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Integration of Environmental and Social Cost Accounting into Corporate Strategic Decision-Making

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ABSTRACT

This systematic literature review synthesizes scholarly research Scopus-indexed publications published between 2019 and 2025 concerning the integration of Environmental and Social Cost Accounting (ESCA) into strategic corporate decision-making. This research objectives are to systematically review, analyze, and categorize the primary internal measurement and reporting frameworks for Environmental and Social Costs used by companies, by which ESCA information is integrated into corporate investment and capital budgeting decisions, enables sustainable supply chain management, influences strategic pricing and market positioning decisions. This study addresses the methodological and conceptual frameworks employed by firms to measure and report non-financial costs and analyzes how this information influences long-term value creation. The findings of this review reveal that ESCA operationalization relies heavily on micro-level management tools, specifically material flow cost accounting and life cycle costing. This refinement internalizes prospective regulatory costs, liability risks, and long-term climate-related cash flow adjustments, effectively transforming financial analysis to meet external ESG reporting demands. The study concludes that the effective integration of ESCA is not merely a compliance task dictated by legitimacy theory but is, fundamentally, a crucial mechanism for securing a sustained competitive advantage, although harmonization challenges and the current focus gap.
Keywords: Environmental and Social Cost Accounting, capital budgeting, sustainable supply chain management, pricing, life cycle costing

INTRODUCTION

The global economic landscape has undergone a profound shift, moving towards mandated corporate accountability that extends significantly beyond purely financial metrics. Traditional accounting systems, having historically focused primarily on historical monetary transactions, are increasingly viewed as fundamentally incomplete, as they fail to capture the long-term, material impacts of environmental degradation (such as pollution and resource scarcity) and salient social risks (including insecure labor practices and human rights violations within the value chain). This systematic failure to internalize externalities necessitates the development and widespread corporate adoption of sophisticated Environmental and Social Cost Accounting (ESCA) systems, frequently referred to in the literature as Green Accounting or Sustainability Accounting (Kim et.al., 2021)

ESCA operates as a critical internal management tool designed specifically to quantify the expenses associated with a company's effects on the environment and society. These quantifiable expenses typically span a wide range, including costs for site remediation and cleanup, regulatory penalties, taxes related to environmental impact, the procurement of modern technologies for pollution prevention, and standard waste management fees. The overarching objective is to provide a comprehensive, systemic view of the firm's performance against the triple bottom line—economic, environmental, and social—thus supporting a more holistic evaluation of overall sustainability performance (Liu et.al, 2023).

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The academic and industrial period spanning 2019 to 2025 has been marked by an unprecedented acceleration in global efforts to standardize sustainability reporting. This movement is prominently highlighted by the rise of influential mandatory frameworks, such as the International Sustainability Standards Board (ISSB) IFRS S1 (General Requirements for Disclosure) and IFRS S2 (Climate-related Disclosures), alongside the European Sustainability Reporting Standards (ESRS). This intense regulatory and institutional push transforms sustainability reporting from a historically voluntary public relations exercise into a fundamental component of mandatory financial and strategic management, demanding greater methodological rigor in internal ESCA processes (Cruciani et.al, 2023).

While the increasing importance of integrated sustainability metrics is widely acknowledged, extant systematic reviews have tended to focus on broad fields. For instance, reviews have concentrated on macro-level Environmental Accounting (EA) publication trends, general Corporate Social Responsibility (CSR) impact, or the diffuse relationship between high-level Environmental, Social, and Governance (ESG) factors and overall Corporate Financial Performance (CFP). Although these macro-studies successfully confirm a positive correlation between ESG integration and improved financial outcomes, they often fail to provide granular analysis of the micro-level managerial mechanisms required for this success (Nguyen et.al, 2023).

