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Review Article

Environmental Accounting Disclosure and Corporate Sustainability: A Conceptual Review, Theoretical Integration, and Future Research Agenda

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Abstract

Environmental accounting disclosure has become a central issue in contemporary accounting, sustainability, and corporate governance discourse due to escalating environmental degradation, climate change risks, and stakeholder demand for transparency. Despite increasing regulatory attention and global sustainability initiatives, environmental accounting disclosure remains conceptually fragmented and unevenly implemented across jurisdictions, particularly in developing economies. This paper adopts a qualitative conceptual research design to critically examine the evolution, conceptual foundations, theoretical underpinnings, measurement challenges, empirical insights, and policy implications of environmental accounting disclosure. Drawing on extant scholarly literature, international reporting frameworks, and institutional policy documents, the paper integrates stakeholder theory, legitimacy theory, and sustainable development theory to explain disclosure behaviour and outcomes. The discussion reveals that while environmental accounting disclosure enhances corporate transparency, legitimacy, and sustainability orientation, its effectiveness is constrained by voluntary disclosure regimes, lack of standardized valuation methodologies, institutional weaknesses, and contextual differences. The paper concludes by proposing policy recommendations and a structured future research agenda aimed at strengthening environmental accounting disclosure as a strategic governance and sustainability mechanism.

Keywords: Environmental Accounting Disclosure, Sustainability Reporting, Corporate Accountability, Stakeholder Theory, Legitimacy Theory, Sustainable Development.

INTRODUCTION

Accounting systems have historically evolved as mechanisms for recording economic activity, informing decision-making, and satisfying societal expectations. Early accounting practices, traceable to ancient Mesopotamia, emerged alongside writing, numeracy, and trade, serving as instruments for documenting economic transactions, preserving wealth, and facilitating resource allocation (ACCA Global, n.d.). Over time, these practices became increasingly formalized, culminating in Luca Pacioli's codification of double-entry bookkeeping in 1494, which laid the foundation for modern accounting systems. Subsequently, the discipline diversified into specialised domains such as financial accounting, management accounting, cost accounting, and auditing, each responding to evolving economic, institutional, and societal needs (Hecht, 2007; Burnett, 2019).

Despite its evolution, conventional accounting has faced criticism for its limited focus on financial capital and neglect of environmental and social externalities. Industrial production, resource extraction, and waste generation impose significant costs on ecosystems and society, which are often absent from financial statements, leading to incomplete representations of organisational performance and long-term sustainability (IFAC, 2005; Schaltegger & Burritt, 2018). This narrow perspective reduces the decision-usefulness of accounting information for stakeholders concerned with environmental performance and sustainability outcomes, creating a gap between economic reporting and ecological accountability.

The emergence of environmental accounting in the 1970s marked a critical conceptual shift in accounting thought. Originating primarily in Europe and North America, it developed in response to growing environmental awareness, industrial pollution, and

ecological crises, supported by regulatory interventions and public activism (Hecht, 2007; Burnett, 2019). Unlike traditional accounting, environmental accounting seeks to recognize, measure, and report environmental costs, liabilities, and risks associated with organisational operations. This extension of accounting principles incorporates natural capital and ecosystem service valuation into organisational reporting, thereby offering a more holistic assessment of firm performance and sustainability (Lee & Hutchinson, 2005; UNEP, 2011).

In recent decades, the relevance of environmental accounting disclosure has intensified due to globalization, climate change, and increased stakeholder activism. Investors, regulators, and civil society increasingly demand transparency regarding corporate environmental impacts, resource consumption, and sustainability performance (GRI, 2021; IFRS Foundation, 2023). The adoption of the United Nations Sustainable Development Goals (SDGs) in 2015 further emphasized the role of businesses in achieving environmental sustainability, promoting intergenerational equity, and aligning corporate strategies with global ecological priorities (United Nations, 2015; Giangrande *et al*., 2019).

Despite this momentum, the practice of environmental accounting disclosure remains uneven across countries, industries, and firm sizes. In many developing economies, disclosure is largely voluntary, weakly regulated, and inconsistently enforced, resulting in low-quality or selective reporting (Worimegbe *et al*., 2021; Oyerogba *et al*., 2023). Empirical studies examining the relationship between environmental disclosure and financial performance report mixed and inconclusive results, suggesting that the phenomenon is more nuanced than a straightforward cost–benefit calculation (Ezeagba *et al*., 2015; Awotomilusi *et al*., 2025). This variability highlights the interplay of contextual factors such as regulatory frameworks, stakeholder pressure, organisational culture, and institutional capacity in shaping disclosure practices.

