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The future of management reporting and sustainability reporting: Integrating ESG metrics for strategic decision-making

Apooyin Agboola Emmanuel *

Department of Finance, University of Lagos, Nigeria.

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Abstract

The future of management and sustainability reporting is undergoing a transformative shift, driven by the increasing emphasis on Environmental, Social, and Governance (ESG) metrics. As businesses face growing pressures from stakeholders to align with sustainable practices, ESG metrics have become essential for informed decision-making and long-term value creation. Traditional financial reporting, while critical, no longer provides a holistic view of a company's impact and performance in the context of sustainability goals. Integrating ESG factors into management reporting systems allows organizations to assess their environmental footprint, social responsibilities, and governance structures more comprehensively. This integration offers strategic insights, enabling companies to navigate regulatory landscapes, mitigate risks, and capture new opportunities tied to sustainable development. By incorporating ESG into performance evaluations and reporting practices, businesses can ensure that sustainability is embedded in their core strategy, moving beyond short-term financial goals to long-term sustainability and stakeholder value. The future of reporting will demand transparency, with a robust framework for ESG disclosure that reflects the company's efforts to create positive societal impact while driving profitability. As investors, consumers, and regulators increasingly prioritize ESG issues, management reporting that includes these metrics will become a pivotal factor in shaping business strategies, fostering trust, and ensuring accountability. This paradigm shift in reporting practices represents a critical step toward the realization of sustainable business models that drive positive change for both the environment and society.

Keywords: ESG Metrics; Sustainability Reporting; Management Reporting; Strategic Decision-Making; Business Strategy; Stakeholder Value

1. Introduction

In recent years, the landscape of corporate reporting has undergone a profound transformation, driven by a growing recognition of the need to incorporate environmental, social, and governance (ESG) factors into business strategies. Traditionally, financial reporting has been the cornerstone of management decision-making, providing critical insights into the performance and profitability of an organization. However, the increasing complexity of global challenges, such as climate change, social inequality, and governance issues, has highlighted the limitations of conventional financial metrics in capturing the broader impact of business activities. As a result, there has been a surge in the adoption of ESG metrics, as organizations seek to demonstrate their commitment to sustainability while addressing stakeholder expectations. The integration of ESG factors into management reporting is not merely a regulatory response but represents a strategic shift toward long-term value creation. It enables organizations to evaluate their performance not only in terms of financial outcomes but also through the lens of their societal, environmental, and governance contributions. The importance of incorporating ESG metrics into management reporting cannot be overstated. With stakeholders, including investors, regulators, and consumers, increasingly demanding transparency and accountability, companies are recognizing the strategic value of ESG data in informing decision-making processes. ESG metrics provide

* Corresponding author: Agboola Apooyin.

a more comprehensive understanding of a company's operational risks and opportunities, particularly those related to environmental impact, workforce diversity, and ethical governance practices [1]. Through the systematic collection and analysis of ESG data, organizations can better align their strategies with sustainable development goals, ultimately fostering resilience, innovation, and competitive advantage in an ever-evolving global economy.

This paper seeks to explore the integration of ESG metrics within the framework of management and sustainability reporting as shown in figure 1. It aims to present a nuanced understanding of how ESG data can be leveraged for strategic decision-making and how companies can adapt their reporting structures to meet the growing demands for transparency and accountability. We examine the challenges and opportunities inherent in this integration, including the need for standardized reporting frameworks, data accuracy, and the role of advanced technologies in facilitating the collection and analysis of ESG information. By conducting an in-depth review of existing literature and empirical data, we aim to contribute to the ongoing discourse on the future of reporting and the evolving role of ESG metrics in corporate decision-making. This research is particularly timely given the escalating pressure on businesses to demonstrate their commitment to sustainability, and it offers insights into how ESG can be seamlessly incorporated into strategic management practices to drive positive societal and environmental change.



Figure 1 Concept of future of management reporting and sustainability reporting

To provide a comprehensive understanding of ESG integration in management reporting, this study employs a mixed-methods approach, combining qualitative and quantitative research techniques. A systematic review of existing literature on ESG reporting frameworks, sustainability reporting standards, and corporate strategies related to ESG integration forms the foundation of this analysis. In parallel, we conduct a series of case studies on leading organizations that have successfully incorporated ESG metrics into their management reporting systems [2]. These case studies offer valuable insights into the practical challenges faced by companies in integrating ESG data into their strategic decision-making processes, as well as the benefits they derive from such integration. Additionally, we utilize survey data collected from a sample of corporate executives and sustainability officers to gauge the current state of ESG reporting practices, the perceived value of ESG metrics, and the barriers to their widespread adoption. By triangulating these data sources, this study provides a holistic view of the state of ESG integration in management reporting and offers evidence-based recommendations for businesses seeking to enhance their sustainability practices through improved reporting mechanisms. The findings contribute to the growing body of knowledge on ESG reporting and its strategic implications for corporate management, providing actionable insights for organizations striving to balance profitability with sustainability in an increasingly complex business environment.

In parallel, technological advancements are poised to play a pivotal role in overcoming these challenges. The rise of big data analytics, artificial intelligence (AI), and blockchain technologies has created new opportunities for enhancing the accuracy, timeliness, and security of ESG data collection and reporting. AI-driven analytics, for instance, can streamline the process of gathering and analyzing vast amounts of ESG data from multiple sources, enabling more sophisticated and granular insights into corporate sustainability performance. Similarly, blockchain technology can improve the transparency and traceability of ESG disclosures, reducing the risk of greenwashing and ensuring that the data presented to stakeholders is authentic and verifiable. These technological innovations not only offer solutions to existing challenges but also open up new possibilities for enhancing the strategic decision-making processes of organizations by providing a clearer and more actionable understanding of ESG performance.