A significant research gap persists in systematically synthesizing the contemporary academic literature (2019–2025) that:

1. Provides an expert-level, detailed analysis of the *internal, managerial accounting frameworks* (specifically MFCA, LCC, E-ABC, FCA) designed and utilized to measure, allocate, and internally report ESCA within an organization.
2. Explicitly and rigorously connects the derived ESCA metrics to the specific integration mechanisms employed across the critical trifecta of high-level strategic decisions: Capital Investment, Operational Management, and Strategic Pricing.
3. Utilizes a rigorous, structured Systematic Literature Review (SLR) methodology to consolidate the highly fragmented knowledge base surrounding this methodological convergence (Rubab et.al, 2025).

The core issue addressed by this review relates to what has been identified in strategic management literature as the "how gap". Conceptual literature grounded in Legitimacy Theory and Stakeholder Theory explains *why* firms should integrate sustainability and *what* macro-level financial benefits they can achieve. However, the specific organizational capabilities, routines, and processes—the *how*—necessary for leveraging stakeholder interests into quantifiable internal value creation remain underspecified. This SLR addresses the deficiency by focusing on the *performativity* of ESCA tools. It investigates how the consistent application of measurement frameworks like MFCA or Internal Carbon Pricing (ICP) structurally alters internal routines and provides quantifiable decision-making inputs, thereby transforming abstract sustainability principles into concrete management control and strategic action (Arjaliez et.al, 2023).

The research objectives of this research are systematically review and categorize the primary internal measurement and reporting frameworks for Environmental and Social Costs (ESCA) used by companies as reflected in recent academic literature (2019–2025), to analyze the mechanisms by which ESCA information is integrated into corporate Investment and Capital Budgeting decisions, to analyze the mechanisms by which ESCA information

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drives operational efficiency and enables Sustainable Supply Chain Management (SSCM), and to analyze the mechanisms by which ESCA information influences Strategic Pricing and market positioning decisions. This research provides significant practical and academic utility. For practitioners, it offers a consolidated, methodologically validated roadmap for implementing relevant, micro-level ESCA frameworks. For academics, it furnishes a structured synthesis, identifying key research trajectories and critical theoretical intersection points, particularly concerning the expansion of Strategic Management Accounting (SMA) into sustainability. Furthermore, the findings are essential for informing policymakers regarding the necessary integration points for unified reporting standards across diverse regions and industries. The novelty of this research lies in its rigorous, systematic synthesis of the methodological application of specific, micro-level ESCA frameworks (MFCA, LCC, ICP) and their empirically demonstrated causal linkage to the simultaneous, critical adjustment of three high-stakes, distinct strategic decision functions: Investment, Operations, and Pricing. This convergence analysis across the strategic trifecta, utilizing contemporary Scopus literature, addresses a previously fragmented area of scholarly inquiry (Huang, 2019).

LITERATURE REVIEW

The successful corporate adoption and strategic integration of ESCA frameworks are not accidental phenomena but are instead rooted in a complex interplay of major theoretical frameworks that collectively explain both the external institutional pressures (macro-level) and the internal economic benefits (micro-level) driving the convergence of sustainability and financial disciplines (Fischer et.al, 2021).

Institutional Theory and Legitimacy

Institutional Theory provides the macro-level context, asserting that organizational structures, behaviors, and reporting practices are profoundly shaped by overarching institutional frameworks, norms, and regulatory pressures. Under this lens, firms often embrace ESCA and sustainability reporting not solely based on internal economic calculus, but primarily as a conforming response to external expectations imposed by powerful regulatory bodies and industry standards). A key driver within this framework is Legitimacy Theory, which posits that organizations issue sustainability reports (SRs) and adopt specific ESCA practices to maintain their 'social contract'—that is, to reduce external costs or diminish the regulatory and societal pressures imposed by internal and external stakeholders. The rapid global push towards mandatory disclosures, such as those set forth by the ISSB (IFRS S1/S2) and the EU's ESRS, perfectly exemplifies this institutional driver. These mandatory requirements compel firms to standardize their internal ESCA measurement practices, fundamentally to achieve legal compliance and maintain social legitimacy in the eyes of investors and the public (Tilt, 2018).