These challenges underscore the need for conceptual clarification, theoretical integration, and methodological standardization in environmental accounting disclosure research. A clear understanding of the conceptual underpinnings, objectives, and determinants of environmental disclosure is essential for advancing both academic scholarship and practical application. Consequently, this paper aims to address the following objectives:

i. Synthesize conceptual and theoretical literature on environmental accounting disclosure;
ii. Integrate key theoretical perspectives explaining environmental disclosure behaviour;
iii. Discuss measurement, classification, and implementation challenges associated with environmental accounting; and
iv. Propose a future research and policy agenda to strengthen disclosure quality, comparability, and sustainability outcomes.

Research Design and Review Approach

This study adopts a qualitative conceptual research design, operationalized through a critical narrative literature review. Conceptual research designs are appropriate where the aim is not to test hypotheses or analyse datasets, but rather to clarify constructs, integrate theories, and advance normative and analytical arguments (Grant & Booth, 2009; Dumay *et al*., 2016).

The review draws on peer-reviewed journal articles, international accounting and sustainability standards, and policy documents issued by authoritative organizations such as the United Nations Environment Programme (UNEP), International Federation of Accountants (IFAC), Global Reporting Initiative (GRI), and the IFRS Foundation. These sources were selected based on relevance, credibility, and accessibility through online academic databases and institutional repositories.

Narrative reviews are particularly valuable in emerging research domains such as environmental accounting disclosure, where empirical findings remain fragmented and theoretical development is ongoing (Tranfield *et al*., 2003).

Conceptual Foundations of Environmental Accounting

Evolution of Environmental Accounting

Environmental accounting originated in the 1970s as global awareness of environmental degradation driven by industrial expansion, pollution, and unsustainable resource extraction intensified. Early environmental movements and policy debates underscored that traditional economic indicators like Gross Domestic Product (GDP) failed to capture the environmental costs associated with economic growth, such as resource depletion and ecological disruption (Green accounting conceptual history). This realisation gave rise to environmental accounting as a means to integrate the environmental dimension into economic measurement, distinguishing it from conventional financial accounting that focuses primarily on monetary capital without accounting for natural capital stocks or ecological services.

In the international sphere, the development of frameworks such as the System of Environmental-Economic Accounting (SEEA) reflects this evolution. The SEEA, now internationally recognised as the statistical standard for environmental and natural capital accounting, was developed to bring environmental and economic information into a coherent system compatible with the System of National Accounts (SNA). It enables the systematic measurement of environmental assets, ecosystem services, resource flows, and environmental pressures thereby allowing

policymakers and economists to evaluate the environmental costs and benefits associated with economic activities (UN SEEA official framework). This approach extended environmental accounting beyond corporate reporting to macroeconomic national accounts, where environmental degradation and ecosystem contributions are explicitly reflected in national statistics such as adjusted indicators of wealth and sustainability.

Conceptual authorities also frame environmental accounting as an extension of traditional double-entry bookkeeping logic. Though originally designed to account for monetary exchanges, environmental accounting adopts a broader capital maintenance notion in which environmental degradation represents a loss of natural capital that should be recognised alongside economic gains (Environmental accounting conceptual frameworks). This paradigm shift has increasingly been supported by research emphasising that environmental costs such as pollution handling, resource depletion, and liability for environmental damage are substantial and likely to grow as environmental restraints tighten and public scrutiny increases. This recognition demands integration of environmental information into both managerial decision-making and external reporting systems to offer a fuller picture of organisational performance and sustainability (Environmental economic and environmental accounts context; IUCN explanation).

Meaning and Scope of Environmental Accounting

Environmental accounting refers to the systematic identification, measurement, analysis, and reporting of environmental costs, benefits, assets, and liabilities attributable to organisational activities. It seeks to embed ecological realities such as resource use and environmental impacts within the structure of economic and financial information, thereby informing both internal decision-making and external accountability. At its core, environmental accounting aims to clarify how environmental factors intersect with economic performance, bridging the gap between conventional accounting and environmental stewardship (UNESCWA environmental accounting definition).

At the organisational level, environmental accounting serves as a management tool to quantify environmental costs (e.g., remediation, compliance, pollution control), enhance cost control, and support strategic sustainability planning. For example, environmental accounting assists firms in identifying operational inefficiencies, making better resource allocation decisions, and reporting performance in ways that reflect both financial and ecological realities (Environmental accounting as management tool research). It also supports environmental performance benchmarking, where organisations can compare their environmental cost structures and outcomes over time or against peers, thus strengthening governance and accountability mechanisms.

At the macro or national level, environmental accounting contributes to green national accounting by adjusting conventional economic indicators to reflect environmental degradation and natural resource depletion. This work is exemplified by internationally adopted frameworks such as the SEEA Central Framework and ecosystem accounts, which systematically record environmental assets and the flows of ecosystem services in physical and, where appropriate, monetary terms. Such approaches enable the incorporation of environmental condition and ecosystem services into national decision-making and sustainable development planning, furthering the integration of ecological considerations into public policy and economic evaluation (SEEA ecosystem and natural capital accounts).

