

Linkages between Environmental, Social, and Governance Practices and Financial Performance in the Indian Electronics Industry: A Review and Conceptual Framework

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Abstract

The relationship between environmental, social, and governance (ESG) practices and corporate financial performance (CFP) has been one of the most extensively debated questions in management and finance research for over four decades, yet the evidence remains fragmented for emerging economies and virtually unexamined for individual manufacturing sectors within them. This chapter reviews the theoretical and empirical literature on the ESG–CFP relationship and situates it within the Indian electronics industry, a sector experiencing extraordinary policy-led growth while simultaneously confronting acute sustainability challenges relating to electronic waste, energy and resource intensity, labour conditions in assembly operations, and evolving disclosure obligations. Drawing on stakeholder theory, the natural-resource-based view, legitimacy and institutional theories, and agency-theoretic counterarguments, the chapter synthesises evidence from global meta-analyses and Indian empirical studies, identifies mechanisms and boundary conditions that shape the ESG–CFP linkage, and highlights measurement and endogeneity concerns that qualify existing findings. The review reveals a pronounced gap: despite the electronics sector's scale and its distinctive ESG risk profile, sector-specific evidence on whether and how ESG practices translate into financial outcomes in Indian electronics firms is scarce. The chapter therefore develops an integrative conceptual framework in which institutional and stakeholder pressures drive the adoption of ESG practices, whose financial consequences are transmitted through mediating mechanisms—operational efficiency, reputation and legitimacy, innovation, employee productivity, financing advantages, and risk mitigation—and conditioned by firm-level and industry-level moderators. Eight research propositions are advanced and formalised into testable hypotheses, and a positivist, deductive, longitudinal panel research design covering variables, data sources, and model specifications is set out to guide the empirical work in journals.

Keywords: ESG; corporate financial performance; Indian electronics industry; sustainability; BRSR; stakeholder theory; conceptual framework

1. Introduction

1.1 Background and Motivation

Few questions in the management and finance literature have attracted as much sustained attention as whether it “pays to be good.” Since the formative debates between shareholder-primacy advocates (Friedman, 1970) and proponents of broader corporate social responsibility (Carroll, 1979; Freeman, 1984), scholars have produced thousands of empirical studies examining whether corporate investments in environmental stewardship, social responsibility, and sound governance are rewarded, penalised, or ignored by markets and reflected in accounting performance. Aggregating more than 2,000 primary studies, Friede, Busch, and Bassen (2015) concluded that roughly 90 per cent report a non-negative ESG–CFP relationship, with a clear majority documenting positive associations. A subsequent aggregation of more than 1,000 studies published between 2015 and 2020 similarly found positive results in the majority of corporate-performance studies, alongside evidence that ESG investing provides downside protection during crises (Whelan, Atz, Van Holt, & Clark, 2021; Atz, Van Holt, Liu, & Bruno, 2023). Yet the same literature contains persistent pockets of negative and null findings (Brammer, Brooks, & Pavelin, 2006; Duque-Grisales & Aguilera-Caracuel, 2021), evidence of non-linearities (Barnett & Salomon, 2012), and serious concerns about measurement validity and endogeneity (Berg, Kölbel, & Rigobon, 2022; McWilliams & Siegel, 2000). The relationship, in short, is contingent rather than universal, and understanding the contingencies—country, industry, mechanism, and measurement has become the central task of contemporary ESG research (Gillan, Koch, & Starks, 2021).

Three observations motivate the present review. First, the overwhelming majority of ESG–CFP evidence derives from developed markets; emerging-economy evidence is thinner, more recent, and more mixed, reflecting weaker enforcement institutions, concentrated (often family or promoter) ownership, and different stakeholder configurations (Aydoğmuş, Gülay, & Ergun, 2022; Duque-Grisales & Aguilera-Caracuel, 2021). Second, within India, the empirical literature has grown rapidly following the mandating of corporate social responsibility spending under Section 135 of the Companies Act 2013 and the introduction of Business Responsibility and Sustainability Reporting (BRSR) by the Securities and Exchange Board of India (SEBI), but it remains dominated by economy-wide samples of NIFTY or BSE index constituents, with little sectoral disaggregation (Chelawat & Trivedi, 2016; Dalal & Thaker, 2019; Shobhwani & Lodha, 2023; Desai, 2024). Third, the Indian electronics industry has become a strategic pillar of national industrial policy—domestic electronics production has grown roughly sevenfold in the past decade, from about ₹1.90 lakh crore in 2014–15 to approximately ₹13.11 lakh crore in 2025–26, with exports exceeding ₹4 lakh crore and smartphones emerging as India’s single largest export commodity (Press Information Bureau [PIB], 2025), while simultaneously facing an ESG risk profile that is unusually intense: India is now the world’s third-largest generator of electronic waste (Baldé et al., 2024), assembly-intensive manufacturing has drawn scrutiny over labour and dormitory conditions, and the sector’s integration into global value chains subjects Indian suppliers to the sustainability codes of multinational buyers. Whether, how, and under what conditions ESG practices contribute to the financial performance of firms in this industry is therefore a question of considerable academic and practical significance and one on which direct evidence is almost entirely lacking.

1.2 Objectives of the Chapter

Against this backdrop, the chapter pursues four objectives: (i) to profile the Indian electronics industry and its distinctive sustainability context; (ii) to review the theoretical perspectives that predict positive, negative, or contingent ESG–CFP relationships; (iii) to synthesise global and Indian empirical evidence,

with attention to mechanisms, moderators, and measurement problems; and (iv) to integrate these strands into a conceptual framework, accompanied by testable propositions and hypotheses, tailored to the Indian electronics sector; and (v) to translate the framework into a research design and methodology for the empirical chapters that follow.

1.3 Review Approach

The chapter adopts a narrative–integrative review approach (Snyder, 2019). Literature was identified through structured searches of Scopus, Web of Science, and Google Scholar using combinations of the terms “ESG,” “environmental social governance,” “corporate social responsibility,” “sustainability,” “financial performance,” “firm value,” “India,” and “electronics,” supplemented by backward and forward citation tracking from landmark reviews and meta-analyses (Friede et al., 2015; Gillan et al., 2021; Whelan et al., 2021). Priority was given to peer-reviewed journal articles, influential meta-analyses, and, for the institutional context, primary regulatory documents of SEBI, the Ministry of Corporate Affairs, and the Ministry of Environment, Forest and Climate Change, together with official production and policy statistics. Because the objective is conceptual synthesis rather than effect-size estimation, the review is integrative rather than strictly systematic, though the search process was conducted with systematic intent.

1.4 Organisation of the Chapter

Section 2 profiles the Indian electronics industry and its sustainability challenges. Section 3 traces the conceptual evolution of ESG. Section 4 examines the theoretical foundations of the ESG–CFP linkage. Section 5 reviews the empirical evidence: global, emerging-market, and Indian. Section 6 analyses mediating mechanisms, moderating conditions, and measurement issues. Section 7 maps India’s regulatory and institutional landscape. Section 8 distills the research gaps. Section 9 presents the conceptual framework and propositions. Section 10 translates the framework into a research design and methodology, including formal hypotheses, and Sections 11 to 13 discuss implications, limitations, and conclusions.

