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Corporate Sustainability Adoption under Industry 5.0: The Role of Regulatory, Market, and Stakeholder Institutions Across Economies

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ABSTRACT

The world of business is entering a new phase called Industry 5.0. This shift is not only about using advanced technologies or smarter machines. It is also about making industries more human-centered, environmentally responsible, and resilient during times of crisis. In simple terms, Industry 5.0 encourages companies to care not just about profits, but also about people, society, and the planet. However, companies across the world are not adopting sustainability practices in the same way. A business operating in a developed country such as Sweden faces very different conditions compared to a company in an emerging economy like Bangladesh or India, even though both are influenced by the same global sustainability goals. This difference raises an important question: why do some companies strongly integrate sustainability into their operations while others struggle to do so?

The study argues that the answer lies in the institutional environment surrounding firms. Every company operates within a system shaped by government regulations, law enforcement, investor expectations, public awareness, and market conditions. These institutional factors strongly influence how seriously businesses adopt sustainability practices. The study focuses on four important elements: the strength of regulations, the effectiveness of enforcement, stakeholder pressure, and the maturity of sustainable markets.

Using secondary data and studies published between 2020 and 2025, the paper finds that companies in developed economies are more likely to adopt sustainability because strict laws, active investors, and informed consumers encourage responsible business behavior. In contrast, companies in developing economies often adopt sustainability mainly because international buyers, foreign investors, or export market requirements push them to do so. This unequal pattern of adoption is described in the paper as “institutional asymmetry.”

The study also proposes a conceptual model and four research hypotheses that can be tested in future research. Finally, it provides recommendations for policymakers and industry leaders to reduce these institutional gaps and create a more balanced and inclusive approach to sustainability under Industry 5.0.

Keywords: Corporate Sustainability, Institutional Context, ESG Practices, Regulatory Enforcement, Market Maturity, Institutional Asymmetry, Developing Economies, Sustainability Governance, Emerging Economies.

INTRODUCTION

Measuring industrial success by output and speed used to feel self-evident. More goods, manufactured faster, delivered cheaper this was the dominant logic of industrial life for most of the twentieth century. Industry 4.0 accelerated that logic with remarkable results. Smart factories began talking to each other through sensors and networks. Robots handled tasks that once required human hands. Artificial intelligence made production lines more responsive and efficient than anything previously thought possible. Companies in dozens of sectors grew faster, leaner, and more globally connected.

But efficiency has costs that are not always counted in profit margins. Job displacement, environmental damage, and the fragility exposed by events like the COVID-19 pandemic began to put pressure on an industrial model that had treated social and ecological concerns as secondary issues. The European Commission articulated a formal response to these pressures in 2021. Under what it called Industry 5.0, three principles were elevated to the center of industrial strategy. The first principle is human centricity: technology ought to work alongside

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people and improve their lives rather than simply eliminate their roles. The second is sustainability: environmental responsibility must be embedded into the core design of how companies function. The third is resilience: industrial systems must be built to withstand crises and recover from them without catastrophic disruption.

On paper, these three principles appear both sensible and urgent. The practical problem becomes visible the moment one looks at how real companies in real countries are actually responding to them. Consider the contrast between two manufacturers: one in the Netherlands subject to binding European disclosure laws, another in Bangladesh navigating a patchwork of voluntary guidelines and inconsistent enforcement. Both face pressure from global sustainability narratives. Both may produce similar-looking annual reports. Yet the depth of their actual sustainability practices, and the forces driving whatever adoption does occur, are fundamentally different. Understanding that difference is the central task this paper takes on.

The paper argues that institutional context is the missing explanatory variable in most discussions of corporate sustainability under Industry 5.0. Four dimensions of institutional context are examined: how demanding the formal rules are, how reliably those rules are enforced, what stakeholders genuinely expect and can compel, and how well developed the surrounding market for sustainability is. Together, these four dimensions determine whether a company embeds sustainability or merely performs it. The paper develops a theoretical model around this argument, states four formal hypotheses, and closes with actionable recommendations for governments, standard-setting bodies, and business practitioners in both developed and developing country settings.