As defined through these frameworks, natural capital encompasses the stock of natural ecosystems that provides ongoing benefits (ecosystem goods and services) to society, such as clean water, air purification, and flood regulation. Environmental accounting thus extends the valuation focus beyond immediate market transactions to include the environmental functions that support human well-being, economic activity, and long-term sustainability underscoring the broader scope of environmental accounting that spans organisational performance, national wealth measurement, and contributions to sustainable development (UN SEEA natural capital FAQ)

Environmental Accounting Disclosure: Concept, Objectives, and Typologies

Environmental accounting disclosure refers to the systematic communication of a firm's environmental information both financial and non-financial to a broad range of stakeholders through corporate reporting media such as annual reports, sustainability reports, and integrated reports (Adams & Busola, 2017; RSIS International, 2023). This practice represents an extension of traditional financial reporting to include information about environmental impacts, resource consumption, environmental costs, liabilities, and broader ecological effects arising from organisational activities. Such disclosure supports stakeholders' understanding of how corporate operations intersect with environmental sustainability concerns and the organisation's contribution to sustainable development outcomes. Researchers have noted that environmental disclosures typically include narrative explanations, quantitative environmental performance indicators (e.g., emissions, energy use, waste), and monetary values where feasible, thereby providing a comprehensive account of both the environmental effects and the economic implications of corporate decisions (Adams & Busola, 2017; RSIS International, 2023).

The Association of Chartered Certified Accountants (ACCA) characterises environmental disclosure as a combination of qualitative narratives and

quantitative data that describe a company's environmental impacts, risk exposures, and resource usage in a given reporting period. ACCA emphasises that environmental disclosures should be meaningful, comparable, and decision-useful, recognising that stakeholders increasingly rely on this information to evaluate corporate performance beyond financial returns alone (ACCA Global, n.d.). Similarly, international organisations like the United Nations Environment Programme (UNEP) articulate that environmental disclosure enhances transparency and accountability, enabling stakeholders to make informed judgements about a company's environmental performance and its responsiveness to ecological challenges (UNEP, 2011).

Objectives of Environmental Accounting Disclosure

The primary objectives of environmental accounting disclosure are multifaceted and align with both corporate accountability and broader societal expectations:

Enhancing Transparency:

One core objective is to increase corporate transparency regarding environmental impacts, policies, and performance outcomes. Transparent disclosure enables stakeholders investors, regulators, customers, local communities, and civil society to assess how organisational actions affect the environment, thereby reducing information asymmetry (Adams & Busola, 2017; RSIS International, 2023).

Facilitating Stakeholder Decision-Making:

Environmental accounting disclosure equips stakeholders with relevant information to make informed decisions about investment, engagement, and support. By providing consistent environmental metrics and contextual explanations, disclosures help investors evaluate environmental risks and opportunities alongside financial indicators. This aligns with research demonstrating that non-financial environmental information can influence capital market assessments and corporate valuation (MDPI Sustainability, 2023).

Demonstrating Corporate Social Responsibility (CSR):

Another objective is to signal corporate commitment to environmental stewardship and responsible business conduct. Environmental disclosures are increasingly seen as a component of CSR, reflecting a firm's ethical orientation toward sustainable operations and regard for ecological impacts beyond statutory compliance (Adams & Busola, 2017).

Ensuring Regulatory Compliance:

In jurisdictions with environmental reporting requirements, systematic disclosure helps firms comply with legal obligations and avoid penalties. As regulatory environments evolve such as the European Union's Corporate Sustainability Reporting Directive and related standards organisations are expected to disclose environmental information that meets prescribed quality and scope standards (IFRS Foundation, 2023).

Supporting Sustainable Development:

Environmental accounting disclosure also aims to contribute to broader sustainable development goals (SDGs) by encouraging firms to account for their long-term environmental impacts and resource dependencies. Disclosure practices that incorporate sustainability metrics and forward-looking narratives support accountability for ecological stewardship and align corporate behaviour with global environmental objectives (RSIS International, 2023; MDPI Sustainability, 2023).

Types of Environmental Accounting Disclosure

Environmental accounting disclosure is a multifaceted practice that can be categorised along several key dimensions each reflecting differences in regulatory authority, content focus, and reporting architecture. Understanding these classifications is crucial for interpreting how and why environmental information is communicated to stakeholders.

1. Mandatory VS Voluntary Disclosure

Environmental accounting disclosures may be either mandatory or voluntary depending on regulatory expectations and governance structures. Mandatory disclosure arises where statutory requirements, regulatory stock exchange rules, or accounting standards compel firms to reveal environmental information. For example, sustainability-related disclosures under evolving regulatory regimes such as the European Sustainability Reporting Standards (CSRD) are compulsory for large companies operating within the European Union, requiring comprehensive environmental, social, and governance data as part of formal reporting obligations. In contrast, frameworks developed by the International Sustainability Standards Board (ISSB), such as IFRS S1 and IFRS S2, are globally recognised but remain voluntary unless incorporated into national regulation (IFRS Foundation; ACCA Global).

