Hasanuddin Economics and Business Review
E-ISSN : 2549-323X
Faculty of Economics and Business, Hasanuddin University

Vol. 10, No. 2, 2026
Doi: 10.26487/hebr.v10i2.7176

RESEARCH REVIEW

ESG Disclosure and Green Accounting in Maritime Logistics: Mechanisms, Outcomes, and Research Frontiers

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KEYWORDS
ESG disclosure; Financial performance; Green accounting; Maritime logistics; Sustainability reporting; Value creation

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RECEIVED 2026-09-25
REVISED 2026-09-30
ACCEPTED 2026-10-30

ABSTRACT
This study critically examines how environmental, social, and governance (ESG) disclosure and green accounting contribute to financial value creation in maritime logistics, addressing fragmented evidence on their underlying mechanisms and institutional conditions. Employing a critical integrative literature review, the study synthesises research published between 2010 and September 2026, identified through Scopus and Web of Science. Thematic synthesis and cross-study comparisons integrate maritime-specific, logistics-sector, and emerging-market evidence to assess financial outcomes, value-creation pathways, and contextual differences. The findings indicate that ESG-related practices are generally associated with favourable but heterogeneous financial and operational outcomes, particularly profitability, firm valuation, and operational efficiency. ESG disclosure may enhance value through information transparency, financing access, stakeholder confidence, and risk management, while green accounting supports environmental cost visibility, resource allocation, and operational decision-making. However, these relationships depend on disclosure credibility, governance quality, ownership structures, institutional maturity, and implementation horizons. Direct maritime evidence remains limited, particularly concerning environmental cost recognition, financing costs, and causal mechanisms. This review contributes an integrated, mechanism-based framework distinguishing the external information function of ESG disclosure from the internal managerial function of green accounting. By identifying potential transmission pathways, institutional boundary conditions, and evidence gaps, the study advances a research agenda for explaining how and under what conditions sustainability practices may generate financial and strategic value in maritime logistics.

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1. INTRODUCTION

Environmental, social, and governance (ESG) considerations have evolved from peripheral corporate responsibility initiatives into strategic dimensions of corporate transparency, investment decision-making, risk management, operational efficiency, and long-term value creation (Chen & Xie, 2022; Ellili, 2022; Zhang & Lucey, 2022; Aydoğmuş et al., 2022). This transformation is particularly significant in maritime logistics, where shipping companies, port authorities, terminal operators, and logistics providers manage capital-intensive assets while facing increasing environmental

obligations, regulatory uncertainty, energy-transition costs, and stakeholder expectations (Wang et al., 2020; Karagiannis et al., 2022; Sheikh et al., 2023). The International Maritime Organization's revised greenhouse gas strategy, which targets net-zero emissions from international shipping by or around 2050, further strengthens the strategic importance of environmental performance measurement, sustainability-related investment, and credible corporate disclosure (IMO, 2023). Consequently, understanding whether and how sustainability practices translate into financial value has become increasingly relevant to maritime corporate strategy, accounting practices, and financial decision-making.

Existing empirical evidence suggests that ESG-related practices may contribute to corporate financial and operational performance, although the magnitude and direction of these relationships vary considerably. Maritime studies have examined associations between sustainability reporting, corporate social responsibility, firm valuation, and financial performance in shipping and port-related activities (Gavalas, 2024; Tsatsaronis et al., 2024). Evidence from logistics firms further indicates that green logistics practices are associated with financial efficiency, while digital transformation and green innovation may transmit the organizational benefits of ESG performance (Kim et al., 2024; Liu et al., 2025). Complementary research across emerging economies reports associations between ESG disclosure and accounting-based profitability, market valuation, investment efficiency, and financing conditions (Chen & Xie, 2022; Al Amosh et al., 2023; Hussain et al., 2024; Abdullah et al., 2026; Awwad et al., 2026). Nevertheless, these findings are not uniformly positive. Differences in institutional environments, ESG measurement, disclosure credibility, corporate governance, and financial performance indicators contribute to heterogeneous and potentially nonlinear relationships (Firmansyah et al., 2023; Narula et al., 2024; Agarwala et al., 2024; Almarayeh, 2026; Moharram et al., 2026). Such variation suggests that financial value creation cannot be adequately explained by the presence or intensity of ESG disclosure alone.

Recent maritime ESG reviews provide an important foundation for understanding this research landscape. Andrikopoulos (2026) synthesizes sustainability performance, reporting, stakeholder relationships, and corporate governance in the shipping industry, emphasizing the fragmentation between sustainability and governance research and the difficulty of establishing causal relationships. Similarly, Li et al. (2026) systematically examine maritime ESG scholarship, identifying financial performance, disclosure practices, risk management, and industry-specific reporting challenges as prominent research themes. Although these reviews advance understanding of maritime sustainability, their principal emphasis is on the development, organization, and challenges of ESG research rather than the integrated financial implications of external sustainability disclosure and internal environmental cost measurement. In particular, the relationship between ESG disclosure, green accounting, organizational value-creation processes, and their contextual limitations remains insufficiently synthesized. The present review therefore seeks to complement existing maritime ESG reviews by

examining how these two accounting and reporting dimensions may jointly contribute to financial value creation.