This paper speaks directly to the core questions of the conference at which it is submitted, including what makes technology governance trustworthy, which institutional frameworks promote fair participation, and how research and data infrastructure can support a more equitable global sustainability transition. These are not abstract concerns. They are decisions being made right now in boardrooms, regulatory agencies, and development banks, and better evidence makes better decisions.

Problem Statement

Industry 5.0 sets ambitious sustainability goals for companies around the world. Yet the reality on the ground tells a very different story. Not every company is adopting these goals at the same pace, in the same depth, or for the same reasons. The core problem this paper addresses is simple but consequential: the institutional infrastructure needed to make global sustainability standards work does not exist equally everywhere, and this gap is rarely acknowledged in the design of those standards. The sections below spell out what that gap looks like and why it matters.

Research Gap

A careful review of the literature published between 2020 and 2025 reveals that existing research has not yet connected the right pieces together. Scholars writing about Industry 5.0 and scholars studying corporate sustainability have both produced valuable work, but they have largely been working in parallel. At the same time, the global policy conversation on these topics has been shaped predominantly by voices from Europe and North America. Three specific gaps emerge from this review, and each one points to a distinct contribution this paper makes.

LITERATURE REVIEW

The Transition from Industry 4.0 to Industry 5.0

The academic conversation about Industry 5.0 begins with an honest accounting of what Industry 4.0 left unfinished. Breque and colleagues (2021), writing for the European Commission, made the case that productivity gains alone are insufficient as a measure of industrial progress when those gains come at the cost of worker displacement, ecological damage, and system-level fragility. Their framing positioned Industry 5.0 not as a replacement for the digital and automated capabilities that Industry 4.0 introduced, but as a broader purpose within which those capabilities should operate. Xu and colleagues (2021) described the difference between the

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two industrial phases as qualitative rather than quantitative. Industry 4.0 asked how much faster a factory could run. Industry 5.0 asks what a factory's relationship with its workers and its environment should look like.

Mourtzis and colleagues (2022) contributed empirical texture to the human centricity pillar by studying manufacturers in high-income European contexts. Their research showed that when businesses invest in collaborative technology that supports skilled workers rather than replacing them, and when the institutional environment rewards that investment through labor law protection and stakeholder governance, the outcomes in productivity and workforce satisfaction are measurably positive. Leng and colleagues (2022) turned their attention to the resilience pillar and found that a company's capacity to absorb and recover from disruptions is not simply a function of its own internal planning. It is shaped by the reliability of public infrastructure, the quality of financial risk management tools available in its operating environment, and the predictability of regulatory systems around it. Neither study, however, addressed the question of how these findings apply in settings where those institutional conditions are substantially weaker.

What Institutional Theory Brings to This Conversation

Institutional theory provides the conceptual tools to explain why firms facing nominally similar pressures behave so differently. The foundational contribution of DiMaggio and Powell (1983) identified three mechanisms through which organizations become shaped by their environments. Legal requirements force change from the outside. The tendency to copy successful competitors drives change through imitation. Professional norms and expectations create change through internalized standards. All three mechanisms apply to sustainability, but their relative weight and effectiveness vary substantially depending on the national institutional context in which a firm operates.

Research extending these ideas into the contemporary sustainability context has been productive. Ioannou and Serafeim (2022) used large datasets to demonstrate that national-level institutional quality, including the robustness of legal systems, the culture of stakeholder engagement, and the development of civil society, significantly predicts the quality of sustainability performance at the firm level. This finding holds even when researchers control for firm size, financial performance, and industry sector, suggesting that institutional context operates as an independent driver of sustainability rather than simply reflecting the characteristics of the firms within it.