2. The Indian Electronics Industry: Growth, Policy, and Sustainability Context

2.1 Scale and Strategic Importance

The electronics industry occupies a central position in India’s manufacturing ambitions. Domestic electronics production rose from approximately ₹1.90 lakh crore in 2014–15 to about ₹11.32 lakh crore in 2024–25 and an estimated ₹13.11 lakh crore in 2025–26, while electronics exports grew from roughly ₹38,000 crore to over ₹4 lakh crore across the same period (PIB, 2025). Mobile handset manufacturing has been the flagship of this transformation: whereas only about a quarter of phones sold in India in 2014–15 were domestically produced, by the end of 2024 over 99 per cent were “made in India,” and the country now supports an annual capacity in excess of 300 million handsets across more than 300 manufacturing units (PIB, 2025). The sector’s industrial structure spans mobile and consumer electronics assembly, electronics manufacturing services (EMS), components and sub-assemblies, industrial and automotive electronics, IT hardware, and an emerging semiconductor fabrication and packaging ecosystem.

This growth is heavily policy-led. The Production Linked Incentive (PLI) scheme for large-scale electronics manufacturing (2020) linked fiscal incentives to incremental production and investment; complementary schemes cover IT hardware, components, and semiconductors. The Semicon India programme (2021), with an outlay of ₹76,000 crore, and subsequent approvals of major fabrication and assembly-test projects, aim to build an end-to-end semiconductor value chain (PIB, 2025). The industry is also deeply embedded in global value chains (GVCs): global brands and their contract manufacturers Apple’s supplier ecosystem, Samsung, Dixon Technologies, Foxconn, Amar, Epack, Goodworth, Tata

Electronics, and others anchor much of the export growth, which means that the sustainability requirements of global buyers propagate directly into Indian operations through supplier codes of conduct and audit regimes such as those of the Responsible Business Alliance.

2.2 The Sector's ESG Risk Profile

Three features make the electronics sector an especially consequential setting for ESG research in India.

Environmental dimension. Electronics manufacturing is energy-, water-, and chemicals-intensive, and its products generate one of the fastest-growing waste streams in the world. The Global E-waste Monitor estimates that the world generated 62 million tonnes of e-waste in 2022, of which less than a quarter was formally collected and recycled; India ranks third globally in e-waste generation, behind only China and the United States, with the overwhelming share historically processed by the informal sector under hazardous conditions (Baldé et al., 2024). The E-Waste (Management) Rules, 2022, which took effect in April 2023, restructured India's extended producer responsibility (EPR) regime around tradeable EPR certificates issued through a centralised portal of the Central Pollution Control Board, imposing progressively rising recycling targets on producers (Ministry of Environment, Forest and Climate Change, 2022). For electronics firms, environmental practice is thus not peripheral philanthropy but a core regulatory and operational issue with direct cost and compliance implications.

Social dimension. The labour-intensive assembly segments of the industry employ large, young, increasingly female workforces, often housed in dormitory arrangements near industrial clusters. Episodes such as the worker unrest at Wistron's Narasapura plant (2020), the food-safety-related protests and temporary closure at Foxconn's Sriperumbudur facility (2021), and continuing civil-society scrutiny of dormitory labour regimes for women migrant workers illustrate the sector's exposure to social risk (Business & Human Rights Resource Centre, 2024). Because these operations sit inside the supply chains of reputationally sensitive global brands, social failures translate quickly into order losses, remediation costs, and production stoppages-tightening the plausible linkage between social practice and financial outcomes.

Governance dimension. The Indian corporate landscape is characterised by concentrated promoter ownership, business-group affiliation, and, in electronics specifically, a mix of listed Indian firms (e.g., Dixon Technologies, Amber Enterprises, Havells, Voltas), subsidiaries of foreign multinationals, and unlisted contract manufacturers. Governance quality-board independence, audit rigour, related-party transaction oversight, and disclosure practices-varies widely, and the top listed firms are now subject to BRSR and, progressively, BRSR Core assurance requirements (SEBI, 2021, 2023).

2.3 Why Sector-Specific Analysis Matters

Industry context conditions both the salience of particular ESG issues and the strength of the ESG-CFP relationship: environmental performance is more material in resource and pollution-intensive industries, social performance in labour and consumer-facing ones (Khan, Serafeim, & Yoon, 2016). Pooling electronics firms with banks, software exporters, and cement producers, as most Indian ESG studies implicitly do, averages away precisely the materiality-driven variation that theory predicts. A sector-focused review and framework is therefore not a narrowing of the question but a sharpening of it.

3. Conceptualising ESG: Evolution and Dimensions

3.1 From CSR to Triple Bottom Line to ESG

The intellectual lineage of ESG runs through several overlapping constructs. Corporate social responsibility (CSR) research, formalised in Carroll's (1979) four-part model of economic, legal, ethical,

and discretionary responsibilities, initially framed the question as one of business ethics and societal expectations. Elkington's (1997) "triple bottom line" reframed it in accounting terms-people, planet, profit-while the corporate social performance and corporate sustainability literatures supplied measurement architectures. The specific term "ESG" gained currency with the 2004 UN Global Compact report *Who Cares Wins* and the 2006 launch of the Principles for Responsible Investment, which repositioned environmental, social, and governance factors as investment-relevant information rather than ethical add-ons (Gillan et al., 2021). The decisive shift embedded in the ESG construct is thus its investor orientation: ESG factors matter, on this view, because they are financially material-predictive of risk and return-rather than merely normatively desirable.

3.2 The Three Pillars in an Electronics Context

Environmental (E) practices encompass energy efficiency and renewable procurement, greenhouse-gas management, water stewardship, hazardous-substance management, product eco-design, and-centrally for electronics-e-waste collection, recycling, and circular-economy initiatives under EPR obligations.

Social (S) practices cover occupational health and safety, wages and working hours, contract and migrant labour management, dormitory conditions, workforce skilling, diversity (notably the rapid feminisation of assembly workforces), community engagement and mandated CSR spending, product safety, and responsible supply-chain management including conflict-minerals due diligence.

Governance (G) practices include board composition and independence, separation of ownership and control in promoter-dominated firms, audit and internal-control quality, executive compensation, business ethics and anti-corruption programmes, cybersecurity and data governance, and the quality and assurance of sustainability disclosure itself.

3.3 Distinguishing Practices, Performance, and Disclosure

A recurring source of confusion in the literature is the conflation of ESG practices (what firms do), ESG performance (measured outcomes, typically proxied by third-party ratings), and ESG disclosure (what firms report). The three are related but distinct: disclosure can outrun practice (greenwashing), ratings diverge sharply across providers for the same firm (Berg et al., 2022; Christensen, Serafeim, & Sikochi, 2022), and mandated reporting regimes such as BRSR alter disclosure without necessarily altering practice. Empirical findings depend materially on which construct is measured, a point developed in Section 6.3.