From a theoretical perspective, the relationship between ESG disclosure, green accounting, and financial performance can be understood through complementary rather than competing explanations. Information asymmetry and signaling perspectives suggest that credible ESG disclosure may reduce information gaps between firms and capital providers, thereby influencing investment decisions and financing conditions (Chen & Xie, 2022; Zhang & Lucey, 2022). Stakeholder and legitimacy perspectives explain how sustainability reporting may strengthen organizational credibility, stakeholder confidence, and access to strategically important resources. In contrast, resource-based and organizational capability perspectives provide a basis for understanding how environmental management accounting and related cost-measurement practices may improve internal information quality, resource allocation, and operational decision-making. Agency and institutional perspectives further suggest that governance arrangements, ownership structures, regulatory pressures, and reporting environments influence the credibility and financial consequences of sustainability practices (Arayssi et al., 2020; Ellili, 2023; Alodat & Hao, 2025; Attia & Almoneef, 2025). Together, these perspectives indicate that ESG disclosure primarily operates through external information and stakeholder-related pathways, whereas green accounting may contribute through internal measurement and managerial decision processes, with both pathways conditioned by organizational capabilities and institutional circumstances.

Despite these theoretical connections, three interrelated research gaps remain. First, the evidence linking ESG disclosure to financial performance remains predominantly association-oriented, while the mechanisms through which sustainability practices generate economic benefits are insufficiently distinguished and evaluated. Prior research identifies potential pathways involving information asymmetry reduction, financing access, investment efficiency, digital transformation, green innovation, and operational efficiency (Chen & Xie, 2022; Ellili, 2022; Kim et al., 2024; Liu et al., 2025). However, not all proposed mechanisms have been directly tested as mediating or causal relationships, particularly in maritime firms. Distinguishing empirically examined mechanisms from theoretically inferred pathways is therefore necessary to avoid overstating the explanatory strength of existing evidence.

Second, green accounting remains insufficiently integrated into maritime ESG and financial performance research. Whereas ESG disclosure primarily communicates sustainability-related information to external stakeholders, green accounting encompasses internal approaches to identifying, measuring, allocating, and managing environmental costs. Environmental management accounting, environmental cost accounting, carbon accounting, and life-cycle costing provide related but conceptually distinct approaches to incorporating fuel consumption, emissions, resource losses, pollution prevention, and environmental liabilities into organizational decisions (Angelakoglou & Gaidajis, 2015; Mondello et al., 2023; Mondal et al., 2024). Cross-sector

meta-analytic evidence indicates a positive overall association between corporate green accounting and firm performance (Khan & Gupta, 2023). Nevertheless, direct maritime research remains more developed in environmental performance measurement, sustainability reporting, and operational sustainability than in examining how environmental cost recognition translates into financial outcomes. Consequently, the relationship between external ESG information and internal environmental accounting remains an important but underexplored dimension of maritime financial value creation.

Third, the boundary conditions and temporal characteristics of ESG-related financial outcomes remain insufficiently integrated into maritime-specific explanations. Evidence from emerging markets indicates that ESG–performance relationships may depend on disclosure quality, governance effectiveness, ownership structure, firm size, institutional development, and financial conditions (Arayssi et al., 2020; Alodat & Hao, 2025; Almulhim & Metwally, 2025; Attia & Almoneef, 2025). Studies employing nonlinear and distribution-sensitive approaches further suggest that sustainability-related financial benefits may vary across performance levels and organizational circumstances (Agarwala et al., 2024; Buallay et al., 2024; Soto et al., 2026). Temporal differences are also relevant because sustainability investments may generate immediate implementation costs while their operational and financial benefits emerge over longer periods. These issues are particularly important in maritime logistics, where asset longevity, environmental regulation, infrastructure investment, and differences between state-owned and privately operated organizations may influence the timing and realization of financial outcomes. However, direct maritime evidence concerning financing costs, ESG assurance, ownership heterogeneity, environmental cost recognition, and causal identification remains limited.

Against this background, this study conducts a critical integrative literature review to examine how ESG disclosure and green accounting may contribute to financial value creation in maritime logistics, through which mechanisms, under what organizational and institutional conditions, and across what time horizons. Specifically, the review aims to synthesize evidence on financial and operational outcomes, distinguish directly examined mechanisms from theoretically inferred pathways, evaluate the complementary functions of ESG disclosure and green accounting, and identify contextual factors that may explain heterogeneous findings. To address limitations in maritime-specific research, the synthesis draws on three differentiated evidence contexts: direct maritime studies, logistics-sector research, and relevant cross-sector evidence from emerging economies. This distinction is intended to clarify the applicability and limitations of existing findings rather than treat evidence from different industrial settings as interchangeable.

The study makes three intended contributions to maritime sustainability, accounting, and finance research. First, it advances a theoretically informed synthesis that connects externally oriented ESG disclosure with internally oriented environmental accounting and resource-allocation processes. Second, it develops an integrated conceptual framework linking these practices to potential financial value-creation

pathways while explicitly recognizing governance, ownership, disclosure quality, institutional conditions, and temporal dynamics as boundary conditions. Third, it identifies a maritime-oriented research agenda addressing environmental cost recognition, sustainability assurance, financing effects, nonlinear relationships, and causal identification. By shifting the analytical emphasis from whether ESG practices are associated with financial performance to how, when, and under what conditions financial value may emerge, the review seeks to provide a more differentiated foundation for future empirical research and evidence-informed managerial and policy decisions in maritime logistics.