As businesses look to integrate ESG metrics more deeply into their strategic decision-making processes, it is imperative that they recognize the interconnections between financial performance and sustainability objectives. Research has shown that companies that embrace sustainability and integrate ESG factors into their business strategies tend to outperform their peers in the long term, benefiting from increased investor confidence, stronger brand reputation, and improved operational efficiencies. Moreover, the strategic integration of ESG metrics can help organizations identify new business opportunities in emerging markets, enhance risk management strategies, and strengthen stakeholder engagement efforts [3]. The growing body of evidence supporting the financial benefits of sustainable practices suggests that companies that prioritize ESG factors will be better equipped to navigate future uncertainties and capitalize on the opportunities presented by the evolving business landscape.

Thus, this paper aims to contribute to the ongoing academic and practical discussions on the future of management and sustainability reporting, focusing on the integration of ESG metrics as a tool for strategic decision-making. By synthesizing the latest research, empirical data, and case studies, the paper provides insights into the evolving role of ESG in corporate governance and reporting, while offering actionable recommendations for businesses to enhance their sustainability practices. Ultimately, the goal is to advance the understanding of how ESG metrics can be leveraged not only as a reporting tool but also as a strategic asset that drives long-term business success, fosters innovation, and contributes to the achievement of global sustainability goals. This research underscores the growing significance of sustainability in modern business practices and its potential to reshape the way companies approach risk, opportunity, and corporate responsibility in the 21st century.

2. Literature Review

The growing integration of Environmental, Social, and Governance (ESG) metrics into management reporting and strategic decision-making has sparked significant academic interest. Scholars have extensively studied the development of ESG metrics, their impacts on corporate performance, and the challenges of incorporating these measures into existing business frameworks. Historically, financial reporting systems focused primarily on the economic value created by businesses, with limited attention paid to the broader societal and environmental impacts. However, as the global business environment has become increasingly interconnected, researchers such as Porter and Kramer (2011) argue that companies can achieve competitive advantage by aligning business strategies with social value creation. Their work on Creating Shared Value (CSV) emphasized the importance of integrating societal needs into corporate goals, thus laying the groundwork for the consideration of ESG metrics as a key driver of business strategy [4]. This view was further reinforced by Eccles, Ioannou, and Serafeim (2014), who demonstrated that companies with high ESG scores tend to exhibit superior financial performance over the long term, suggesting that strong ESG practices may not only contribute to sustainability but also enhance shareholder value.

One of the primary academic discussions surrounding ESG metrics is the role of standardized reporting frameworks. The development of reporting frameworks such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD) has been pivotal in shaping corporate sustainability practices. Eccles and Krzus (2010) argued that standardized ESG reporting is essential for enhancing transparency and comparability across industries, which ultimately helps investors make more informed decisions. However, a lack of universally accepted standards continues to be a significant challenge. In their analysis, Grioli and Fontana (2019) observed that, despite the growing adoption of these frameworks, differences in their application across sectors often create confusion and hinder the meaningful comparison of ESG performance. Their findings suggest that the heterogeneity in reporting practices calls for a more integrated and globally harmonized approach to ESG disclosure.

In contrast, scholars like Bebbington et al. (2007) and Hummel and Schlick (2016) argue that the push for standardized reporting might overshadow the need for more nuanced, context-specific approaches to ESG data. They contend that generic reporting frameworks may not capture the full diversity of corporate sustainability efforts, particularly in industries where environmental and social issues are more pressing. For example, in sectors such as energy or mining, the environmental impact may be much more significant than in technology or finance, which may require a different set of metrics. Hummel and Schlick (2016) suggested that while standardization may improve transparency, it could also lead to "check-box" compliance rather than genuine, context-driven sustainability practices. This highlights the ongoing tension between the need for comparability and the need for contextual relevance in ESG reporting.

Further research by Friede, Busch, and Bassen (2015) reviewed the relationship between ESG practices and corporate financial performance, demonstrating that firms with higher ESG performance tend to outperform their peers, particularly in the long term. Their meta-analysis revealed that the positive relationship between ESG factors and financial returns is not only observable in developed markets but also in emerging economies, suggesting that the

benefits of integrating sustainability into business strategy are universally applicable. Similarly, Margolis and Walsh (2003) conducted an extensive review of over 100 studies on corporate social responsibility (CSR) and its impact on financial performance, finding that CSR initiatives often lead to improved customer loyalty, enhanced employee satisfaction, and stronger brand reputation—all of which have positive financial implications. These studies underscore the growing recognition of ESG as a driver of financial performance, challenging the traditional view that financial success and sustainability are mutually exclusive.

The integration of ESG metrics into management reporting also raises questions about the methodologies and technologies that can facilitate such reporting. Several studies have explored the potential of new technologies, such as big data analytics, artificial intelligence (AI), and blockchain, in improving the collection, analysis, and verification of ESG data [5]. According to Goh et al. (2020), AI and machine learning techniques can significantly enhance the predictive capabilities of ESG data by identifying patterns and correlations that might not be immediately apparent through traditional analysis. These technologies allow companies to forecast future ESG trends, assess risks more effectively, and make more informed strategic decisions. For example, AI can help businesses identify early signs of environmental or social risks by analyzing large datasets from various sources, including satellite imagery, social media, and regulatory reports. Moreover, blockchain technology has been highlighted by researchers such as Tapscott and Tapscott (2016) as a tool for enhancing the transparency and security of ESG disclosures, thereby reducing the risk of "greenwashing" and ensuring that companies provide accurate and reliable data. Figure 2 illustrated the blockchain can help build trust with investors, consumers, and regulators.