4. Theoretical Foundations of the ESG–CFP Linkage

No single theory governs the ESG–CFP relationship; rather, competing and complementary lenses predict positive, negative, or conditional linkages. Six perspectives dominate the literature.

4.1 Stakeholder Theory

Stakeholder theory (Freeman, 1984; Donaldson & Preston, 1995) holds that firm value is created through relationships with customers, employees, suppliers, communities, and regulators, not shareholders alone. ESG practices function as investments in stakeholder relationships that yield reciprocal benefits-employee effort and retention, customer loyalty, supplier reliability, regulatory goodwill-and reduce the likelihood of value-destroying conflict. In the electronics sector, where production depends on large semi-skilled workforces and on the continued confidence of global buyers, the instrumental-stakeholder prediction of a positive ESG–CFP link is particularly plausible: worker unrest halts assembly lines, and buyer codes make stakeholder treatment a condition of order flow.

4.2 Resource-Based and Natural-Resource-Based Views

The resource-based view attributes sustained competitive advantage to valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Hart's (1995) natural-resource-based view (NRBV) extends this to environmental strategy, arguing that capabilities in pollution prevention, product stewardship, and sustainable development are path-dependent, socially complex, and hence sources of advantage (Hart & Dowell, 2011). For electronics manufacturers, capabilities in eco-design, closed-loop recycling under EPR, and energy-efficient operations are costly to imitate and can lower input costs while opening access to sustainability-conscious buyers-predicting a positive, capability-mediated ESG–CFP relationship.

4.3 Legitimacy and Institutional Theories

Legitimacy theory views ESG activity and disclosure as means of maintaining congruence between corporate behaviour and societal expectations (Suchman, 1995); institutional theory emphasises coercive, normative, and mimetic pressures that drive convergence on legitimated practices (DiMaggio & Powell, 1983). These lenses are especially apposite in India's current conjuncture, where coercive pressures (Section 135 CSR mandate, BRSR, E-Waste Rules), normative pressures (professionalisation of sustainability functions, ICAI assurance standards), and mimetic pressures (benchmarking against global electronics leaders) jointly push ESG adoption. Legitimacy-driven adoption may, however, be decoupled from substantive practice, predicting weaker financial effects for symbolic than for substantive ESG (Aouadi & Marsat, 2018).

4.4 Agency Theory and the Shareholder-Primacy Critique

The classical objection holds that ESG spending beyond legal requirements diverts shareholder wealth to managers' pet causes or private reputational benefits (Friedman, 1970; Jensen & Meckling, 1976). On this "agency view," ESG expenditure is an agency cost, predicting a negative ESG–CFP relationship, particularly where governance is weak enough to permit managerial discretion. In promoter-controlled Indian firms the standard agency conflict is transposed: the salient risk is expropriation of minority shareholders by controlling families, and mandated CSR or ESG spending may be channelled toward promoter-affiliated trusts, weakening the practice–performance link. Agency theory thus supplies both the principal counter-hypothesis and a rationale for governance quality as a moderator.

4.5 Slack Resources and Virtuous Cycles

The direction of causality is contested. The slack-resources hypothesis holds that superior financial performance generates discretionary resources that are then allocated to ESG, reversing the causal arrow; the good-management hypothesis holds that ESG and financial performance are jointly produced by managerial quality. Waddock and Graves (1997) found evidence for both, describing a "virtuous circle." Any credible framework must therefore accommodate bidirectionality, and any credible empirical design must address it (Section 6.3).

4.6 The Porter Hypothesis and Win–Win Contingency

Porter and van der Linde (1995) argued that well-designed environmental regulation can trigger innovation offsets that fully or partially compensate compliance costs. India's EPR-certificate regime under the 2022 E-Waste Rules is a quasi-market instrument of precisely the kind the hypothesis contemplates; whether it stimulates innovation in recycling technology and reverse logistics among Indian electronics firms-or merely adds compliance cost-is an open empirical question with direct bearing on the E-pillar's financial consequences.

4.7 Synthesis

The theories converge on a contingency view: ESG practices are most likely to enhance financial perform-

ance when they build genuine capabilities (NRBV), address material stakeholder interests (stakeholder theory and materiality), secure legitimacy under strong institutional pressure (legitimacy/institutional theory), and are disciplined by sound governance (agency theory)-and least likely to do so when they are symbolic, immaterial, or agency-driven. This synthesis underpins the framework in Section 9.

5. Empirical Evidence on the ESG–CFP Relationship

5.1 Global Meta-Analytic Evidence

The meta-analytic record is now extensive. Orlitzky, Schmidt, and Rynes (2003), synthesising 52 studies, reported a positive average correlation between corporate social/environmental performance and CFP, stronger for accounting-based than market-based measures and partially mediated by reputation. Margolis and Walsh (2003), reviewing 127 studies, found a preponderance of positive results but flagged pervasive methodological weakness. Friede et al. (2015), aggregating more than 2,000 studies through second-order meta-analysis, reported that about 90 per cent of studies found a non-negative relation, with the positive share notably higher in emerging markets and for non-portfolio (i.e., corporate) studies. Whelan et al. (2021) and Atz et al. (2023), covering the 2015–2020 literature, found positive results in a majority of corporate studies and identified improved financial performance associated with ESG becoming more pronounced over longer horizons, with sustainability strategies providing downside protection in crisis periods. Notwithstanding this broadly positive central tendency, effect sizes are modest, heterogeneous, and sensitive to measurement choices-grounds for expecting contingency rather than uniformity.

5.2 Influential Firm-Level Studies

Several landmark studies illuminate mechanisms. Eccles, Ioannou, and Serafeim (2014) tracked matched samples of “high-sustainability” and “low-sustainability” US firms over 18 years, finding that early voluntary adopters of sustainability policies outperformed in both stock-market and accounting terms. Khan et al. (2016) demonstrated that only performance on financially material sustainability issues-as classified by SASB industry standards-predicts superior returns, while immaterial ESG effort does not: a finding of first-order importance for sector-specific research designs. El Ghouli, Guedhami, Kwok, and Mishra (2011) showed that stronger CSR is associated with a lower cost of equity capital; Cheng, Ioannou, and Serafeim (2014) linked CSR to relaxed capital constraints; Flammer (2015), using a regression-discontinuity design on close shareholder votes, provided causal evidence that adopting CSR proposals raises value; and Krüger (2015) documented that markets penalise negative ESG events, consistent with a risk channel. Conversely, Brammer et al. (2006) found negative return associations for high-scoring UK firms; Barnett and Salomon (2012) documented a U-shaped relation in which moderate ESG underperforms both low and high ESG; and Duque-Grisales and Aguilera-Caracuel (2021) reported negative ESG–financial performance associations among Latin American multinationals, attributing the result to weak institutional environments and resource constraints-an instructive caution for emerging-market generalisation.

5.3 Emerging-Market and Indian Evidence

Emerging-market studies generally support a positive but conditional relationship. Aydoğan et al. (2022), studying large firms across emerging and developed markets, found positive associations of combined ESG scores with both firm value and profitability, with the social and governance pillars strongest.

