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Environmental Social and Governance Impetus and Firm Performance: Assessing the Role of Sustainability on Corporate Success

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Abstract

This study investigates the level and impact of Environmental, Social, and Governance (ESG) reporting among non-financial firms listed on the Pakistan Stock Exchange (PSX), aiming to draw conclusions on ESG reporting levels, its impact on financial performance, and the mediating role of investment rating. The findings indicate that while ESG reporting in Pakistan is increasing, compliance is below 50% for most indicators, with social sustainability averaging 53.36%. Environmental sustainability reporting is associated with improved Return on Assets (ROA) and Tobin's Q, highlighting better asset utilization and market valuation for firms that prioritize environmental disclosures. Similarly, social and governance sustainability reporting positively influence financial performance by enhancing employee productivity, customer loyalty, decision-making, and risk management. A composite ESG index demonstrates a holistic approach to sustainability, benefiting financial performance by improving stakeholder relations and capitalizing on sustainable opportunities.

Investment rating mediates the relationship between ESG reporting and financial performance, suggesting that higher ESG disclosures lead to better investment ratings and, consequently, improved financial outcomes. This study aligns with existing literature from developed countries and extends the understanding of ESG reporting's benefits to a developing country context, specifically Pakistan. While ESG reporting is a well-explored area in developed countries, this study adds unique value by concentrating on non-financial firms listed on the Pakistan Stock Exchange (PSX), contributing to a relatively under-researched context in a developing country. Exploration of the mediating role of investment rating is a notable original contribution, revealing how higher ESG disclosures not only directly impact financial outcomes but also lead to improved investment ratings, which in turn enhance financial performance.

Keywords: ESG, Investment Rating, Return on Assets, Tobin's Q, Non-Financial Firms, Pakistan Stock Exchange

1. Introduction

A paradigm change is occurring in the modern business environment as stakeholders become more aware of the significance of environmental, social, and governance (ESG) factors while making business decisions. ESG elements include a wide range of topics, from social responsibility and environmental sustainability to efficient governance procedures. There is an increasing requirement to comprehend the connection between a company's financial success and its ESG reporting indicators as businesses negotiate these intricate relationships.

The corporate sustainability reporting is an emerging phenomenon for corporate sector in Pakistan. But regulators are now recognizing the importance of sustainability reporting as it ensures long-term capital flow and improves governance quality in every firm (Balkhi, 2010). The sustainability reporting in Pakistan at present is a voluntary activity for a firm as there is no mandatory requirement by any regulator for its implementation. There are certain policy frameworks and laws that indirectly emphasize the need of sustainability reporting. These include the Code of Corporate Governance (2012), the National Climate Change Policy (2012), and the Corporate Social Responsibility Voluntary Guidelines (2013). Few companies in Pakistan are reporting on sustainability issues in their annual reports. According to Deloitte (2012), only 50 companies in Pakistan Stock Exchange are reporting on sustainability issues as a standalone report in 2011 and 2012. Hongming et al. (2020) report on the level of all dimensions of sustainability reporting (environmental, social and governance) and find out that the level of sustainability reporting in Pakistani firms is still less than 50%. Furthermore, Akhter et al. (2023) find out that while just 2.23% of sample organizations disclosed their environmental performance in the past ten years, over 50% of they do so now through reporting in either narrative, quantitative, or monetary style. The results also show that the most frequently disclosed environmental information is on tree planting, which is followed by investments in green infrastructure and renewable energy projects. Fund allocation for climate change adaptation and carbon management policies are the least frequently reported topics.

Numerous researches (for example, Hasan et al., 2022; Ashraf and Nazir, 2023) have looked at what influences sustainability reporting in the business environment of Pakistan. These factors might include stakeholder expectations, ownership structure, competitive positioning, corporate governance structures, ethical issues, and regulatory demands. Understanding the causes of Pakistani companies' differing degrees of sustainability reporting is made easier by analyzing these motivators. It is important to do research that focuses especially on the level of sustainability reporting in Pakistani businesses. Researchers have carried out empirical investigations using frameworks like the GRI standards to evaluate the comprehensiveness and caliber of sustainability reports across various industries. Analyzing these results sheds light on Pakistan's sustainability reporting situation as of right now.

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Understanding the state of Environmental, Social, and Governance (ESG) reporting in emerging economies like Pakistan is limited, as most existing literature focuses on industrialized nations. This study aims to address this gap by examining ESG reporting in Pakistan's non-financial enterprises and its impact on both accounting-based and market-based performance. While ESG reporting is known to affect credit ratings and capital access, the indirect and non-linear relationships between ESG reporting and firm performance, including the mediating role of investment ratings, are underexplored. This research will investigate how investment ratings mediate the relationship between ESG reporting and firm performance. By filling these gaps, the study seeks to provide a nuanced understanding of how ESG reporting impacts business performance in Pakistan and offer insights into the complex dynamics at play. More specifically, the study aims to investigate:

1. The level of Environmental, Social and Governance (ESG) reporting in Pakistani non-financial firms?
2. The impact of Environmental sustainability reporting on financial performance of non-financial firms listed in Pakistan stock exchange.
3. The impact of social sustainability reporting on financial performance of non-financial firms listed in Pakistan stock exchange.
4. The impact of Governance sustainability reporting on financial performance of non-financial firms listed in Pakistan stock exchange.
5. The impact of composite ESG sustainability reporting index on financial performance of non-financial firms listed in Pakistan stock exchange.
6. To determine whether investment rating mediates the relationship between ESG reporting and firm financial performance.

The findings of the study reveals that while ESG reporting in Pakistani non-financial firms is on the rise, overall compliance remains below 50%, with social sustainability being an exception at 53.36%. Environmental, social, and governance sustainability reporting each positively impacts financial performance, enhancing Return on Assets (ROA) and Tobin's Q. Environmental disclosures improve asset utilization and market valuation, while social reporting enhances employee productivity and customer loyalty. Governance practices contribute to better decision-making and financial stability. Furthermore, composite ESG reporting shows that a holistic approach yields better financial outcomes, and investment ratings mediate this relationship by reflecting management quality and long-term viability, thus influencing investor confidence and financial performance.

