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Navigating the Carbon Ledger: A Meta-Analysis of Methodologies, Digital Transformations, and Strategic Implications in Global Carbon Accounting (2020–2025)

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ABSTRACT

Carbon accounting has transitioned from a peripheral corporate social responsibility (CSR) activity to a central pillar of global climate governance and financial risk management. This study presents an exhaustive meta-analysis of the carbon accounting literature published between 2020 and 2025, synthesizing findings from over 100 open-access sources to evaluate the current state of methodologies, technological integrations, and strategic implications. The analysis reveals a complex, rapidly maturing landscape characterized by three dominant trends: the migration of focus from direct (Scope 1) to indirect value chain (Scope 3) emissions, the digitalization of carbon data through blockchain and artificial intelligence (AI), and the increasingly quantified relationship between carbon performance and financial outcomes.

Methodologically, the review highlights persistent challenges in Scope 3 measurement, specifically the trade-offs between spend-based and activity-based calculations, and the "organizing-performing paradox" where increased transparency initially inflates reported emissions. Technological interventions are identified as pivotal, with blockchain offering solutions to double-counting and AI enhancing predictive accuracy for missing data, though both face hurdles regarding interoperability and the "oracle problem." Sector-specific analysis across construction, logistics, agriculture, and healthcare demonstrates the necessity of context-dependent frameworks, such as "well-to-wake" accounting in maritime transport and soil organic carbon (SOC) verification in agriculture.

Critically, the synthesis of financial performance data indicates a non-linear relationship where the economic benefits of carbon accounting are moderated by firm size and regulatory environment, with a distinct "green premium" emerging in high-accountability markets. The study concludes that while carbon accounting is transitioning toward "audit-grade" precision, significant gaps remain in global standardization, particularly for Small and Medium Enterprises (SMEs) and developing economies facing Ecologically Unequal Exchange (EUE).

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I. INTRODUCTION

The imperative to limit global warming to 1.5°C above pre-industrial levels has precipitated a fundamental transformation in how organizations measure, manage, and report their environmental impact. Carbon accounting, once a niche practice relegated to technical appendices of sustainability reports, has ascended to the forefront of corporate strategy, regulatory compliance, and investment decision-making. The period from 2020 to 2025 marks a watershed era in this discipline, characterized by the transition from voluntary disclosure frameworks to mandatory reporting regimes such as the European Union’s Corporate Sustainability Reporting Directive (CSRD), the International Sustainability Standards Board (ISSB) IFRS S2 standards, and the emergence of Carbon Border Adjustment Mechanisms (CBAM) (Macferran & Bolderston, 2025).

The urgency of this transition is underscored by the Intergovernmental Panel on Climate Change (IPCC), which emphasizes that accurate inventorying of Greenhouse Gas (GHG) emissions is the bedrock of effective climate action (IDRIC, 2025). Without robust accounting mechanisms, "Net Zero" commitments risk becoming rhetorical exercises devoid of empirical substance. However, the current state of carbon accounting is fraught with complexity. As Stechemesser and Guenther (2012) noted, and recent reviews reaffirm, there is no single, universally accepted definition of carbon accounting, which spans physical inventorying of non-monetary gases to the financial valuation of carbon credits and liabilities (Marlowe & Clarke, 2022). This definitional ambiguity contributes to a lack of comparability, reliability, and transparency in reported data, creating a "Tower of Babel" effect where stakeholders struggle to benchmark performance across firms and industries.

The primary problem addressed in this research is the fragmentation of methodologies and the operational challenges that hinder the efficacy of carbon accounting as a tool for decarbonization. While Scope 1 (direct emissions) and Scope 2 (purchased energy) accounting practices have stabilized, Scope 3 (value chain) emissions remain a "black box" for many organizations. Representing over 70% of the total carbon footprint for many sectors, Scope 3 emissions are notoriously difficult to quantify due to data gaps, supplier opacity, and the complexity of global supply chains (Mohsen, 2025). Furthermore, the rapid integration of digital technologies—such as Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain—promises to revolutionize the field by enabling real-time tracking and immutable verification, yet these technologies introduce new risks related to data governance and algorithmic bias (Borazjani & Adeel, 2025).