Jamali and colleagues (2021) shifted the analytical gaze to developing nations and found a distinct pattern. In countries where domestic institutional frameworks are weaker, companies often adopt sustainability vocabularies and surface practices in response to international commercial relationships rather than because of genuine internal commitment or domestic legal pressure. A garment manufacturer in South Asia that publishes a sustainability report primarily to satisfy the procurement requirements of a European retailer is not the same kind of sustainability adopter as a German automotive firm that integrates environmental targets into executive compensation structures under legal mandate. Pizzi and colleagues (2021) provided complementary evidence that in stronger regulatory environments, what companies report and what they actually do tend to track each other much more closely than in weaker regulatory contexts.

ESG Governance and the Shifting Reporting Landscape, 2020 to 2025

The period between 2020 and 2025 produced a significant restructuring of global sustainability reporting norms. The establishment of the International Sustainability Standards Board in 2021 and the finalization of its IFRS S1 and S2 standards in 2023 represented a serious effort to consolidate the fragmented landscape of sustainability disclosure frameworks into something more universally applicable. At the same time, the European Union moved far beyond voluntary disclosure through its Corporate Sustainability Reporting Directive, which requires large companies to publish detailed information on how their operations affect both their own financial health and the wider world around them. The concept of double materiality, requiring companies to consider their outward impact on society and the environment and not just the inward financial impact of sustainability risks, marks a genuine philosophical departure from earlier investor-focused models of disclosure.

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Drempetic and colleagues (2020) identified a consistent pattern across their sample: the resources available to a firm are a strong predictor of the quality of its ESG disclosure. Larger firms with more administrative capacity produce more complete and credible sustainability reports. This resource-quality relationship has direct implications for emerging economies, where a large proportion of firms, including many publicly listed ones, lack the internal expertise and infrastructure to implement complex reporting frameworks. Kumar and Prakash (2022) confirmed this specifically for South Asian firms, finding that formal adoption of global reporting standards increased between 2018 and 2022 while substantive disclosure quality remained inconsistent. Serafeim and Yoon (2022) added a market dimension: ESG disclosures that investors find specific and credible generate positive responses in equity markets, but this mechanism operates primarily in developed markets where sustainability-focused institutional investors are already well established.

Supply Chain Sustainability and the Institutional Dimension

Supply chains are the arena in which institutional asymmetry between developed and developing countries becomes most practically visible. Yadav and colleagues (2020) showed that while digital tools offer real potential for improving sustainability tracking and accountability throughout supply chains, their adoption is constrained by the institutional environment of the countries where suppliers operate. Traceability systems that function smoothly in countries with reliable infrastructure and consistent regulatory oversight become unreliable when applied in environments where those conditions are absent. Zhou and colleagues (2020) found that businesses facing high environmental turbulence in emerging markets tend to respond in adaptive and reactive ways rather than developing the kind of systematic, proactive sustainability management that characterizes firms in stable, high-enforcement environments.

The picture that emerges from this body of evidence is consistent. Corporate sustainability adoption is not a matter of individual company choice in any simple sense. It is shaped by the surrounding institutional infrastructure, and that infrastructure differs enough between developed and developing economies to produce fundamentally different sustainability realities at the firm level, even under the same global policy aspirations.

Theoretical Framework and Conceptual Model

Four institutional factors anchor the theoretical framework of this paper. Each factor works on corporate sustainability adoption through a distinct mechanism, and together they form a system that either enables or constrains how a company responds to the Industry 5.0 agenda.

Regulatory strength is the first factor. It refers to the overall quality and ambition of a country's formal rules governing corporate environmental and social conduct. This is not simply about whether regulations exist but about how demanding they are, how comprehensive their coverage is, and how consistently they apply across different types of firms. Countries with high regulatory strength create environments in which sustainability is not optional. Measurable indicators include scores on the OECD Policy Stringency Database, the count of legally binding ESG disclosure requirements, and the World Bank's Regulatory Quality Index drawn from the World Governance Indicators.

