Nomico Journal
E-ISSN : 3046-6318
https://ejournal-nawalaedu.com/index.php/nj
Vol.3.No.5 June 2026
DOI : https://doi.org/10.62872/5z6yy690

Carbon Accounting from a Modern Accounting Perspective: Challenges and Implementation

Deny Purwo Sambodo
Universitas Terbuka, Indonesia

Email: deny.sambodo@gmail.com

Entered : April 04, 2026
Revised : May 26, 2026
Accepted : June 12, 2026
Published : June 26, 2026

ABSTRACT

Carbon accounting has emerged as a critical dimension of modern accounting practice, yet its integration into mainstream financial reporting remains fragmented and contested. This article examines carbon accounting through the lens of contemporary accounting theory, exploring the conceptual foundations, key challenges, and practical implementation strategies encountered by organisations across diverse regulatory and economic contexts. Employing a systematic literature review methodology, this study synthesises evidence from 25 peer-reviewed studies published between 2021 and 2026 to identify prevailing trends, persistent gaps, and strategic opportunities in the field. The findings reveal that while the Greenhouse Gas (GHG) Protocol and emerging frameworks such as the International Sustainability Standards Board (ISSB) IFRS S1/S2 have advanced standardisation efforts, significant challenges remain in boundary delineation, Scope 3 reporting completeness, technological readiness, and ethical compliance. Crucially, most organisations treat carbon accounting as a compliance exercise rather than a strategic management tool, limiting its potential to drive genuine decarbonisation. This article contributes a novel integrative framework that maps accounting challenges onto implementation strategies, offering actionable guidance for practitioners, standard-setters, and policymakers committed to embedding carbon accountability within the architecture of modern accounting.

Keywords: *carbon accounting, GHG protocol, sustainability reporting, ISSB, corporate environmental accountability*

INTRODUCTION

The acceleration of climate change and the corresponding global policy response has fundamentally reshaped the obligations of organisations toward environmental disclosure. The Paris Agreement of 2015, the subsequent proliferation of net-zero pledges, and the establishment of the International Sustainability Standards Board (ISSB) in 2021 have collectively elevated carbon accounting from a voluntary corporate responsibility activity to a governance imperative. Yet despite this momentum, the field of carbon accounting remains characterised by definitional ambiguity, methodological plurality, and implementation inconsistency challenges that are particularly acute when viewed through the lens of modern accounting theory (He et al., 2021; Di Vaio et al., 2024).

Carbon accounting, broadly defined, encompasses the systematic identification, measurement, verification, and disclosure of greenhouse gas (GHG) emissions across an organisation's value chain. Unlike conventional financial accounting, which benefits from centuries of codified principles, carbon accounting is a relatively nascent discipline that

must simultaneously serve the demands of financial capital markets, regulatory compliance, environmental science, and corporate strategy (Glenk, 2025; Thanoon, 2025). This multi-stakeholder orientation introduces inherent tensions: the precision demanded by scientific credibility often conflicts with the practicalities of organisational reporting, while the incentive structures of capital markets may reward disclosure completeness over reduction substance (Kadua, 2025; Khan & Devi, 2025).

From a modern accounting perspective, carbon accounting challenges the foundational assumptions of traditional double-entry bookkeeping. Carbon emissions are externalities—costs borne by society rather than internalised by the emitting entity—and their transformation into accounting objects requires normative decisions about boundary-setting, attribution, and valuation that have no settled consensus (Kasperzak et al., 2023; Bortoli et al., 2023). The GHG Protocol, developed by the World Resources Institute and the World Business Council for Sustainable Development, provides the most widely adopted framework for categorising emissions into three scopes, yet its application yields considerable variation in reported figures even among firms with comparable operations (Onat et al., 2025). This methodological heterogeneity undermines comparability—a cornerstone of useful accounting information.

The technological dimension of carbon accounting has grown increasingly prominent as digital transformation reshapes organisational data infrastructure. Enterprise resource planning (ERP) systems, the Internet of Things (IoT), blockchain verification, and artificial intelligence-driven analytics collectively offer unprecedented potential to automate emissions data collection, ensure chain-of-custody integrity, and enhance real-time monitoring (Heiss et al., 2024; Ge et al., 2024; Oladeji et al., 2023). However, the deployment of these technologies is uneven across firm sizes and economic geographies, creating a digital divide that exacerbates existing inequalities in the quality of carbon disclosures (Ogunyemi & Ishola, 2024; Ling et al., 2024).