This article employs a meta-analysis method to synthesize the explosion of literature produced between 2020 and 2025. Unlike a standard literature review, this meta-analysis systematically aggregates quantitative and qualitative findings to identify high-level patterns, contradictions, and emerging paradigms. The goals of this research are threefold: First, to critically evaluate the evolution of carbon accounting methodologies, with a specific focus on the intractability of Scope 3 emissions. Second, to assess the impact of digital transformation on data accuracy and auditability. Third, to analyze the strategic implications of carbon accounting, investigate whether "it pays to be green" by synthesizing empirical evidence on the link between carbon disclosure and financial performance (Busch & Lewandowski, 2017).

Tabel 1. Evolution of Carbon Accounting Frameworks (2020–2025)

Year	Framework/Standard	Key Development / Impact
2020	**PCAF Launch**	Standardized accounting for "financed emissions" (Scope 3 Cat. 15), crucial for banks.[18]
2021	**ISO 14064-1:2018**	Widespread adoption of the updated standard focusing on indirect emissions and verification.[2]

Year	Framework/Standard	Key Development / Impact
2023	IFRS	International Sustainability Standards Board (ISSB) mandates Scope 3 disclosure, integrating carbon into financial reporting.[1]
2023	EU CBAM	Carbon Border Adjustment Mechanism enters transitional phase, requiring granular product-level embedded carbon data.[3]
2024	EU CSRD	Corporate Sustainability Reporting Directive expands scope to 50,000+ companies, mandating assured sustainability reporting.[52]
2025	AI & Blockchain Integration	Rise of "Near Real-Time" (NRT) accounting and automated LCA tools becomes a dominant research theme.[28]

II. LITRATURE REVIEW

The theoretical and practical foundations of carbon accounting have expanded significantly in the last five years. This section reviews the core definitions, the evolution of regulatory frameworks, and the theoretical lenses used to interpret carbon disclosure behaviors.

Defining Carbon Accounting: A Dual Perspective

The literature distinguishes between two primary forms of carbon accounting: **Physical Carbon Accounting** and **Monetary Carbon Accounting**. Physical accounting focuses on the quantification of GHG emissions in physical units (e.g., metric tons of CO2 equivalent). This stream of research is heavily influenced by engineering and natural sciences, utilizing Life Cycle Assessment (LCA) methodologies to track emissions from "cradle to grave" (Ren et al., 2025). Conversely, Monetary Carbon Accounting involves the financial recognition of carbon-related assets (e.g., emission allowances) and liabilities (e.g., compliance costs) within financial statements. This duality often leads to confusion, as the term is used interchangeably by ecologists tracking carbon cycles and accountants tracking carbon credits (Saraswati, 2020).

Recent literature has attempted to bridge this gap through the concept of Carbon Management Accounting (CMA), which integrates physical data into management decision-making processes. CMA serves as a tool for internal strategy, helping managers identify inefficiencies, allocate carbon costs to specific products, and justify investments in low-carbon technologies (Usman et al., 2024). The integration of these perspectives is crucial for the "circular harmony" of accounting systems, where circular economy principles are embedded into the carbon ledger to prevent value leakage and ensure environmental integrity (Di Vaio, Zaffar, & Ferretti, 2025).

The Regulatory and Standard-Setting Landscape

The governance of carbon accounting is dictated by a "regime complex" of overlapping standards. The GHG Protocol remains the de facto global standard, providing the fundamental classification of Scope 1, 2, and 3 emissions. However, the period 2020–2025 has seen a shift toward harmonization and greater stringency.

First, the issuance of IFRS S2 has been a game-changer, mandating the disclosure of material Scope 3 emissions and requiring entities to consider the full 15 categories of the GHG Protocol (Macferran & Bolderston, 2025). This moves Scope 3 from a voluntary "best practice" to a mandatory component of financial reporting for many jurisdictions.

Second, ISO 14064. This standard continues to provide the rigor required for verification and assurance, focusing on the principles of relevance, completeness, consistency, accuracy, and transparency (Safdie, 2025).

Third, Sector-Specific Frameworks. The inadequacy of generic standards for specific industries has led to the proliferation of sector-specific guidance. For instance, the Global Logistics Emissions Council (GLEC) framework has become the standard for logistics 17, while the Partnership for Carbon Accounting Financials (PCAF) has standardized how financial institutions account for "financed emissions" (Scope 3, Category 15) (Shrimali, 2021).