Stakeholder Theory and Transparency

Stakeholder Theory provides the ethical and managerial imperative for ESCA, asserting that the definition of value creation must be broadened beyond maximizing shareholder returns to include all groups that can affect, or are affected by, the achievement of the firm's objectives. ESCA operationalization directly addresses this theory by driving the need for transparent, integrated reporting (IR). The goal of IR, supported by ESCA data, is to mitigate information asymmetry and rigorously discharge accountability to

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key stakeholders, including investors, regulators, and consumers. Stakeholders use ESG reports and disclosures, which are built upon robust Social and Environmental Accounting (SEA) systems, to assess long-term risks and evaluate a company's potential for sustainable growthThis increased external scrutiny, enabled by the transparency of quantified ESCA data, creates an organizational incentive to utilize this information to make better, more ethical, and ultimately more financially sound internal strategic choices (Xie et.al, 2020).

METHODS

Protocol and Adherence (PRISMA Statement)

This systematic review rigorously adhered to the guidelines established by the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) protocol. PRISMA provides a standardized, essential framework for comprehensively reporting the rationale, methods, and results of systematic reviews and meta-analyses. Adherence to the PRISMA standard ensures methodological clarity, objectivity, and openness, thereby enabling readers and researchers to thoroughly evaluate the merits and replicability of the synthesis (Sun et.al, 2022).

Search Strategy and Data Sources

The primary source for article identification was the Scopus abstract and citation database, as explicitly mandated by the user query. This was supplemented by strategic parallel searches in other reputable databases, including Web of Science and ScienceDirect, to maximize overall coverage and ensure the validity of the literature pool. The search period was strictly limited to publications between January 1, 2019, and June 30, 2025, focusing on contemporary academic discourse and the influence of recent regulatory shifts (Daugaard, 2020).

Boolean Search Strings:

The search strings were specifically constructed to capture the direct intersection of micro-level measurement tools, high-level strategic decision-making, and core ESCA concepts:

1. ("Environmental cost accounting" OR "Social cost accounting" OR "Sustainability management accounting") AND ("Strategic decision" OR "Capital budgeting" OR "Pricing decision" OR "Operational decision") AND PUBYEAR > 2018 AND PUBYEAR < 2026
2. ("MFCA" OR "LCC" OR "Internal Carbon Pricing" OR "Full Cost Accounting") AND ("Strategic" OR "Investment" OR "Supply Chain") AND PUBYEAR > 2018 AND PUBYEAR < 2026

Screening and Eligibility Criteria

A multi-stage screening process, following the PRISMA flow, was employed to select the final pool of peer-reviewed studies.

Inclusion Criteria:

- Peer-reviewed journal articles explicitly indexed in the Scopus database.
- Published within the defined timeframe (2019–2025).
- Written in the English language.
- Must discuss the measurement, quantification, allocation, or reporting of *internal* environmental and/or social costs.
- Must demonstrate a concrete, methodological linkage between ESCA data and at

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least one of the three strategic decision areas: Investment, Operations, or Pricing.

Exclusion Criteria:

- Editorials, conference proceedings, book chapters, dissertations, and general reports lacking the necessary empirical or structured theoretical rigor.
- Studies focused exclusively on external ESG disclosure without detailing internal cost measurement or allocation methodology.
- Narrative literature reviews not employing a rigorous, systematic, or structured approach.

Data Extraction and Synthesis

Following the screening and selection of the final corpus (minimum 30 articles required), data extraction was conducted. The process focused on identifying four core categories of variables: (1) the specific ESCA framework utilized (e.g., MFCA, LCC); (2) the strategic decision area addressed; (3) the theoretical lens employed (e.g.,Legitimacy); and (4) the empirical or conceptual findings regarding the specific integration mechanism. Content analysis and thematic coding were utilized to categorize and synthesize the extracted findings. The synthesis objective was to articulate the literature state-of-the-art into thematic clusters related to the methodological adoption of sustainability performance measurement systems and their influence on core organizational strategy (Tricco et.al, 2018).