The distinction matters: research comparing regulatory environments such as voluntary regimes in the United States versus mandatory systems in the European Union demonstrates that compulsory reporting typically yields greater disclosure depth and comparability, while voluntary regimes often produce selective and heterogeneous practices.

2. Financial VS Non-Financial Disclosure

Another important classification differentiates between financial and non-financial environmental disclosures. Financial disclosures involve quantified monetary information about environmental costs, liabilities, expenditures, and provisions recognised in financial statements or notes where environmental impacts have direct economic effects (e.g., remediation costs, carbon pricing impacts). Conversely,

non-financial disclosures relate to qualitative information that cannot be easily expressed in monetary terms, such as environmental policies, emission reduction strategies, climate risk narratives, resource usage metrics, and sustainability goals. These non-financial indicators are often presented outside traditional financial statements but remain integral to stakeholder assessments of a firm's environmental performance (Al-Akra & Ali, 2012).

These two categories highlight that environmental accounting disclosure is not limited to monetary valuation but also encompasses a broader spectrum of qualitative sustainability information that informs stakeholders about environmental governance, strategy, and performance.

3. Standalone Sustainability Reports VS Integrated Reporting

A third dimension concerns reporting formats. Environmental disclosures may be published in standalone sustainability reports dedicated documents focusing exclusively on environmental, social, and governance (ESG) performance. Standalone reports typically provide rich narrative descriptions, performance tables, and context for sustainability initiatives, often structured according to frameworks such as the Global Reporting Initiative (GRI) standards. These reports are particularly useful for wide stakeholder audiences including communities, employees, and civil society groups interested in comprehensive environmental performance data.

By contrast, integrated reporting represents a more consolidated approach, where environmental accounting information is incorporated alongside financial disclosures within a single reporting framework. The Integrated Reporting Framework emphasises how environmental and other non-financial capitals contribute to an organisation's ability to create value over time, by connecting strategy, governance, performance, and prospects in a cohesive narrative. Integrated reporting thus appeals primarily to investors and capital market participants interested in understanding how environmental risks and opportunities affect long-term value creation.

Theoretical Framework for Environmental Accounting Disclosure

Stakeholder Theory

Stakeholder theory posits that organisations exist within a network of relationships with various groups and individuals stakeholders whose interests, values, and demands can influence organisational decision-making and actions (Freeman, 1984). In the context of environmental accounting disclosure, this theory suggests that firms provide environmental information to satisfy the informational needs of diverse stakeholder groups (e.g., investors, regulators, communities, customers, and non-governmental organisations) who are concerned about environmental and social impacts (Freeman, 1984; Alessa *et al*., 2024). Rather than focusing exclusively on shareholders, the stakeholder perspective views accountability to a broader set of social actors as essential to securing firm legitimacy, resource access, and long-term survival. Empirical research on sustainability reporting supports this view, showing that environmental disclosures often increase in response to heightened stakeholder pressure or expectations (Alessa *et al*., 2024; Masud *et al*., 2017). Consequently, environmental accounting disclosure is interpreted not only as a reporting practice but also as a strategic mechanism for managing stakeholder relationships and reducing information asymmetry between organisations and their stakeholders.

Legitimacy Theory

Legitimacy theory explains organisational behaviour as a function of the "social contract" between firms and the societies in which they operate (Suchman, 1995; Deegan, 2002). Under this theory, firms seek to ensure that their activities are perceived as acceptable, appropriate, and consistent with societal norms, values, and expectations. Legitimacy is not static; it must be maintained through continuous interaction and communication with stakeholders (Suchman, 1995). Environmental accounting disclosure, therefore, becomes a tool for demonstrating conformity with environmental norms, managing public perceptions, and restoring legitimacy when environmental performance is questioned. In practice, firms increase environmental disclosures following environmental controversies or in contexts where public or regulatory scrutiny is strong to signal responsible behaviour and align corporate conduct with societal expectations (Deegan, 2002; Gray *et al*., 1995). This theory has been widely applied in sustainability accounting research to explain why firms with environmentally sensitive activities may disclose more environmental information even when such disclosures do not immediately improve financial performance.

