Journal of Social Sciences and Management Studies ISSN: 2957-8795
https://doi.org/10.56556/jssms.v2i3.1525

REVIEW ARTICLE

Environmental, Social, and Governance (ESG) Practices and Corporate Sustainability: A Review of Drivers, Challenges, and Future Research Directions

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Received: 25 June, 2023, Accepted: 26 August, 2023, Published: 09 September, 2023

Abstract
Environmental, Social, and Governance (ESG) practices have become increasingly important components of corporate sustainability strategies, reflecting growing expectations for businesses to address environmental impacts, social responsibilities, and governance accountability alongside financial performance. Although ESG integration has expanded across industries, substantial differences remain in its adoption, implementation, measurement, and contribution to long-term corporate sustainability. This review critically examines the principal drivers, practices, challenges, and future research directions associated with ESG integration into corporate sustainability. Drawing on influential theoretical perspectives and empirical research, the review examines regulatory pressures, stakeholder expectations, investor demands, organizational leadership, and technological innovation as major drivers of ESG adoption. It further evaluates environmental initiatives, social responsibility practices, and governance mechanisms that contribute to organizational sustainability and long-term value creation. Particular attention is given to persistent implementation challenges, including inconsistent ESG assessment methodologies, limited data comparability, financial and technological constraints, greenwashing, and differences in institutional and regulatory environments. The review also discusses the complex relationship between ESG performance and corporate financial and non-financial outcomes, highlighting the importance of industry-specific materiality and credible sustainability measurement. Finally, it identifies emerging research opportunities involving artificial intelligence, standardized ESG reporting, sustainable supply chains, biodiversity integration, and ESG implementation in small and medium-sized enterprises and emerging economies. An integrated conceptual framework is proposed to explain the relationships among ESG drivers, implementation practices, organizational challenges, and corporate sustainability outcomes. The review highlights the need to move beyond disclosure-oriented ESG adoption toward measurable, transparent, and impact-oriented corporate sustainability strategies.

Keywords: ESG; Corporate sustainability; Sustainable business practices; Sustainability reporting

1. Introduction

Corporate sustainability has evolved from a relatively narrow focus on environmental protection and corporate social responsibility into a broader strategic approach integrating environmental, social, and economic considerations into organizational decision-making. Increasing environmental degradation, climate change, resource scarcity, social inequalities, and governance failures have intensified expectations that corporations should contribute to sustainable development while maintaining economic viability. Consequently, businesses are increasingly expected to demonstrate not only financial performance but also their ability to manage environmental impacts, protect stakeholder interests, and maintain transparent and accountable governance systems.

Environmental, Social, and Governance (ESG) considerations have emerged as an influential framework for evaluating and managing these corporate responsibilities. The environmental dimension addresses organizational interactions with natural systems, including greenhouse gas emissions, energy consumption, pollution, water management, waste generation, and biodiversity impacts. The social dimension concerns relationships with employees, communities, customers, suppliers, and other stakeholders, encompassing human rights, labor standards, occupational health and safety, diversity, and social inclusion. Governance refers to the organizational structures and processes that determine corporate accountability, transparency, ethical conduct, board oversight, and risk management (Gillan et al., 2021).

Although ESG and corporate social responsibility (CSR) are closely related, they are not entirely interchangeable. CSR traditionally emphasizes corporate responsibilities toward society and stakeholders, whereas ESG provides a more structured approach for assessing environmental, social, and governance issues through organizational policies, performance indicators, and disclosures. ESG has consequently become particularly relevant to investors, financial institutions, regulators, and corporate managers seeking to incorporate sustainability-related risks and opportunities into business decisions (Aguinis and Glavas, 2012; Gillan et al., 2021).

The growing importance of ESG is also associated with increasing regulatory and institutional attention to sustainability reporting. The Global Reporting Initiative (GRI) provides standards for reporting organizational impacts on the economy, environment, and people, while the International Sustainability Standards Board (ISSB) has introduced IFRS S1 and IFRS S2 to establish requirements for sustainability-related and climate-related financial disclosures. These developments reflect the increasing institutionalization of sustainability information within corporate reporting and investment decision-making (Christensen et al., 2021; GRI, 2021; IFRS Foundation, 2023a).