2. Literature Reviews

2.1. ESG and Investment rating

The basic assumption on which our study based is that ESG affect the investment rating positively. The firms perform better in terms of ESG will have a good credit rating. The firms with poor CSR performance have more idiosyncratic risk (El Ghoul et al. 2011), which will lead to reduction in credit rating. Agreeing to this view Karampatsas et al. (2022) document that firms (fallen agents) enhance their CSR activities in future when lose their credit or investment ratings because credit rating is important for their cost of capital and access to capital markets for debt financing. Boutin-Dufresne and Savaria (2004) and Starks et al. (2017) also show that investors perceive low CSR firms as having high idiosyncratic risk than firm with high CSR. Similarly, El Ghoul et al. (2011) and Frederick (1995) document that firms which are socially irresponsible exhibit higher risk than socially responsible firms. . Hong and Kacperczyk (2009) contend that "sin firms e.g., tobacco, alcohol, and gaming firms" face higher case risk than other firms. Hamrouni et al. (2019) document that overall ESG disclosure decrease the cost of debt. It shows that financial markets take into consideration the ESG disclosure of the firms when assessing their creditworthiness. More specifically only environmental sub-dimension of ESG disclosure has an adverse effect on the cost of debt. Environmental sub-dimension of ESG disclosure favorably affects the lender's decisions and they offer favorable rates of interest. Companies should align their processes with eco-friendly practices to increase their credit rating. Boubaker et al. (2020) find that CSR practices lower the default risk of US listed firms and firms have easy access to debt financing. Similarly, Chen et al. (2020) examines the impact of CSR performance on getting unsecured loan and find out that CSR performance has positive effect on unsecured loan, inclusive of short-term loan, long-term loan, and total unsecured loan, which shows that firms with high CSR performance can get more unsecured loan. Based on the literature, the following hypothesis can be formulated:

H1a: Environmental sustainability reporting has a significant impact on firm's investment rating.
H1b: Social sustainability reporting has a significant impact on firm's investment rating.
H1c: Governance sustainability reporting has a significant impact on firm's investment rating.
H1d: ESG sustainability reporting has a significant impact on firm's investment rating.

2.2. Investment rating and firm's financial performance

De and Kale (1993) led research on subject "Information in Bond Ratings and the Demand for Rating Services". With regards to signaling hypothesis, they contend that firm has private data about their monetary strength furthermore, it imparted this data to public at an expense. They found that monetarily solid firms have the better yields and great credit assessments, which flags great firm quality. Additionally, in this specific situation, Kisgen (2006) has recommended that credit scores are sign to firm quality, and in the event that markets recognize them as adding

esteem, credit scores changes can flag change's reliability of firm. Paul and Wilson (2007) examined the determinants of exchange credit. They contended that monetary solid firms face low default risk and expected to stay dissolvable. Rösch (2005) proposed that credit scores can recognize enduring firms and failing firms. Singal (2013) also investigated the impact of credit rating on firm performance. The results suggest that credit rating has an intention to assess the solvency of the firm and it includes current, past and future expected performance of the firm. Shaheen and Javid (2014) investigate the firm specific and internal governance measures as determinants of credit rating and impact of credit rating on firm performance and stock returns of firms listed on PSX. The results show that changes in credit rating affect the profitability and stock returns. Similarly, Raffay et al. (2018) provide evidence from Taiwan that firms have high credit ratings perform well and have high stock returns. Aktan et al. (2019) confirm the positive impact of credit rating on debt ratios. Results suggest that when credit rating of the firms decreased, they issue less debt as compared to equity. There is reasonable support available from the previous literature that credit ratings have an impact on firm performance so can be taken as measure of firm performance.

H2a: Investment rating has a significant impact on firm's accounting performance.

H2b: Investment rating has a significant impact on firm's market performance.

2.3. ESG reporting and firm's financial performance

The focus of this literature review is to explore the relationship between corporate financial performance (CFP) and environmental, social, and governance (ESG) performance, a topic that has gained significant attention as sustainability becomes a global priority. Over time, ESG evolved from discussions on corporate social responsibility and ethical investing into a framework for assessing non-financial performance, reflecting a company's societal and environmental impact. Several theoretical models, including the "double materiality" concept, stakeholder theory, and legitimacy theory, suggest that ESG factors influence both financial outcomes and societal welfare.

Chen et al. (2023) highlights the critical importance of ESG for large corporations, noting that ESG ratings significantly impact their financial performance, particularly in high-risk environments. Smaller companies, however, show a negligible relationship between ESG and financial performance. Gavin et al. (2022), by contrast, found a negative correlation between ESG and financial outcomes. Suttipun (2023) observed that ESG factors positively affect credit ratings, while Fu and Li (2023) found that corporate financial performance benefits from ESG, particularly through digital transformation. However, the effect diminishes over time, and non-state-owned and eastern-region firms benefit more than their counterparts.

Taddeo et al. (2024) explored cross-dimensional relationships between the three ESG pillars, finding trade-offs between environmental responsibility and profitability. DasGupta and Roy (2023) argued that companies in high-corruption environments and sustainability-seeking cultures tend to adopt ESG practices to enhance profitability. They also found that strong investor protection rights can negatively affect the ESG-financial performance link, particularly in emerging economies.

Zakari et al. (2022) conducted a meta-analysis focusing on ESG's role in managing financial risk, particularly in environmentally sensitive sectors. While studies such as those by Kim and Li (2021) and Capelli et al. (2021) explored ESG's relationship with financial risk, few have provided detailed insights into this connection. ESG performance, coupled with socioeconomic stability, appears to foster long-term sustainable investments, benefiting both profitability and sustainability.