Enforcement capacity is the second factor, and it is analytically separate from regulatory strength for an important reason: rules without enforcement are very different from rules that are consistently applied. Enforcement capacity describes the practical ability of a state to make firms live up to their regulatory obligations. It encompasses the technical competence of regulatory agencies, the independence of the courts, and the political environment that determines whether powerful companies face accountability for violations. Relevant measures include the World Bank Rule of Law Index, observed environmental compliance rates from national environmental agencies, and judicial independence scores from the V-Dem project.

Stakeholder expectations form the third factor. Regulations and enforcement are not the only sources of pressure on companies. Investors, customers, local communities, trade unions, and civil society organizations all exert influence on corporate behavior, and the intensity of that influence varies by context. In developed economies, large institutional investors with explicit ESG mandates now represent a major force shaping corporate sustainability decisions. In developing economies, the same commercial pressure sometimes arrives from the

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international end of supply chains rather than from domestic sources. This variable can be measured through ESG investor pressure indices produced by organizations such as MSCI, civil society strength scores from the CIVICUS Monitor, and the frequency of supply chain sustainability audits as reported in CDP supply chain data.

Market maturity is the fourth factor. Even when regulations require sustainability and stakeholders demand it, the depth of the commercial ecosystem surrounding sustainability affects how rewarding it is for firms to invest. Where green bond markets are large, sustainable procurement standards are widespread, and ESG rating agencies provide extensive coverage, sustainability investment generates tangible returns. Where that ecosystem is thin, companies that invest in sustainability beyond the minimum required for compliance or export market access find that the market does not reward them accordingly. Indicators include green bond issuance as a percentage of GDP from the Climate Bonds Initiative, sustainable procurement adoption rates from OECD surveys, and the breadth of ESG rating coverage from Bloomberg data.

These four factors operate through the three pillars of Industry 5.0. Human centricity, sustainability, and resilience are not evenly accessible across institutional contexts. The institutional environment determines which pillar receives the most pressure and investment, how deeply it is integrated into firm operations, and whether adoption is driven by genuine strategic commitment or by the need to satisfy external requirements with minimum internal change. The moderating role of institutional asymmetry, the structural gap between rich-country and developing-country institutional endowments, shapes the character of adoption as much as its depth. Figure 1 captures these relationships in the full conceptual model.