2. METHODOLOGY

This study employed a critical integrative literature review to synthesize and critically evaluate research on ESG disclosure, green accounting, and financially relevant outcomes in maritime logistics. An integrative review was considered appropriate because the literature spans heterogeneous theoretical perspectives, research designs, geographical contexts, and measures of corporate performance, while the objective of this study is not merely to aggregate findings but to identify mechanisms, boundary conditions, and emerging research directions (Snyder, 2019; Whittemore & Knafl, 2005). A structured literature search was conducted using Scopus and Web of Science Core Collection, covering studies published from 2010 to September 2026. Search terms combined ESG-related concepts, including “ESG disclosure,” “ESG reporting,” “sustainability reporting,” “green accounting,” “environmental accounting,” and “carbon accounting,” with financial terms such as “financial performance,” “firm value,” “profitability,” “cost of debt,” and “cost of capital,” and sectoral terms including “maritime,” “shipping,” “port,” “terminal,” and “logistics.” Complementary searches incorporated “emerging markets,” “Middle East,” “MENA,” “GCC,” and “ASEAN” to capture contextual evidence relevant to regions where direct maritime studies remain limited. This broader contextual strategy was necessary because existing evidence shows that direct maritime-logistics studies, particularly those linking ESG or green accounting to financial outcomes, remain substantially less developed than cross-sector emerging-market research.

Peer-reviewed English-language journal articles were included when they provided theoretical or empirical evidence concerning ESG disclosure, sustainability reporting, green or environmental accounting, financial performance, firm value, financing costs, operational efficiency, or related value-creation mechanisms. Editorials, book reviews, non-peer-reviewed materials, and purely technical environmental studies without organizational, accounting, or financial implications were excluded. After deduplication, titles and abstracts were screened for relevance, followed by full-text assessment according to the predefined eligibility criteria. Data from the final studies were extracted into a structured matrix covering publication characteristics, geographical setting, maritime subsector, theoretical foundation, research design, ESG or green-accounting constructs, financial outcomes, mediating and moderating mechanisms, governance

and ownership factors, key findings, and limitations. The evidence was subsequently analyzed using thematic synthesis and cross-study comparison, with findings organized into antecedents, value-creation mechanisms, financial and operational outcomes, boundary conditions, and research gaps. Contradictory findings were interpreted in relation to disclosure quality, governance, ownership, firm characteristics, institutional maturity, and time horizon rather than through simple vote counting, because the existing literature demonstrates substantial heterogeneity in the ESG–financial performance relationship. This analytical process ultimately informed the development of an integrative framework explaining how ESG disclosure and green accounting may translate into financial value within maritime logistics and where the principal research frontiers remain.

3. RESULTS

3.1 Profile and Structure of the Reviewed Literature

Bagian pertama jangan langsung lompat ke “ESG berpengaruh positif”. Tampilkan dahulu bentuk evidence base-nya.

Table 1. Descriptive Profile of the Reviewed Literature

Dimension	Classification	Main Characteristics	Interpretation
Sector	Shipping	ESG/CSR, emissions, financial strategy, sustainability disclosure	Growing but still fragmented evidence
	Ports and terminals	Sustainability reporting, ESG disclosure, efficiency, firm value	Relatively stronger direct maritime evidence
	Logistics firms	ESG ratings, green logistics, digital transformation, efficiency	Strong mechanism-oriented evidence
	Cross-sector emerging markets	ESG disclosure, profitability, firm value, financing	Important contextual evidence
Geography	Asia	Logistics, shipping, ESG and green innovation	Strong representation
	Middle East/GCC	ESG disclosure and firm performance	Mostly cross-sector rather than maritime
	Europe/global	Shipping, ports, sustainability reporting	Broader sector evidence
Research design	Panel regression	ESG–performance association	Dominant empirical design
	GMM/FE/RE	Endogeneity and longitudinal effects	Stronger inferential evidence
	Quantile/threshold	Nonlinear ESG effects	Growing research stream
	Content/text analysis	Disclosure quality and materiality	Common in maritime reporting studies
Primary outcome	Profitability	ROA, ROE, efficiency	Generally favorable
	Market value	Tobin's Q, market-to-book	Mixed but often positive
	Financing	Cost of debt/capital	Promising but maritime evidence sparse
	Operational performance	Efficiency, innovation, scale	Consistently relevant

Existing maritime studies already span ports, shipping and logistics, but the evidence varies considerably in terms of outcomes and geographical coverage. Port studies have linked sustainability disclosure with firm valuation, while shipping research has examined CSR and financial performance, and more recent logistics studies have shifted toward mechanisms such as digital transformation and green innovation. Liu et

al. (2025), for example, identify digital transformation and green innovation as transmission channels connecting ESG ratings with the scale and operational efficiency of logistics firms.

3.2 Core Empirical Evidence on ESG and Financial Performance

Table 2. Representative Empirical Evidence on ESG and Financial Outcomes

Study	Context	ESG/Accounting Focus	Outcome	Main Evidence
Tsatsaronis et al. (2024)	Shipping	CSR/ESG-related practices	Financial performance	Positive association with shipping company performance
Gavalas (2024)	Ports and integrated carriers	ESG disclosure	Firm value	Positive relationship with valuation indicators
Hussain et al. (2024)	Saudi Arabia	ESG disclosure	ROA, ROE, Tobin's Q	Positive financial-performance effects
Kim et al. (2024)	Logistics	Green logistics	Financial efficiency	Green logistics linked to improved efficiency
Liu et al. (2025)	Listed logistics firms	ESG ratings	Scale and efficiency	Positive effect through digital and green innovation
Almarayeh (2025)	Developing economies	ESG ratings	Financial performance	Effects vary across measures and context
Abdullah et al. (2026)	GCC	ESG performance	Financial performance	Generally positive but heterogeneous
Arslan et al. (2026)	Maritime firms	ESG integration	Financial strategy	Distinct firm typologies and temporal variation
Khan & Gupta (2023)	Cross-sector meta-analysis	Green accounting	Firm performance	Positive aggregate relationship
Salsabila & Munari (2026)	Transport/logistics	Green accounting	Financial performance	Positive relationship reported

Gavalas focuses specifically on companies involved in port activities, while Tsatsaronis et al. (2024) examine CSR and corporate financial performance in shipping. More recent longitudinal work using 94 publicly listed maritime firms over 2013–2024 further suggests that ESG–financial relationships differ across strategic firm configurations rather than conforming to a single homogeneous pattern.