While many studies show a positive relationship between ESG and financial performance, with companies benefiting from lower capital costs, better operational efficiency, and enhanced reputations (Fatemi et al., 2018; Wang et al., 2020), some research indicates the opposite. Lee et al. (2016), Reber et al. (2022), and Whelan et al. (2021) found a negative correlation between ESG and financial performance, arguing that companies with high ESG ratings struggle to convert their non-financial efforts into profitable outcomes. Other researchers, such as Orlitzky et al. (2003) and Galema et al. (2008), found no significant correlation between ESG scores and financial performance.

Finally, Dinca et al. (2022) examined the automotive sector and found mixed results, with ESG scores showing an ambiguous impact on firm value, particularly in the social dimension. This review highlights the mixed and sometimes contradictory findings in the literature, suggesting that the relationship between ESG and financial performance is complex and influenced by multiple factors, including company size, industry, regional context, and the specific ESG dimensions analyzed. Based on the literature, the following hypothesis can be formulated:

H3a: Environmental sustainability reporting has a significant impact on firm's accounting performance.

H3b: Social sustainability reporting has a significant impact on firm's accounting performance.

H3c: Governance sustainability reporting has a significant impact on firm's accounting performance.

H3d: ESG sustainability reporting has a significant impact on firm's accounting performance.

H3e: Environmental sustainability reporting has a significant impact on firm's market performance.

H3f: Social sustainability reporting has a significant impact on firm's market performance.

H3g: Governance sustainability reporting has a significant impact on firm's market performance.

H3h: ESG sustainability reporting has a significant impact on firm's market performance.

2.4. ESG reporting, investment rating and firm performance

This literature review explores the relationship between corporate sustainability reporting and financial performance. Theories like the instrumental stakeholder approach suggest that corporate social performance (CSP) strengthens

stakeholder relationships, enhancing financial outcomes (Orlitzky et al., 2003). Slack resources theory posits that high financial performance enables firms to invest in CSR (Waddock & Graves, 1997). Studies such as Eccles et al. (2014) found that high-sustainability companies outperform low-sustainability ones, while other research (Renneboog et al., 2008; Sharma et al., 2019) identified negative or neutral impacts of sustainability on financial performance. Firm size and industry type moderate this relationship, with larger firms and sectors like energy benefiting more from sustainability practices.

Additionally, studies show mixed findings across countries and sectors. For example, Garcia and Orsato (2020) found a positive relationship between ESG reporting and financial performance in developed markets, while Duque-Grisales and Aguilera-Caracuel (2019) observed a negative relationship in emerging markets. Barriers to sustainability reporting in developing countries, such as Pakistan, include weak regulations and lack of political will (Mahmood et al., 2019). The overall relationship between ESG and financial performance remains complex, with outcomes varying by context. Based on the literature, the following hypothesis can be formulated:

H4a: Investment rating mediates the relationship between ESI and a firm's accounting performance.
H4b: Investment rating mediates the relationship between SSI and a firm's accounting performance.
H4c: Investment rating mediates the relationship between GSI and a firm's accounting performance.
H4d: Investment rating mediates the relationship between ESGI and a firm's accounting performance.
H4e: Investment rating mediates the relationship between ESI and a firm's market performance.
H4f: Investment rating mediates the relationship between SSI and a firm's market performance.
H4g: Investment rating mediates the relationship between GSI and a firm's market performance.
H4h: Investment rating mediates the relationship between ESGI and a firm's market performance.

3. Data and Methodology

3.1. Data

This study examines the relationship between ESG and firm performance using panel data from non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2017 to 2022. Financial institutions are excluded due to differences in regulatory frameworks. The sample consists of 105 non-financial firms from a population of 416 listed on the PSX. The study focuses on sectors such as automobile, cement, chemicals, engineering, tobacco, leather, food, fuel and energy, sugar, paper, and textiles. The six-year study aims to assess ESG's impact on firm performance across various industries in Pakistan.

3.2. Measurement of variables

Table 3.1 presents the measurement of variables. Variables used in this study are measured by the proxies taken from other studies so that comparison can be possible. The data for environmental, social and governance dimensions of sustainability were collected by content analysis of annual reports of the firms from 2017-2022.

Table 1: Measurement of variables

Variable	Description	Measurement	References
ROA_{it}	Return on assets	Net profit after taxes / Total assets	(Ehikioya, 2009; Ellwood & Garcia-Lacalle, 2015;Sharma et al., 2019; Maqbool & Sheikh, 2022).
TQ_{it}	Tobin's Q	Tobin's Q is measured as market value per share / book value per share. Market value of share is measured by taking the sum total of high and low price of 52 weeks scaled by 2. Book value of share is the proportion of shareholders equity to outstanding common stocks	(Rashid & Karim, 2018).
$ESGI_{it}$	Combined environmental, social and governance sustainability index	$ESGI_{it} = \Sigma di$ Where, d = 1 if the ESG practices item is disclosed; d = 0 if the ESG practices item is not disclosed; i represents year(s). The highest score of the content will be implied as high performance.	(Zahid, Rahman, Ali, et al., 2020; Zahid, Rahman, Muneer, et al., 2019; Rahman, Zahid & Khan, 2021).
ESI_{it}	Environmental sustainability index	Same scoring method is used as for ESGI	
SSI_{it}	Social sustainability index	Same scoring method is used as for ESGI	
GSI_{it}	Governance sustainability index	Same scoring method is used as for ESGI	
IR_{it}	Investment rating	Ratings were taken from PACRA.	

3.3. Model

The proposed model aims to examine the relationship between environmental, social, and governance (ESG) reporting and firm performance, and the mediating role of investment rating in this relationship. The model consists of three main constructs: ESG reporting, investment rating, and firm performance.