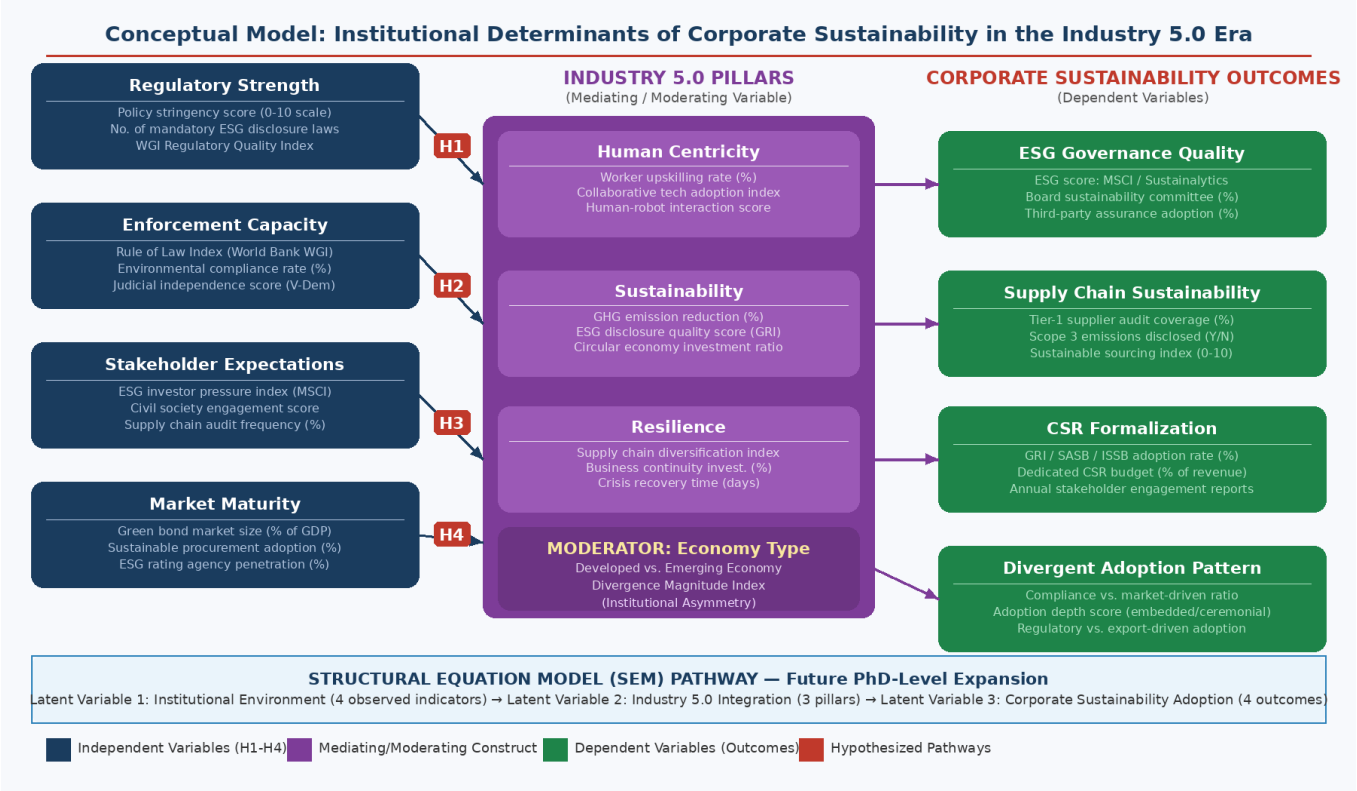

Figure 1: Conceptual Model - Institutional Determinants of Corporate Sustainability in the Industry 5.0 Era

The model in Figure 1 is designed to serve two research functions simultaneously. Within this paper, it organizes the comparative analysis by making explicit which institutional variables connect to which sustainability outcomes and through which Industry 5.0 pillars. For future empirical work at doctoral level, it provides the architecture for a Structural Equation Model. In that SEM design, the four institutional determinants would function as observed indicators loading onto a latent variable called Institutional Environment. The three Industry 5.0 pillars would serve as observed indicators of a second latent construct called Industry 5.0 Integration. The sustainability outcome variables, covering ESG governance quality, supply chain sustainability, and CSR formalization, would constitute the dependent latent construct. A multi-group analysis path through the institutional asymmetry moderator would then test whether the structural relationships hold equally for

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developed and developing country firms or whether the model's parameters differ significantly between groups. Table 1 lists all measurable indicators and recommended data sources for each model variable.

Table 1: Measurable Indicators and Recommended Data Sources

Variable	Measurable Indicators	Data Source
Regulatory Strength	Policy stringency score (0 to 10 scale); count of mandatory ESG laws; WGI Regulatory Quality score	World Bank WGI; OECD Policy Stringency Database; national legislative records
Enforcement Capacity	Rule of Law Index (WGI); observed environmental compliance rate (%); judicial independence score	World Bank WGI; Yale Environmental Performance Index; V-Dem project data
Stakeholder Expectations	ESG investor pressure index; civil society strength score; supply chain sustainability audit rate (%)	MSCI ESG Research; CIVICUS Monitor; CDP Supply Chain Programme data
Market Maturity	Green bond issuance (% of GDP); sustainable procurement adoption (%); ESG rating coverage breadth	Climate Bonds Initiative; OECD Procurement Surveys; Bloomberg ESG database
Industry 5.0 Integration	Worker retraining investment rate; GHG reduction achieved (%); supply chain diversification score; ESG disclosure completeness	ILO Skills and Employability Reports; GRI Transparency Register; CDP Climate Disclosure
Corporate Sustainability Adoption	Composite ESG score (MSCI or Sustainalytics); GRI or ISSB adoption rate (%); CSR budget as % of revenue; Scope 3 emissions disclosure status	MSCI; Sustainalytics; GRI Transparency Register; Bloomberg Sustainability data