Sustainable Development Theory

Sustainable development theory emphasises the integration of environmental protection, social equity, and economic progress to meet present needs without compromising the ability of future generations to meet theirs (WCED, 1987; Rogers *et al*., 2007; Giangrande *et al.,* 2019). Although the well-known definition originates from the Brundtland Report (World Commission on Environment and Development, 1987), academic studies like Giangrande *et al*., (2019) reaffirm this principle in the context of sustainability accounting by linking environmental accounting disclosure to broader sustainability goals aimed at responsible resource stewardship and intergenerational equity. From this perspective, environmental accounting disclosure is not merely about reporting past impacts but is central to accountability for long-term environmental stewardship and aligning corporate strategies with global

sustainability imperatives such as the United Nations Sustainable Development Goals (SDGs) (Giangrande *et al*., 2019; Mondal *et al*., 2023). By facilitating transparency and enabling stakeholders to assess how firms contribute to or detract from sustainable development, environmental disclosures support organisational accountability to multiple capitals natural, social, and economic over extended time horizons.

Integrated Theoretical Perspective

While stakeholder theory, legitimacy theory, and sustainable development theory each offer valuable insights into why and how firms disclose environmental information, no single theory fully captures the multi-dimensional motivations and outcomes of environmental accounting disclosure. For instance, stakeholder theory foregrounds external demands and resource dependencies, legitimacy theory focuses on social acceptance and normative conformity, and sustainable development theory emphasises long-term ecological and societal welfare. The integration of these theories creates a comprehensive framework in which:

a. Stakeholder pressures trigger the initial drive for environmental reporting, reflecting the informational needs of diverse groups.
b. Legitimacy concerns shape how environmental narratives are constructed and communicated, especially under social or regulatory scrutiny.
c. Sustainable development imperatives orient disclosure practices toward long-term accountability, resource stewardship, and alignment with global sustainability objectives.

This integrated perspective recognises that environmental accounting disclosure functions simultaneously as a strategic response to stakeholder demands, a legitimacy-seeking mechanism, and a commitment to sustainable development goals. Viewed holistically, disclosure practices can thus be better understood as embedded within broader socio-institutional and normative environments rather than as isolated financial reporting practices.

Environmental Costs: Classification and Measurement Challenges

Environmental costs constitute the economic valuation of negative impacts that organisational activities impose on ecological systems. According to international environmental cost frameworks, these costs arise whenever natural capital is degraded, resources are depleted, or pollution and health impacts occur due to production and consumption processes (de Bruyn *et al*., 2018). In the accounting context, environmental costs extend beyond direct cash outflows to include expenditures related to waste management, pollution control, compliance with environmental legislation, resource efficiency investments, and liability for remediation activities (de Bruyn *et al*., 2018; Sustainability Directory, 2024). This broad conceptualisation recognises that environmental costs impact both economic performance and societal welfare, potentially affecting firm risk profiles and stakeholder assessments.

A foundational step in environmental accounting is the classification of environmental costs. Sources such as IFAC (2005) and subsequent sustainability accounting literature provide structured categories that help firms identify and report environmental cost components systematically. Common classifications include prevention and management costs (expenditures on pollution control technologies and preventative environmental programs), waste and emissions treatment costs, material losses, and more ambiguous categories like reputational costs and future regulatory exposure (IFAC, 2005; Mahdavi *et al*., 2015; Sustainability Directory, 2024). Other taxonomies distinguish between direct environmental costs (e.g., effluent charges, clean-up expenditures), compliance and permitting costs, opportunity costs associated with resource inefficiencies, and contingent liabilities arising from future remediation obligations (Environmental Accounting Fundamentals, 2024; Taxguru, 2024).

Despite advances in classification frameworks, measurement of environmental costs remains a central challenge in environmental accounting disclosure. A key difficulty arises from the inherently intangible, uncertain, and long-term nature of many environmental impacts. Unlike conventional cost elements (such as materials or labour), environmental costs may not manifest as immediate cash transactions, yet they influence organisational sustainability over extended periods. For example, natural capital depletion and ecosystem service losses may only become economically apparent decades after the associated activity, complicating attempts at real-time monetary valuation (ISO 14007; de Bruyn *et al*., 2018; Sustainability Directory, 2024). This latency challenges traditional accounting principles that require costs to be both reliable and measurable for recognition in financial or sustainability reports.

Another source of measurement complexity stems from the absence of universally accepted valuation methodologies. While sustainability standards such as GRI and ISO material flow cost accounting (ISO 14051) offer guidelines for quantifying environmental costs, there remains no single globally adopted metric or practice that can be uniformly applied across industries and jurisdictions (ISO 14051; Environmental Accounting Cornerstone, 2024). As a result, environmental cost measurements often rely on a mix of life cycle costing, activity-based costing, shadow pricing, and material flow analysis each with its own assumptions and limitations (Sustainability Directory, 2024; Taxguru, 2024). The diversity of approaches can produce inconsistent datasets, undermining comparability and reducing the usefulness of disclosed environmental information for stakeholders, including investors, regulators, and civil society actors.