Nevertheless, the increasing adoption of ESG practices does not necessarily guarantee improvements in corporate sustainability performance. Organizations may demonstrate extensive sustainability disclosures without achieving corresponding reductions in environmental impacts or improvements in social outcomes. Differences in ESG definitions, indicators, assessment methodologies, reporting boundaries, and institutional contexts further complicate comparisons between organizations. Berg et al. (2022), for example, demonstrated substantial divergence among major ESG rating providers, identifying differences in measurement, scope, and weighting as important sources of inconsistency.

Furthermore, the relationship between ESG performance and corporate financial performance remains complex. Although a substantial body of empirical research identifies non-negative or positive associations, the magnitude and direction of these relationships vary according to industry characteristics, measurement approaches, materiality, and research methodologies (Friede et al., 2015; Khan et al., 2016; Gillan et al., 2021).

Despite considerable progress, important questions remain concerning the factors motivating ESG adoption, the effectiveness of different implementation strategies, the barriers preventing meaningful integration, and the conditions under which ESG practices contribute to measurable corporate sustainability outcomes. Against this background, this review examines the relationship between ESG practices and corporate sustainability through four interconnected objectives: (1) to examine the principal organizational, institutional, financial, and stakeholder-related drivers of ESG adoption; (2) to evaluate major environmental, social, and governance practices and their contributions to corporate sustainability; (3) to identify the principal challenges and limitations affecting effective ESG implementation and performance assessment; and (4) to identify research gaps and propose future research directions for strengthening ESG integration into corporate sustainability strategies. The review also develops an integrated conceptual framework linking ESG adoption drivers, implementation practices, organizational challenges, and sustainability outcomes.

2. Methodology

2.1. Literature search strategy

A systematic literature review approach is appropriate for synthesizing the expanding body of research on ESG practices and corporate sustainability. This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting framework to promote transparency in study identification, screening, eligibility assessment, and inclusion.

For this study, the literature search covered publications from 2011 to 2022. Scopus and Web of Science served as the principal bibliographic databases because they provide structured indexing of peer-reviewed research across management, finance, environmental science, and sustainability disciplines. ScienceDirect and SpringerLink were also used for supplementary searches, while Google Scholar assisted in identifying relevant publications and tracing cited references.

The search strategy combined terms relating to ESG, corporate sustainability, implementation drivers, organizational barriers, and sustainability performance. The Boolean search string is ("environmental, social and governance" OR ESG OR "ESG practices" OR "ESG performance" OR "corporate social responsibility") AND ("corporate sustainability" OR "sustainable business" OR "sustainability performance") AND (drivers OR determinants OR adoption OR implementation OR challenges OR barriers OR outcomes OR "future research").

The search prioritized peer-reviewed journal articles, systematic reviews, meta-analyses, and relevant theoretical contributions. Official institutional documents and sustainability reporting standards were also included as supplementary sources for understanding regulatory and reporting developments.

2.2. Inclusion and exclusion criteria

Studies were included when they: (1) examine ESG practices, ESG adoption, or corporate sustainability; (2) investigate environmental, social, or governance dimensions of organizational performance; (3) analyze drivers, challenges, implementation mechanisms, or outcomes of ESG integration; (4) provide empirical, theoretical, or systematic-review evidence relevant to corporate sustainability; and (5) are published in peer-reviewed academic journals or constitute authoritative institutional standards and reports.

Studies were excluded when they: (1) focus exclusively on individual consumer behavior without a corporate sustainability connection; (2) discuss environmental or social issues without examining organizational implications; (3) are unrelated to ESG adoption or corporate sustainability; (4) are duplicate records or lack sufficient methodological or conceptual information; and (5) are non-academic opinion pieces without a clear contribution to the review objectives.

2.3. Screening and thematic synthesis

The literature was screened in three stages: title and abstract screening, full-text eligibility assessment, and final inclusion. Relevant information was extracted concerning publication characteristics, geographical context, research design, theoretical frameworks, ESG dimensions, implementation drivers, challenges, and sustainability outcomes. The selected publications were then synthesized using a thematic approach. Four principal analytical themes guide the synthesis: conceptual foundations, ESG adoption drivers and practices, implementation challenges and sustainability impacts, and future research priorities.