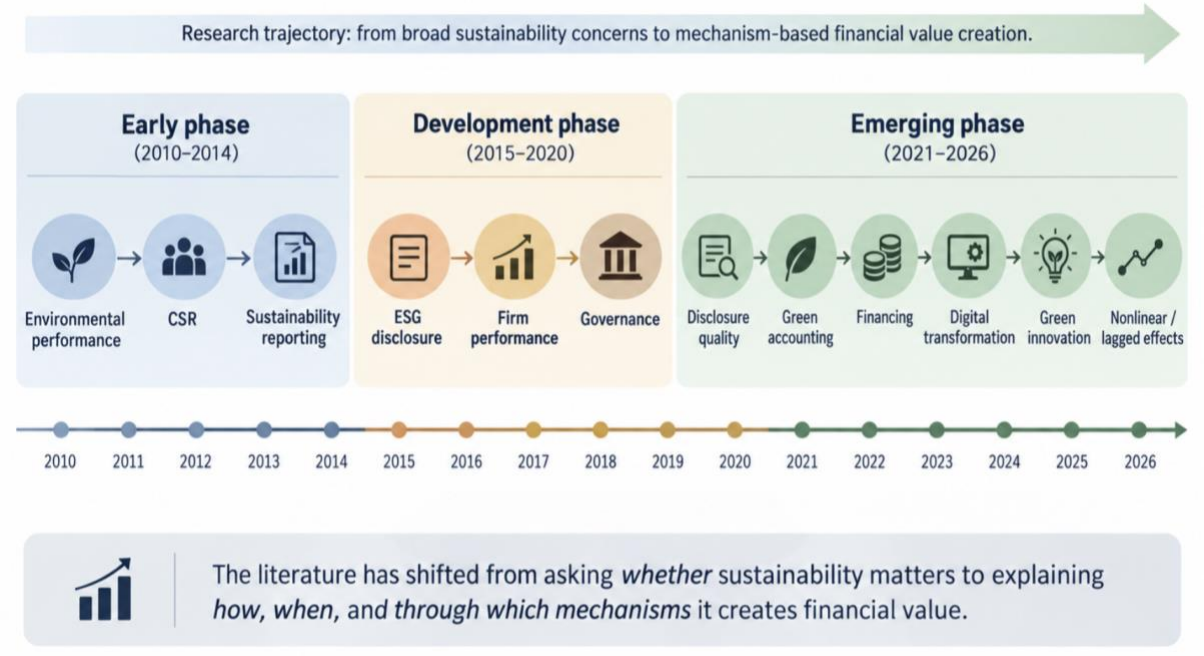


Figure 1. Evolution of ESG and Green Accounting Research in Maritime Logistics

3.3 Financial Outcomes: A Heterogeneous Value-Creation Pattern

Table 3. Synthesis of ESG and Green Accounting Outcomes

Outcome Domain	Predominant Evidence	Main Channel	Degree of Consistency	Key Limitation
ROA / profitability	Mostly positive	Efficiency, resource allocation	Relatively strong	Short observation periods
ROE	Positive to mixed	Profitability and capital use	Moderate	Limited maritime-specific evidence
Tobin's Q	Positive to mixed	Investor valuation	Moderate	Market recognition may lag
Market-to-book	Mostly positive in port evidence	Reputation and investor confidence	Moderate	Few direct studies
Cost of debt	Generally favorable outside maritime	Reduced information asymmetry	Moderate	Direct maritime tests scarce
Cost of capital	Potentially lower	Transparency and liquidity	Moderate	Mixed regional evidence
Operational efficiency	Mostly positive	Green logistics, digitalization	Strong	Financial translation not always tested
Innovation	Positive	Digital and green innovation	Emerging	Concentrated in logistics studies
Risk	Potential reduction	Governance and information credibility	Emerging	Measurement heterogeneity

This pattern suggests that the economic consequences of ESG should not be compressed into a single measure of "financial performance." Accounting returns, market valuation, financing conditions, and operational efficiency represent different stages of value realization. Several studies in the reviewed material show stronger effects on internal profitability and efficiency than on market valuation or debt-related outcomes, suggesting that capital-market recognition can lag internal improvements.