Figure 2 The blockchain can help build trust with investors, consumers, and regulators

However, the use of these technologies in ESG reporting also presents several challenges, particularly regarding data privacy, security, and the integration of disparate data sources. This complexity underscores the need for robust data governance frameworks that can manage the quality, consistency, and accuracy of ESG data across organizations and reporting platforms. Additionally, the rapid pace of technological advancements poses an ongoing challenge for organizations that must continually adapt their reporting systems to keep up with innovations in data analytics, AI, and blockchain technologies. The literature on the integration of ESG metrics into management and sustainability reporting highlights several key themes. The growing body of research underscores the strategic importance of ESG metrics in long-term business success, with numerous studies linking high ESG performance to improved financial outcomes, risk management, and stakeholder trust. However, challenges remain in standardizing ESG reporting frameworks, ensuring data accuracy, and leveraging emerging technologies to enhance ESG data collection and analysis. This review provides a foundation for further exploration into how organizations can navigate these challenges and effectively integrate ESG metrics into their strategic decision-making processes to create sustainable value.

3. Methodology

This study employs a mixed-methods approach to explore the integration of Environmental, Social, and Governance (ESG) metrics into management and sustainability reporting, with a focus on their role in strategic decision-making. The methodology combines both qualitative and quantitative data collection techniques to ensure a comprehensive understanding of the subject matter and to address the multifaceted nature of ESG reporting.

3.1. Research Design and Approach

A sequential explanatory design (Creswell, 2014) was utilized, where quantitative data collection and analysis were conducted first, followed by qualitative data collection. This approach allows for the exploration of broad patterns and correlations in ESG reporting practices and the subsequent in-depth investigation of these patterns through qualitative insights [6]. The primary objective of this methodology is to identify the relationships between ESG reporting frameworks, organizational strategic decision-making, and financial performance, and to explore the barriers and facilitators of effective ESG integration.

3.2. Quantitative Data Collection

The quantitative component of the study focuses on analyzing the integration of ESG metrics into corporate management reporting and its relationship with organizational performance. The data was collected through a cross-sectional survey distributed to executives and sustainability officers of publicly traded companies in various industries. The survey included closed-ended questions designed to measure the level of ESG reporting adoption, the frequency and depth of ESG metrics integration into strategic decision-making, and the perceived impact of these metrics on corporate performance. The survey instrument was developed based on existing scales from prior studies (Eccles et al., 2014; Grioli & Fontana, 2019), and it was pre-tested with a small group of professionals in sustainability reporting to ensure clarity and reliability. The final survey was distributed to a sample of 500 companies from the Global 1000, covering a wide range of industries including energy, technology, finance, and manufacturing. A total of 112 responses were received, representing a response rate of 22.4%. This sample size is deemed sufficient to perform both descriptive and inferential statistical analysis (Hair et al., 2010). Descriptive statistics were used to provide an overview of the distribution of ESG reporting practices across industries. Inferential statistics, including regression analysis, were employed to examine the relationships between the adoption of ESG reporting frameworks and key performance indicators (KPIs), such as financial performance, risk management effectiveness, and stakeholder trust. A particular focus was placed on the impact of ESG reporting on long-term financial performance, with control variables such as company size, industry sector, and market position included in the models.

3.3. Qualitative Data Collection

The qualitative component of the study aimed to deepen the understanding of how companies integrate ESG metrics into strategic decision-making processes and the barriers they face in adopting standardized ESG reporting. In-depth semi-structured interviews were conducted with 20 senior executives, including Chief Sustainability Officers, Chief Financial Officers, and strategy leads from a mix of companies that demonstrated advanced and early-stage adoption of ESG reporting practices. The interviewees were selected using a purposive sampling technique to ensure that a diverse range of perspectives was represented across various industries. The interviews were designed to gather insights into the decision-making processes surrounding ESG metrics integration, the challenges encountered in implementing these metrics, and the perceived benefits and drawbacks of using ESG data for strategic planning. The interview guide was developed based on themes emerging from the literature on ESG reporting, including data transparency, governance practices, and stakeholder engagement (Friede et al., 2015; Porter & Kramer, 2011). Interviews were conducted over a 3-month period, and each interview lasted between 45 minutes and 1 hour. All interviews were audio-recorded with participant consent and transcribed verbatim for analysis.

3.4. Data Analysis

For the quantitative data, descriptive statistics were calculated to provide an overview of ESG reporting practices within the sample. Regression analysis was conducted to test hypotheses regarding the relationship between ESG adoption and corporate performance. Specifically, the analysis focused on how the integration of ESG metrics correlates with financial performance, as well as the mediating effects of risk management and stakeholder engagement. For the qualitative data, thematic analysis was applied (Braun & Clarke, 2006) to identify recurring patterns and themes across the interviews [7]. The coding process was carried out using NVivo software, which facilitated the organization and categorization of data into key themes related to the integration of ESG metrics, strategic decision-making, and reporting challenges. Thematic analysis allowed for an in-depth exploration of the nuances of how ESG metrics are understood and applied by decision-makers in real-world corporate settings. The qualitative data was triangulated with the quantitative findings to provide a holistic view of the research topic. By combining both data sources, the study aimed to validate the findings from the survey with real-world perspectives, ensuring a robust and comprehensive analysis of the integration of ESG metrics in management and sustainability reporting.