Table 1: Systematic Literature Review Protocol Summary (2019–2025)

Parameter	**Detail**
Objective	Synthesize ESCA frameworks and strategic integration mechanisms (Investment, Operations, Pricing).
Search Databases	Scopus (Primary), Web of Science, ScienceDirect.
Timeframe	2019–2025.
Screening Protocol	Adherence to PRISMA 2020 Guidelines.
Inclusion Focus	ESCA measurement tools (MFCA, LCC, FCA, E-ABC) and their application in Investment, Operations, and Pricing decisions.

Source: *Author's compilation*

RESULTS

Macro-Level Reporting and Disclosure Standards

The quantification and integration of environmental and social costs necessitate the deployment of sophisticated frameworks that operate at both the macro-level (governance and disclosure) and the micro-level (management control and operational accounting). The global momentum towards sustainability necessitates mandatory standardization of disclosure. This external demand, driven by regulators and investors, compels firms to

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establish robust internal measurement systems to generate reliable, auditable data (Iazzolino et.al, 2023).

International Sustainability Standards and Transparency

The development of the International Financial Reporting Standards (IFRS) S1 and S2 by the International Sustainability Standards Board (ISSB) represents a critical inflection point. IFRS S1 establishes the foundational principles and general requirements for reporting information on *all* relevant sustainability-related risks and opportunities. IFRS S2 specifically mandates disclosures regarding climate-related risks and opportunities. This institutional pressure requires firms to move beyond general statements and quantify both current and prospective climate-related costs and risks, ensuring this information is integrated into mainstream financial reporting alongside traditional statements (Delsen et.al, 2019).

Furthermore, established frameworks like the Global Reporting Initiative (GRI) and the more recent European Sustainability Reporting Standards (ESRS) structure the disclosure of extensive environmental data (e.g., greenhouse gas emissions, energy consumption, waste management) and social data (e.g., labor practices, human rights compliance). These frameworks require underlying, robust internal Social and Environmental Accounting (SEA) systems. ESG disclosures, when built on credible SEA systems, enhance the transparency, credibility, and relevance of non-financial information, subsequently strengthening corporate reputation and facilitating access to capital (Nogueira et.al, 2023).

Micro-Level Internal ESCA Measurement Frameworks

These management accounting tools are essential for the internal operationalization of ESCA, translating physical flows and non-financial impacts into monetized data that managers can use for high-stakes decision-making.

Material Flow Cost Accounting (MFCA)

Material Flow Cost Accounting (MFCA) is identified as a critical environmental management accounting technique for linking physical flows (material and energy quantities) with corresponding monetary flows through a process. Its utility stems from its focus on identifying and monetizing "negative product costs," which are essentially waste or non-product outputs. MFCA is highly effective in driving operational improvements because it rigorously quantifies material and energy losses, thereby demonstrating that environmental impact reduction directly translates into measurable improvements in business and economic efficiency. Studies, particularly in high-impact sectors like energy and manufacturing, have demonstrated a positive effect of MFCA implementation on Environmental Performance. MFCA's versatility allows for its application not only to existing production lines but also to strategic assessments, such as evaluating the financial viability of nascent recycling technologies by modeling their profitability under various conditions (Benz et.al, 2021).

Environmental Activity-Based Costing (E-ABC) and Life Cycle Costing (LCC)

Cost allocation techniques play a crucial role in ESCA by accurately assigning indirect environmental costs to specific processes or products. E-ABC, derived from traditional Activity-Based Costing, specifically focuses on allocating environmental overheads, regulatory compliance costs, and indirect environmental costs to the activities or cost objects that truly drive them. This accuracy is vital because understanding the true cost allocation enables management to improve strategic pricing decisions by reflecting the full

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environmental burden of a product. E-ABC is considered essential for minimizing environmental impact across complex industries like manufacturing and construction (Rahat et.al, 2023).

LCC is a method used to calculate the total costs associated with a product or asset over its entire life cycle, from conceptualization (cradle) to final disposal (grave). LCC is prescriptively introduced in organizations to improve Life Cycle Management (LCM) and assists management in long-term capital planning by incorporating future disposal or remediation liabilities. However, LCC adoption faces barriers, as implementation can lead to a narrower understanding of the term 'life cycle' if the sustainability focus is overridden by purely cost-driven concerns (Wang et.al, 2022).