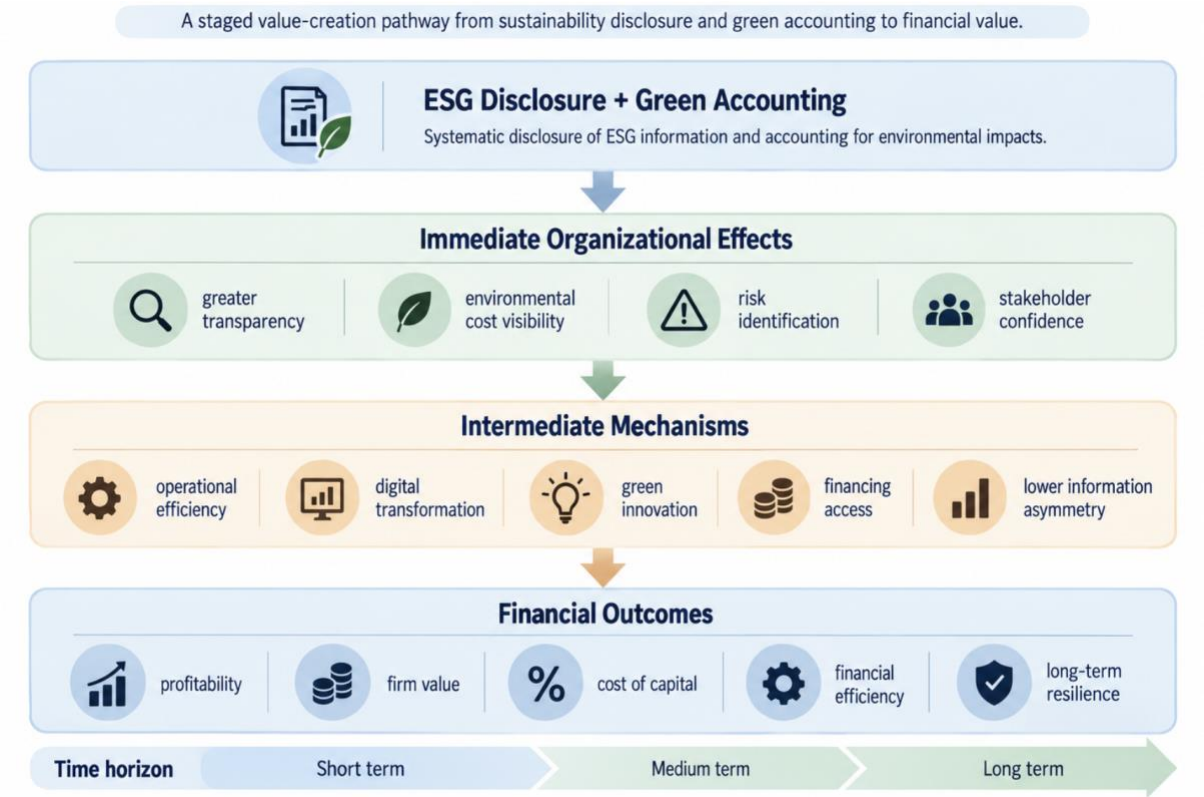


Figure 2. Financial Value Realization Pathway of ESG in Maritime Logistics

3.4 Value-Creation Mechanisms

Table 4. Mechanisms Linking ESG and Green Accounting to Financial Value

Mechanism	ESG/Green Accounting Function	Intermediate Effect	Expected Financial Consequence	Evidence Status
Information asymmetry reduction	Improves transparency	Better investor information	Lower financing friction	Strong contextual evidence
Stakeholder legitimacy	Signals sustainability commitment	Reputation and trust	Firm-value benefits	Moderate
Environmental cost visibility	Identifies hidden environmental costs	Better cost allocation	Higher efficiency/profitability	Strong conceptual, limited maritime evidence
Digital transformation	ESG stimulates process digitalization	Better operational coordination	Efficiency and scale gains	Emerging strong evidence
Green innovation	Encourages sustainable innovation	Technology and process improvements	Productivity and long-term value	Emerging
Financing access	Improves perceived sustainability quality	Greater lender/investor confidence	Lower cost of capital	Moderate
Risk management	Improves identification and governance	Reduced operational/regulatory exposure	More stable financial outcomes	Emerging
Resource efficiency	Links sustainability with operating decisions	Lower fuel/waste/resource use	Margin improvements	Strong operational evidence

The financing literature provides one of the clearer cross-sector channels: better climate, carbon and ESG disclosure has been associated with lower debt or capital costs across several emerging-market contexts, although contradictory findings remain and direct maritime tests are still scarce. Meanwhile, Khan and Gupta's meta-analysis of 68 independent studies finds a positive aggregate association between corporate green accounting and firm performance, with stronger results when environmental costs are explicitly measured.