Indian evidence has accumulated rapidly. Chelawat and Trivedi (2016), among the earliest Indian studies, found that superior ESG performance improved financial performance among listed Indian firms. Dalal

and Thaker (2019), using NSE-listed firms with ESG scores over 2015–2017, reported positive effects on both ROA and Tobin's Q. Behl, Kumari, Makhija, and Sharma (2022), applying cross-lagged panel analysis to the Indian energy sector, found the ESG–firm-value relationship to be time-lagged and bidirectional, with short-run negative and longer-run positive effects-underscoring the importance of temporal design. Shobhwani and Lodha (2023), examining NSE-100 firms, found that higher ESG risk scores are associated with weaker firm performance, while Desai (2024) reported significant firm-value effects of ESG disclosure among Indian firms, and related NSE-100 evidence links ESG disclosure scores to financial, operating, and market performance (Shobhwani & Lodha, 2024). Sharma, Panday, and Dangwal (2020) documented that firm size, profitability, and leverage shape ESG disclosure-reminding us that disclosure itself is endogenous. Studies of Indian ESG index portfolios and asset-pricing tests similarly suggest that ESG screening has not sacrificed-and may have enhanced-risk-adjusted returns in Indian equities (Narula et al., 2025). Taken together, Indian evidence tilts positive, but it is index-centric, disclosure-heavy, short-panelled, and almost never sector-specific.

5.4 Evidence Relating to the Electronics Sector

Direct evidence on ESG–CFP linkages in the Indian electronics industry is, to the best of the author's knowledge, absent from the peer-reviewed literature. Adjacent literatures offer indirect guidance: global studies of electronics supply chains document the financial materiality of labour compliance for contract manufacturers; the greening-of-GVCs literature shows buyers rewarding certified suppliers with order stability; and studies of EPR regimes indicate that regulatory design determines whether producer responsibility becomes a cost burden or an innovation stimulus (Porter & van der Linde, 1995). The absence of direct evidence, combined with strong theoretical reasons to expect sectoral distinctiveness (Section 2.3), defines the gap this thesis addresses.

5.5 Summary Table of Selected Studies

Study	Context / Sample	ESG Measure	CFP Measure	Key Finding
Orlitzky et al. (2003).	Meta-analysis, 52 studies	CSP (various)	Accounting & market	Positive average association; reputation mediates
Friede et al. (2015).	Meta-meta-analysis, 2,000+ studies	ESG (various)	Various	~90% non-negative; majority positive; stronger in EMs
Eccles et al. (2014)	180 US firms, 1993–2010	Sustainability policy adoption	Stock returns, ROA, ROE	High-sustainability firms outperform
Khan et al. (2016).	US firms, SASB materiality	Material vs immaterial ESG	Stock returns	Only material ESG predicts outperformance
El Ghoul et al. (2011).	US firms	CSR scores	Cost of equity	CSR lowers cost of equity capital
Barnett & Salomon (2012).	US firms	CSP	ROA, net income	U-shaped relationship
Duque-Grisales & Aguilera-Caracuel (2021).	Latin American MNEs	ESG scores	ROA	Negative association; institutional voids

Study	Context / Sample	ESG Measure	CFP Measure	Key Finding
Whelan et al. (2021); Atz et al. (2023)	1,000+ studies, 2015–2020	ESG (various)	Various	Majority positive for corporate studies; downside protection
Aydoğmuş et al. (2022)	Large EM & DM firms	Combined & pillar ESG	Firm value, profitability	Positive; S and G pillars strongest
Chelawat & Trivedi (2016)	Listed Indian firms	ESG ratings	Financial performance	Positive
Dalal & Thaker (2019)	65 NSE firms, 2015–2017	ESG scores	ROA, Tobin's Q	Positive on both
Behl et al. (2022)	Indian energy firms	ESG scores	Firm value	Lagged, bidirectional; short-run negative, long-run positive
Shobhwani & Lodha (2023)	NSE-100 firms	ESG risk scores	ROA, ROE, Tobin's Q	Higher ESG risk associated with weaker performance
Desai (2024)	Listed Indian firms	ESG disclosure	Firm value	Positive firm-value effects

Note: EM = emerging markets; DM = developed markets; CSP = corporate social performance.

6. Mechanisms, Moderators, and Measurement Issues

6.1 Mediating Mechanisms: How ESG Reaches the Bottom Line

The credibility of any claimed ESG–CFP linkage rests on identifiable transmission channels. Six recur across the literature and map naturally onto electronics manufacturing.

Operational efficiency and cost savings. Energy efficiency, water recycling, waste minimisation, and material recovery reduce input costs directly; in thin-margin assembly businesses, small unit-cost savings scale enormously. EPR-driven reverse logistics can convert waste streams into secondary-material revenue (Porter & van der Linde, 1995; Hart, 1995).

Reputation and legitimacy. ESG performance builds reputational capital with consumers, regulators, and-critically for electronics exporters-global buyers, functioning as insurance that dampens the penalty when adverse events occur (Orlitzky et al., 2003; Krüger, 2015).

Innovation capability. Environmental constraints and buyer requirements stimulate product and process innovation (eco-design, recyclable packaging, energy-efficient products), consistent with the Porter hypothesis; innovation in turn drives differentiation and margin (Porter & van der Linde, 1995; Hart & Dowell, 2011).

Employee productivity and human capital. Safety, fair treatment, skilling, and credible grievance mechanisms reduce attrition and disruption in labour-intensive plants- a first-order operational variable where lines run continuously, and worker unrest can idle capacity (Freeman, 1984; Eccles et al., 2014).

Access to and cost of capital. Strong ESG performance broadens the investor base, reduces information asymmetry, and lowers the cost of equity and debt; capital-constrained expansion-phase electronics firms benefit disproportionately (El Ghouli et al., 2011; Cheng et al., 2014).

Risk mitigation and resilience. ESG practices reduce exposure to regulatory sanction, supply-chain exclusion, litigation, and reputational shocks, lowering cash-flow volatility and tail risk (Krüger, 2015; Whelan et al., 2021).

6.2 Moderating Conditions: When ESG Pays

Firm size and resources. Larger firms enjoy scale economies in ESG investment and disclosure infrastructure; ESG ratings themselves exhibit a well-documented size bias (Drempetic, Klein, & Zwergel, 2020). Small component makers may bear proportionately heavier compliance burdens.

Ownership and governance structure. Promoter concentration, family control, business-group affiliation, and MNC parentage alter both the propensity to invest in ESG and the credibility of that investment to outsiders (Jensen & Meckling, 1976; Gillan et al., 2021).

Export orientation and GVC participation. Firms embedded in global buyers' supply chains face stronger coercive pressure and larger rewards for compliance (order stability, preferred-supplier status), strengthening the ESG–CFP link relative to purely domestic firms.