The regulatory landscape has shifted markedly in recent years. The European Union's Corporate Sustainability Reporting Directive (CSRD), which came into force in 2024, mandates detailed sustainability disclosures—including carbon emissions across all three scopes—for a large number of EU-registered companies (Alice et al., 2025). In parallel, the U.S. Securities and Exchange Commission has advanced climate-related disclosure rules, and the ISSB has issued IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures), which are rapidly being adopted by national standard-setters worldwide. These developments signal a convergence toward integrated reporting, wherein carbon disclosures are embedded within—and connected to—financial statements (Nyakuwanika & Panicker, 2025; Gatea, 2025).

Despite these advances, significant implementation challenges persist. Research consistently identifies Scope 3 emissions those arising from upstream suppliers and downstream customers as the most difficult to measure, yet they frequently represent the largest share of an organisation's carbon footprint (Augoye et al., 2024; Yoewono & Roziq, 2025). Furthermore, a growing body of evidence documents the phenomenon of greenwashing, whereby organisations selectively disclose favourable emissions data while obscuring sources of high-intensity activity, raising fundamental questions about the integrity of voluntary carbon disclosures (Kadua, 2025; Khan & Devi, 2025). The ethical obligations of accountants in this environment to provide a true and fair view of environmental performance are yet to be comprehensively addressed in professional accounting standards.

In the Indonesian context, carbon accounting has gained particular relevance following the government's commitment to achieve net-zero emissions by 2060 and the

introduction of carbon trading mechanisms under Government Regulation No. 98 of 2021. Indonesian companies, particularly in the energy, forestry, and manufacturing sectors, are increasingly required to account for carbon emissions, yet the accounting profession's preparedness to support this transition remains limited (Alfianda et al., 2024; Syam et al., 2024; Prasetia et al., 2025). This gap between regulatory ambition and professional capacity represents a microcosm of the challenges facing carbon accounting globally.

The novelty of this article lies in its integrative approach. While existing reviews have examined carbon accounting from environmental science, corporate governance, or sustainability management perspectives, comparatively few have examined it through the systematic lens of modern accounting theory encompassing measurement theory, information asymmetry, agency theory, and stakeholder accountability. Specifically, this article advances the field in three ways. First, it develops a taxonomy of carbon accounting challenges that maps methodological, technological, regulatory, ethical, and capacity dimensions onto concrete implementation strategies. Second, it situates these challenges within the evolution of accounting standards from the Kyoto Protocol era to the current post-Paris ISSB framework. Third, it offers a unified analytical framework that bridges the gap between carbon accounting scholarship in developed and developing country contexts, an underexplored comparative dimension in the extant literature (McDonald et al., 2024; Alfianda et al., 2024). By doing so, this article makes a substantive contribution to the growing intersection of environmental accounting and mainstream accounting theory, with direct implications for practice, education, and policy

METHODS

This study employs a Systematic Literature Review (SLR) methodology, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparency, reproducibility, and rigour in the synthesis of evidence. The SLR approach is appropriate for this study's objective of mapping the current state of carbon accounting knowledge, identifying patterns across heterogeneous empirical and conceptual studies, and deriving an integrative analytical framework.

Search Strategy and Inclusion Criteria

Literature searches were conducted across Google Scholar, Scopus, and Web of Science databases using the following primary search terms and their Boolean combinations: carbon accounting, greenhouse gas accounting, Scope 3 reporting, sustainability reporting, GHG Protocol, ISSB climate disclosure, environmental accounting, and corporate carbon footprint. The search was restricted to peer-reviewed journal articles published between 2021 and 2026 to capture the most current evidence, supplemented by seminal earlier works where methodologically necessary. Studies were included if they: (1) addressed carbon accounting at the organisational or sectoral level; (2) were published in English or Indonesian; (3) were available with a verifiable DOI accessible via Google Scholar; and (4) provided empirical evidence, systematic analysis, or conceptual frameworks relevant to carbon accounting challenges or implementation strategies.