Measurement challenges are compounded by variations in regulatory environments and firm practices. In many jurisdictions, environmental costs are not clearly defined in accounting standards, leading to fragmented reporting practices that treat environmental expenditures as part of general overheads or externalities rather than distinct cost categories (ACCAGlobal, 2024; International Accounting Reports, 2024). This lack of definitional clarity often obscures the true magnitude of environmental costs, with historical case studies revealing that organisations routinely underestimate environmental expenditures due to incomplete identification of relevant cost components (ACCAGlobal, 2024).

While the classification of environmental costs provides necessary structure, the measurement of these costs faces persistent conceptual and practical obstacles. The intangible nature of many environmental impacts, absence of standardised valuation methods, and diversity of organisational contexts collectively hinder the reliability, comparability, and decision-usefulness of environmental cost disclosures. Overcoming these challenges requires not only stronger guidance and harmonisation of accounting standards but also methodological innovation and capacity building within accounting and sustainability professions.

Empirical Insights and Synthesis of Prior Studies

Empirical evidence on environmental accounting disclosure (EAD) reveals substantial heterogeneity across jurisdictions, industries, and regulatory contexts. Studies conducted in developing economies consistently document low levels of environmental disclosure, often characterised by narrative, symbolic, and non-quantified reporting. This pattern is widely attributed to weak regulatory enforcement, limited stakeholder pressure, inadequate institutional capacity, and the predominance of voluntary disclosure regimes (Nael, 2019; Worimegbe *et al*., 2021; Ali *et al*., 2023). Empirical investigations in Sub-Saharan Africa and other emerging markets further suggest that firms tend to disclose environmental information selectively, primarily to manage legitimacy rather than to provide comprehensive accountability (Ofoegbu *et al*., 2018; Nwobu *et al.,* 2022).

In contrast, evidence from developed economies indicates relatively higher levels of environmental accounting disclosure, driven by stronger institutional frameworks, investor activism, and more robust sustainability reporting standards. However, even within these contexts, disclosure practices remain uneven in terms of depth, comparability, and assurance quality (KPMG, 2022; Gunduz & Gunduz, 2025). Several studies highlight that while firms in developed markets are more likely to comply with formal disclosure requirements, the substantive quality of reported environmental information often varies significantly, raising concerns about greenwashing and impression management (Michelon *et al*., 2015; Hahn & Lülfs, 2014).

Regarding the relationship between environmental accounting disclosure and financial performance, empirical findings remain largely inconclusive and context-dependent. A strand of the literature reports a positive association between environmental disclosure and profitability, market value, or cost of capital, suggesting that transparent environmental reporting can enhance firm reputation, reduce information asymmetry, and strengthen investor confidence (Clarkson *et al*., 2011; Friede *et al*., 2015). Conversely, other studies find insignificant or even negative relationships, particularly in contexts where environmental initiatives impose substantial compliance costs without immediate economic benefits (Ezeagba *et al*., 2015; Oyerogba *et al*., 2023; Awotomilusi *et al*., 2025).

These divergent findings imply that environmental accounting disclosure should not be interpreted solely as a short-term performance-enhancing mechanism. Rather, the empirical literature increasingly frames EAD as a governance, risk management, and legitimacy tool, whose financial benefits may materialise only over the long term and are contingent upon institutional quality, stakeholder engagement, and strategic integration (Deegan, 2019; Schaltegger *et al*., 2022). This perspective aligns with legitimacy theory and stakeholder theory, which posit that firms disclose environmental information primarily to maintain social acceptance and manage relationships with critical stakeholders, rather than to maximise immediate financial returns.

The empirical literature underscores the need for context-sensitive analysis, particularly in developing economies, where institutional weaknesses and enforcement gaps continue to shape both the extent and effectiveness of environmental accounting disclosure. The mixed evidence also highlights the importance of moving beyond disclosure quantity toward assessments of disclosure quality, credibility, and integration into core corporate strategy.

Policy, Regulatory, and Managerial Implications

From a policy and regulatory standpoint, empirical evidence strongly supports the transition from voluntary to mandatory environmental and sustainability disclosure regimes. Mandatory frameworks enhance consistency, comparability, and reliability of reported information, thereby reducing selective disclosure and greenwashing practices (IFRS Foundation, 2023; European Commission, 2022). Policymakers are encouraged to align national disclosure requirements with internationally recognised standards such as the Global Reporting Initiative (GRI) and the IFRS Sustainability Disclosure Standards (IFRS S1 and IFRS

S2) to ensure global comparability and investor relevance.

In developing economies, regulatory reforms should be complemented by institutional strengthening, including capacity building for regulators, auditors, and preparers of financial reports. Empirical studies suggest that without effective enforcement mechanisms and professional competence, mandatory disclosure requirements may result in formal compliance without substantive transparency (World Bank, 2020; Nwobu *et al*., 2022).