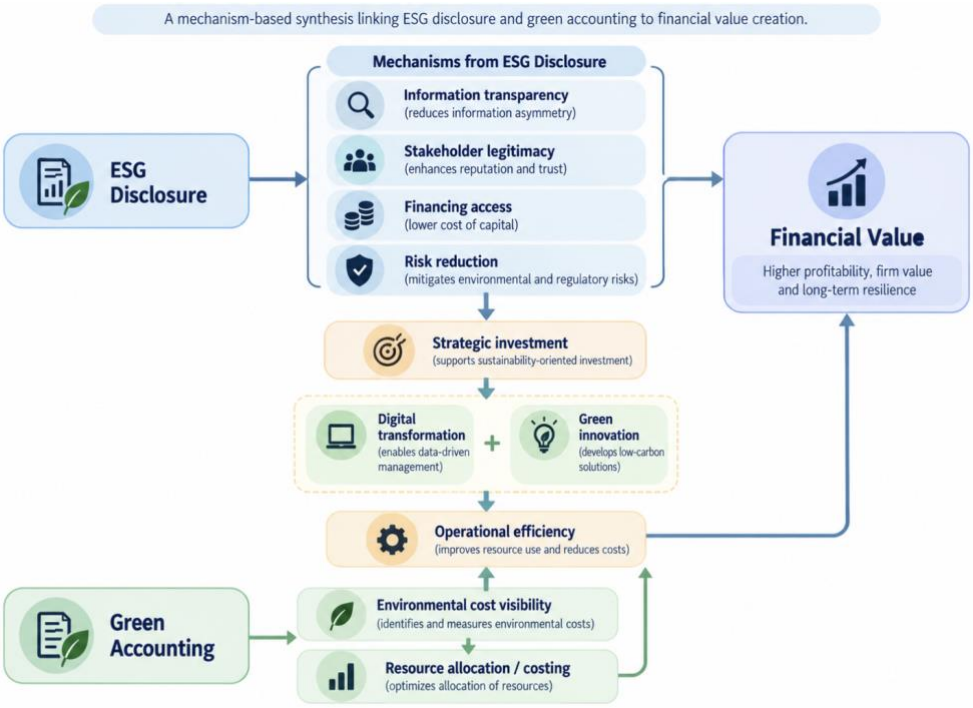


Figure 3. Mechanism Map: From ESG Disclosure to Financial Value

3.5 Green Accounting and Environmental Cost Recognition

Table 5. Green Accounting Instruments and Their Relevance to Maritime Logistics

Accounting Instrument	What It Captures	Maritime Application	Potential Financial Contribution	Current Evidence
Environmental Management Accounting	Physical and monetary environmental flows	Fuel, waste, emissions management	Cost control and efficiency	Limited direct maritime evidence
Environmental Cost Accounting	Prevention, remediation and environmental costs	Pollution and compliance costs	More accurate profitability assessment	Underexplored
Carbon Accounting	Carbon emissions and associated costs	Vessel and port emissions	Carbon-risk and investment decisions	Growing
Life-Cycle Costing	Costs over asset/product lifecycle	Ships, terminals, alternative fuels	Long-term investment appraisal	Relevant but fragmented
Material Flow Cost Accounting	Material/resource losses	Fuel and operational resources	Waste reduction and efficiency	Rare in maritime literature
Sustainability Accounting	Integrated financial/non-financial measures	Ports and logistics operators	Strategic performance evaluation	Emerging

reen accounting is therefore one of the clearest areas where the conceptual case is considerably more developed than direct maritime empirical evidence. The reviewed studies emphasize environmental management accounting, lifecycle costing and carbon accounting as tools for identifying environmental costs, but maritime applications more often measure emissions and environmental efficiency than accounting recognition itself.

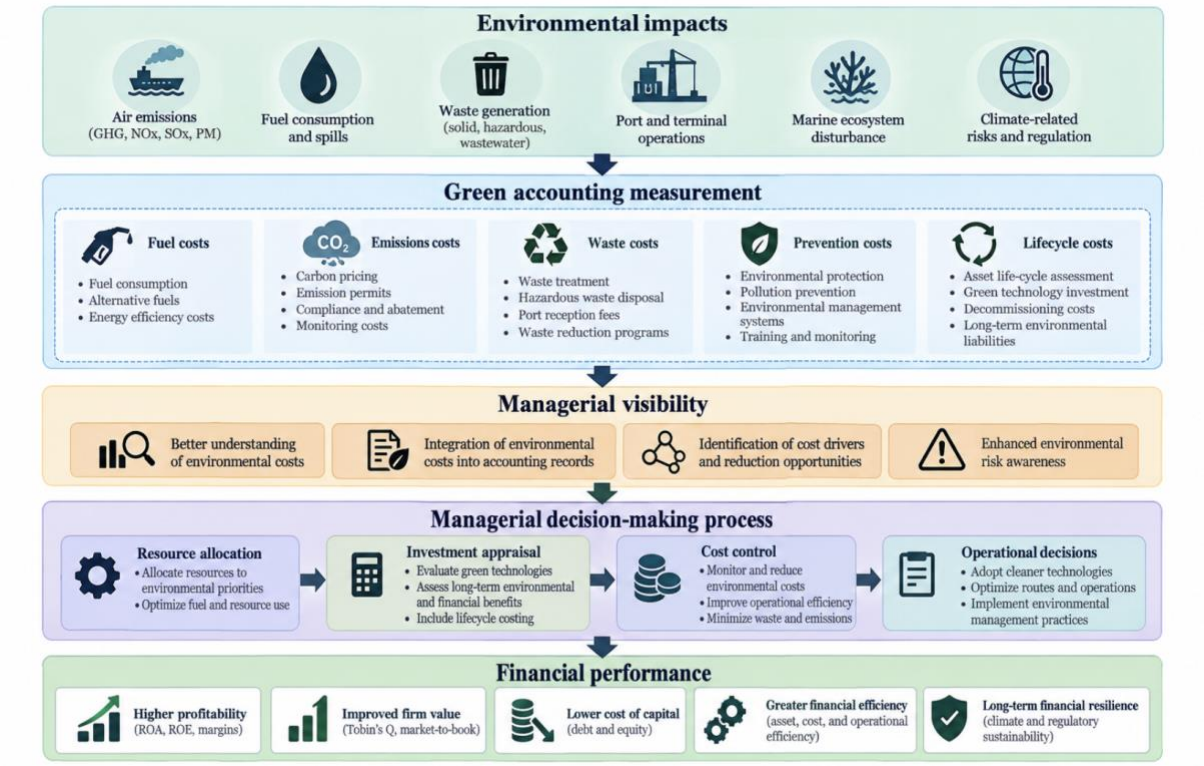


Figure 4. Green Accounting–Financial Performance Conversion Model

3.6 Boundary Conditions: Why ESG Does Not Produce Uniform Outcomes

Table 6. Boundary Conditions Shaping ESG–Financial Performance Relationships

Boundary Condition	Expected Role	Evidence Pattern	Maritime Relevance
Disclosure quality	Strengthens information credibility	Generally positive	Very high

Boundary Condition	Expected Role	Evidence Pattern	Maritime Relevance
Third-party assurance	Improves reliability	Underexplored	High
Board independence	Improves monitoring	Generally positive	High
Sustainability committee	Strengthens ESG governance	Mostly supportive	High
Audit quality	Improves disclosure credibility	Positive/moderating	High
Family ownership	May strengthen long-term orientation	Context dependent	Understudied
State ownership	Mixed incentive structures	Mixed/negative in some settings	Very high for ports
Foreign ownership	Often improves transparency	Generally positive	Relevant
Firm size	More resources for ESG systems	Mostly positive, nonlinear possible	High
Institutional maturity	Determines market recognition	Strong contextual influence	Very high
ESG adoption maturity	Determines cost–benefit timing	Lagged effects likely	High
Firm profitability	May alter ESG valuation effects	Nonlinear/threshold evidence	High

Governance characteristics consistently emerge as important disclosure determinants, while ownership effects remain heterogeneous. In particular, this matters for maritime logistics because state-owned ports, sovereign-linked carriers, family firms and private logistics firms can face very different disclosure incentives.