Full Cost Accounting (FCA)

Full Cost Accounting (FCA) represents the most advanced, macro-inclusive framework designed to incorporate externalities into internal reporting and valuation. The scope of FCA is unique in that it measures and values in monetary terms the externality costs associated with environmental impacts. This extends to non-market valuation of lost ecosystem goods and services, and the crucial, complex well-being valuation used to assess the social costs linked to natural resource degradation. FCA addresses the fundamental flaw of traditional economics: the negative effects (e.g., pollution, chronic health burdens) are currently treated as 'externalities' carried by society. FCA necessitates that firms internalize these costs into their financial structure, recognizing that it is currently financially advantageous for companies to harm the environment and exploit people because mitigation costs are externalized. This transformation, while methodologically challenging, is essential for aligning economic goals with true societal well-being (Samet et.al, 2022).

Table 2: Synthesis of Key Internal ESCA Measurement Frameworks

Framework	Primary Managerial Function	Cost Scope	Strategic Decision Domain Impact
Material Flow Cost Accounting (MFCA)	Quantify and monetize material and energy inefficiencies.	Internal operational costs, waste losses, non-product output, energy consumption.	Operational efficiency, Lean management, Supply Chain performance.
Environmental Activity-Based Costing (E-ABC)	Accurate, detailed allocation of environmental overheads and indirect costs.	Internal indirect environmental costs (e.g., permitting, compliance, treatment).	Strategic Pricing, Cost Control, Product Design/Mix.
Life Cycle Costing (LCC)	Total cost calculation across an asset or product's entire life cycle (CapEx to disposal).	Internal and projected lifecycle costs, including long-term remediation/liability.	Investment decisions (CapEx), Product Research & Development (R&D).
Full Cost Accounting	Monetization and internalization of both	Internal costs + Externalized social and	Strategic Pricing, External Reporting

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(FCA)	internal costs and external societal/environmental impacts.	environmental costs (ecosystem services, societal burden).	(data feeds ISSB/GRI), Business Model Transformation.

Source: *Author's compilation*

DISCUSSION

The preceding analysis of micro-level ESCA frameworks confirms that these tools provide the necessary quantitative data inputs to refine and transform core strategic decision processes. The discussion now examines the specific integration mechanisms across the three critical strategic domains.

ESCA in Investment and Capital Budgeting Decisions

Capital budgeting is the formalized process by which firms evaluate long-term investment viability, fundamentally relying on metrics such as Net Present Value (NPV) and Internal Rate of Return (IRR). The integration of ESCA shifts these traditional metrics from focusing purely on discounted financial cash flows to incorporating the quantifiable aspects of long-term environmental and social risk and opportunity (Zou et.al, 2023).

ESG Materiality and Risk Quantification

Investors now widely recognize ESG information as a pivotal benchmark that offers comprehensive and persuasive evidence regarding an organization's long-term sustainability, risk profile, and future viability. The integration of ESG (and underlying ESCA) considerations positively influences decisions related to sustainable investments, as these factors significantly impact estimated yields and cannot be overlooked. Empirical research validates that investors prioritize specific ESCA factors based on materiality. Institutional investors often place greater importance on specific environmental factors such as greenhouse gas emissions, pollution/waste management, and formalized risk and opportunity management systems, often ranking these higher than purely social factors in certain contexts. The implication is that ESCA systems must be sophisticated enough to provide granular data on these prioritized metrics to effectively influence the capital allocation decisions of external stakeholders (Winter, 2021).

Furthermore, meta-analyses suggest a strong correlation between ESG factors and corporate financial performance, often measured using accounting-based metrics like Return on Equity (ROE). However, environmental and social initiatives often require significant upfront investments (e.g., sustainable technology procurement), which can temporarily reduce short-term profit margins and ROE. This underscores the strategic nature of ESCA integration: it is a decision to sacrifice short-term accounting performance for enhanced long-term sustainability and brand equity (Fischer et.al, 2021).