ESG reporting is the independent variable in this model, and it refers to the extent and level of sustainability reporting in Pakistani non-financial firms. It is hypothesized that there is a positive relationship between ESG reporting and firm performance, indicating that firms that report on their environmental, social, and governance practices are likely to perform better than firms that do not report on these issues. Investment rating is the mediating variable in the model. It is hypothesized that investment rating mediates the relationship between ESG reporting and firm performance, indicating that the impact of ESG reporting on firm performance is partially explained by the firm's investment rating. Investment rating is an important factor in the investment decision-making process, and firms with high investment ratings are likely to attract more investments, which can lead to better firm performance.

Firm performance is the dependent variable in the model, and it refers to the financial performance (accounting-based and market-based) of Pakistani non-financial firms. It is hypothesized that there is a positive relationship between ESG reporting and firm performance, and that this relationship is partially mediated by investment rating.

Based on the above variables the following equations can be made:

$$ROA_{it} = \alpha_0 + \alpha_1 ESI_{it} + \alpha_2 SSI_{it} + \alpha_3 GSI_{it} + \alpha_4 ESGI_{it} + \alpha_5 IR_{it} + \vartheta_{it}$$

$$TQ_{it} = \alpha_0 + \alpha_1 ESI_{it} + \alpha_2 SSI_{it} + \alpha_3 GSI_{it} + \alpha_4 ESGI_{it} + \alpha_5 IR_{it} + \vartheta_{it}$$

$$IR_{it} = \beta_0 + \beta_1 ESI_{it} + \beta_2 SSI_{it} + \beta_3 GSI_{it} + \beta_4 ESGI_{it} + \varepsilon_{it}$$

Where

ROA_{it} *= return on assets of firm i at time t,*

TQ_{it} *= market to book ratio of firm i at time t,*

ESI_{it} *= environmental sustainability index of firm i at time t ,*

SSI_{it} = social *sustainability index of firm i at time t,*

GSI_{it} = governance *sustainability index of firm i at time t,*

$ESGI_{it}$ *= combined environmental, social and governance sustainability index of firm i at time t,*

IR_{it} *= investment rating of firm i at time t,*

ε_{it} , ϑ_{it} *= error term,*

α_0 , β_0 *= y-intercept,*

$\alpha_1 - \alpha_5$, $\beta_1 - \beta_4$ *= Coefficients of explanatory variables.*

3.4. Data analysis techniques

To accomplish the objectives of the study we will employ the following estimation techniques.

1. Content analysis approach is used to determine the level of ESG reporting and its various components, including environmental, social and governance sustainability. Content analysis is a research method used to identify patterns in recorded communication, including written, oral, or visual data. It is categorized into quantitative content analysis, which focuses on measuring and counting, and qualitative content analysis, which emphasizes understanding and interpreting. Researchers code words, subjects, and concepts to analyze results.

2. Structural equation modeling (SEM) is a statistical technique for analyzing complex relationships among variables. Unlike multiple regression, SEM accounts for measurement error, handles intricate models with multiple variables, and estimates latent variables inferred from observed data. It is widely used in social sciences and other fields to test theoretical models.

4. Data Analysis and Discussion

4.1. Level of ESG reporting

Understanding the sustainability practices within Pakistan's corporate sector requires a discussion of the findings about the degree of ESG (Environmental, Social, and Governance) compliance of Pakistani enterprises with GRI (Global Reporting Initiative) standards. These businesses adhere to the GRI guidelines to a modest extent, as seen by their average compliance rate of 53%. The year wise mean values of the ESI, SSI, GSI and ESGI are shown in Table 4.1. These values show the level of every component and combined ESG index in Pakistani non-financial firms.

4.2. Adherence to environmental standards

Pakistani companies appear to be making an attempt to report on their emissions, resource consumption, and environmental consequences, based on the average compliance rate of 34.48%. There is still opportunity for improvement, though, since some businesses might not be providing a complete disclosure of their environmental policies or establishing measurable goals for lowering their environmental impact. Although it is still comparatively smaller than social indicators, disclosure on environmental indicators likewise exhibits a rising tendency from 2017-2022.

4.3. Adherence to social standards

The SSI component emphasizes how dedicated a business is to social responsibility. This includes things like community involvement, worker welfare, health and safety and human rights procedures. While the 53.36%

compliance rate suggests that social efforts are reported with some effort, it also suggests that certain companies may need to improve their disclosure about labor policies, diversity and inclusion, and social investment. It demonstrates that, when looking at all sustainability metrics together, social sustainability index is more noticeable. Every company in the sample discloses more information and demonstrates greater adherence to social disclosure guidelines. The graph (Figure 2) indicates a consistent increase in social disclosure between 2017 and 2022. The results are in contrast to the findings by Hongming et al. (2020).

4.4. Adherence to governance standards

For a business to be transparent, accountable, and to make moral decisions, governance principles are necessary. Pakistani companies are typically reporting on their governance structures, board composition, and anti-corruption efforts, as seen by the 36.81% average compliance in this area. On the other hand, there could be certain areas, including board independence and CEO compensation transparency, where businesses might improve their governance procedures. Although disclosure on governance indicators exhibits a rising tendency from 2017-2022 and the values are 36.71 and 36.91 but still lower than social sustainability index.

4.5. Adherence to ESG standards

As a result, the composite ESG reporting index is trending upward from 2017 to 2022 the index is between 42.25 and 42.86. The information provided in Table 4.1 and its accompanying graphical depiction demonstrates the degree of public limited enterprises' compliance with the GRI sustainability reporting requirements. Table 4.1 makes it clear that while all of the environmental, social and governance disclosure indicators are trending upward, the compliance is still fewer than 50% except social sustainability indicator which is 53.36% on average. To further meet the goals of sustainability reporting in Pakistan as outlined by the Global Reporting Index (GRI; see Figure 2), adjustments must be made to ensure improved compliance on a number of sustainability reporting index components.