Theoretical Underpinnings

Academic research in this period has predominantly utilized Stakeholder Theory, Legitimacy Theory, and Signaling Theory to explain corporate carbon disclosure behavior.

Legitimacy Theory suggests that companies disclose carbon information to maintain their "license to operate" within society. High-emitting firms may increase disclosure not to show performance, but to explain their mitigation strategies and avoid regulatory backlash (Saraswati, 2020). While Signaling Theory posits that superior environmental performers use carbon accounting as a signal to investors to reduce information asymmetry. A verifiable low-carbon footprint is a costly signal that poor performers cannot easily mimic, theoretically lowering the cost of capital for green firms (Munir & Pratama, 2025).

Institutional Theory explains the isomorphism observed in carbon reporting, where companies mimic the accounting practices of industry leaders to appear legitimate, often leading to a "tick-box" approach rather than substantive strategic change (Ervik et al., 2025).

III. METHODS (Tahoma, size 11, Bold, Left)

To ensure a rigorous and exhaustive analysis, this study employs a systematic meta-analysis methodology guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.

Search Strategy and Data Collection

The review focuses on open-access, peer-reviewed journal articles and authoritative "grey literature" (industry reports from recognized bodies like the World Bank and major accounting firms) published between January 2020 and early 2025. The search utilized databases including Scopus, Web of Science, Google Scholar, and the Directory of Open Access Journals (DOAJ).

Search Terms: Boolean strings were constructed to capture the breadth of the topic:

1. "Carbon Accounting" OR "Greenhouse Gas Accounting" OR "GHG Measurement"
2. AND "Scope 3" OR "Supply Chain" OR "Digitalization" OR "Blockchain" OR "Financial Performance"
3. AND "Challenges" OR "SMEs" OR "Developing Countries"

Inclusion Criteria:

Language: English only.

Timeframe: 2020–2025 (to capture the post-Paris Agreement acceleration and recent digital trends).

Content: Articles must focus on the methodology, implementation, or impact of carbon accounting. Studies purely on climate science without an accounting/management angle were excluded.

Accessibility: Full-text open access.

Data Analysis

A total of over 100 snippets and articles were screened.4 The analysis proceeded in two phases:

1. Thematic Synthesis: Qualitative coding of articles to identify recurring themes (e.g., "Data gaps," "Interoperability," "Regulatory pressure").
2. Quantitative Aggregation: For studies examining the relationship between carbon performance and financial performance, statistical findings (correlation coefficients, regression results) were aggregated to determine the overall direction and significance of the relationship.7

Limitations

The primary limitation is the reliance on secondary data and the inherent heterogeneity of the studies. Differences in how "financial performance" (ROA vs. Tobin's Q) and "carbon performance" (intensity vs. absolute emissions) are measured make direct statistical comparison challenging. Furthermore, the rapid pace of technological change means that literature from 2020 may already be outdated regarding specific software capabilities or AI models.

IV. RESULTS AND DISCUSSION

The meta-analysis of literature from 2020 to 2025 reveals a field in rapid flux, moving from theoretical frameworks to hard implementation challenges. The results are categorized into five distinct but interconnected themes: the methodological crisis of Scope 3 emissions, the transformative role of digital technologies, sector-specific accounting nuances, the financial materiality of carbon data, and the systemic inequities faced by developing economies.

1. The Scope 3 Conundrum: From Estimation to Granularity

Scope 3 emissions, which encompass all indirect emissions in a company's value chain, have emerged as the central challenge in modern carbon accounting. The literature consistently identifies Scope 3 as the largest component of corporate carbon footprints, often exceeding 70% to 90% of total emissions in sectors like manufacturing and retail (Mohsen, 2025).

Methodological Divergence: Spend-Based vs. Activity-Based

A critical tension exists between **spend-based** and **activity-based** calculation methods. Spend-based methods, which estimate emissions by multiplying the monetary value of purchased goods by an emission factor (e.g., $kgCO_2e$ per dollar spent), are widely used due to their ease of implementation. However, they are criticized for their lack of accuracy and inability to reflect actual decarbonization efforts. If a company reduces emissions by purchasing a more expensive, low-carbon material, a spend-based method might perversely show an increase in emissions due to the higher cost (Safdie, 2025).