3. Conceptual foundations of ESG and corporate sustainability

ESG provides an integrated framework for understanding corporate environmental responsibilities, social relationships, and governance mechanisms. Its conceptual foundations are closely associated with stakeholder theory, legitimacy theory, institutional theory, the resource-based view, and the Triple Bottom Line approach. These perspectives explain why organizations adopt sustainability practices, how external expectations influence corporate behavior, and under what conditions sustainability-related capabilities contribute to organizational performance.

Stakeholder theory, introduced by Freeman (1984), emphasizes that organizations should consider the interests of multiple stakeholder groups rather than focusing exclusively on shareholders. Employees, customers, suppliers, communities, governments, and investors can influence corporate decisions and organizational legitimacy. From this perspective, ESG adoption represents a mechanism for addressing stakeholder expectations and managing relationships that influence long-term organizational success.

Legitimacy theory provides another important explanation for ESG adoption. Organizations operate within broader social and institutional environments and seek to maintain acceptance by demonstrating that their activities are consistent with societal expectations. Sustainability disclosures, environmental management initiatives, and social responsibility programs may therefore function as mechanisms for strengthening organizational legitimacy (Suchman, 1995). However, legitimacy-oriented reporting may also encourage symbolic disclosure when corporate communication is not supported by actual improvements in sustainability performance.

Institutional theory emphasizes the influence of regulatory requirements, professional norms, and competitive pressures on organizational behavior. DiMaggio and Powell (1983) identify coercive, normative, and mimetic mechanisms through which organizations become increasingly similar. Applied to ESG, coercive pressures arise from regulations and reporting requirements, normative pressures from professional standards and investor expectations, and mimetic pressures from organizations adopting practices already established by industry leaders.

The resource-based view offers a complementary perspective by explaining how sustainability-related resources and capabilities can contribute to competitive advantage. Barney (1991) argues that valuable, rare, inimitable, and organizationally embedded resources can support sustained competitive advantage. In this context, environmental technologies, employee capabilities, stakeholder relationships, and effective governance systems may become strategic organizational resources.

The Triple Bottom Line framework, popularized by Elkington (1997), emphasizes the integration of economic prosperity, environmental protection, and social responsibility. Although ESG and the Triple Bottom Line have different conceptual origins and measurement traditions, both emphasize that corporate performance should be assessed beyond conventional financial indicators. Table 1 summarizes these major theoretical perspectives and their relevance to ESG adoption and corporate sustainability.

An important conceptual distinction concerns the relationship between ESG disclosure, ESG performance, and corporate sustainability. ESG disclosure refers to the information organizations communicate about their sustainability-related policies, activities, and results. ESG performance concerns the extent to which organizations achieve measurable environmental, social, and governance outcomes. Corporate sustainability is

broader, involving the integration of these outcomes into long-term organizational strategies, operations, and value creation.

Table 1. Major theoretical perspectives underpinning ESG adoption and corporate sustainability

Theoretical framework	Central concept	Relevance to ESG practices
Stakeholder theory (Freeman, 1984)	Organizational responsibility toward multiple stakeholder groups	Explains stakeholder pressure and corporate responsiveness
Legitimacy theory (Suchman, 1995)	Maintaining social acceptance and organizational legitimacy	Explains sustainability disclosure and reputational strategies
Institutional theory (DiMaggio and Powell, 1983)	Regulatory, normative, and mimetic pressures	Explains external influences on ESG adoption
Resource-based view (Barney, 1991)	Strategic value of organizational resources and capabilities	Explains ESG-related innovation and competitive advantage
Triple Bottom Line (Elkington, 1997)	Integration of economic, environmental, and social performance	Provides a broader framework for corporate sustainability

These concepts should not be treated as equivalent. A corporation may disclose extensive ESG information while continuing to generate substantial environmental impacts or experiencing persistent social and governance problems. Consequently, the quality and credibility of ESG assessment depend on whether reported information reflects actual organizational performance and material impacts. Materiality is particularly important in this context. Khan et al. (2016) demonstrated that corporate performance on sustainability issues considered material to particular industries was associated with stronger financial performance, whereas performance on immaterial issues did not demonstrate the same relationship. This finding highlights the importance of identifying industry-specific sustainability priorities rather than applying identical ESG indicators to all organizations.

4. Drivers and practices of ESG implementation

4.1. Drivers of ESG adoption

The adoption of ESG practices is influenced by a combination of external institutional pressures and internal organizational motivations. These drivers often operate simultaneously and interact with industry characteristics, corporate resources, leadership commitment, and stakeholder expectations.

