitability, while governance disclosures show a comparatively weaker impact. This suggests that investors place greater emphasis on operational and social sustainability initiatives when assessing firm efficiency.

The Market-to-Book ratio also exhibits a significant relationship with sustainability disclosures, reinforcing the notion that socially responsible firms enjoy higher market valuation. This reflects a shift in investor preferences toward sustainable enterprises, as increased demand for such firms' stocks enhances their market value. Regarding moderating effects, firm size negatively moderates the relationship between sustainability disclosures and market-based performance measures, implying that larger firms face higher investor expectations regarding sustainability efforts. Firm age selectively moderates the impact of environmental disclosures on Tobin's Q, suggesting that mature firms may experience cost pressures associated with environmental initiatives. For ROA, neither firm size nor firm age shows a significant moderating effect, indicating stability in the direct relationship between sustainability disclosures and profitability.

CONCLUSION

The objective of this study is to investigate the association between corporate sustainability initiatives and financial performance among listed textile firms in Pakistan. It examines how sustainability strategies implemented by these firms affect financial outcomes. The analysis covers the period from 2017 to 2022, using data obtained from sustainability reports of textile companies listed on the Pakistan Stock Exchange. The empirical assessment relies on a Sustainability Reporting Index developed through systematic content analysis of sustainability disclosures. The index consists of 42 indicators derived from the Global Reporting Initiative framework and is grouped into four sub-indices: environmental, social, economic, and governance indicators. This structured design allows a detailed evaluation of sustainability practices and their financial implications within the textile sector. The results indicate a multidimensional relationship between sustainability disclosures and financial performance. Environmental and social disclosures, in particular, significantly enhance performance by strengthening stakeholder trust and improving market perception. These dimensions are especially relevant for firms seeking to attract ethically oriented investors and establish societal legitimacy. The findings further suggest that conventional financial metrics alone may not fully capture firm value, emphasizing sustainability reporting as a complementary assessment mechanism. Moreover, integrating sustainability practices aligns with the resource-based perspective by encouraging efficient resource utilization, thereby improving profitability and long-term competitiveness. Enhanced efficiency promotes stakeholder satisfaction and reduces agency costs arising from conflicting interests. This outcome supports stakeholder theory by demonstrating that sustainable business practices directly affect stakeholder confidence and performance outcomes. The theoretical implications are important for policymakers, regulators, and corporate stakeholders. The findings highlight sustainability as a strategic instrument for improving performance, strengthening stakeholder relationships, and mitigating agency conflicts. Overall, the study demonstrates that embedding sustainability strategies within corporate structures is vital for sustaining competitive advantage and effective resource management in Pakistan's textile industry.

LIMITATIONS

The study faces limitations largely due to the non-disclosure of sustainable practices by firms, mainly because sustainability reporting is not mandatory. Furthermore, financial performance ratios were not consistently reported in annual financial statements. These factors restrict a comprehensive evaluation of the link between sustainability initiatives and financial performance in the textile sector.

Overcoming these constraints requires regulatory intervention to mandate sustainability disclosures and related practices. Such measures would promote greater market efficiency, enhance transparency, and enable investors to make more informed decisions.

Despite these limitations, the findings remain valuable for investors by providing sector-specific insights. They also offer guidance for corporate leaders and policymakers regarding the strategic importance of sustainability initiatives and their broader economic implications. The relatively small sample size presents another limitation, indicating scope for future research to incorporate larger samples or conduct cross-cultural comparisons to strengthen the robustness and generalizability of results.

FUTURE RESEARCH

Future research can expand the sample size and include a wider range of sectors within Pakistan to enable a more comprehensive evaluation of sustainable practices across industries. A broader dataset would allow deeper comparison of sectoral differences in sustainability engagement and financial outcomes.

Extending the range of financial metrics beyond Tobin's Q, Return on Assets, and the Market-to-Book ratio would further strengthen analysis of both financial and sustainability performance. Incorporating additional profitability, liquidity, and market-based ratios could provide a more holistic assessment of sustainability's influence on financial results. Expanding the time horizon to examine long-term market value effects would also offer insight into the enduring financial consequences of sustainability practices.

Future studies may also undertake cross-country comparisons, including BRIC nations, G7 economies, and regions at different stages of development, to assess how sustainability initiatives influence global capital markets. Exploring additional Sustainable Development Goals beyond those currently examined could broaden analytical scope and relevance. Such comparative analyses would reveal varying efficiency effects and generate practical implications for economies seeking to enhance market efficiency while advancing sustainable development.

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