Materiality and sub-segment. Following Khan et al. (2016), the financial relevance of each pillar varies across sub-segments: E-pillar materiality peaks for manufacturers with heavy energy and waste footprints; S-pillar materiality peaks in labour-intensive assembly; G-pillar materiality is universal but acute where minority-shareholder protection is weak.

Slack resources. Profitable firms can afford substantive ESG; distressed firms may decouple symbolically (Waddock & Graves, 1997).

Disclosure quality, assurance, and rating divergence. Assured, standardised disclosure (BRSR Core) should tighten the observed practice–performance link by reducing measurement noise; rating divergence weakens it (Berg et al., 2022; Christensen et al., 2022).

Temporal horizon. Behl et al. (2022) and Whelan et al. (2021) indicate that ESG investments behave like capital expenditure: short-run cost, longer-run return. Study horizon is therefore itself a moderator of findings.

6.3 Measurement and Methodological Issues

Four problems qualify the empirical record. First, **construct heterogeneity**: studies variously measure ESG practices, third-party scores, risk scores, or disclosure indices, and these are weakly correlated with one another (Berg et al., 2022). Second, **rating divergence**: correlations among major providers' ESG ratings average roughly 0.5, so results can flip with the choice of provider (Berg et al., 2022; Christensen et al., 2022). Third, **endogeneity**: reverse causality (slack resources), omitted variables (management quality, R&D; McWilliams & Siegel, 2000), and sample selection (rated firms are larger and better performing) bias naive estimates; credible designs use lags, cross-lagged panels (Behl et al., 2022), instruments, quasi-experiments (Flammer, 2015), or regulatory discontinuities such as BRSR applicability thresholds. Fourth, **India-specific data constraints**: ESG scores cover mainly the largest listed firms, leaving the mid-cap and unlisted firms that dominate electronics manufacturing unobserved; BRSR time series only begin in 2022–23. These constraints shape the research designs proposed in the concluding sections.

7. The Regulatory and Institutional Landscape in India

7.1 Mandated CSR: Companies Act 2013, Section 135

India was the first major economy to mandate CSR spending: companies exceeding specified net-worth, turnover, or profit thresholds must spend at least 2 per cent of average net profits of the preceding three

years on scheduled CSR activities, with board-level CSR committees and disclosure obligations (Ministry of Corporate Affairs, 2014). The mandate converts part of the S-pillar from discretionary strategy into quasi-tax, with contested implications for the ESG–CFP link: mandated spending may crowd out strategic CSR or, alternatively, institutionalise stakeholder engagement capabilities.

7.2 From BRR to BRSR and BRSR Core

SEBI introduced Business Responsibility Reporting (BRR) for the top 100 listed companies in 2012, expanded progressively, and replaced it with the far more granular BRSR, mandatory for the top 1,000 listed companies from FY 2022–23 (SEBI, 2021). BRSR requires disclosure across nine principles of the National Guidelines on Responsible Business Conduct, covering energy, emissions, water, waste, workforce composition and safety, value-chain practices, and governance. In 2023, SEBI introduced **BRSR Core**, a subset of assured key performance indicators with reasonable-assurance requirements phased in from the top 150 companies (FY 2023–24) toward the top 1,000, together with ESG disclosure obligations for value chains of the largest listed companies (SEBI, 2023). For listed electronics firms, BRSR materially raises the observability and auditability of ESG practice, creating for researchers an unprecedented sector-comparable panel of standardised ESG data.

7.3 Environmental Regulation: E-Waste and Beyond

The E-Waste (Management) Rules, 2022 replace the 2016 rules with a certificate-based EPR system: registered recyclers generate EPR certificates that producers must procure to meet annual recycling obligations, rising stepwise as a share of products placed on the market in preceding years (MoEFCC, 2022). Complementary instruments include the Energy Conservation Act amendments enabling carbon-credit trading, Bureau of Energy Efficiency standards for appliances, and restrictions on hazardous substances (RoHS) embedded in the e-waste rules. The regime effectively prices the E-pillar for electronics producers, making environmental practice a direct financial variable.

7.4 Industrial Policy as ESG Context

PLI incentives, the Semicon India programme, and state-level cluster policies shape ESG indirectly: they concentrate large greenfield workforces (raising S-pillar salience), accelerate capacity addition (raising E-pillar salience), and attract global anchor firms whose supplier codes transmit international ESG norms. Industrial policy and ESG regulation are thus converging pressures on the same firms—a distinctive feature of the Indian electronics setting that the conceptual framework internalises as institutional antecedents.

8. Research Gaps Emerging from the Review

Seven gaps emerge. **(G1) Sectoral vacuum:** no peer-reviewed study, to the author’s knowledge, estimates ESG–CFP linkages specifically for Indian electronics firms. **(G2) Materiality blindness:** Indian studies rarely apply industry-materiality mapping (Khan et al., 2016), treating all pillars as equally relevant to all firms. **(G3) Mechanism opacity:** mediation through efficiency, reputation, innovation, human capital, financing, and risk is theorised but almost never measured in Indian samples. **(G4) Moderator neglect:** ownership structure, GVC participation, and slack are seldom modelled as boundary conditions. **(G5) Disclosure–practice conflation:** the BRSR era enables, but research has not yet exploited, the separation of assured practice indicators from narrative disclosure. **(G6) Temporal and causal weakness:** short panels and contemporaneous specifications dominate; the lagged, bidirectional dynamics documented by Behl et al. (2022) remain untested outside energy. **(G7) Unlisted-firm invisibility:** contract manufacturers central to the sector are absent from samples built on listed-firm ESG scores. The framework and

propositions that follow are constructed to address G1–G6 directly and to acknowledge G7 as a data frontier.

9. An Integrative Conceptual Framework and Propositions

9.1 Overview of the Framework

Figure 1 presents the proposed framework. Its logic proceeds in four movements. First, institutional and stakeholder pressures-SEBI's BRSR and BRSR Core, the E-Waste Rules' EPR obligations, Section 135 CSR mandates, global buyers' supplier codes, investor expectations, and community and media scrutiny-constitute the antecedents that drive Indian electronics firms to adopt ESG practices (institutional and legitimacy theories). Second, ESG practices across the three pillars affect financial performance both directly and, more importantly, through six mediating mechanisms: operational efficiency and cost savings, reputation and legitimacy, innovation capability, employee productivity, access to and cost of capital, and risk mitigation (stakeholder theory, NRBV, Porter hypothesis). Third, the strength and potentially the sign of these effects is conditioned by moderators: firm size and age, ownership structure, export orientation and GVC participation, sub-segment materiality profile, slack resources, and disclosure quality and assurance (agency theory, materiality logic, measurement theory). Fourth, financial performance feeds back into ESG investment through the slack-resources channel, generating the virtuous-or, in downturns, vicious-cycle documented by Waddock and Graves (1997).