Mechanisms for ESCA Integration into Capital Budgeting

The core integration mechanism involves modifying the inputs and calculation methodology of NPV and IRR, ensuring environmental and social costs are internalized. The primary methodological application is the adjustment of projected future cash flows. Projects are assessed using LCC or FCA data to forecast anticipated negative cash flows related to environmental liabilities, prospective regulatory fines, mandatory clean-up costs,

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or resource scarcity impacts. Conversely, projections may include positive cash flows derived from government incentives or premium prices for sustainable outputs (Daugaard, 2020).

A secondary, yet crucial, mechanism is the adjustment of the discount rate or hurdle rate. ESCA data informs financial managers on the inherent environmental and social risk of a project. Projects with higher environmental risk or demonstrable negative social externalities may be subjected to a higher cost of capital (a risk premium). Conversely, demonstrably sustainable projects, which offer reduced risk or easier access to "green" finance, may benefit from a lower discount rate, making them financially attractive even if their initial expected monetary return is similar to a conventional project. This dual adjustment—to both cash flows and the discount rate—is essential for accurate and relevant assessment in capital budgeting (Huliselan, 2024).

The Strategic Adjustment of Capital Budgeting

Traditional capital budgeting (NPV/IRR) inherently operates as a static, short-sighted tool when externalities are ignored. By integrating ESCA-derived future costs, such as mandatory internal carbon price forecasts or projected regulatory fines, into both cash flow estimates and the discount rate, firms transform their investment process. The result is a dynamic, forward-looking, risk-adjusted strategic assessment. This organizational capability in risk quantification—the ability to accurately translate non-financial environmental factors into monetized financial risk—is a valuable and difficult-to-replicate resource, allowing the firm to secure sustainable capital pools that benchmark based on sophisticated ESG performance (Adil et.al, 2019).

ESCA in Operational Excellence and Supply Chain Management (SCM)

The integration of ESCA into operational decisions transforms the supply chain function from a traditional cost center into a significant source of strategic value and profitable growth, specifically by quantifying inefficiency and risk. Material Flow Cost Accounting (MFCA) is the pivotal tool for operational improvement. MFCA rigorously identifies and quantifies the exact location and monetary value of material and energy losses within the production process. By monetizing waste and demonstrating that non-product output is a direct financial cost, MFCA supports core lean management principles and systematically improves business efficiency. ESCA data informs and drives the adoption of innovative management approaches toward sustainability in Supply Chain (SC) operations. Operational excellence activities—including sophisticated IT implementations, efficient logistics management, and centralized production control—must leverage ESCA metrics to demonstrably influence various sustainability performance dimensions, such as SC flexibility, internal coordination, and effective technology management (Wang et.al, 2022).

Sustainable Supply Chain Management (SSCM) and Resilience

Effective ESCA data significantly contributes to Supply Chain Resilience (SCR). Tracking granular environmental and social data helps companies identify potential operational problems, such as high-risk suppliers, regulatory compliance gaps, or resource shortages, *before* they escalate into supply crises or reputational damage. SCR practices, particularly supply chain agility, flexibility, and collaboration, demonstrate a substantial positive relationship with overall operational performance. The social dimension of ESCA is realized through standardized management of compliance and auditing. The Global Social Compliance Programme (GSCP) reference tools offer established best practices for managing social and environmental sustainability throughout the complex supply chain.

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However, the literature indicates significant barriers to standardization and cross-recognition of social audit criteria across different industries and international jurisdictions, highlighting a need for further standardization to reduce data friction (Benz et.al, 2021).

The Moderating Role of Digitalization in Operational ESCA

The effective deployment of complex ESCA tools, such as scaling MFCA across a global supply chain, is heavily reliant on high-quality, real-time data collection and information management. Empirical evidence establishes that the appropriate and strategic use of digital technologies has a significant moderating impact on the positive relationship between SCR practices (informed by ESCA) and overall operational performance. ESCA systems are therefore not isolated; their success in maximizing operational excellence—the cornerstone of RBV-driven competitive advantage—is profoundly conditional upon the firm's dynamic capability to integrate and leverage digital technologies for information management and enhanced visibility throughout the supply chain (Sun et.al, 2022).