Regulatory and institutional pressures represent important external drivers. Governments, regulatory agencies, stock exchanges, and international organizations increasingly encourage or require organizations to disclose sustainability-related risks, impacts, and management strategies. Mandatory sustainability reporting can improve corporate transparency and information availability, although its effectiveness depends on reporting quality, enforcement, institutional capacity, and the comparability of disclosed information (Christensen et al., 2021).

Investor expectations and sustainable finance also influence ESG adoption. Institutional investors and financial institutions increasingly consider environmental and social risks alongside governance quality when evaluating investment opportunities. ESG-related information may assist investors in identifying climate exposure, reputational risks, regulatory liabilities, and opportunities associated with sustainable technologies. However, ESG ratings and investment criteria differ across providers, making the interpretation of corporate sustainability performance challenging (Gillan et al., 2021; Berg et al., 2022).

Stakeholder expectations constitute another important driver. Customers increasingly evaluate corporate environmental and social responsibility, while employees may prefer organizations that demonstrate ethical leadership, workplace equality, and environmental commitment. Suppliers and business partners may also face sustainability requirements imposed by larger corporations and international value chains. Such pressures encourage organizations to integrate sustainability considerations into procurement, production, distribution, and corporate communication.

Leadership commitment and organizational culture are particularly important internal drivers. Senior management and boards of directors influence sustainability priorities through corporate strategies, resource allocation, performance targets, and accountability arrangements. Eccles et al. (2014) found that companies characterized by stronger sustainability policies exhibited distinctive organizational processes, including greater board responsibility for sustainability, stronger stakeholder engagement, and more extensive non-financial measurement and disclosure.

Market competitiveness and innovation can further motivate ESG adoption. Environmental efficiency initiatives may reduce resource consumption and operational costs, while investments in cleaner technologies and sustainable products may create new market opportunities. Bansal and Roth (2000) identified competitiveness, legitimation, and ecological

responsibility as important motivations for corporate environmental responsiveness.

4.2. Environmental, social, and governance practices

Environmental practices constitute a central component of ESG implementation. They involve reducing the environmental footprint of corporate activities through energy efficiency, renewable energy adoption, greenhouse gas emission reduction, water conservation, waste minimization, pollution prevention, and sustainable resource management.

Climate-related initiatives are particularly important because organizations face increasing physical and transition risks associated with climate change. Physical risks include extreme weather events, water scarcity, flooding, and heat-related disruptions, whereas transition risks arise from changes in climate policies, technologies, markets, and consumer expectations. Corporate climate strategies therefore increasingly involve emissions inventories, reduction targets, energy transitions, climate-risk assessments, and supply-chain decarbonization. IFRS S2 provides a reporting framework for climate-related risks and opportunities, including governance, strategy, risk management, and performance indicators (IFRS Foundation, 2023b).

Social practices focus on organizational relationships with employees, communities, customers, and supply-chain partners. Important initiatives include occupational health and safety, fair employment conditions, human rights protection, workforce diversity, gender equality, employee training, and community engagement. Responsible supply-chain management is especially relevant for multinational corporations because labor conditions and social impacts may occur beyond the direct operational boundaries of the reporting organization.

Governance practices provide the institutional and managerial structures needed to support effective ESG implementation. These include board oversight, ethical leadership, transparency, anti-corruption policies, internal controls, executive accountability, risk management, and stakeholder engagement. Strong governance mechanisms can help ensure that sustainability commitments are incorporated into corporate strategy and supported by appropriate resources, monitoring systems, and accountability arrangements.

The three dimensions are interdependent. Environmental targets require governance mechanisms for implementation and verification, while social outcomes depend partly on management decisions concerning employment, procurement, and investment. Similarly, responsible governance can strengthen the credibility of environmental and social reporting. Figure 1 presents the proposed integrated framework connecting ESG adoption drivers with implementation practices and corporate sustainability outcomes.