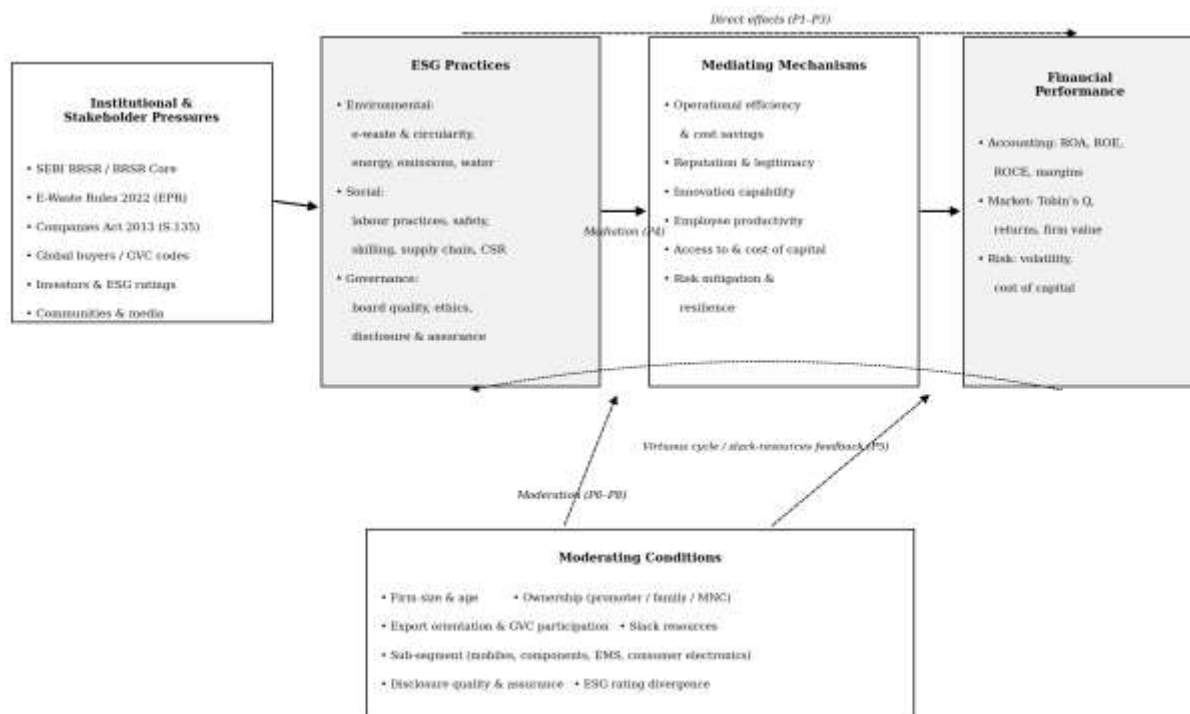


Figure 1. Conceptual framework linking ESG practices to financial performance in the Indian electronics industry.

9.2 Research Propositions

P1. Environmental practices-e-waste management and circularity, energy and emissions management, and resource efficiency-are positively associated with the financial performance of Indian electronics firms, with the association strengthening as EPR enforcement and carbon-pricing instruments mature.

P2. Social practices-labour standards, workforce safety and skilling, supply-chain responsibility, and community engagement-are positively associated with financial performance, with the association strongest in labour-intensive assembly segments where social disruption directly interrupts production.

P3. Governance practices-board independence and quality, disclosure integrity, and ethical-conduct systems-are positively associated with financial performance, and among the three pillars exhibit the most consistent association, given India's promoter-dominated ownership structures.

P4. The relationship between ESG practices and financial performance is mediated by (a) operational efficiency, (b) reputation and legitimacy, (c) innovation capability, (d) employee productivity, (e) access to and cost of capital, and (f) risk mitigation, such that direct effects attenuate when these mechanisms are modelled.

P5. The ESG–CFP relationship is bidirectional: superior financial performance increases subsequent ESG investment through slack resources, and the positive effect of ESG practices on financial performance strengthens over longer time horizons.

P6. Firm size, slack resources, and MNC affiliation positively moderate the ESG–CFP relationship, such that larger, resource-rich, and globally affiliated firms realise greater financial returns from equivalent ESG practices.

P7. Export orientation and GVC participation positively moderate the ESG–CFP relationship, such that the financial returns to ESG practices are greater for firms serving global buyers than for purely domestic-market firms.

P8. The financial materiality of each ESG pillar varies systematically across electronics sub-segments (mobile assembly, EMS, components, consumer electronics, semiconductors), such that pillar-specific ESG–CFP associations are strongest where the pillar is most material to the sub-segment's cost and risk structure.

9.3 Operationalising the Framework

The framework lends itself to a staged empirical agenda. A first stage would construct a panel of listed Indian electronics and allied firms (assemblers, EMS providers, component makers, consumer-electronics firms), combining BRSR/BRSR Core indicators, commercial ESG scores, and hand-collected practice measures (EPR compliance, certifications such as ISO 14001/SA8000, RBA membership), with accounting (ROA, ROE, ROCE, margins) and market (Tobin's Q, returns, volatility) outcomes, estimated with lagged and cross-lagged panel designs to address P1–P3 and P5. A second stage would test mediation (P4) using structural equation modelling with mechanism proxies-energy intensity, attrition rates, credit spreads, controversy counts. A third stage would exploit BRSR applicability and assurance thresholds as regulatory discontinuities, and buyer-code adoption events as quasi-experiments, to strengthen causal identification of moderation effects (P6–P8). Qualitative case studies of leading firms (e.g., large EMS providers and mobile assemblers) would complement the quantitative core by tracing mechanisms in situ.

10. Research Design and Methodology

Having derived the conceptual framework and propositions, this section sets out the research design through which the propositions can be tested in the empirical chapters of the thesis. The design follows the classical "research onion" logic-philosophy, approach, design, sampling, data, analysis, and quality criteria-summarised in the methodology framework of Figure 2, while Figure 3 charts the end-to-end research process from problem identification to conclusions.

10.1 Methodological Framework

The study adopts a **positivist** research philosophy: ESG practices, mediating mechanisms, and financial performance are treated as objectively measurable constructs whose relationships can be tested against observable data. Consistent with positivism, the **approach is deductive-theory** (stakeholder, NRBV, legitimacy/institutional, and agency perspectives) generated the framework of Section 9, from which propositions were derived and now formalised as hypotheses. The **research design** is explanatory and longitudinal: a quantitative panel design capable of estimating lagged, mediated, and moderated effects, complemented by illustrative case evidence from leading firms for mechanism tracing. The **population** comprises listed Indian electronics and allied firms across assembly, EMS, components, and consumer-electronics segments, observed over FY 2019 to FY 2026 so that the panel spans the pre- and post-BRSR regimes. **Data sources** combine BRSR/BRSR Core filings, commercial ESG scores from multiple providers (to address rating divergence; Berg et al., 2022), CMIE Prowess and annual-report financials, CPCB EPR-portal compliance data, and stock-market data. **Analysis** proceeds from panel diagnostics to fixed-/random-effects and dynamic (system GMM) estimation, structural equation modelling for mediation, and interaction specifications for moderation, with robustness and endogeneity checks throughout. **Quality criteria**-construct validity via multi-provider ESG measurement, internal validity via lag structures and regulatory discontinuities, reliability via documented variable construction, and ethical use of secondary data-complete the framework.