3.5. Ethical Considerations

The study adhered to strict ethical guidelines throughout the research process. All survey participants and interviewees were informed of the purpose of the research, the voluntary nature of their participation, and their right to withdraw at any time without consequence. Anonymity and confidentiality were maintained by assigning unique identification numbers to the survey responses and interview transcripts. Consent was obtained from all participants, and the data was stored securely in accordance with data protection regulations. Ethical approval for the study was granted by the institutional review board of the university.

3.6. Limitations

While this study provides valuable insights into the integration of ESG metrics in management reporting, several limitations should be acknowledged. First, the cross-sectional nature of the survey limits the ability to infer causality between ESG adoption and corporate performance. Longitudinal studies would be beneficial for capturing the long-term effects of ESG reporting on business outcomes. Second, the sample was limited to publicly traded companies, which may not fully represent the practices of private firms or organizations in emerging markets. Future research could explore the adoption of ESG metrics in different organizational contexts to provide a more comprehensive understanding of ESG integration. This mixed-methods methodology offers a detailed and multidimensional approach to examining the integration of ESG metrics in management reporting and strategic decision-making. By combining quantitative survey data with qualitative interviews, the study aims to provide a holistic view of the challenges, opportunities, and impacts associated with the adoption of ESG reporting frameworks. The results will contribute to the growing body of literature on corporate sustainability practices and provide practical insights for businesses seeking to leverage ESG metrics for strategic advantage.

3.7. Methods and Techniques for Data Collection and Analysis

This study employs a combination of quantitative and qualitative research methods, designed to gather comprehensive insights into the integration of Environmental, Social, and Governance (ESG) metrics in management and sustainability reporting. The data collection process involves surveys, interviews, and advanced statistical and qualitative analysis techniques. This section details the specific methods and techniques used for data collection and the analysis of the data.

3.8. Quantitative Data Collection Techniques

For the quantitative aspect of the study, a structured survey was developed to collect data from publicly traded companies regarding their ESG reporting practices and their relationship to corporate performance. The survey was distributed to a sample of 500 companies across diverse industries to ensure broad representation. The questionnaire was designed with questions focusing on key areas, including:

- The level of adoption of ESG metrics in management reporting
- The frequency and depth of ESG data integration into decision-making processes
- The perceived impact of ESG metrics on corporate performance and sustainability outcomes
- Specific ESG frameworks in use (e.g., GRI, SASB, TCFD)

Company financial performance indicators, including return on assets (ROA), return on equity (ROE), and market share. The survey used Likert-scale questions, where participants were asked to rate their responses from 1 (strongly disagree) to 5 (strongly agree), to quantify perceptions of ESG adoption and its impact. These measures allowed for the categorization of companies into varying levels of ESG maturity, which were then analyzed for correlations with financial performance indicators.

3.8.1. Formulas and Metrics for Analysis

Several financial performance metrics were used in the survey to measure company performance. These include:

3.8.2. Return on Assets (ROA)

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} * 100$$

This ratio measures the company's ability to generate profit from its assets, which is critical for understanding how ESG adoption might relate to efficient asset management.

3.8.3. Return on Equity (ROE)

$$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}} * 100$$

This metric reflects how effectively a company uses equity financing to generate profits and is often used as an indicator of the financial success of sustainability initiatives.

- **Market Share:** Market share was collected in absolute terms (e.g., revenue, total sales) and as a percentage of the total market within each industry.

3.9. Qualitative Data Collection Techniques

For the qualitative component, semi-structured interviews were conducted with 20 senior executives (e.g., Chief Sustainability Officers, CFOs) from a selection of companies identified as leaders or early adopters in ESG reporting. These interviews aimed to provide deeper insights into the challenges faced by companies in integrating ESG metrics into their management practices and decision-making processes.

The interview guide focused on three key themes:

3.9.1. Integration of ESG Metrics into Strategic Decision-Making

- How do you incorporate ESG metrics into your company's decision-making processes?
- What frameworks or standards do you use for reporting ESG performance?

3.9.2. Barriers and Facilitators of ESG Adoption

- What are the main challenges in adopting ESG reporting in your organization?
- What technologies or strategies have facilitated your ESG reporting practices?

3.9.3. Perceived Benefits of ESG Reporting

- How has ESG reporting affected your company's financial performance and risk management?
- How do you measure the impact of ESG practices on stakeholder trust and market reputation?

3.10. Data Analysis Techniques

The quantitative data analysis was performed using descriptive statistics and inferential statistics. Descriptive statistics provided an overview of the ESG adoption levels, while inferential statistics tested the relationships between ESG metrics and financial performance.

3.11. Regression Analysis

To assess the relationship between ESG adoption and corporate performance, multiple regression analysis was performed. The dependent variable (DV) was financial performance, measured by ROA and ROE, while the independent variables (IV) were various ESG metrics, such as the level of ESG integration (measured on a scale from 1 to 5), the adoption of specific reporting frameworks, and the company's commitment to sustainability (measured via survey responses). The model can be expressed as:

$$\text{Performance}_i = \beta_0 + \beta_1(\text{ESG Integration})_i + \beta_2(\text{Reporting Framework})_i + \beta_3(\text{Commitment to Sustainability})_i + \epsilon_i$$

Where

- Performance_i is the financial performance of company *i* (either ROA or ROE).
- β₀ is the intercept term.
- β₁ are the regression coefficients for the independent variables.
- ε_i represents the error term.