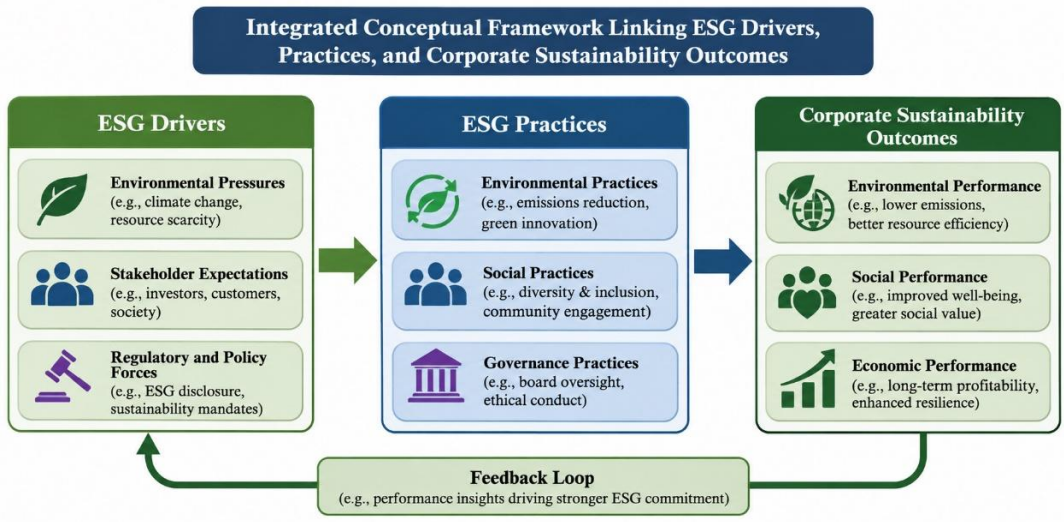


Figure 1. Integrated conceptual framework linking ESG drivers, practices, and corporate sustainability outcomes

5. Challenges and impacts of ESG on corporate sustainability

5.1. Major challenges affecting ESG implementation

Despite the growing importance of ESG, organizations encounter substantial difficulties when translating sustainability commitments into operational improvements. These challenges relate to measurement, financial resources, institutional conditions, organizational capabilities, and the credibility of sustainability disclosures.

One of the most significant challenges is the absence of universally consistent ESG measurement approaches. Different rating agencies, reporting frameworks, and assessment methodologies use different indicators, weighting systems, and definitions of corporate sustainability performance. Berg et al. (2022) demonstrated that ESG rating divergence arises from differences in scope, measurement, and weighting. Their analysis identified measurement as the largest contributor to rating divergence, followed by differences in scope and weighting. This creates difficulties for investors, regulators, and corporate managers seeking to compare ESG performance across organizations.

Data availability and reliability represent another important challenge. ESG assessments often require information concerning greenhouse gas emissions, energy consumption, water use, workforce characteristics, labor conditions, supply-chain practices, and governance structures. However, organizations may have different data collection capacities, reporting boundaries, monitoring systems, and verification procedures. Smaller organizations, in particular, may lack the financial and technical resources needed to develop comprehensive ESG information systems.

Financial constraints can also restrict ESG implementation. Investments in renewable energy, cleaner production technologies, environmental monitoring, employee welfare, and sustainable supply-chain management may require substantial initial expenditure. Although these investments can generate long-term economic and environmental benefits, their costs may discourage adoption among organizations facing limited financial resources or short-term profitability pressures.

Greenwashing represents a further threat to ESG credibility. It occurs when organizations communicate misleading or exaggerated claims about their environmental or sustainability performance. Delmas and Burbano (2011) explain that greenwashing can arise through interactions among institutional pressures, market incentives, organizational characteristics, and individual managerial motivations. Such practices can undermine stakeholder confidence and weaken the credibility of corporate sustainability initiatives.

Regulatory fragmentation also complicates implementation. Organizations operating across different countries may encounter varying disclosure requirements, sustainability definitions, reporting expectations, and enforcement mechanisms. Although international standards are intended to improve comparability, differences in regulatory adoption, institutional capacity, and reporting practices continue to create implementation difficulties.

Organizational resistance and insufficient expertise can further limit ESG integration. Employees and managers may perceive sustainability requirements as additional administrative responsibilities rather than strategic priorities. Effective implementation consequently requires leadership commitment, workforce training, internal coordination, and the integration of sustainability indicators into organizational performance management. Finally, supply-chain complexity presents difficulties for assessing environmental and social impacts beyond organizational boundaries. Corporate sustainability performance may depend on suppliers, logistics providers, contractors, and customers, making it difficult to obtain reliable information and ensure compliance throughout the value chain.