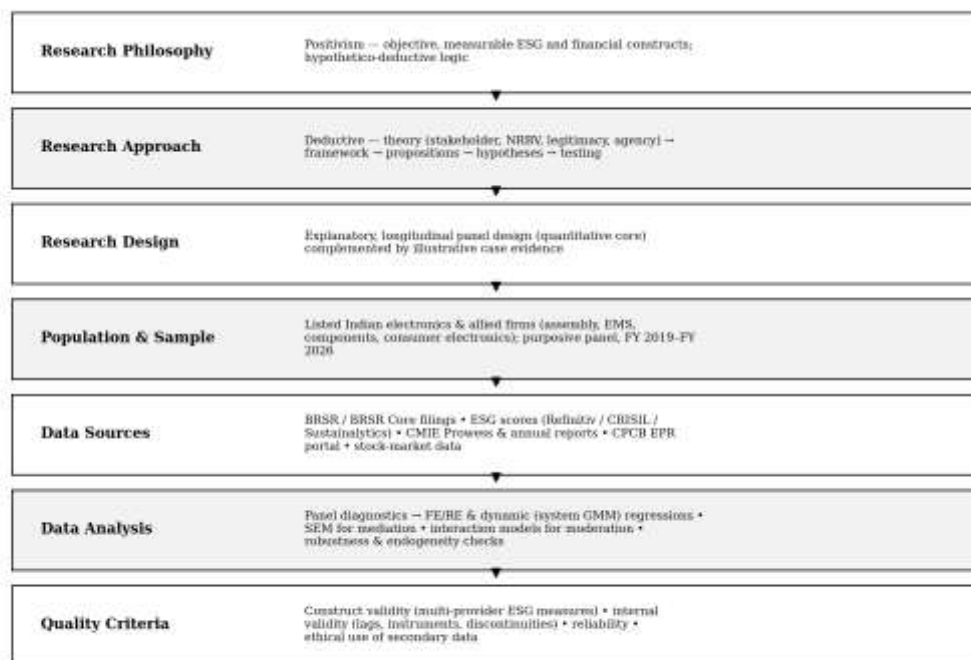


Figure 2. Research design and methodology framework.

10.2 Research Process Flow

Figure 3 depicts the sequence of the study: identification of the research problem; the literature review of Sections 3–7; distillation of research gaps G1–G7; development of the conceptual framework; derivation of propositions and hypotheses; specification of the research design and operationalisation of variables; data collection; staged data analysis; hypothesis testing and interpretation; and conclusions with

theoretical, managerial, and policy implications. The dashed return path denotes framework refinement: findings that contradict or qualify the framework feed back into its revision, in keeping with the deductive–iterative character of thesis research.

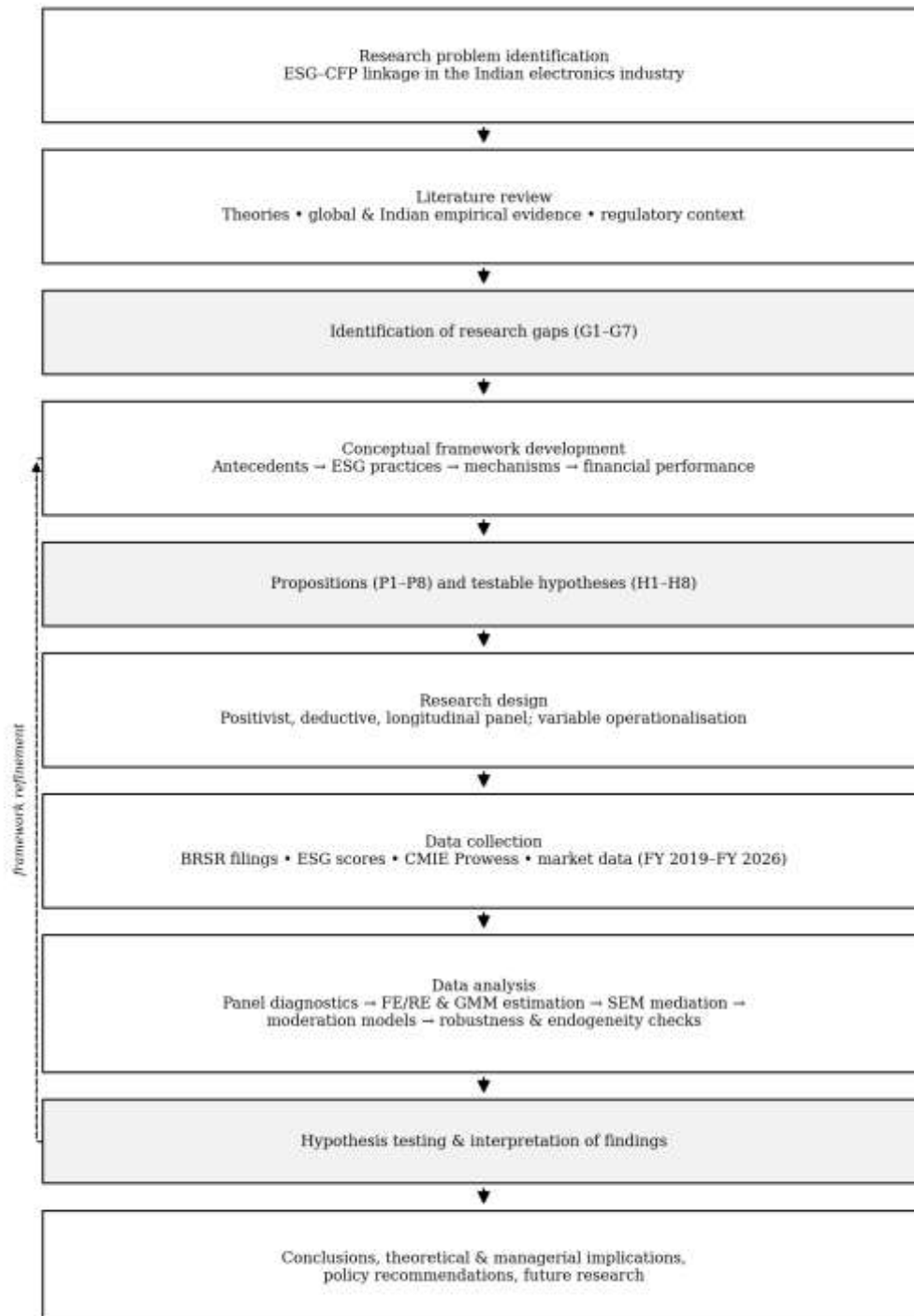


Figure 3. Flow chart of the research process.

10.3 Hypotheses

The propositions of Section 9.2 are restated as directional, testable hypotheses. P1–P3 map to H1–H3 (direct pillar effects, with H1 additionally testing the composite score), P4 to H4 (mediation), P5 to H5 (bidirectionality and lag structure), and P6–P8 to H6–H8 (moderation).