The regression coefficients β₁ were estimated using ordinary least squares (OLS), and statistical significance was determined at the 5% level (p<0.05).

3.12. Factor Analysis

A **principal component analysis (PCA)** was conducted to reduce the dimensionality of the ESG metrics and identify underlying factors that influence ESG adoption. This technique is particularly useful when the survey includes numerous items, as it allows for the reduction of variables into a smaller set of components that explain most of the variance in the data. The formula for PCA can be represented as:

$$X = WZ$$

Where:

- X is the original data matrix of ESG metrics.
- W is the matrix of eigenvectors.
- Z is the matrix of principal components.

The result of the PCA was used to identify which ESG factors (e.g., environmental performance, governance practices) have the greatest impact on financial outcomes.

3.13. Qualitative Data Analysis

For the qualitative data from interviews, a thematic analysis was conducted using NVivo software. This technique involves coding the interview transcripts to identify recurring themes and patterns. The coding process was iterative, with codes being refined as new themes emerged. Thematic analysis was structured around three main research questions: (1) how ESG metrics are integrated into strategic decision-making, (2) the barriers to effective ESG adoption, and (3) the perceived benefits of ESG reporting. The qualitative data was cross-checked with the quantitative findings to validate the results and provide richer insights into the underlying factors influencing ESG integration. This triangulation approach ensures the robustness and credibility of the study's conclusions [8]. The combination of survey-based quantitative analysis and in-depth qualitative interviews provides a holistic view of the integration of ESG metrics in management reporting. Regression and factor analysis techniques enable the identification of relationships between ESG adoption and business performance, while thematic analysis of qualitative interviews allows for a deeper understanding of the organizational challenges and strategies related to ESG reporting. By using these robust data collection and analysis methods, this study provides comprehensive insights into the strategic value of ESG metrics in decision-making and their impact on corporate performance.

4. Results and Analysis

In this section, we present the results of the data analysis performed on both the quantitative survey data and qualitative interview responses. This includes the findings derived from statistical tests, regression models, and factor analysis, which provide insights into the relationship between Environmental, Social, and Governance (ESG) metrics and corporate performance. The results are discussed in terms of the specific hypotheses posed in the study, with corresponding values, complex formulas, and detailed analysis.

4.1. Descriptive Statistics

The first step in our analysis involved computing the descriptive statistics for the key variables in our dataset, which included ESG integration levels, financial performance metrics (ROA, ROE), and other control variables. The survey data from 500 companies revealed the following summary statistics for ESG integration:

Table 1 ESG Integration Levels Among Companies

ESG Integration Level	Percentage of Companies
Level 1 (No ESG)	15%
Level 2 (Basic)	25%
Level 3 (Intermediate)	35%
Level 4 (Advanced)	20%
Level 5 (Exemplary)	5%

The average ESG integration level across all respondents was found to be 3.12 (Intermediate), suggesting that while ESG adoption is becoming more common, there remains considerable variability in how deeply companies integrate ESG metrics into their management practices.

4.2. Correlation Analysis

To better understand the relationships between ESG adoption and corporate performance, Pearson’s correlation coefficient was computed between ESG integration levels and financial performance metrics (ROA and ROE). The results are as follows:

Table 2 Impact of ESG Integration Level on Financial Performance

Variable	ROA	ROE
ESG Integration Level	0.42	0.38

Both ROA and ROE show a positive correlation with the level of ESG integration, with a stronger correlation observed between ESG integration and ROA ($r = 0.42$) compared to ROE ($r = 0.38$). These results suggest that companies with higher levels of ESG integration tend to exhibit better financial performance, particularly in terms of asset utilization.

4.3. Regression Analysis

Next, a multiple regression analysis was conducted to assess the impact of ESG integration on financial performance, controlling for other factors such as company size and industry type. The regression model was specified as follows:

$$\text{Performance}_i = \beta_0 + \beta_1(\text{ESG Integration})_i + \beta_2(\text{Size})_i + \beta_3(\text{Industry})_i + \epsilon_i$$

Where:

- Performance_i represents the financial performance of company i (either ROA or ROE).
- β_0 is the intercept term.
- β_1 is the coefficient for ESG integration.
- β_2 and β_3 represent the coefficients for company size and industry type, respectively.
- ϵ_i is the error term.

4.3.1. Results for ROA Model

$$\text{ROA}_i = 2.45 + 0.18(\text{ESG Integration})_i + 0.07(\text{Size})_i + 0.03(\text{Industry})_i + \epsilon_i$$

Where:

- $\beta_0=2.45$ (Intercept)
- $\beta_1=0.18$ (ESG Integration)
- $\beta_2=0.07$ (Company Size)
- $\beta_3=0.03$ (Industry)

The coefficients for ESG integration ($\beta_1=0.18$) are statistically significant at the 1% level ($p<0.01$). This indicates that an increase in ESG integration is associated with a 0.18% increase in ROA, suggesting that ESG adoption positively impacts asset utilization efficiency. The model has an R^2 value of 0.33, indicating that 33% of the variation in ROA can be explained by ESG integration, company size, and industry type.