Conversely, activity-based methods, which use physical data (e.g., liters of fuel, kilograms of steel) and supplier-specific emission factors, offer greater precision and are "audit-ready." The meta-analysis reveals a strong trend toward hybrid models, where companies start with spend-based estimates to identify "hotspots" and then progressively replace them with activity-based data for material categories (Safdie, 2025). This transition is crucial for ensuring that carbon accounting reflects physical reality rather than economic fluctuations.

The "Organizing-Performing Paradox"

An insightful finding from the literature is the "organizing-performing paradox" in Scope 3 reporting. As companies improve their accounting systems and expand their reporting boundaries to include more Scope 3 categories (e.g., employee commuting, downstream use of sold products), their reported emissions often increase significantly. This creates a disincentive for transparency, as companies fear reputational damage from rising emission figures, even if the rise is purely an artifact of better measurement (Mohsen, 2025). This paradox highlights the need for stakeholders to value "completeness" and "data quality" over raw emission reductions in the short term. It suggests that a temporary increase in reported emissions is often a sign of accounting maturity rather than poor environmental performance.

Supply Chain Collaboration

The measurement of Scope 3 emissions is fundamentally a collective action problem. A focal firm's Scope 3 is its suppliers' Scope 1 and 2. Therefore, carbon accounting is driving a new era of Green Supply Chain Management (GSCM), where data sharing becomes a prerequisite for business relationships. However, this creates friction, particularly for SMEs in the supply chain who lack the resources to calculate their footprint. Large buyers are increasingly "cascading" these requirements down the chain, creating coercive pressure that can either drive capacity building or exclude smaller players (Ervik et al., 2025). The literature points to the necessity of collaborative platforms where suppliers can report data once and share it with multiple buyers to reduce the administrative burden.

Tabel 2. Key Challenges in Implementing Carbon Accounting for SMEs

Challenge Category	Description	Impact
Resource Constraints	Lack of dedicated sustainability staff and budget for software/consultants.	Inability to move beyond basic Scope 1 & 2 measurement.
Data Availability	Difficulty in obtaining primary data from upstream suppliers.	Reliance on generic, inaccurate spend-based estimates.
Technical Expertise	Gap in knowledge regarding complex standards (GHG Protocol, LCA methodologies).	High risk of calculation errors and misreporting.
Regulatory Uncertainty	Confusion caused by the "alphabet soup" of varying voluntary and mandatory standards.	Paralysis in decision-making and delayed adoption.

2. Digital Carbon Accounting: The Technological Turn

The manual compilation of carbon ledgers using spreadsheets is rapidly becoming obsolete, replaced by a suite of digital technologies termed **Digital Carbon Accounting** (DCA). The review identifies three key technologies reshaping this space: Blockchain, AI, and IoT.

Blockchain and the "Trust" Architecture

Blockchain technology addresses the "double-counting" problem and the lack of trust in carbon data. By recording emissions data on a decentralized, immutable ledger, blockchain ensures that a ton of carbon emitted (or sequestered) is claimed only once. This is particularly vital for carbon trading and offsetting markets. The concept of "triple-entry accounting," facilitated by blockchain, allows for a shared, verifiable record of transactions between suppliers and buyers, streamlining Scope 3 verification (Caldarelli, 2025).

However, the literature warns of the "Oracle Problem". A blockchain is only as good as the data entered into it. If the physical sensors (the oracles) feeding data to the blockchain are inaccurate or tampered with, the ledger becomes an immutable record of false data (Caldarelli, 2025). To mitigate this, research suggests integrating IoT sensors with cryptographic signatures to ensure data integrity at the source.

Artificial Intelligence and Predictive Modeling

AI and Machine Learning (ML) are being deployed to fill the massive data gaps in Scope 3 inventories. Predictive models can estimate emissions based on proxy data (e.g., predicting a building's energy use based on its age, size, and location) with increasing accuracy.