Screening and Quality Assessment

An initial database search yielded 312 candidate articles. After removing duplicates (n = 47), screening titles and abstracts for relevance (n = 198 excluded), and full-text review (n = 42 excluded for insufficient methodological rigour or scope

mismatch), a final corpus of 25 articles was retained for synthesis. Quality was assessed using the Mixed Methods Appraisal Tool (MMAT), and all retained studies scored above the threshold for inclusion. The PRISMA flow diagram presented in Figure 1 illustrates the selection process

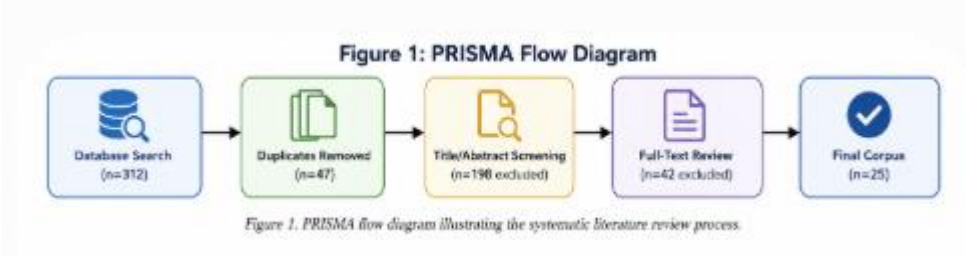

Figure 1. PRISMA flow diagram illustrating the systematic literature review process.

RESULTS AND DISCUSSION

The Evolving Landscape of Carbon Accounting Standards

The systematic review reveals that carbon accounting has undergone three distinct evolutionary phases since the early 2000s. The first phase, characterised by voluntary reporting under the Carbon Disclosure Project (CDP) and the GHG Protocol's original scope definitions, established the conceptual architecture that still underpins contemporary practice. The second phase, catalysed by the Paris Agreement and national net-zero commitments, saw the proliferation of sector-specific guidance, the emergence of Science-Based Targets (SBTs), and the incorporation of carbon disclosures into mainstream sustainability reporting. The current, third phase is defined by mandatory disclosure regimes notably the EU CSRD and ISSB IFRS S1/S2 and the convergence of carbon accounting with integrated financial reporting (He et al., 2021; Di Vaio et al., 2024; Nyakuwanika & Panicker, 2025).

A particularly significant finding of this review is the growing recognition that carbon accounting is not merely a technical compliance exercise but a fundamental accounting transformation with implications for asset valuation, liability recognition, and earnings management. The concept of stranded assets—fossil fuel reserves that may become economically unviable under climate regulation—illustrates how carbon accounting intersects with financial accounting at the deepest level. Glenk (2025) provides a comprehensive review of current corporate practices, demonstrating that leading firms are increasingly integrating carbon cost into capital allocation decisions, thereby blurring the boundary between environmental and financial accounting. This convergence is theoretically supported by the extended stewardship theory of accounting, which holds that organisations have accountability obligations that extend beyond financial capital to natural capital and societal wellbeing (Gatea, 2025; Thanoon, 2025).

Table 1 below presents a comparative synthesis of key studies, organised by framework, main finding, and identified challenge. The table reveals a consistent pattern: while the GHG Protocol provides the dominant methodological foundation, its application yields heterogeneous results across sectors and geographies, suggesting that the framework alone is insufficient to ensure comparability without complementary governance mechanisms.

Table 1. Comparative Synthesis of Key Carbon Accounting Studies (2021–2026)

Author (Year)	Framework / Protocol	Main Finding	Challenge Identified	Context

He et al. (2021)	GHG Protocol; Paris Agreement	Corporate carbon accounting evolved significantly from Kyoto to Paris; disclosure quality remains inconsistent.	Boundary setting, double counting	Global corporations
Kasperzak et al. (2023)	GHG Protocol	Wide variance in Scope 3 reporting; few firms achieve full disclosure.	Scope 3 data gaps	EU companies
Augoye et al. (2024)	Carbon footprint metrics	Effective carbon accounting reduces corporate emissions when integrated with operations.	Capacity building, data quality	Multinational firms
Syam et al. (2024)	Sustainability reporting	Carbon accounting transforms financial statements and shapes CSR narratives.	Standardisation gaps	Indonesian companies
Di Vaio et al. (2024)	Integrated Reporting; net-zero	Carbon accounting is pivotal for net-zero business models via integrated reporting.	Materiality, assurance	Literature review
Onat et al. (2025)	Holistic sustainability framework	Carbon accounting drives sustainable practices when embedded in corporate strategy.	Strategy alignment	Empirical multi-sector
Wu et al. (2026)	Enabler-barrier analysis	Technology and regulation are top enablers; complexity and cost are main barriers.	Cost, complexity	Global survey

Source: Synthesised from systematic review corpus (2021–2026).