4.4. Results for ROE Model:

$$\text{ROE}_i = 3.72 + 0.14(\text{ESG Integration})_i + 0.05(\text{Size})_i + 0.02(\text{Industry})_i + \epsilon_i$$

Where:

- $\beta_0=$ (Intercept)
- $\beta_1=0.14$ (ESG Integration)
- $\beta_2=0.05$ (Company Size)
- $\beta_3=0.02$ (Industry)

Again, the coefficient for ESG integration ($\beta_1=0$) is statistically significant at the 5% level ($p<0.05$), showing that ESG practices contribute positively to ROE, albeit to a lesser degree than ROA. The R^2 value for this model is 0.27, implying that 27% of the variance in ROE can be explained by the predictors.

4.5. Factor Analysis

To identify underlying factors driving ESG adoption, Principal Component Analysis (PCA) was performed on the ESG-related variables. The results of the PCA indicated that three main components explained 78% of the total variance in the dataset.

4.5.1. Component 1: Environmental Metrics (32%)

- Indicators such as carbon emissions, waste management, and water usage were grouped into this component.
- High loadings were observed for items such as "Carbon Emissions Reduction" (0.85) and "Water Usage Efficiency" (0.79).

4.5.2. Component 2: Social Metrics (25%)

- Key indicators included labor rights, diversity, and community engagement.
- Strong loadings for "Diversity and Inclusion" (0.82) and "Community Engagement" (0.79).

4.5.3. Component 3: Governance Metrics (21%)

- Focused on executive compensation, board structure, and business ethics.
- High loadings were observed for "Board Independence" (0.90) and "Ethical Business Practices" (0.87).

4.6. Qualitative Analysis

From the qualitative interviews with senior executives, several recurring themes were identified regarding the integration of ESG metrics into management reporting. One key theme was the strategic alignment of ESG with long-term goals. Interviewees emphasized that ESG reporting was increasingly seen as integral to corporate sustainability and long-term value creation. For example, one CEO stated, *"Integrating ESG metrics has allowed us to better manage long-term risks, especially in terms of regulatory compliance and stakeholder expectations."* Another theme centered around barriers to ESG adoption, with many companies citing data quality issues and lack of standardized reporting frameworks as significant challenges [9]. One CFO noted, *"We are committed to ESG, but the lack of consistency in reporting standards makes it difficult to present comparable data to our investors."*

5. Discussion

The quantitative findings demonstrate a positive correlation between ESG integration and financial performance, especially in terms of asset utilization (ROA). The regression models highlight the significance of ESG metrics in driving corporate profitability, with a stronger effect observed in companies that report on environmental and governance metrics. Factor analysis further confirms the prioritization of environmental metrics, followed by social and governance factors, in driving ESG integration. These results support the growing body of literature suggesting that ESG metrics not only contribute to sustainability but also offer tangible financial benefits. However, the findings also underscore the challenges in adopting standardized ESG reporting frameworks, which remain a barrier for many firms. Future research should focus on refining ESG reporting standards to enhance comparability and usability of ESG data across industries. In conclusion, the results of this study highlight the strategic importance of ESG metrics in management and sustainability reporting.

The quantitative analysis indicates that companies with higher levels of ESG integration tend to experience better financial performance, particularly in terms of ROA and ROE. Factor analysis reveals that environmental, social, and governance metrics each play distinct roles in ESG reporting, with environmental metrics being the most prioritized. The qualitative data from interviews provides additional insights into the practical challenges and strategic benefits of adopting ESG reporting practices. These findings contribute to the ongoing debate on the role of ESG metrics in corporate decision-making and performance assessment. Future studies could explore the relationship between ESG integration and other financial outcomes, such as shareholder value, and examine the impact of emerging technologies on ESG reporting practices. This table shows the correlation coefficients between ESG integration levels and key financial performance metrics, such as Return on Assets (ROA) and Return on Equity (ROE). The data represents Pearson's correlation values.

Table 3 Return on Assets (ROA) and Return on Equity (ROE) by ESG Integration Level

ESG Integration Level	ROA	ROE
Level 1 (No ESG)	0.15	0.12
Level 2 (Basic)	0.25	0.22
Level 3 (Intermediate)	0.40	0.35
Level 4 (Advanced)	0.50	0.48
Level 5 (Exemplary)	0.58	0.53

- Interpretation:** As companies increase their level of ESG integration, a positive and consistent increase in both ROA and ROE is observed. The highest correlation is found in companies with "Advanced" and "Exemplary" ESG integration levels, supporting the hypothesis that robust ESG adoption correlates with higher financial returns.

Chart 1 displays the results of the multiple regression analysis conducted to explore the relationship between ESG integration and corporate financial performance (ROA and ROE).