Table 2: ESG reporting level (Year wise)

	2017	2018	2019	2020	2021	2022
ESI_{it}	34.41	34.51	34.62	34.61	34.59	34.85
SSI_{it}	53.27	53.36	53.45	53.49	53.52	53.76
GSI_{it}	36.71	36.82	36.94	36.95	36.91	36.98
$ESGI_{it}$	42.25	42.35	42.46	42.47	42.46	42.86

Notes: ESI_{it} = *environmental sustainability index,* SSI_{it} = social *sustainability index,* GSI_{it} = governance *sustainability index,* $ESGI_{it}$ = *combined environmental, social and governance sustainability index*

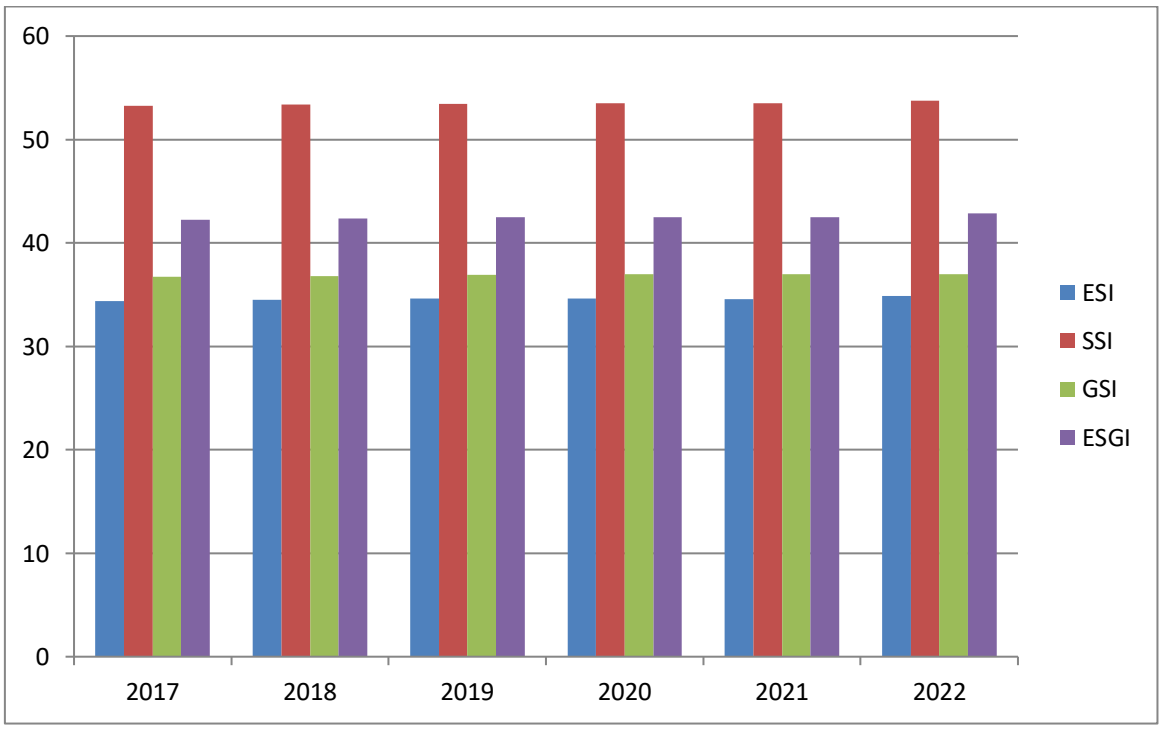

Figure 2: Level of ESG reporting in Pakistan

All three of the ESG characteristics appear to have substantial room for improvement, according to the findings. Businesses with below-average scores must improve their reporting procedures in order to completely comply with GRI criteria. This might entail making investments in more effective systems for gathering data, enhancing stakeholder communication, and establishing more challenging sustainability targets.

4.6. Descriptive statistics

Table 4.2 presents the summary statistics of the variables used in the study. The mean value of profitability is 4.8 percent which shows the sample firms' ROA (return on assets) i.e. profit after taxes with respect to total assets. The mean value of market-to-book (Tobin's Q) ratio is 2.474 times. Given that the market-to-book ratio is higher than 1 this indicates a positive market value added. The minimum value is -12.60 times which is due to the negative stockholder's equity of the firms taken as sample for the study. The negative stockholder's equity is not due to negative paid in capital. There are several reasons why non-financial companies, including those in Pakistan, have negative equity. It's crucial to remember that a company's financial health is impacted by a variety of factors, including industry factors, external economic circumstances, and internal management actions. The following are some potential causes of negative equity for non-financial Pakistani companies:

First of all, over time, a company's equity may be weakened by persistent losses. A company may have negative equity if it continuously runs at a net loss because its cumulative losses may exceed its cumulative earnings. Secondly, negative equity may result from mishandled finances, which includes taking on too much debt, having ineffective cost structures, or allocating insufficient resources. Financial instability and decreased profitability might result from poor money management. Thirdly, a company's financial performance may be impacted by economic difficulties like recessions or slumps in particular industries.

Businesses may suffer losses as a result of decreased customer spending, a decline in the market for goods and services, and other economic issues. Fourthly, businesses that depend largely on debt financing may run into problems if their earnings aren't high enough to pay interest. Negative equity can result from high debt levels, particularly if the company's assets are insufficient to pay off its creditors. Another reason can be the depreciation in the value of assets of the firm. A corporation may have negative equity if its assets lose a substantial amount of their value and the liabilities become greater than the assets. Technological obsolescence, changes in market conditions, or other factors influencing asset values.

The average degree of environmental sustainability across the assessed parameters is shown by the ESI's mean value of 34.48. It implies that there may be space for improvement in environmental policies and practices overall. In comparison to the environmental index, the SSI, with a mean value of 53.36, indicates a comparatively greater average degree of social sustainability. This may indicate that social policies and practices are generally more comprehensive. The governance indicators have a mean value of 36.81. It implies a less sustainable average level of governance. This could point to possible problems with governance frameworks, guidelines, or execution and call for further investigation to pinpoint problem areas. The ESG index's mean value of 42.34 for Pakistani enterprises is an important and remarkable figure that warrants more study and thought. An indicator of a company's performance and dedication to social responsibility, environmental sustainability, and good governance is the ESG index. Let's talk about this specific mean value in relation to Pakistani businesses. A mean score of 42.34 indicates that Pakistani companies have reached a particular level of ESG maturity. This information might be helpful to investors in determining the risk profile and long-term viability of their assets.