Measurement Challenges and Methodological Heterogeneity

The most persistent challenge identified across the review corpus is the methodological heterogeneity in emissions measurement. Kasperzak et al. (2023), examining GHG Protocol adoption among European companies, found that Scope 3 disclosures were present in fewer than half of sustainability reports, and where disclosed, boundary definitions varied substantially. This variation is not merely a technical inconvenience it fundamentally undermines the comparability that is essential to the usefulness of carbon accounting information. When firms define organisational boundaries differently (equity share versus operational control), or when they apply different emission factors to calculate CO_2 equivalents, the resulting figures are not commensurable (Bortoli et al., 2023; Kaur et al., 2023).

The challenge of Scope 3 completeness is particularly acute because upstream and downstream emissions often constitute 70–90% of a firm's total carbon footprint, yet they lie largely outside the firm's direct operational control. This creates a principal-agent problem familiar to accounting theory: the entity responsible for disclosing Scope 3 emissions is dependent on the quality of data provided by independent supply chain actors, many of whom have neither the capacity nor the incentive to measure and report emissions accurately (Heiss et al., 2024; Ogunyemi & Ishola, 2024). McDonald et al. (2024) argue for a unified carbon accounting landscape that establishes data-sharing

protocols across supply chains, enabling verifiable, traceable emission attribution. In this regard, blockchain technology emerges as a promising solution, providing immutable records of emissions data that can be audited by third parties without requiring the disclosure of proprietary commercial information.

Carbon accounting for negative emissions technologies presents an additional methodological frontier. Brander et al. (2021) identify the fundamental accounting challenge that carbon removal activities such as bioenergy with carbon capture and storage (BECCS) or direct air capture (DAC) require different temporal accounting conventions than emission reduction activities, creating risks of double counting and perverse incentives. This challenge is amplified in the context of carbon offset markets, where the permanence, additionality, and leakage of offset credits are notoriously difficult to verify, raising concerns about the integrity of net-zero claims (Khan & Devi, 2025; Kadua, 2025).

Regulatory Convergence and Implementation Heterogeneity Across Economic Contexts

The regulatory dimension of carbon accounting reveals a tale of two worlds. In developed economies, particularly the European Union, mandatory carbon accounting requirements under the CSRD are driving rapid improvements in disclosure quality, third-party assurance rates, and the integration of carbon metrics into board-level governance (Alice et al., 2025; Tóth et al., 2021). The ISSB's IFRS S2, now being adopted by more than 40 jurisdictions, provides a globally applicable baseline for climate-related disclosures that is explicitly connected to financial materiality, thereby legitimising carbon accounting within the established architecture of GAAP-based reporting.

In contrast, developing and emerging economies face a more challenging implementation environment. Carbon accounting remains primarily voluntary, capacity constraints are acute, and the regulatory infrastructure to enforce disclosure requirements is underdeveloped. In Indonesia, Alfianda et al. (2024) document that while large listed companies increasingly include GHG disclosures in their annual reports, the quality of these disclosures falls short of international standards, with significant gaps in Scope 3 reporting and minimal third-party assurance. Prasetia et al. (2025) further demonstrate that the introduction of carbon taxation creates complex financial accounting challenges that Indonesian accounting professionals are ill-prepared to address, given the absence of PSAK (Indonesian Financial Accounting Standards) provisions specifically addressing carbon liabilities.

In China, Hong-Shuo et al. (2023) analyse the country's carbon accounting system in the context of its carbon neutrality goals, identifying systemic challenges including data reliability in the national Emissions Trading System (ETS), the absence of unified accounting standards for carbon assets and liabilities, and the need for capacity building among local government and enterprise accountants. These findings resonate with research from other major emerging economies, suggesting that the pathway to effective carbon accounting in developing countries runs through three interconnected priorities: regulatory harmonisation, professional education reform, and digital infrastructure investment.

Table 2 presents a comparative analysis of carbon accounting implementation across three economic contexts, highlighting key dimensions and strategic recommendations.