5.2. Impacts of ESG practices on corporate sustainability

The relationship between ESG practices and corporate sustainability is multidimensional, involving environmental performance, social outcomes, governance quality, financial performance, and organizational resilience.

Environmental ESG practices can contribute to sustainability by reducing resource consumption, limiting pollution, improving energy efficiency, and supporting the transition toward low-carbon production systems. Renewable energy investments, cleaner technologies, circular production systems, and improved waste management may reduce environmental pressures while creating opportunities for operational efficiency and innovation.

Social ESG practices can strengthen corporate sustainability through improved employee well-being, occupational safety, labor standards, workplace diversity, and community relationships. Organizations that invest in employee development and responsible employment practices may benefit from stronger workforce engagement, organizational commitment, and human capital development. Nevertheless, these outcomes depend on the quality of implementation rather than the existence of formal policies alone (Aguinis and Glavas, 2012).

Governance practices support sustainability by strengthening transparency, accountability, ethical conduct, and organizational oversight. Effective governance mechanisms can improve the integration of sustainability considerations into strategic planning, risk management, and executive decision-making. Eccles et al. (2014) provide empirical evidence that organizations with stronger sustainability policies tend to demonstrate more developed stakeholder engagement and sustainability-related organizational processes.

The relationship between ESG and financial performance has received considerable research attention. Friede et al. (2015) synthesized evidence from approximately 2,200 empirical studies and reported that roughly 90% identified a non-negative relationship

between ESG and corporate financial performance. However, this finding should not be interpreted as evidence that every ESG activity produces financial benefits or that the relationship is necessarily causal. The studies included different ESG indicators, industries, geographical contexts, and financial performance measures.

The importance of materiality further explains these differences. Khan et al. (2016) found that corporate performance on financially material sustainability issues was associated with stronger financial outcomes, whereas performance on immaterial issues did not show the same association. Thus, the effectiveness of ESG strategies may depend on the extent to which organizations identify and prioritize sustainability issues relevant to their industries and operational contexts.

Gillan et al. (2021) similarly highlighted relationships between corporate ESG characteristics, leadership, ownership, risk, and firm value while emphasizing that some findings remain conflicting. Consequently, the financial implications of ESG should be understood as context-dependent rather than universally positive.

Importantly, financial performance alone cannot provide a complete assessment of corporate sustainability. An organization may improve profitability while continuing to generate substantial environmental damage or social inequalities. Comprehensive sustainability evaluation should therefore consider both financially relevant ESG risks and the organization's broader environmental and social impacts. Table 2 summarizes the principal drivers, practices, implementation challenges, and sustainability implications identified in the literature.

Table 2. Key drivers, ESG practices, challenges, and their implications for corporate sustainability

ESG dimension	Major drivers	Principal practices	Key challenges	Potential sustainability contributions
Environmental	Climate regulation, resource efficiency, investor expectations	Emission reduction, renewable energy, waste management, water conservation, circular economy	Investment costs, environmental data limitations, technological barriers	Reduced environmental footprint, resource efficiency, climate resilience
Social	Stakeholder expectations, labor standards, employee welfare	Occupational safety, human rights, diversity, employee development, community engagement	Supply-chain monitoring, social impact measurement, cultural differences	Improved employee well-being, social equity, stakeholder trust
Governance	Regulatory compliance, accountability, investor scrutiny	Board oversight, transparency, anti-corruption, risk management, ethical leadership	Regulatory fragmentation, inconsistent reporting, weak enforcement	Greater accountability, transparency, institutional credibility
Integrated ESG	Corporate strategy, competitiveness, sustainable finance, leadership commitment	ESG integration, sustainability reporting, performance monitoring, responsible procurement	Rating divergence, greenwashing, data comparability, organizational resistance	Long-term value creation, organizational resilience, sustainable competitiveness

Source: Synthesized from Bansal and Roth (2000), Aguinis and Glavas (2012), Eccles et al. (2014), Friede et al. (2015), Khan et al. (2016), Christensen et al. (2021), Gillan et al. (2021), and Berg et al. (2022).

6. Research gaps and future research directions

Although ESG research has expanded substantially, several important knowledge gaps remain. These gaps concern the measurement of sustainability outcomes, the relationship between ESG activities and actual environmental and social impacts, differences in organizational capabilities, and the integration of emerging technologies into sustainability management.