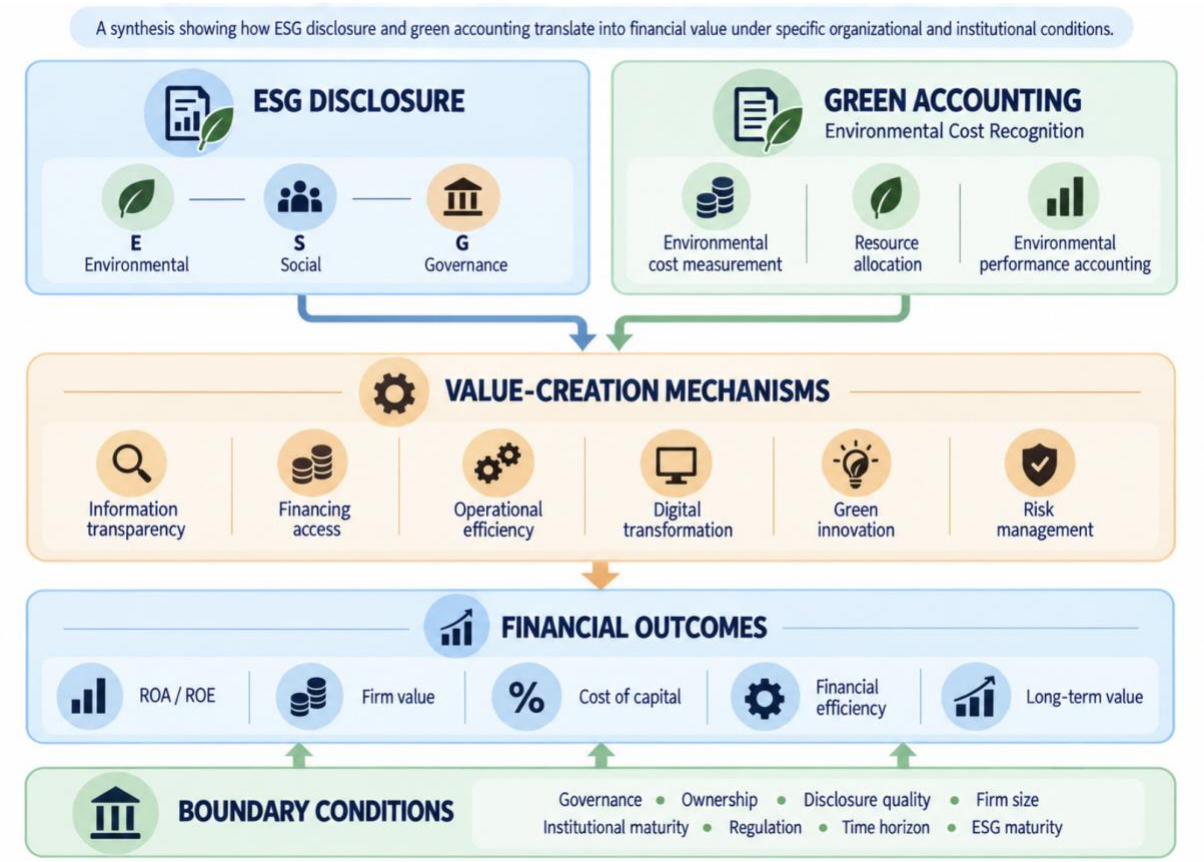


Figure 5. Integrated Conceptual Framework of ESG Financial Value Creation

3.7 Contradictory Evidence and ESG Performance Paradox

Table 7. Explaining Contradictory ESG–Financial Performance Findings

Observed Finding	Possible Explanation	Interpretation
ESG improves ROA but not market value	Internal benefits emerge before market recognition	Temporal lag
ESG disclosure shows insignificant effects	Disclosure may lack credibility or materiality	Quality–quantity problem
ESG initially reduces profitability	Implementation and transition costs	Short-term cost effect
High ESG does not always maximize valuation	Threshold/nonlinear relationship	Diminishing or conditional returns

Observed Finding	Possible Explanation	Interpretation
Strong firms gain more from ESG	Complementary organizational resources	Capability dependence
Weak firms show limited benefit	Insufficient resources to exploit ESG	Resource constraint
Governance pillar produces inconsistent results	Institutional differences	Context dependency
Green practices improve efficiency but not profits	Benefits captured operationally before financially	Outcome mismatch

This table is especially important because the literature explicitly reports nonlinear and threshold effects. ESG disclosure can reduce valuation error overall while producing different outcomes across ESG levels and profitability conditions, and some evidence indicates that sustainability "leaders" do not always dominate lower-disclosure firms on every financial outcome.