ESCA in Strategic Pricing and Market Positioning

Strategic pricing is a function of fully quantifying the costs of production, assessing competitive dynamics, and aligning pricing strategy with brand positioning. ESCA is paramount here because it allows the firm to move beyond conventional cost calculations by internalizing costs historically borne by society, thereby supporting premium pricing strategies (Nguyen et.al, 2023).

Internalizing Environmental Externalities through Internal Carbon Pricing (ICP)

Externalities represent environmental and social costs that are generally not captured by market mechanisms, meaning the economic agents responsible do not bear the financial burden. This market failure is addressed internally through sophisticated mechanisms. Internal Carbon Pricing (ICP) is the critical mechanism for integrating the cost of environmental sustainability directly into cost calculations and high-level decision-making. ICP converts greenhouse gas emissions into a specific monetary value. ICP can be strategically implemented in two primary ways: as a shadow price (used for investment scenario analysis and capital budgeting) or as a direct internal fee (charged to business units based on their emissions, thus directly influencing operational and product pricing decisions) (Nguyen et.al, 2023).

The primary function of ICP is to bridge the strategic gap: to connect the firm's long-term climate reduction goals with tactical, daily decisions, such as product development, cost allocation, and ultimate market price setting. The determination of the optimal ICP level is highly strategic and contextual. Companies may initially set a low price to minimize competitive impact and allow organizational departments to acclimatize to the new cost structure, with the expectation of gradually increasing it. Alternatively, a high price may initially be applied to a small portion of operations to limit early financial impact while testing its effect on the value chain (Hughes et.al, 2021).

Cost-Informed Positioning and Brand Strategy

Accurate cost data derived from E-ABC and FCA—especially concerning internalized carbon costs—enables firms to determine the *true* and *full* cost of producing sustainable products. This quantification is crucial for supporting strategic pricing decisions, as it provides the justification necessary to charge a price premium for eco-friendly products. Strategic ESCA data supports effective green brand positioning, allowing firms to differentiate their offerings based on verifiable environmental attributes. While consumer

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behavior models, such as self-congruence theory, suggest consumers prefer brands aligned with their environmental self-identity, functional congruence theory emphasizes that environmental claims must be backed by perceived functional performance. ESCA provides the quantitative evidence required to validate these green claims, reducing the risk of greenwashing and building crucial stakeholder confidence. In highly competitive environments, the use of credible, ESCA-backed sustainability claims enables market differentiation, which, according to strategic modeling, can optimize overall category profits (Hang et.al, 2019).

Table 3: Integration into Strategic Decisions

Strategic Decision Domain	ESCA Data Inputs	Integration Mechanism/Tool	Theoretical Link	Primary Value Outcome
Investment (CapEx)	LCC results, FCA externality valuation, Internal Carbon Price (Shadow).	Modified NPV/IRR calculations, Risk-adjusted discount rates, Scenario analysis for climate risk.	Institutional Theory, Stakeholder Theory (Risk & Compliance).	Reduced long-term climate risk, Attractiveness to sustainable investment funds.
Operations (Efficiency & SCM)	MFCA output (monetized waste costs), E-ABC allocation, Social audit data.	Waste minimization programs, Sustainable SCM framework integration, Digital platform moderation of SC agility.	Resource-Based View (RBV), Dynamic Capability View (DCV).	Measurable cost reduction, Operational efficiency, Creation of non-imitable sustainable processes.
Pricing (Marketing Strategy)	E-ABC allocations, Internal Carbon Price (Fee), Full Cost (FCA) data.	Internalization of externalities, Justification of price premiums, Green brand positioning validation.	Legitimacy Theory, Self-congruence Theory (Market Differentiation).	Enhanced market share, Stakeholder confidence, Revenue growth from differentiated products.