First, ESG measurement and reporting require further methodological development. Existing ESG rating systems demonstrate considerable differences in indicators, scope, and assessment procedures. Future studies should investigate methods for improving indicator consistency, measurement transparency, and comparability while recognizing that material sustainability issues differ across industries and geographical contexts (Berg et al., 2022; Khan et al., 2016).

Second, additional research is needed to distinguish sustainability disclosure from actual sustainability performance. Many studies rely on ESG ratings,

corporate reports, or disclosure scores as indicators of organizational sustainability. However, these measures may not adequately reflect real environmental improvements, social outcomes, or the effectiveness of governance mechanisms. Future studies should combine corporate disclosures with independently verified environmental and social performance indicators.

Third, greenwashing and sustainability assurance require greater attention. Research should examine how independent verification, standardized reporting, corporate governance, and regulatory enforcement can improve the credibility of ESG disclosures. The effectiveness of assurance mechanisms should also be evaluated across different industries and organizational sizes.

Fourth, research on ESG implementation in small and medium-sized enterprises remains important. Compared with large corporations, SMEs may face greater financial, technological, and human-resource constraints when developing ESG strategies. Future studies should identify cost-effective approaches to sustainability measurement, implementation, and reporting that are appropriate for smaller organizations.

Fifth, the relationship between ESG performance and financial outcomes requires more longitudinal and context-sensitive research. Although existing studies frequently report positive or non-negative associations, questions remain regarding causality, industry materiality, geographical variation, and the influence of institutional conditions. Researchers should investigate whether ESG adoption produces long-term improvements in organizational resilience, environmental performance, and financial sustainability.

Sixth, emerging technologies provide important opportunities for advancing ESG implementation. Artificial intelligence, machine learning, remote sensing, blockchain, and digital monitoring systems may improve data collection, supply-chain transparency, environmental monitoring, and sustainability reporting. Nevertheless, their effectiveness depends on data quality, technological accessibility, cybersecurity, and appropriate human oversight.

Seventh, biodiversity and nature-related corporate impacts require stronger integration into ESG research. Corporate environmental assessments have traditionally emphasized climate change, energy consumption, and emissions, while impacts on ecosystems, biodiversity, and natural capital may receive comparatively limited attention. Future studies should investigate how organizations can incorporate biodiversity risks, ecosystem dependencies, and nature-positive strategies into ESG decision-making.

Finally, research should examine the social dimensions of corporate sustainability more comprehensively, particularly labor rights, social equity, human rights, community development, and just transition considerations. This is important because environmental improvements may create uneven social and economic consequences across workers, communities, and supply-chain participants. Figure 2 presents a proposed research roadmap addressing these knowledge gaps and emerging opportunities. Furthermore, Table 3 provides a more detailed summary of the principal research gaps and potential directions for future investigation.