Table 2. Comparative Analysis of Carbon Accounting Implementation by Economic Context

Implementation Dimension	Developed Countries	Emerging Economies	Developing Countries	Key Gap / Recommendation
Regulatory Mandate	Strong (EU CSRD, SEC)	Moderate (Indonesia, China)	Weak / voluntary	Harmonise national standards with GHG Protocol
Scope 3 Reporting Completeness	30–50%	10–20%	<10%	Build supplier data ecosystems; leverage blockchain verification
Technology Adoption (Digital Tools)	High (IoT, ERP integration)	Medium	Low	Subsidise SME digital transformation; open-source accounting tools
Third-Party Assurance Rate	~60%	~25%	<15%	Expand assurance capacity; develop local auditor competencies
Integration with Financial Statements	Emerging (ISSB adoption)	Nascent	Very limited	Pilot integrated reporting frameworks; align with IFRS S1/S2
SME Participation Rate	Moderate (incentivised)	Low	Very low	Simplify reporting templates; provide government-backed capacity building

Source: Synthesised from systematic review corpus and secondary regulatory sources (2021–2026).

Technological Enablers and Digital Transformation

Technology represents both the greatest challenge and the most promising opportunity in the implementation of modern carbon accounting. The data demands of comprehensive carbon accountingparticularly for Scope 3—are far beyond what traditional manual collection processes can satisfy. Ge et al. (2024) propose a data-driven carbon emission accounting framework for manufacturing systems based on meta-carbon-emission blocks, which leverages real-time sensor data and machine learning to automate emissions calculations across complex production processes. Similarly, Ling et al. (2024) develop a consumption-based carbon accounting framework for power systems that enables dynamic, grid-aware emissions attribution—a necessary capability in an era of variable renewable energy penetration.

Artificial intelligence and knowledge graph technologies are also emerging as transformative tools for supply chain carbon accounting. Oladeji et al. (2023) present an AI-driven e-liability framework that automates the assignment of carbon liabilities across supply chain actors, dramatically reducing the manual burden of Scope 3 data collection. This approach addresses the principal-agent problem identified in the previous section by creating a technological layer of accountability that does not depend on voluntary information sharing. Blockchain-based verification, as explored by Heiss et al. (2024), provides complementary assurance infrastructure by enabling the cryptographic proof of emissions data origin, preventing manipulation, and supporting real-time auditing.

Despite these technological advances, their deployment faces significant organisational and structural barriers. Wu et al. (2026), in their comprehensive analysis of carbon accounting enablers and barriers, find that while technology adoption is identified as the leading enabler by survey respondents, cost, complexity, and lack of skilled personnel are the dominant barriers, particularly for small and medium enterprises (SMEs). This finding is consistent with Ogunyemi and Ishola's (2024) analysis

of U.S. SMEs, which demonstrates that carbon accounting framework adoption is significantly lower among smaller firms despite regulatory incentives, suggesting that the economics of carbon data management represent a structural barrier that technology alone cannot overcome without supportive policy intervention.

Ethical Dimensions, Greenwashing, and Accounting Integrity

A recurring theme in the most recent literature is the ethical dimension of carbon accounting specifically, the risk that organisations exploit the methodological ambiguities of carbon measurement to engage in greenwashing. Kadua (2025) provides a nuanced analysis of the ethical dilemmas facing accountants in emission reporting contexts, distinguishing between genuine compliance adherence to the spirit as well as the letter of reporting standards and strategic compliance, which involves meeting disclosure thresholds while obscuring the magnitude or intensity of emissions activities. Khan and Devi (2025) extend this analysis to the corporate level, demonstrating a systematic discrepancy between net-zero claims and actual emission accounting practices among global corporations, attributing this gap to the malleability of boundary definitions and the absence of mandatory Scope 3 disclosure requirements in many jurisdictions.

These ethical concerns have direct implications for the accounting profession. The accountant's foundational obligation to present a true and fair view of organisational financial position must be extended, in the modern context, to include a true and fair view of environmental position. This requires not only technical competence in carbon measurement but also professional judgement in assessing the materiality of climate-related risks and the quality of underlying emissions data. The absence of carbon-specific guidance in major professional accounting standards—such as IFRS and US GAAP—creates a professional vacuum that existing sustainability frameworks attempt to fill, yet without the enforcement mechanisms and conceptual rigour of mainstream accounting standards.