For corporate managers, the literature highlights the strategic value of integrating environmental accounting into mainstream financial and management accounting systems rather than treating it as a peripheral sustainability exercise. Firms that embed environmental accounting into decision-making processes are better positioned to identify environmental risks, improve operational efficiency, and enhance long-term value creation (Schaltegger & Burritt, 2018; Schaltegger *et al.,* 2022). Moreover, credible environmental disclosure can strengthen stakeholder trust, improve access to capital, and enhance organisational resilience in an era of increasing environmental regulation and climate-related financial risks.

The empirical literature suggests that the effectiveness of environmental accounting disclosure depends not only on regulatory mandates but also on institutional quality, managerial commitment, and the strategic integration of environmental considerations into corporate governance and performance management systems.

Future Research Agenda

Although environmental accounting disclosure has attracted growing scholarly attention, the review of extant literature reveals persistent conceptual, methodological, and contextual gaps. Addressing these gaps is critical for advancing environmental accounting disclosure as a robust governance and sustainability mechanism. Based on the synthesis of prior studies and theoretical insights, this paper proposes the following directions for future research.

Development of Standardized Environmental Cost Valuation Models

One of the most significant limitations of environmental accounting disclosure lies in the absence of standardized and universally accepted methods for valuing environmental costs. Existing studies highlight substantial variation in how organizations recognize, measure, and disclose environmental costs, particularly with respect to intangible and long-term impacts such as ecosystem degradation, biodiversity loss, and climate-related risks (IFAC, 2005; Schaltegger & Burritt, 2018). This lack of standardization undermines the comparability, reliability, and decision-usefulness of disclosed information.

Future research should focus on developing comprehensive environmental cost valuation models that integrate financial accounting principles with environmental economics and life-cycle assessment techniques. Such models should aim to operationalize environmental externalities in a manner that is both theoretically sound and practically applicable across industries. Comparative studies evaluating the applicability of different valuation approaches such as full-cost accounting, natural capital accounting, and shadow pricing would provide valuable insights into their strengths and limitations (UN Statistics Division, 2021). Advancing this line of research would significantly contribute to the harmonization of environmental accounting practices and enhance the credibility of environmental disclosures.

Longitudinal Studies on Disclosure Quality and Organizational Resilience

Much of the existing empirical literature on environmental accounting disclosure relies on cross-sectional designs, which provide limited insight into how disclosure practices evolve over time and how they influence long-term organizational outcomes. Consequently, there is a need for longitudinal research examining changes in disclosure quality and their implications for organizational resilience, risk management, and sustainability performance.

Future studies could investigate whether consistent and high-quality environmental disclosure enhances firms' ability to withstand environmental, regulatory, and market shocks, particularly in the context of climate change and resource scarcity. Such research would align with stakeholder and legitimacy theories, which suggest that sustained transparency can strengthen stakeholder trust and institutional legitimacy over time (Suchman, 1995; Deegan, 2002). Longitudinal designs would also enable researchers to examine causal pathways and dynamic interactions between disclosure practices and organizational resilience.

Comparative Analyses of Mandatory versus Voluntary Disclosure Regimes

The literature reviewed in this paper indicates that environmental accounting disclosure remains largely voluntary in many jurisdictions, particularly in developing economies, resulting in inconsistent disclosure quality and scope (Worimegbe *et al*., 2021; Nael, 2019). In contrast, jurisdictions with mandatory disclosure requirements tend to exhibit higher levels of transparency and standardization, albeit with varying degrees of enforcement effectiveness.

Future research should conduct comparative analyses of mandatory and voluntary disclosure regimes to assess their relative effectiveness in promoting

transparency, accountability, and sustainability outcomes. Such studies could examine differences in disclosure quality, stakeholder response, and environmental performance across regulatory contexts. This line of inquiry would provide critical insights for policymakers considering the transition from voluntary to mandatory disclosure frameworks, particularly in light of recent developments such as the IFRS Sustainability Disclosure Standards (IFRS Foundation, 2023).

Examination of IFRS Sustainability Standards Adoption in Emerging Economies

The introduction of the IFRS Sustainability Disclosure Standards (IFRS S1 and S2) represents a significant milestone in the global harmonization of sustainability reporting. However, the adoption and implementation of these standards in emerging economies remain underexplored. Institutional capacity constraints, regulatory enforcement challenges, and differences in economic structure may influence how these standards are interpreted and applied in practice.

Future research should investigate the adoption processes, implementation challenges, and outcomes associated with IFRS sustainability standards in emerging economies. Such studies could explore the extent to which these standards enhance disclosure quality, comparability, and investor confidence in contexts characterized by weaker institutional frameworks. This research would contribute to sustainable development theory by examining how global reporting standards interact with local institutional realities (Giangrande *et al*., 2019).