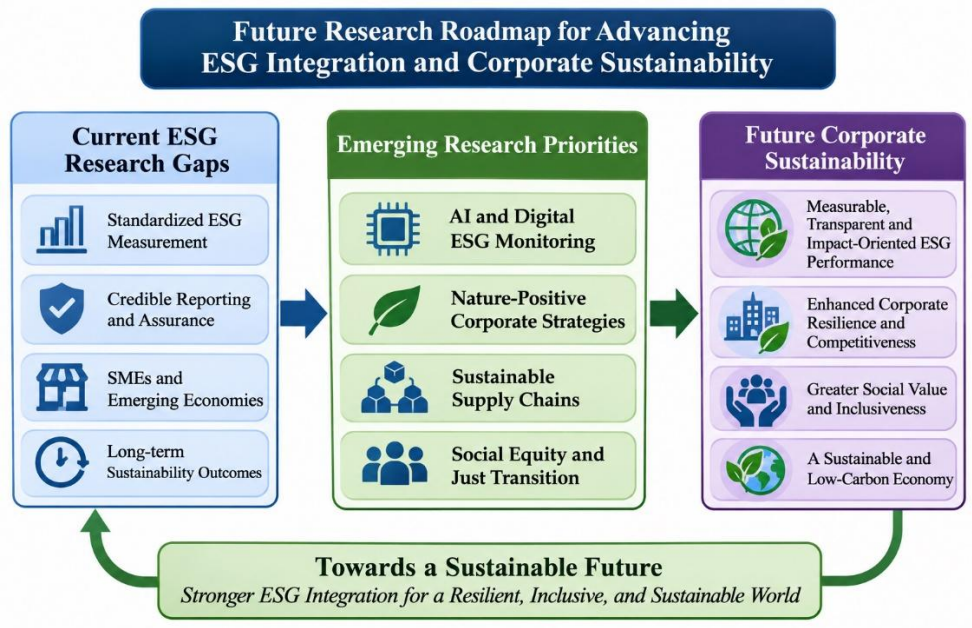


Figure 2. Future research roadmap for advancing ESG integration and corporate sustainability

Table 3. Major research gaps and future research directions in ESG and corporate sustainability

Identified research gap	Future research direction	Potential research question
Inconsistent ESG assessment methodologies	Develop comparable and transparent ESG indicators	How can ESG performance measurement be improved across industries?
Limited verification of sustainability disclosures	Strengthen independent assurance and impact-based reporting	How can organizations reduce greenwashing and improve ESG credibility?
Limited evidence from SMEs	Develop cost-effective ESG implementation frameworks	What organizational capabilities enable SMEs to adopt ESG practices?
Uncertain causal relationships between ESG and financial performance	Conduct longitudinal and causal empirical studies	Under what conditions does ESG adoption improve long-term corporate performance?
Limited application of digital technologies	Integrate AI, blockchain, and digital monitoring systems	How can digital technologies improve ESG data reliability and transparency?
Insufficient biodiversity integration	Incorporate nature-related risks and ecosystem impacts	How can biodiversity considerations be integrated into corporate ESG strategies?
Uneven social sustainability assessment	Investigate labor rights, inclusion, and just transition	How do ESG practices contribute to measurable social sustainability outcomes?
Fragmented supply-chain sustainability monitoring	Develop integrated supply-chain ESG assessment systems	How can organizations improve environmental and social accountability across global supply chains?

7. Conclusions and implications

Environmental, Social, and Governance practices have become important components of contemporary corporate sustainability strategies. This review highlights that ESG integration is influenced by multiple institutional, financial, organizational, and stakeholder-related drivers. Regulatory developments, investor expectations, market competitiveness, leadership commitment, and technological innovation collectively encourage organizations to incorporate environmental, social, and governance considerations into corporate decision-making.

The review also demonstrates that effective ESG implementation requires coordinated action across the three dimensions. Environmental practices, including emission reduction, renewable energy adoption, resource efficiency, and waste management, contribute to reducing corporate environmental impacts. Social initiatives involving employee welfare, labor rights, diversity, and community engagement strengthen organizational relationships and social responsibility. Governance mechanisms, including transparency, accountability, ethical leadership, and board oversight, provide the institutional foundations necessary for credible ESG implementation.

However, significant barriers continue to constrain the effectiveness of ESG integration. Inconsistent measurement methodologies, limited data availability, financial constraints, greenwashing, regulatory fragmentation, and insufficient organizational capabilities make it difficult to achieve comparable and verifiable sustainability outcomes. The divergence among ESG rating providers further emphasizes the need for improved measurement consistency and greater transparency in corporate sustainability assessment.

The relationship between ESG practices and corporate financial performance is generally encouraging but remains context-dependent. Existing evidence suggests that ESG integration can support organizational resilience, innovation, risk management, and long-term value creation. Nevertheless, corporate sustainability should not be evaluated exclusively through financial indicators or ESG disclosure scores. Greater attention should be given to measurable environmental improvements, social impacts, and the quality of corporate governance.

Future research should prioritize standardized ESG assessment methodologies, independent sustainability assurance, AI-enabled monitoring, biodiversity integration, sustainable supply-chain management, and the participation of SMEs and organizations in emerging economies. Longitudinal and interdisciplinary investigations are also needed to establish the mechanisms through which ESG adoption generates measurable sustainability benefits.

Overall, this review emphasizes the importance of transitioning from disclosure-oriented ESG adoption toward measurable, transparent, and impact-oriented corporate sustainability management. Integrating environmental responsibility, social value creation, and accountable governance into corporate strategies can provide a stronger foundation for sustainable business development and long-term organizational resilience.

Acknowledgement: None

Funding: None

Conflict of interests: The author affirms no conflict of interest.

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