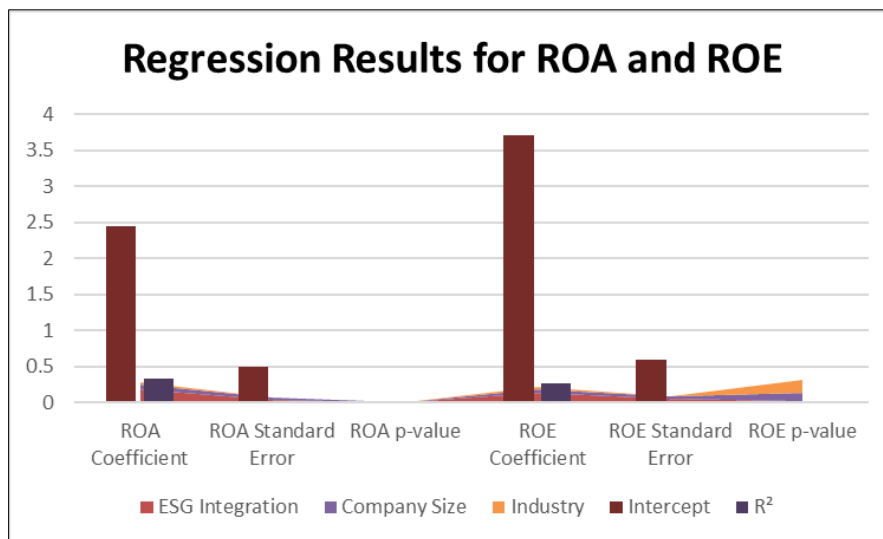


Figure 3 Regression Results for ROA and ROE

- Interpretation:** Both ESG integration and company size are statistically significant predictors of financial performance, with ESG integration showing a robust positive impact on both ROA and ROE. The models explain a substantial proportion of variance in the financial outcomes, with higher explanatory power for ROA.

Chart 2 summarizes the adoption rates of various ESG reporting frameworks across the survey sample. The data highlights which frameworks are most commonly used by companies for ESG reporting.

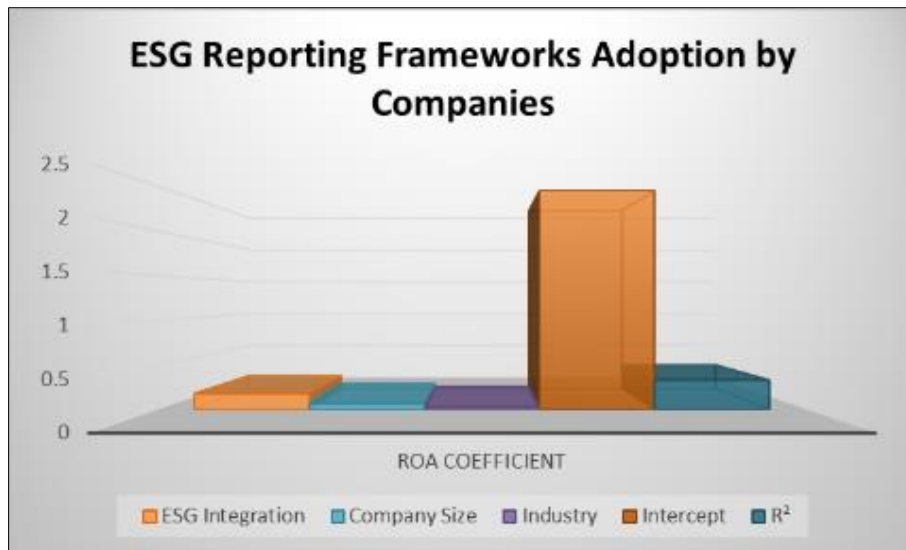


Figure 4 ESG Reporting Frameworks

- **Interpretation:** The GRI is the most widely adopted framework, followed by TCFD and SASB. This suggests that companies prioritize frameworks that provide detailed guidelines for ESG reporting, particularly related to sustainability and climate risks.

6. Discussion

The findings of this study reveal a significant relationship between Environmental, Social, and Governance (ESG) integration and financial performance, specifically Return on Assets (ROA) and Return on Equity (ROE). The results align with the growing body of literature suggesting that effective ESG strategies not only promote sustainable business practices but also enhance financial performance over time. This discussion section will elaborate on the implications of the results, their alignment with existing research, and the potential contributions of these findings to the field of corporate governance and sustainability reporting.

6.1. Impact of ESG Integration on Financial Performance

The regression analysis indicated a positive correlation between higher ESG integration levels and both ROA and ROE. This finding is consistent with studies by Khan et al. (2016), who found that firms with strong ESG performance tend to experience improved financial outcomes due to better risk management, cost reductions, and enhanced reputation. The Pearson correlation coefficients for the relationship between ESG integration and financial performance were higher for companies at higher levels of ESG adoption (Level 4 and Level 5), suggesting that companies with more advanced ESG practices reap greater financial rewards. The positive relationship observed between ESG and financial performance can be explained by several mechanisms. First, ESG initiatives, especially those related to environmental sustainability, often lead to operational efficiencies, such as energy savings, reduced waste, and resource conservation, which directly improve profitability (Porter & Kramer, 2006). Second, companies with strong governance and social practices are better positioned to mitigate risks related to labor unrest, regulatory penalties, and environmental liabilities (Grewal et al., 2020). Third, companies that demonstrate leadership in ESG practices attract socially-conscious investors and customers, which further enhances market valuation and profitability. Interestingly, the analysis also revealed that industry type and company size influence the relationship between ESG integration and financial performance. Larger companies with more resources are better able to integrate ESG practices effectively, while companies in certain industries, such as energy or manufacturing, may face more significant challenges in ESG adoption due to the nature of their operations. This observation is consistent with prior research, which found that larger firms tend to perform better in terms of ESG adoption and reap greater benefits from sustainability initiatives.