1. **Gap Filling:** AI algorithms can extrapolate supplier emissions data where primary data is missing, using industry averages and peer benchmarking.2 This capability is essential for companies with thousands of Tier 2 and Tier 3 suppliers.
2. **Optimization**: Beyond measurement, AI is used to optimize logistics routes and energy consumption in real-time, directly linking accounting to mitigation.31
3. **Challenges**: The "black box" nature of some AI models poses a challenge for auditability. Furthermore, the training of large AI models is itself energy-intensive, creating a recursive carbon footprint that must be accounted for—a factor often omitted in current reporting.32

IoT and Real-Time Monitoring

The integration of IoT sensors allows for the shift from annual or monthly reporting to real-time carbon accounting. In high-energy sectors like steel manufacturing or data centers, smart meters provide granular data at 15-minute intervals, enabling dynamic decision-making. For instance, "carbon-aware computing" shifts data center workloads to times of day when the grid is greener, a strategy that relies entirely on real-time carbon intensity data.34

3. Sector-Specific Accounting Nuances
The meta-analysis underscores that "one size does not fit all." Different sectors face unique accounting challenges that require specialized frameworks.

Construction and Infrastructure
The construction sector focuses heavily on Embodied Carbon—the emissions associated with the manufacturing and transport of building materials.

1. **LCA Databases:** The accuracy of carbon accounting in construction is heavily dependent on the quality of emission factor databases. A comparative study of the ICE (UK), EU-EFDB, and IPCC-EFDB databases revealed significant discrepancies. For a highway project in China, results from the EU-EFDB were over 200% higher than those from the ICE database, highlighting the critical importance of selecting regionally appropriate emission factors (Wu et al., 2025).
2. **BIM Integration:** Building Information Modeling (BIM) is increasingly integrated with LCA tools to automate carbon estimation during the design phase, allowing architects to "value engineer" carbon out of a project before construction begins (Wang et al., 2025).

Tabel 3. Comparison of Carbon Accounting Databases in Construction

Database	Region	Focus	Application Characteristics
ICE (Inventory of Carbon & Energy)	UK / Global	Construction Materials	High authority for embodied carbon; slower update cycle.
EU-EFDB	Europe	Multi-sector (Transport, Waste, Ag)	Broad coverage; real-time updates; resulted in significantly higher emission estimates in case studies.
IPCC-EFDB	Global	Climate Change Factors	Standardized benchmark; generally lower emission estimates compared to EU-EFDB.

Logistics and Maritime Transport
Shipping is moving toward a "Well-to-Wake" (WtW) accounting approach, which covers emissions from the entire fuel lifecycle—from extraction (well) to combustion in the ship's engine (wake). This is crucial for assessing alternative fuels like hydrogen or ammonia, which may have zero emissions at the "tank-to-wake" stage but high upstream emissions.

1. **Methodologies**: The GLEC Framework provides a standardized method for calculating logistics emissions across multi-modal supply chains (Smart Freight Centre, 2018).
2. **Real-Time Tracking:** New frameworks utilize AIS (Automatic Identification System) data and machine learning to estimate ship emissions in near real-time, achieving high accuracy (under 6% error) even without direct fuel flow meter data (Li et al., 2024).

Agriculture and Forestry
Carbon accounting in land-use sectors is dominated by the complexity of biological systems.

1. Soil Carbon: Accounting for soil carbon sequestration is fraught with uncertainty due to spatial variability and the impermanence of carbon storage (e.g., tilling can release stored carbon).

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Recent research emphasizes the need for rigorous "measure-and-remeasure" protocols rather than relying solely on modeled estimates (Bradford et al., 2025).

2. Forestry: The debate continues regarding the "baseline" for forest carbon. Accounting must distinguish between natural sequestration and "additional" sequestration resulting from human intervention. The use of remote sensing and drones is improving the precision of biomass estimation, allowing for individual tree-level carbon accounting (Ray & Singh, 2025).

Higher Education and Campus Sustainability

Universities serve as "living laboratories" for carbon accounting. Case studies, such as the one from Sichuan University Jinjiang College, utilize hybrid methodologies (emission factors + Delphi method) to calculate campus footprints. A key finding is the high degree of uncertainty in Scope 3 categories like commuting and business travel. Monte Carlo simulations reveal that these categories introduce the most significant variance in the final carbon inventory, suggesting that universities need better data collection mechanisms for student and staff mobility (Yang et al., 2025).

4. Financial Performance and Materiality

A central question in the literature is whether carbon accounting translates into financial value. The meta-analysis of quantitative studies from 2020–2025 provides a nuanced answer. Multiple studies confirm a positive relationship between carbon performance (low emissions) and financial performance (e.g., ROA, ROE, Tobin's Q). This supports the "Porter Hypothesis" that environmental efficiency drives operational efficiency and innovation.8 Larger firms, in particular, show a stronger positive correlation, likely due to their ability to capitalize on economies of scale in compliance and access to green finance (Basri & Husnaini, 2025).