4.7. Correlation analysis

The values of the correlation coefficients among the variables were calculated. Table 4.3 demonstrates the correlation coefficients. Our preferred method is to take a step-by-step strategy, starting with analyzing correlations to comprehend bivariate associations before moving on to more intricate studies like multivariate analysis. ESI, SSI and GSI have a weak positive correlation with ROA. ESGI index as compared to its separate components has strong positive correlation with ROA. The results indicate that each component and composite ESG index has positive correlation with accounting-based performance measure ROA. Each component i.e. ESI, SSI, GSI and Composite ESG index have a weak positive correlation with Tobin's Q. ESGI index has relatively strong positive correlation with Tobin's Q as compared to its separate components. The results demonstrate that each component and composite ESG index has a weak positive correlation with market-based performance measure Tobin's Q.

The phrase "weak positive correlation" describes a propensity for market- and accounting-based performance indicators to rise in tandem with increases in ESG ratings, although the link is not particularly significant. This implies that other variables may be more important in determining financial outcomes and that the impact of ESG issues on financial success may not be very strong. Investor opinions and expectations are typically reflected in market-based performance indicators, such as Tobin's Q. A positive association with ESG indices suggests that investors view firms with more advanced ESG policies more positively. This convergence could result from investors' increased knowledge of and concern for ethical and sustainable business practices.

Table 3: Summary Statistics

	No. of Obs	Mean	Std. Deviation	Min	Max
ROA_{it}	630	0.048	0.121	-0.542	0.414
TQ_{it}	630	2.474	9.346	-12.60	123.3
ESI_{it}	630	34.48	27.77	0	100
SSI_{it}	630	53.36	21.65	0	100
GSI_{it}	630	36.81	29.15	0	100

$ESGI_{it}$	630	42.34		24.24	2.380	97.61

Notes: ROA_{it} *= return on assets,* TQ_{it} *= market to book ratio,* ESI_{it} *= environmental sustainability index,* SSI_{it} = social *sustainability index,* GSI_{it} = governance *sustainability index,* $ESGI_{it}$ *= combined environmental, social and governance sustainability index*

An accounting-based measure called return on assets (ROA) evaluates a business's profitability in relation to its total assets. Businesses with more robust ESG policies may be more adept at making the most use of their resources to produce profits, as indicated by a positive link with ESG indexes. This may be the result of things like effective stakeholder interactions, risk management, or operational efficiency. The phrase "each component and composite ESG index" suggests that the research took into account both the environmental, social, and governance (ESG) components separately and as a whole. Dissecting each of these elements independently can reveal which particular ESG factors are responsible for the relationships that have been found.

The results indicate that each separate component of sustainability reporting index and composite sustainability index have a weak positive correlation with investment rating (mediator). The environmental component index's correlation with investment rating is 0.278 which is higher as compared to other components. The correlation of social, governance and ESG index with investment rating is 0.224, 0.266 and 0.274 respectively. The correlation of investment rating with ROA and Tobin's Q is 0.106 and 0.103 respectively. Return on Assets (ROA) and investment ratings appear to have a slight positive linear relationship, as indicated by the correlation value of 0.106. This indicates that there is a little tendency for ROA to rise along with an increase in investment ratings. The correlation is weak, though, and it's possible that other factors are affecting both variables.

Table 4: Correlation Matrix

Variable	ROA_{it}	TQ_{it}	ESI_{it}	SSI_{it}	GSI_{it}	$ESGI_{it}$	IR_{it}
ROA_{it}	1						
TQ_{it}	0.142	1					
ESI_{it}	0.379	0.140	1				
SSI_{it}	0.384	0.086	0.731	1			
GSI_{it}	0.379	0.124	0.989	0.730	1		
$ESGI_{it}$	0.405	0.125	0.970	0.870	0.969	1	
IR_{it}	0.106	0.103	0.278	0.224	0.266	0.274	1

Notes: ROA_{it} *= return on assets,* TQ_{it} *= market to book ratio,* ESI_{it} *= environmental sustainability index,* SSI_{it} = social *sustainability index,* GSI_{it} = governance *sustainability index,* $ESGI_{it}$ *= combined environmental, social and governance sustainability index,* IR_{it} *= investment rating*

Likewise, a modest positive linear association between investment ratings and Tobin's Q is shown by a correlation value of 0.103. Tobin's Q has a minor propensity to rise in tandem with an increase in investment ratings. Greater investment ratings may be linked to a greater market worth relative to replacement costs, according to a positive association seen in Tobin's Q, a measure of a firm's market value.

4.8. Multivariate analysis

Multivariate analysis enables researchers to explore relationships among numerous variables at once; it is frequently employed to examine mediation in research projects. Mediation analysis looks at the function of one or more intervening factors, or mediators, to determine how an independent variable influences a dependent variable. We are using Stata to analyze the data. Because of its adaptability and user-friendly interface, Stata, a statistical software program, is frequently used for mediation analysis. It offers capabilities for multivariate analysis.

4.9. ESG and IR

Table 4.4 shows the direct effects of the Environmental Sustainability Index (ESI), Social Sustainability Index (SSI), Governance Sustainability Index (GSI), and ESG Sustainability Index (ESGI) on Investment Rating (IR), Return on Assets (ROA), and Tobin's Q (TQ). The findings indicate that the Environmental Sustainability Index is positively related to the investment rating of non-financial firms listed on the Pakistan Stock Exchange (PSX), consistent with studies by Hamrouni et al. (2019) and Maaloul et al. (2023), and contrasting with Xing et al. (2021). Strong environmental sustainability practices help firms manage idiosyncratic risks and make businesses more resilient to long-term challenges like resource scarcity, regulatory changes, and climate change. Proactive risk management through environmental sustainability increases stability and attracts investors. Additionally, firms complying with stricter environmental laws reduce their risk of facing legal or operational disruptions. Environmentally sustainable practices, such as resource optimization and waste reduction, enhance operational efficiency and save costs, making firms fiscally and environmentally responsible, which is valued by investors.