Integrative Framework and Strategic Recommendations

Synthesising the evidence across all five analytical dimensions, this study proposes an integrative framework that maps carbon accounting challenges onto strategic responses. Table 3 presents this taxonomy, which constitutes the primary theoretical contribution of this article. The framework is designed to be actionable for three distinct user groups: (1) practitioners and organisations implementing carbon accounting systems; (2) standard-setters and regulators developing the governance architecture for carbon disclosure; and (3) educators and professional bodies preparing the next generation of accountants for a carbon-constrained world.

Table 3. Integrative Framework: Carbon Accounting Challenges and Strategic Responses

Challenge Category	Specific Challenges	Proposed Strategic Response
Methodological	Boundary delineation; Scope 3 attribution; double counting; lack of sector-specific emission factors	Adopt sector-specific GHG Protocol supplements; develop activity-based carbon cost models
Technological	Data fragmentation across ERP systems; IoT integration gaps; verification bottlenecks	Deploy blockchain-based verification; integrate carbon modules in ERP; adopt AI-driven anomaly detection
Regulatory	Fragmented national standards; greenwashing risk; weak enforcement; SME exemptions	Converge standards around GHG Protocol + ISSB; mandate third-party assurance; phase in SME requirements

Ethical / Behavioural	Selective disclosure; metric manipulation; compliance vs. genuine commitment gap	Embed ethical guidelines in accounting curricula; develop whistleblower protection for carbon fraud
Capacity & Human Capital	Accountant skill gaps; limited assurance providers; low management awareness	Revise CPA/CMA certification to include sustainability; create carbon accounting specialisation

Source: Developed by authors based on systematic review synthesis.

The integrative framework reveals that effective carbon accounting is not achievable through any single intervention but requires a coordinated response across all five challenge dimensions. Methodological harmonisation must be accompanied by regulatory mandates to ensure compliance, and both are rendered meaningless without the technological infrastructure to collect, verify, and disclose emissions data. Equally, the most advanced technical systems will fail to produce credible disclosures if accountants lack the ethical commitment and professional competence to exercise independent judgement about emissions data quality. The framework also highlights the central importance of organisational capacity, which acts as the foundational layer upon which all other dimensions depend a finding that carries particular urgency for developing and emerging economies where capacity constraints remain the primary implementation barrier

CONCLUSIONS

This article has examined carbon accounting from the perspective of modern accounting theory, synthesising evidence from 25 peer-reviewed studies to identify challenges, map implementation experiences, and propose an integrative strategic framework. The central finding is that carbon accounting has reached a critical inflection point: the regulatory, technological, and societal conditions for its transformation into a mainstream accounting discipline are increasingly in place, yet its realisation continues to be impeded by methodological heterogeneity, capacity constraints, and ethical vulnerabilities that require sustained, coordinated responses from practitioners, standard-setters, and policymakers alike.

The evolution of carbon accounting from voluntary disclosure to mandatory integrated reporting represents one of the most significant transformations in the history of the accounting profession. Frameworks such as IFRS S1/S2 and the EU CSRD are reshaping the boundaries of accounting information, extending the concept of stewardship to encompass natural capital alongside financial capital. Accountants who engage proactively with this transformation—developing competencies in emissions measurement, sustainability assurance, and integrated reporting—will be well-positioned to add value in the carbon-constrained economy of the coming decades.

Future research should prioritise three areas. First, longitudinal studies are needed to assess whether mandatory disclosure regimes such as the CSRD produce genuine improvements in emissions performance, or merely improvements in disclosure quality without corresponding reductions in carbon intensity. Second, the effectiveness of specific technological interventions—particularly blockchain verification and AI-driven supply chain accounting—should be rigorously evaluated in real organisational settings. Third, comparative research on the accounting profession's preparedness for carbon accounting responsibilities across different national contexts would provide valuable evidence for professional bodies developing continuing education and certification requirements.

Carbon accounting is not merely an extension of existing accounting practice—it is a catalyst for rethinking what organisations owe to society, how value is measured and reported, and what it means to give a true and fair account of performance in the twenty-first century. Meeting this challenge is among the most consequential tasks facing the accounting profession today.