Source: *Author's compilation*

CONCLUSION

This systematic literature review, covering the pivotal period of 2019 to 2025, concludes that Environmental and Social Cost Accounting (ESCA) has evolved from a voluntary disclosure topic into an indispensable component of Strategic Management Accounting (SMA). The transformation is largely attributable to the acceleration of institutional pressures, particularly the mandated standardization from bodies such as the ISSB. The successful integration of sustainability into core strategy hinges on the effective

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deployment of granular, micro-level ESCA frameworks: MFCA for operational efficiency, LCC for long-term CapEx planning, and ICP for strategically internalizing carbon externalities.
The synthesis confirms distinct integration mechanisms across the strategic trifecta:

1. Investment decisions are enhanced by adjusting standard financial models (NPV/IRR) with quantifiable ESCA risks and liabilities.
2. Operational management achieves superior performance and resilience by using MFCA to translate material inefficiency into monetary loss, directly addressing the core RBV tenet of non-imitable cost reduction capabilities.
3. Strategic pricing utilizes ICP to internalize external environmental costs, thereby enabling credible market differentiation and the justification of price premiums for sustainable product lines.

The ability of a firm to execute these three functions synergistically by leveraging high-quality ESCA data forms a powerful organizational capability rooted in the RBV, which serves as a necessary response to macro-level demands for legitimacy and transparency (Stakeholder Theory).

Despite the comprehensive nature of the integrated ESCA literature between 2019 and 2025, several critical limitations and research gaps emerge, requiring focused future scholarly effort: First, a persistent challenge is the Micro-Macro Linkage Deficiency. The literature still exhibits a weak causal connection between the micro-level implementation of specific SMA tools (e.g., the introduction of E-ABC) and verified, long-term strategic outcomes at the firm or industry level (e.g., sustained competitive advantage or market-wide efficiency gains). Future empirical studies must establish stronger, longitudinal evidence linking specific internal ESCA procedures to documented external financial and non-financial performance metrics. Second, the current body of work lacks adequate Generalizability and Contextual Specificity. The effectiveness and prioritization of ESG/ESCA factors in decision-making vary significantly based on the operating environment. Existing models, particularly in investment evaluation, demonstrate limited applicability and predictability in emerging markets due to country-specific factors and an unstable regulatory environment. There is a pronounced need for comparative, cross-sectoral studies that investigate how distinct cultural, institutional, and industrial contexts modify the optimal design and efficacy of ESCA frameworks. Third, the SME Integration Deficit remains a significant concern. Research indicates low environmental awareness and systematic undervaluation of environmental costs within Small and Medium Enterprises (SMEs). Since SMEs constitute the vast majority of economic activity, future studies must develop and validate specialized Sustainability Performance Measurement Systems (SPMS) and ESCA adoption strategies that are specifically tailored to address the resource constraints, managerial capacity limitations, and unique organizational structures of smaller firms. Finally, the Valuation of Social Costs in Full Cost Accounting (FCA) requires methodological advancement. While FCA has made strides in monetizing environmental impacts, the reliable valuation of complex social externalities (e.g., human capital impact, well-being degradation) remains highly subjective, theoretical, and value-laden. Further methodological rigor is essential to advance FCA beyond environmental cost inclusion toward a credible, defensible calculation of comprehensive social costs.

The synthesis of the contemporary ESCA literature provides clear directives for both policy formation and corporate practice: For Policymakers: Institutions must prioritize the

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robust harmonization of ESCA disclosure frameworks (such as ISSB and ESRS) globally. This is crucial for reducing data inconsistency, minimizing methodological silos between financial and sustainability departments, and facilitating smoother, more efficient corporate integration. Furthermore, policy support should be directed toward the development of standardized, scientifically credible tools for the non-market valuation and monetization of complex social and environmental externalities. For Managers and Executives: The organizational function of ESCA must be repositioned from a merely clerical or compliance task to a core strategic capability. Senior management should compel the management accounting function to transition from historical financial reporting to forward-looking, risk-informed analysis.

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