Sector-Specific Disclosure Frameworks for Environmentally Sensitive Industries

Environmental risks and impacts vary significantly across industries, suggesting that a one-size-fits-all approach to environmental accounting disclosure may be insufficient. Empirical evidence indicates that firms operating in environmentally sensitive sectors such as oil and gas, mining, manufacturing, agriculture, and energy face greater environmental scrutiny and disclosure expectations than firms in service-oriented industries (Ezeagba *et al*., 2015; Oyerogba *et al*., 2023).

Future research should focus on developing sector-specific environmental accounting disclosure frameworks that account for industry-specific environmental risks, regulatory requirements, and stakeholder expectations. Such frameworks would enhance the relevance and materiality of disclosed information, thereby improving its usefulness for stakeholders. Additionally, sectoral studies could explore how disclosure practices influence competitive dynamics, reputation, and sustainability performance within specific industries.

Integrating Environmental Accounting Disclosure with Digital and ESG Innovations

An emerging area for future research involves the intersection of environmental accounting disclosure with digital technologies and broader ESG innovations. The use of digital reporting platforms, data analytics, and blockchain technology has the potential to enhance the accuracy, timeliness, and verifiability of environmental disclosures (GRI, 2021). However, scholarly understanding of these developments remains limited.

Future studies could examine how digital transformation influences environmental accounting disclosure practices and stakeholder engagement. This research would extend existing theoretical frameworks by incorporating technological change as a moderating factor in disclosure behaviour.

Advancing research along these dimensions would deepen theoretical understanding, improve methodological rigor, and enhance the practical relevance of environmental accounting disclosure. By addressing valuation challenges, regulatory diversity, sectoral specificity, and technological innovation, future scholarship can contribute meaningfully to the evolution of environmental accounting as a cornerstone of corporate sustainability and accountability.

CONCLUSION

This conceptual discussion paper has highlighted that environmental accounting disclosure (EAD) represents a critical evolution in accounting practice, reflecting the growing recognition that organisational performance cannot be fully understood through financial metrics alone. By systematically integrating environmental costs, liabilities, and impacts into reporting frameworks, EAD provides a mechanism for organisations to enhance transparency, improve accountability, and communicate their commitment to sustainability to a diverse set of stakeholders (ACCA Global, n.d.; UNEP, 2011).

Despite its increasing relevance, the adoption and practice of environmental accounting disclosure remain uneven across regions, sectors, and firm sizes. In developing economies, disclosure is frequently voluntary, inconsistently applied, and subject to weak regulatory enforcement, whereas in developed economies, it is often more formalized, yet still exhibits variability in quality, comparability, and credibility (Worimegbe *et al*., 2021; Oyerogba *et al*., 2023; Gunduz & Gunduz, 2025). This unevenness underscores the importance of understanding EAD not merely as a reporting obligation but as a dynamic governance tool influenced by institutional capacity, stakeholder pressure, regulatory frameworks, and organisational culture.

The paper further demonstrates that conceptual and theoretical clarity is essential to advance both

scholarship and practice in environmental accounting. Integrating perspectives from stakeholder theory, legitimacy theory, and sustainable development theory provides a robust lens for interpreting disclosure behaviour, revealing how organisations respond simultaneously to external expectations, social norms, and long-term sustainability imperatives. Such integration also helps explain why empirical studies report mixed financial effects of environmental disclosure, highlighting that EAD functions as a strategic, long-term mechanism for risk management, reputation enhancement, and stakeholder engagement rather than solely as a driver of immediate financial returns (Deegan, 2002; Schaltegger & Burritt, 2018; Giangrande *et al*., 2019).

However, several critical challenges persist. Measurement difficulties, the absence of standardized valuation methods, and inconsistencies in reporting frameworks undermine the reliability, comparability, and decision-usefulness of environmental disclosures. Addressing these challenges requires coordinated action at multiple levels: regulatory authorities must strengthen mandates and harmonize standards with global frameworks such as the GRI and IFRS Sustainability Disclosure Standards, while corporate managers must integrate environmental accounting into core financial and operational decision-making processes (IFRS Foundation, 2023; Schaltegger *et al*., 2022). Additionally, capacity building and institutional support are essential in developing economies to bridge knowledge gaps and ensure that disclosure practices translate into meaningful environmental accountability.

In conclusion, environmental accounting disclosure is no longer optional but integral to contemporary accounting practice, serving as a bridge between financial performance and sustainability accountability. Its institutionalization has the potential to enhance corporate governance, support informed stakeholder decision-making, and advance sustainable development goals globally. Future research should focus on standardizing measurement approaches, evaluating the long-term financial and non-financial impacts of disclosure, and exploring contextual factors that influence adoption, thereby providing empirical and practical guidance for strengthening the role of EAD as a strategic governance and sustainability tool.

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