4. DISCUSSION

The findings indicate that ESG disclosure and green accounting contribute to financial value in maritime logistics through a multi-stage value-creation process rather than a simple direct relationship. Across ports, shipping, logistics, and comparable emerging-market firms, ESG disclosure is generally associated with stronger profitability, firm value, and operational efficiency, although the magnitude of these effects varies across financial measures and institutional settings (Gavalas, 2024; Tsatsaronis et al., 2024; Hussain et al., 2024; Abdullah et al., 2026; Awwad et al., 2026). More importantly, the synthesis suggests that financial benefits emerge through mechanisms including lower information asymmetry, improved stakeholder confidence, better access to finance, risk reduction, digital transformation, green innovation, and operational efficiency rather than through disclosure alone (Chen & Xie, 2022; Zhang & Lucey, 2022; Ellili, 2022; Kim et al., 2024; Liu et al., 2025). Chen and Xie (2022), for example, demonstrate that ESG-oriented investors influence the ESG disclosure–financial performance relationship, while Liu et al. (2025) identify digital transformation and green innovation as mechanisms through which ESG ratings enhance logistics-firm development. Green accounting complements these externally oriented disclosure mechanisms by converting environmental impacts into financially relevant information through environmental management accounting, carbon accounting, environmental cost accounting, and life-cycle costing. Meta-analytic evidence indicates a positive association between corporate green accounting and firm performance, with stronger effects when environmental costs are explicitly incorporated into measurement systems (Khan & Gupta, 2023), while logistics and transport studies similarly associate environmental cost integration and green practices with financial and operational improvements (Agyabeng-Mensah et al., 2020; Salsabila & Munari, 2026; Zainudin et al., 2026). These findings support the integrated pathways proposed in Figures 2–5, in which ESG disclosure primarily increases external information credibility, green accounting strengthens internal environmental-cost visibility, and both feed into managerial and

organizational mechanisms before producing profitability, firm value, financial efficiency, financing benefits, and longer-term resilience.

Nevertheless, the evidence does not support a universal proposition that more ESG disclosure necessarily generates better financial performance; rather, the relationship appears conditional, nonlinear, and temporally heterogeneous. Studies from emerging markets report positive, insignificant, and occasionally negative relationships depending on the financial outcome examined, disclosure credibility, reporting maturity, firm characteristics, and institutional setting (Firmansyah et al., 2023; Narula et al., 2024; Almarayeh, 2025; Moharram et al., 2026; Yolanda et al., 2026). Governance quality further conditions this relationship because board independence, sustainability committees, audit quality, gender diversity, and ownership structure can influence both the credibility of sustainability disclosure and firms' capacity to convert ESG commitments into economic outcomes (Arayssi et al., 2020; Alodat & Hao, 2025; Attia & Almoneef, 2025; Almulhim & Metwally, 2025; Ellili, 2023). Evidence of threshold and nonlinear effects also indicates that ESG benefits may emerge only after firms achieve sufficient reporting quality, organizational maturity, or sustained implementation, while stronger internal performance may precede capital-market recognition (Jadhav et al., 2022; Wen et al., 2022; Agarwala et al., 2024; Arslan et al., 2026). This interpretation helps reconcile contradictory findings and positions governance, ownership, disclosure quality, firm size, regulation, institutional maturity, ESG maturity, and time horizon as substantive boundary conditions, as represented in Figure 5. The principal research gap therefore lies less in repeatedly testing whether ESG affects financial performance and more in establishing which mechanisms operate, under what conditions, and with what temporal sequence. This issue is particularly acute in maritime logistics because direct evidence on environmental cost recognition, ESG assurance, cost of capital, ownership heterogeneity, and causal relationships remains limited, especially for Middle Eastern and GCC shipping, port, and terminal firms (Andrikopoulos, 2026; Merika & Syriopoulos, 2026; Li et al., 2026; Arslan et al., 2026). Accordingly, future research should combine longitudinal or quasi-experimental designs with maritime-specific operating measures and accounting data to determine whether the pathways identified in this review represent genuine mechanisms of financial value creation rather than correlations associated with firms that already possess stronger resources, governance, or sustainability capabilities.

5. CONCLUSION

This review demonstrates that ESG disclosure and green accounting should be understood as complementary components of a broader financial value-creation architecture in maritime logistics rather than as isolated sustainability practices. ESG disclosure primarily enhances external transparency, stakeholder confidence, information quality, and access to capital, whereas green accounting strengthens internal environmental-cost visibility and supports more informed resource allocation

and investment decisions. Their financial consequences emerge through interconnected mechanisms involving information-asymmetry reduction, financing access, operational efficiency, digital transformation, green innovation, and risk management, ultimately influencing profitability, firm value, financial efficiency, cost of capital, and long-term organizational resilience. However, the synthesis also demonstrates that these relationships are not universally positive or linear. Financial outcomes depend substantially on disclosure quality, governance arrangements, ownership structure, firm size, institutional maturity, regulatory conditions, ESG implementation maturity, and time horizon. Accordingly, apparently contradictory findings across previous studies may reflect different organizational and institutional configurations rather than an inherently inconsistent ESG–performance relationship.

The principal contribution of this review is therefore to shift maritime sustainability research beyond the conventional question of whether ESG improves financial performance toward a mechanism-based explanation of how, when, and under what conditions sustainability practices create financial value. The proposed framework integrates external ESG disclosure with internal environmental accounting processes while explicitly incorporating value-creation mechanisms and boundary conditions. Nevertheless, substantial research opportunities remain. Direct maritime evidence is still limited regarding environmental cost recognition, third-party ESG assurance, financing costs, ownership heterogeneity, nonlinear effects, and causal relationships, particularly among shipping companies, port operators, terminals, and logistics firms in Middle Eastern and GCC markets. Future studies should therefore employ longitudinal and quasi-experimental designs, distinguish disclosure quantity from credibility and assurance, operationalize green accounting through environmental management accounting and lifecycle-cost measures, and integrate financial indicators with maritime-specific operating metrics such as fuel efficiency, emissions intensity, asset utilization, and terminal turnaround performance. Such developments would enable the field to move from documenting ESG associations toward establishing the mechanisms through which sustainability becomes a durable source of financial and strategic value.

Author Contributions

A.M.A: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Acknowledgement

The authors received no specific funding or external financial support for the research, authorship, and/or publication of this article.

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