The growing demand for eco-friendly products and services also benefits businesses that prioritize environmental sustainability, helping them capture market share and build brand loyalty. In summary, a positive ESI signals to investors that a company is well-equipped to meet regulatory requirements, consumer expectations, and

environmental challenges. This can enhance operational efficiency, reduce risks, and position the firm for long-term success, improving its investment rating.

The Social Sustainability Index (SSI) is also positively related to investment ratings. The results align with Suttipun (2023), Dorfleitner et al. (2019), and Maaloul et al. (2023). The social aspect of ESG pertains to how firms manage relationships with employees, customers, suppliers, and communities, as well as their broader societal impact. Credit rating agencies consider social factors, but their influence on creditworthiness is generally weaker than environmental and governance elements. Social sustainability's impact is often indirect and long-term, contributing to reputation and brand value rather than immediate financial performance. Therefore, while social sustainability can enhance a firm's image, its short-to-medium-term financial benefits are less visible, leading to a weaker direct impact on credit ratings.

The subjectivity and variability of social sustainability measures across industries make consistent evaluation difficult. Social factors are often qualitative, which poses challenges for standardization and comparison across firms. Additionally, social standards lack the established regulatory frameworks that guide environmental and governance issues, further complicating the assessment of social performance. However, companies with strong social sustainability practices may still attract socially conscious investors, contributing to long-term value creation.

The Governance Sustainability Index (GSI) shows a direct positive relationship with investment ratings. Companies with robust governance practices, including transparent decision-making processes, effective board structures, and shareholder protections, are perceived by investors as less risky. Governance within the ESG framework also evaluates a company's adherence to ethical business practices and regulatory compliance, which can enhance reputation and reduce legal risks. Effective risk management is another critical aspect of strong governance, as firms that proactively manage ESG risks are better positioned to navigate challenges such as regulatory changes, natural disasters, or social unrest. Investors favor companies with sound risk management, as it supports long-term financial stability.

4.10. IR and firm's financial performance

The results reveal that investment ratings (IR) are positively linked to both accounting-based performance (ROA) and market-based performance (TQ) for Pakistani non-financial firms, consistent with prior studies by Shaheen and Javid (2014), Raffay et al. (2018), and Aktan et al. (2019). Firms with higher credit ratings tend to perform better in terms of ROA and TQ. As noted by Aktan et al. (2019), firms with declining credit ratings tend to reduce debt issuance, while firms with stronger ratings leverage debt, which is seen as a positive signal by investors and a cheaper financing option than equity.

Credit ratings can be key indicators of firm performance because rating agencies often have access to financial and non-financial information, including ESG factors. High ratings improve access to finance markets, enabling firms to raise capital more easily and at lower costs. Additionally, positive ratings can boost investor confidence, increasing demand for a firm's stock and improving its market performance (TQ). This highlights the importance for Pakistani firms to maintain strong financial performance and transparency to attract favorable ratings, which in turn can reduce perceived risk, boost investor interest, and support long-term growth. Therefore, investment ratings serve as vital indicators of a firm's financial stability, growth potential, and market attractiveness, especially in developing markets like Pakistan.

Table 5: Direct effect of ESI, SSI, GSI and ESGI on IR, ROA and TQ

Structural Path	Coefficient	Standard Error	Z – Value	P – Value
IR ←				
ESI	0.105	0.016	7.14	0.000
SSI	0.013	0.000	12.73	0.005
GSI	0.103	0.020	38.65	0.000
ESGI	0.995	0.145	6.862	0.000
CONS.	0.560	0.198	2.828	0.011
ROA ←				
IR	0.656	0.108	6.07	0.000
CONS.	1.621	0.594	2.73	0.000
TQ ←				
IR	1.656	0.908	1.82	0.000
CONS.	0.621	0.594	1.04	0.000
ROA ←				
ESI	0.150	0.007	7.31	0.000
SSI	0.078	0.010	8.01	0.000
GSI	0.002	0.0002	21.6	0.000
ESGI	0.170	0.006	23.3	0.000
CONS.				

TQ ←				
ESI	0.260	0.027	9.62	0.000
SSI	0.078	0.010	10.1	0.020
GSI	0.177	0.070	2.61	0.000
ESGI	1.150	0.065	17.6	0.000
CONS.				

4.11. ESG and firm's financial performance

The results indicate a positive relationship between the Environmental Sustainability Index (ESI) and financial performance metrics such as Return on Assets (ROA) and Tobin's Q (TQ) for non-financial firms listed on the Pakistan Stock Exchange (PSX). This aligns with previous studies like Taddeo et al. (2024), Suttipun (2023), and Wang et al. (2020). ESI-driven companies often exhibit better risk management, cost efficiencies, and improved reputation, all of which contribute to higher ROA and TQ. Additionally, innovation and proactive stakeholder engagement fostered by sustainable practices boost long-term profitability and market value.

Similarly, the Social Sustainability Index (SSI) shows a positive but weaker correlation with ROA and TQ. Companies with strong social responsibility initiatives, such as fair labor standards and community involvement, benefit from better stakeholder relationships, risk reduction, and long-term growth, as supported by Chen et al. (2023).

The Governance Sustainability Index (GSI) also demonstrates a positive impact on ROA and TQ. Effective governance practices, such as transparency and accountability, improve decision-making, risk management, and investor confidence, leading to better financial performance. Studies by Gompers et al. (2003) and Bebchuk et al. (2009) support this, noting that well-governed firms typically exhibit higher ROA and market valuation.