Tabel 4. Financial Performance Correlation with Carbon Accounting (Aggregated Meta-Analysis Findings)

No	Study Focus	Independent Variable	Dependent Variable	Finding	Source
1.	**Mining Sector (Indonesia)**	Carbon Accounting	Financial Performance (ROA/ROE)	**No direct effect**; significant **positive effect** only when moderated by Firm Size.	25
2.	**Global Cross-Country**	Emission Reduction	Return on Assets (ROA)	**Positive association** in advanced economies; mixed results in high-emitting sectors.	8
3.	**Sri Lanka Listed Firms**	Carbon Disclosure	Earnings Per Share (EPS)	**Significant positive relationship**; no significant relationship with ROA.	53
4.	**General Meta-Analysis**	GHG Emissions	Corporate Financial Performance (CFP)	**Significant inverse association**; lower emissions correlate with better financial performance.	7
5.	**Southeast Asia**	Emission Performance	Firm Value (Price-to-Book)	**Insignificant direct effect**; disclosure acts as a mediator.	20

Interestingly, some studies suggest that in the short term, high-quality carbon disclosure can be associated with lower market valuation if it reveals previously hidden climate risks. However, in the long term, transparency reduces idiosyncratic risk and the cost of equity, as investors place a premium on reduced information asymmetry (Zhou et al., 2025).

There is a growing debate on how to recognize carbon credits on the balance sheet. Should they be treated as inventory, intangible assets, or financial instruments? The lack of specific guidance in IFRS/GAAP leads to diverse reporting practices that hinder comparability (Salih, 2024).

Ecologically Unequal Exchange (EUE)

Theories of EUE highlight that developing nations often export carbon-intensive resources to the Global North, effectively "outsourcing" emissions. Carbon accounting frameworks that focus solely on territorial (production-based) emissions disadvantage these nations. Consumption-based accounting, which allocates emissions to the final consumer, is proposed as a fairer metric but is data-intensive and politically contentious (Medeckytė-Žydelė, 2026).

The Capability Gap

SMEs and firms in developing countries often lack the technical expertise, digital infrastructure, and financial resources to implement complex accounting standards like the GHG Protocol. This creates a barrier to entry for global supply chains, as multinational buyers increasingly demand carbon data from their suppliers. Capacity-building initiatives and simplified "entry-level" accounting frameworks are identified as urgent needs to prevent the exclusion of these stakeholders from the green economy.16 he following example.

V. CONCLUSION

The period from 2020 to 2025 has witnessed the maturing of carbon accounting from a voluntary, disjointed practice into a rigorous, technology-driven discipline essential for global commerce. This meta-analysis demonstrates that while methodologies are becoming more sophisticated, significant challenges remain in achieving the "audit-grade" data required by regulators and investors.

Key Takeaways:

1. Scope 3 is the Frontier: The focus has definitively shifted to the value chain. Success in carbon accounting now depends on a firm's ability to engage suppliers and transition from spend-based estimates to primary, activity-based data.
2. Digital is Non-Negotiable: The complexity of modern supply chains and the volume of data required make manual accounting unfeasible. The adoption of AI and blockchain is not just an enhancement but a necessity for scaling carbon accounting.
3. Context Matters: Generic emission factors are a source of significant error. Sector-specific and region-specific databases (like customized ICE or EU-EFDB for construction) are critical for accuracy.
4. Financial Linkages are Real but Complex: While there is a general trend that "green pays," the financial benefits of carbon accounting are realized through long-term risk reduction and operational efficiency rather than immediate market rewards.

We suggest few recommendations. For Policymakers, there is an urgent need to harmonize standards to prevent fragmentation and to provide support for the development of localized emission factor databases in the Global South. For Practitioners, the priority must be to establish robust data governance systems that can integrate silos of information (procurement, logistics, operations) into a unified carbon ledger. For Researchers, future inquiries should focus on solving the "Oracle Problem" in blockchain applications and developing standardized methodologies for accounting for the carbon "handprint" (avoided emissions) of products and services.

As we move toward 2030, carbon accounting will cease to be a distinct discipline, likely becoming fully integrated into financial accounting, where a ton of carbon is tracked, audited, and valued with the same rigor as a dollar of revenue.

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