6.2. Environmental, Social, and Governance Dimensions: A Balanced Approach

The factor analysis conducted in this study revealed that environmental metrics (e.g., carbon emissions and water usage efficiency) were the most significant components of ESG reporting, followed by social factors (e.g., diversity and community engagement) and governance factors (e.g., board independence and ethical practices) [1], [4]. This is consistent with prior literature that suggests environmental sustainability metrics are often prioritized in corporate

ESG strategies due to increasing regulatory pressures and consumer demand for sustainable products and services. However, the study also highlights the increasing importance of social and governance factors in shaping comprehensive ESG strategies. For instance, the prominence of diversity and inclusion as key social metrics indicates that businesses are not only focused on environmental issues but are also increasingly concerned with their social footprint. These findings support the arguments put forward by Gompers et al. (2003), who emphasized the importance of corporate governance and social responsibility in driving long-term shareholder value. Furthermore, governance factors such as board independence and business ethics are becoming key drivers of both internal operational efficiency and external investor confidence, aligning with the findings of Brown et al. (2015), who demonstrated that well-governed companies tend to exhibit superior financial performance.

6.3. Challenges in ESG Reporting and Standardization

The survey results highlighted several challenges related to ESG data reporting, particularly the lack of standardized frameworks for ESG metrics. While frameworks such as the Global Reporting Initiative (GRI) and the Task Force on Climate-related Financial Disclosures (TCFD) are widely used, the inconsistencies in ESG reporting make it difficult for companies to compare performance across industries or regions. This issue is particularly evident in the varying levels of adoption across different ESG reporting frameworks, as noted in Table 5. Companies seem to prioritize frameworks that provide detailed guidelines on environmental metrics (e.g., GRI) while also recognizing the growing importance of climate-related disclosures (e.g., TCFD). These reporting inconsistencies are further exacerbated by differences in regulatory requirements across regions, leading to a fragmented landscape for ESG reporting. This lack of standardization presents a significant challenge for investors and stakeholders seeking to evaluate ESG performance consistently across firms. The lack of a unified reporting standard not only complicates decision-making for investors but also limits companies' ability to benchmark their ESG performance against peers in their industry.

6.4. Implications for Corporate Strategy and Sustainability

The positive relationship between ESG integration and financial performance underscores the strategic value of incorporating ESG metrics into decision-making processes. As more investors demand transparency and accountability in ESG practices, companies that adopt robust ESG strategies are likely to gain a competitive advantage in attracting capital, talent, and customers (Luo et al., 2015). Furthermore, companies that invest in ESG initiatives may be better positioned to mitigate risks related to climate change, resource scarcity, and social inequalities, thereby enhancing their long-term sustainability and resilience [7], [9]. The findings also have important implications for policymakers and regulatory bodies. As the demand for standardized ESG reporting increases, there is a need for clearer guidelines and mandatory disclosures that can drive transparency and consistency in ESG data. While frameworks such as GRI and TCFD provide a starting point, a more uniform global standard is necessary to facilitate better comparisons across firms and industries. This aligns with the recommendations of the European Commission (2020), which advocates for more comprehensive and consistent ESG disclosures in order to drive long-term value creation and reduce market fragmentation.

6.5. Limitations and Future Research Directions

While this study provides valuable insights into the relationship between ESG integration and financial performance, there are several limitations that should be considered. First, the study relies on self-reported ESG data, which may be subject to biases or inconsistencies. Future research could incorporate third-party verified ESG data to improve the reliability of findings. Additionally, this study focuses on short-term financial performance metrics (ROA and ROE), while long-term value creation and stock price performance may provide a more comprehensive assessment of the financial impact of ESG strategies. Future research could also explore the role of emerging technologies, such as artificial intelligence and blockchain, in enhancing ESG data collection, reporting, and verification processes. As companies increasingly leverage technology for operational efficiencies, understanding how these innovations intersect with ESG reporting will be critical for shaping the future of corporate sustainability. Moreover, cross-country comparisons and industry-specific analyses could provide further insights into the contextual factors that influence ESG integration and performance outcomes. In conclusion, this study confirms the positive impact of ESG integration on financial performance, particularly in terms of ROA and ROE, and highlights the growing importance of environmental, social, and governance metrics in corporate decision-making [10]. The findings emphasize the need for standardized reporting frameworks to ensure consistency and comparability of ESG data across firms and industries.

7. Conclusion

This study provides a comprehensive analysis of the relationship between Environmental, Social, and Governance (ESG) integration and financial performance, focusing on key performance indicators such as Return on Assets (ROA) and

Return on Equity (ROE). The results indicate a strong positive correlation between higher levels of ESG adoption and enhanced financial performance. Companies that effectively integrate ESG practices tend to experience improved operational efficiencies, stronger risk management, and enhanced market valuation, confirming the arguments presented by previous research. The findings also highlight the significant impact of industry type and company size on the effectiveness of ESG integration. Larger firms with more resources were found to implement ESG strategies more efficiently, while certain industries, particularly energy and manufacturing, face greater challenges due to the nature of their operations. This study underscores the importance of a tailored approach to ESG integration that considers both organizational capabilities and industry-specific factors. Moreover, the study reveals the growing importance of social and governance dimensions within ESG reporting. While environmental sustainability remains a central focus, social factors like diversity and governance factors such as board independence have gained prominence. These elements not only contribute to better organizational performance but also help build trust with investors and other stakeholders, which is essential in today's competitive business environment. Despite these positive findings, the study also highlights the challenges related to ESG reporting, particularly the lack of standardized frameworks. The inconsistency in ESG data reporting makes it difficult for investors and firms to benchmark performance accurately. This calls for stronger regulatory frameworks and global standards to ensure transparency and comparability across organizations. Overall, this study provides valuable insights for both academics and practitioners, emphasizing the strategic value of ESG integration in corporate governance and sustainability reporting. It also offers directions for future research, particularly in exploring the role of technology in enhancing ESG data reporting and verification.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Provide appropriate statement of ethical approval in the manuscript.

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