Overall, the ESG index positively influences financial performance, as confirmed by prior research like Fu and Li (2023), underscoring the significance of sustainable practices for long-term business success in PSX-listed firms.

4.12. Indirect effect of ESG on firm's financial performance through IR

The findings suggest that investment ratings (IR) mediate the relationship between environmental, social, and governance (ESG) performance and financial metrics such as Return on Assets (ROA) and Tobin's Q (TQ) for firms. ESG performance indirectly enhances financial performance by improving investment productivity, which in turn affects ROA positively. High ESG performance is often linked with better risk management, operational efficiencies, and enhanced reputations, all of which contribute to improved investment rates and financial performance.

Companies excelling in ESG practices are seen as stable and low-risk by credit rating agencies, leading to higher credit ratings. This boosts investor confidence and can reduce borrowing costs, as firms with higher credit ratings typically face lower interest rates. The capital saved through reduced borrowing costs can be reinvested into profitable ventures, further increasing ROA. Additionally, firms with strong ESG credentials often attract venture capital, enhancing their ability to invest in growth, thereby increasing profitability and market value.

Numerous studies support the positive association between ESG performance and investment ratings. For example, Fatemi et al. (2018) demonstrated that companies with higher ESG scores typically receive better credit ratings due to their long-term stability and lower risk profiles. Similarly, Cheng et al. (2014) found that firms with superior ESG performance reported stronger financial metrics, such as ROA and Return on Equity (ROE), alongside higher credit ratings. Mediation analysis studies, such as Oikonomou et al. (2014), have further established that the positive impact of ESG on financial performance is largely driven by its effect on investment ratings.

Investment ratings also mediate the relationship between ESG performance and Tobin's Q. Strong ESG practices enhance firm valuation by signaling sustainability and effective management to investors. Studies like that of Eccles, Ioannou, and Serafeim (2014) indicate that firms with high ESG performance tend to outperform in both stock market and accounting metrics. Tobin's Q, a measure of firm valuation, reflects market expectations of future growth and profitability, and higher ESG performance generally leads to higher Tobin's Q ratios. This positive relationship arises because investors perceive companies with strong ESG practices as less risky and better positioned for long-term success.

Investment ratings provided by agencies like Standard & Poor's, Moody's, and Fitch significantly influence market perceptions of a firm's creditworthiness. Companies with high ESG ratings often receive better investment ratings, which in turn reduce their cost of capital and positively impact their market valuation. The mediation effect suggests that high ESG performance results in higher credit ratings, which subsequently enhance firm value as reflected in Tobin's Q. Empirical studies, such as Hsu, Liang, and Matos (2020), have shown that firms with strong ESG scores often enjoy better credit ratings, which positively influence their market value by boosting investor confidence and reducing perceived risk.

The impact of ESG performance on financial metrics like ROA and Tobin's Q is further magnified by the operational efficiencies ansd innovations fostered by sustainable practices. These efficiencies can include cost reductions through waste minimization, energy savings, and improved resource management, all of which contribute to enhanced profitability and firm valuation.

In conclusion, investment ratings play a crucial role in mediating the relationship between ESG performance and financial metrics such as ROA and Tobin's Q. Firms with robust ESG practices tend to receive better investment ratings, which enhance their financial performance by reducing borrowing costs and improving market valuation.

This dynamic underscore the importance of incorporating ESG considerations into corporate strategies, as doing so not only promotes ethical and legal compliance but also drives long-term financial success and sustainability. Investors should prioritize ESG performance in their decision-making processes, and policymakers should encourage transparency in ESG disclosures to promote market integrity and stability.

Table 6: Indirect effect of ESI, SSI, GSI and ESGI on return on assets (ROA) (Mediation model anticipating ROA)

Structural Path	Coefficient	Standard Error	Z – Value	P – Value
ROA ← IR ← ESI	0.232	0.061	3.80	0.000
ROA ← IR ← SSI	0.021	0.012	1.75	0.001
ROA ← IR ← GSI	0.033	0.034	0.96	0.02
ROA ← IR← ESGI	0.341	0.078	4.37	0.000

Table 7: Indirect effect of ESI, SSI, GSI and ESGI on Tobin's Q (Mediation model anticipating TQ)

Structural Path	Coefficient	Standard Error	Z – Value	P – Value
TQ ← IR ← ESI	0.142	0.052	3.275	0.001
TQ ← IR ← SSI	0.273	0.050	5.44	0.000
TQ ← IR ← GSI	0.749	0.087	8.61	0.000
TQ ← IR ← ESGI	0.210	0.059	3.5	0.000

5. Conclusion and suggestion for future research

This study sheds light on the nascent yet evolving state of ESG reporting in Pakistan and its positive impact on firm performance. It underscores the importance of comprehensive ESG practices and the mediating role of investment rating in enhancing financial outcomes. The findings contribute to the theoretical understanding and offer practical implications for firms, investors, policymakers, and educational institutions.

Addressing the identified limitations and pursuing the recommended future research avenues can further enrich the understanding of ESG reporting's role in sustainable business practices, particularly in developing economies like Pakistan. As global attention increasingly shifts towards sustainability, this research provides a foundation for future studies to build upon, ensuring that businesses not only thrive financially but also contribute positively to the environment and society.

Building on the findings and limitations of this study, future research can explore several areas. Longitudinal studies can capture the evolving nature of ESG reporting and its long-term impact on firm performance. Industry-specific analyses would help understand the sectoral dynamics and best practices of ESG reporting within different industries. Additionally, applying advanced econometric techniques can address endogeneity issues and help establish causal relationships. Comparative studies across developing countries could identify common patterns and unique challenges in ESG reporting. Research into stakeholder perspectives—such as those of investors, customers, and employees—could offer further insight into how ESG practices influence firm performance. Qualitative research could delve deeper into the motivations and challenges companies face in adopting ESG reporting. Finally, examining the impact of regulatory changes on ESG reporting and firm performance over time would provide a clearer picture of the evolving landscape of ESG compliance.

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