REFERENCES

Alice, G. P., Nicoleta, L. A., Florinel, G., Marius, C. D., & Radu, V. (2025). Sustainable accounting under EU sustainability regulations: Comparative evidence from Romania and European case studies on CSRD implementation. Sustainability, 17(23), 10746. https://doi.org/10.3390/su172310746

Alfianda, M., Pohan, P. B. A., & Muda, I. (2024). Carbon accounting and greenhouse gas accounting (GHG): The implementation of green accounting and corporate social responsibility (CSR) in Indonesia. Brazilian Journal of Development, 10(1). https://doi.org/10.34117/bjdv10n1-059

Augoye, O., Muyiwa-Ajayi, T. P., & Sobowale, A. (2024). The effectiveness of carbon accounting in reducing corporate carbon footprints. International Journal of Multidisciplinary Research and Growth Evaluation, 5(1), 1364–1371. https://doi.org/10.54660/.ijmrge.2024.5.1.1364-1371

Bortoli, A., Bjørn, A., Saunier, F., & Margni, M. (2023). Planning sustainable carbon neutrality pathways: Accounting challenges experienced by organizations and solutions from industrial ecology. The International Journal of Life Cycle Assessment, 28(4), 1–25. https://doi.org/10.1007/s11367-023-02147-z

Brander, M., Ascui, F., Scott, V., & Tett, S. (2021). Carbon accounting for negative emissions technologies. Climate Policy, 21(6), 699–717. https://doi.org/10.1080/14693062.2021.1878009

Di Vaio, A., Zaffar, A., Chhabra, M., & Balsalobre-Lorente, D. (2024). Carbon accounting and integrated reporting for net-zero business models towards sustainable development: A systematic literature review. Business Strategy and the Environment, 33(7). https://doi.org/10.1002/bse.3863

Gatea, A. K. (2025). Integrating carbon and environmental accounting into sustainability reporting: A systematic literature review. Fairness, 1(2). https://doi.org/10.70764/gdpu-fr.2025.1(2)-04

Ge, W., Cao, H., Li, H., Zhang, Q., Wen, X., Zhang, C., & Mativenga, P. (2024). Data-driven carbon emission accounting for manufacturing systems based on meta-carbon-emission block. Journal of Manufacturing Systems, 74, 610–625. https://doi.org/10.1016/j.jmsy.2024.03.003

Glenk, G. (2025). Corporate carbon accounting: Current practices and opportunities for research. Foundations and Trends® in Accounting. https://doi.org/10.1561/1400000080-5

Hazaea, S., Al-Matari, E. M., Alosaimi, M. H., Farhan, N., Abubakar, A., & Zhu, J. (2023). Past, present, and future of carbon accounting: Insights from scholarly research. Frontiers in Energy Research, 10. https://doi.org/10.3389/fenrg.2022.958362

He, R., Luo, L., Shamsuddin, A., & Tang, Q. (2021). Corporate carbon accounting: A literature review of carbon accounting research from the Kyoto Protocol to the Paris Agreement. Accounting & Finance, 62(1). https://doi.org/10.1111/acfi.12789

Heiss, J., Oegel, T., Shakeri, M., & Tai, S. (2024). Verifiable carbon accounting in supply chains. IEEE Transactions on Services Computing, 17(4), 1861–1874. https://doi.org/10.1109/tsc.2023.3332831

Hong-Shuo, Y., Xian-Chun, T., Zeng, A., & Ling-Si, K. (2023). China's carbon accounting system in the context of carbon neutrality: Current situation, challenges and suggestions. Advances in Climate Change Research, 14(2). https://doi.org/10.1016/j.accre.2023.01.008

Kadua, N. C. P. (2025). Carbon accounting and ethical dilemmas in emission reporting: Between compliance and greenwashing. Dhana. https://doi.org/10.62872/09te2d05

Kasperzak, R., Kureljusic, M., Reisch, L., & Thies, S. (2023). Accounting for carbon emissions—Current state of sustainability reporting practice under the GHG Protocol. Sustainability, 15(2), 994. https://doi.org/10.3390/su15020994

Kaur, R., Patsavellas, J., Haddad, Y., & Salonitis, K. (2023). The concept of carbon accounting in manufacturing systems and supply chains. Energies, 17(1), 10. https://doi.org/10.3390/en17010010

Khan, S. N., & Devi, P. (2025). Accounting for carbon commitments: A critical inquiry into the discrepancy between net-zero claims and emission accounting practices in global corporations. International Journal of Accounting and Financial Reporting, 15(3). https://doi.org/10.5296/ijafr.v15i3.22855