- H1.** (a) Composite ESG performance has a significant positive effect on the accounting-based financial performance (ROA, ROE) of Indian electronics firms; (b) composite ESG performance has a significant positive effect on their market-based performance (Tobin's Q, firm value).
- H2.** Environmental-pillar performance-e-waste and circularity management, energy and emissions efficiency-has a significant positive effect on financial performance.
- H3.** Social-pillar performance-labour standards, workforce safety and skilling, supply-chain responsibility, CSR engagement-has a significant positive effect on financial performance.
- H4.** Governance-pillar performance-board independence and quality, disclosure integrity, ethical-conduct systems-has a significant positive effect on financial performance.
- H5.** The effect of ESG performance on financial performance is significantly mediated by (a) operational efficiency, (b) corporate reputation, (c) innovation intensity, (d) employee productivity, (e) cost of capital, and (f) firm risk.
- H6.** (a) Lagged ESG performance has a stronger effect on financial performance than contemporaneous ESG performance; (b) prior financial performance has a significant positive effect on subsequent ESG performance (bidirectional/virtuous-cycle effect).
- H7.** Firm size, slack resources, and MNC affiliation positively moderate the ESG–financial performance relationship.
- H8.** (a) Export orientation and GVC participation positively moderate the ESG–financial performance relationship; (b) the strength of pillar-specific effects differs significantly across electronics sub-segments in line with pillar materiality.

10.4 Variables and Measurement

Variable Class	Variable	Measurement / Proxy	Source
Dependent (accounting)	ROA; ROE; ROCE; operating margin	Net income/total assets; net income/equity; EBIT/capital employed	CMIE Prowess, annual reports
Dependent (market)	Tobin's Q; annual stock return; volatility	(Market value of equity + debt)/total assets; buy-and-hold return; σ of daily returns	Exchange data
Independent	ESG composite; E, S, G pillar scores	Multi-provider scores (Refinitiv/CRISIL/Sustainalytics); BRSR Core KPIs; disclosure index from BRSR filings	ESG databases, BRSR
Mediators	Operational efficiency; reputation; innovation; employee productivity; cost of capital; risk	Energy intensity, asset turnover; controversy counts, awards; R&D intensity; revenue per employee, attrition; WACC/credit spread; beta, distress scores	Mixed secondary
Moderators	Size; age; slack; ownership; export intensity; sub-segment	ln(total assets); years since incorporation; cash/assets; promoter/MNC holding %; exports/sales; industry classification	Prowess, filings

Variable Class	Variable	Measurement / Proxy	Source
Controls	Leverage; sales growth; capital intensity; year & segment effects	Debt/assets; Δ Sales; fixed assets/total assets; dummies	Prowess

10.5 Model Specification

The baseline panel specification for H1–H4 is:

$$FP_{it} = \beta_0 + \beta_1 ESG_{i,t-1} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \beta_5 GROWTH_{it} + \beta_6 CAPINT_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where FP is the financial-performance measure, ESG is the composite or pillar score (lagged one year to mitigate simultaneity), μ_i and λ_t are firm and year effects. Pillar-specific tests replace the composite with E, S, and G scores. For H5, mediation is assessed through structural equation modelling with bootstrapped indirect effects. For H6, dynamic panels with lagged dependent variables are estimated by two-step system GMM, and reverse-causality models regress ESG_{it} on $FP_{i,t-1}$. For H7–H8, interaction terms ($ESG \times$ moderator) are added, with moderators mean-centred; sub-segment heterogeneity is examined through split-sample and multi-group analysis. Robustness checks include alternative ESG providers, alternative FP measures, winsorisation, and exploitation of BRSR applicability and assurance thresholds as regulatory discontinuities.

11. Discussion and Implications

11.1 Theoretical Implications

The review and framework contribute to theory in three ways. First, they respond to the call in Gillan et al. (2021) for contextualised ESG research by embedding the ESG–CFP question in a specific emerging-market industry whose institutional pressures are unusually legible: EPR certificates price the E-pillar, buyer codes price the S-pillar, and BRSR assurance disciplines the G-pillar. Second, the framework integrates commonly siloed theoretical lenses-institutional antecedents, capability-based mediation, agency-theoretic moderation-into a single causal chain, clarifying that the theories are complementary answers to different questions (why adopt, how it pays, when it pays). Third, by foregrounding materiality heterogeneity across sub-segments (P8), the framework imports the Khan et al. (2016) materiality insight into an emerging-market manufacturing setting where it has yet to be tested.

11.2 Managerial Implications

For managers of Indian electronics firms, the review counsels a materiality-first ESG strategy: prioritise e-waste and energy management where regulatory pricing is sharpest; treat workforce stability and safety as production-continuity investments rather than compliance costs; and use governance quality and assured disclosure to lower financing costs and win global-buyer confidence. The evidence that ESG behaves like capital expenditure-short-run cost, long-run return (Behl et al., 2022; Whelan et al., 2021)-implies that ESG budgeting should be evaluated on multi-year horizons, not quarterly payback.

11.3 Policy Implications

For policymakers, the analysis suggests that the financial payoff of ESG regulation depends on its design: certificate-based EPR can stimulate a recycling industry if enforcement is credible and certificate pricing stable; BRSR Core assurance can reduce greenwashing and rating divergence if extended down the size

distribution as data infrastructure matures; and integrating baseline ESG requirements into PLI-type incentive schemes would align industrial policy with sustainability policy rather than leaving them parallel tracks.

12. Limitations of the Review

Four limitations warrant acknowledgement. First, as a narrative–integrative review, the chapter does not compute pooled effect sizes; conclusions about the balance of evidence rest on published meta-analyses and the author’s synthesis. Second, the empirical base for the Indian electronics sector specifically is thin, so sectoral inferences are necessarily theory-led extrapolations from adjacent evidence. Third, the review privileges English-language, peer-reviewed sources; grey literature from industry bodies and NGOs was used only for contextual facts. Fourth, the regulatory landscape described is current as of mid-2026 and is evolving rapidly–BRSR value-chain requirements, EPR targets, and climate-disclosure norms are all in flux–so the institutional description should be read as a snapshot.

13. Conclusion

This chapter set out to review the linkages between ESG practices and financial performance and to build a conceptual foundation for studying them in the Indian electronics industry. The weight of global evidence indicates a modest, positive, and highly contingent ESG–CFP relationship, transmitted through identifiable mechanisms and conditioned by firm, industry, and institutional factors. Indian evidence, while growing and broadly consistent with the global pattern, remains index-bound, disclosure-centric, and sector-blind–leaving the electronics industry, for all its scale, policy salience, and distinctive ESG intensity, essentially unexamined. The integrative framework and eight propositions developed here translate that gap into a researchable agenda: pillar-specific direct effects, six mediating mechanisms, bidirectional dynamics, and theoretically grounded moderators, all situated within an institutional environment–BRSR, EPR, CSR mandates, and GVC codes–that renders ESG unusually measurable and unusually consequential. Subsequent chapters of this thesis take up that agenda empirically.

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