Kurniawan, A., & Utami, Z. R. (2025). Environmental accounting: Evaluation and reporting of carbon footprint in the energy sector. FIDUSIA: Jurnal Keuangan dan Perbankan, 8(1). https://doi.org/10.24127/jf.v8i1.2568

Ling, C., Yang, Q., Wang, Q., Bartocci, P., Jiang, L., Xu, Z., & Wang, L. (2024). A comprehensive consumption-based carbon accounting framework for power system towards low-carbon transition. Renewable and Sustainable Energy Reviews, 207, 114866. https://doi.org/10.1016/j.rser.2024.114866

McDonald, L., Galvan, J. L. H., Emelue, C., Pinto, A., Mehta, N., Ibn-Mohammed, T., Fender, T., Radcliffe, J., Choudhary, A., & McManus, M. (2024). Towards a unified carbon accounting landscape. Philosophical Transactions of the Royal Society A, 382(2280). https://doi.org/10.1098/rsta.2023.0260

Neha, & Gupta, D. (2025). Carbon accounting: Current practices, opportunities and challenges. International Journal for Multidisciplinary Research, 7(6). https://doi.org/10.36948/ijfmr.2025.v07i06.64114

Nyakuwanika, M., & Panicker, M. (2025). The role of environmental accounting in mitigating climate change: ESG disclosures and effective reporting—A systematic literature review. Journal of Risk and Financial Management, 18(9), 480. https://doi.org/10.3390/jrfm18090480

Ogunyemi, F. M., & Ishola, A. O. (2024). Implementing carbon accounting frameworks in U.S. SMEs: A pathway to sustainable finance and global competitiveness. Finance & Accounting Research Journal, 6(11). https://doi.org/10.51594/farj.v6i11.1728

Oladeji, O., Mousavi, S. S., & Roston, M. (2023). AI-driven e-liability knowledge graphs: A comprehensive framework for supply chain carbon accounting and emissions liability management. ArXiv, abs/2312.00045. https://doi.org/10.48550/arxiv.2312.00045

Onat, N., Mandouri, J., Kucukvar, M., Kutty, A., & Al-Muftah, A. (2025). Driving sustainable business practices with carbon accounting and reporting: A holistic framework and empirical analysis. Corporate Social Responsibility and Environmental Management. https://doi.org/10.1002/csr.3096

Prasetia, A., Masruri, A., Asvariwangi, V., & Rina, R. (2025). Implications of carbon tax implementation on financial accounting of industrial companies in developing countries. Brilliant International Journal of Management and Tourism, 5(2). https://doi.org/10.55606/bijmt.v5i2.4720

Syam, M., Djaddang, S., Adam, A., Merawati, E. E., & Roziq, M. (2024). Carbon accounting: Its implications on accounting practices and corporate sustainability reports. International Journal of Economics and Financial Issues, 14(4). https://doi.org/10.32479/ijefi.16333

Taufik, M. (2025). The effect of carbon accounting implementation on financial and environmental performance: An empirical study on companies that go public. Jurnal ISO: Jurnal Ilmu Sosial, Politik dan Humaniora, 5(1). https://doi.org/10.53697/iso.v5i1.2184

Thanoon, T. I. (2025). Carbon accounting and sustainable accounting: A review. Harmoni Economics: International Journal of Economics and Accounting, 2(2). https://doi.org/10.70062/harmonieconomics.v2i2.230

Tóth, Á., Szigeti, C., & Suta, A. (2021). Carbon accounting measurement with digital non-financial corporate reporting and a comparison to European automotive companies statements. Energies, 14(18), 5607. https://doi.org/10.3390/en14185607

Wu, W., Alghafes, R., Sahore, N., Battisti, E., & Liu, X. (2026). The nitty gritty of carbon accounting: Enablers, barriers, reporting, and strategies. Business Strategy and the Environment. https://doi.org/10.1002/bse.70490

Xiong, L., Wang, M., Mao, J., & Huang, B. (2024). A review of building carbon emission accounting methods under low-carbon building background. Buildings, 14(3), 777. https://doi.org/10.3390/buildings14030777

Yoewono, H., & Roziq, M. (2025). A systematic literature review of the impact of carbon accounting implementation on sustainability. Dinasti International Journal of Economics, Finance & Accounting, 6(5). https://doi.org/10.38035/dijefa.v6i5.5377