Research Objectives

1. To understand how factors such as government regulations, effective law enforcement, stakeholder expectations, and market development influence the adoption of corporate sustainability practices in both developed and emerging economies within the Industry 5.0 era.
2. To explore why sustainability adoption differs across economies due to institutional differences and to examine how these inequalities affect fair global sustainability governance and the achievement of Industry 5.0 goals

Hypotheses

H1: Firms operating within strong regulatory environments are more likely to exhibit higher levels of ESG governance quality and formalized CSR practices compared to firms operating in weaker regulatory environments.

H2: The positive influence of regulatory strength on sustainability adoption is significantly stronger when enforcement mechanisms are credible, effective, and consistently implemented.

H3: Firms in developed economies are more likely to demonstrate compliance-driven and deeply embedded sustainability adoption, whereas firms in emerging economies tend to adopt sustainability selectively due to external institutional pressures, reflecting institutional asymmetry.

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H4: Firms operating in markets characterized by mature green finance systems and sustainable procurement ecosystems are more likely to integrate sustainability practices deeply, even in the absence of mandatory regulatory requirements.

METHODOLOGY

Research Design

A comparative qualitative design was chosen for this study because the central question is about how and why institutional context shapes different sustainability outcomes, not about measuring average effects across a large population of firms. Comparing a small number of institutional configurations systematically, while preserving the specific conditions of each, is well suited to generating the kind of explanatory insight the research question demands. The unit of analysis is the firm as embedded in a national institutional environment rather than the isolated firm considered in abstraction from its surroundings.

Data Sources

All data used in this study comes from secondary sources published between 2020 and 2025. These include published sustainability and ESG reports from major corporations across European Union member states, the United Kingdom, India, Brazil, and South Africa; quantitative governance indicators from the World Bank's World Governance Indicators database; ESG ratings from MSCI and Sustainalytics; adoption and reporting quality data from the GRI Transparency Register; workforce and skills data from the International Labour Organization; green finance market data from the Climate Bonds Initiative; regulatory quality data from the OECD and peer-reviewed articles from journals in management, sustainability, and institutional economics.

Analytical Approach

The analysis treats the Industry 5.0 policy framework as a constant against which institutional variation can be compared. Developed economies, represented primarily by the European Union, are contrasted with emerging economies, represented by India, Brazil, and South Africa, across three sustainability outcome dimensions: ESG governance quality, supply chain sustainability practices, and the depth of CSR formalization. Holding the global framework constant while varying the institutional context allows the analysis to isolate the effect of institutional differences without needing to attribute outcomes to individual firm-level factors.

Limitations

- The study is based entirely on secondary data and existing literature, and therefore does not include primary data collected through surveys or interviews.
- The analysis focuses on economy level institutional differences and does not explore variations in sustainability behaviour among individual firms within the same economy.

ANALYSIS AND DISCUSSION

1. The EU's CSRD compels ~50,000 firms to report double materiality, producing measurable ESG improvements across chemicals, energy, and manufacturing between 2021 and 2024, confirming **H1**.

2. Ioannou and Serafeim (2022) confirmed regulatory quality directly predicts firm-level ESG performance regardless of firm size or sector, proving stronger governance produces better sustainability outcomes.

3. Europe's co-determination laws and public retraining programs enabled human-robot collaboration that improved output quality and worker satisfaction (Mourtzis et al., 2022), showing human centricity works best where institutions back it, supporting **H2**.

4. India, Brazil, and South Africa have sustainability frameworks on paper, but Kumar and Prakash (2022) found real integration remains shallow, proving that rules without enforcement change little.

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5. In weak-enforcement economies, foreign buyers and investors drive sustainability more than domestic law, with firms in textiles, agribusiness, and mining adopting ESG only because international markets demand it, confirming **H3**.

6. European firms build resilience through clean energy and circular systems, while emerging economy firms rely on supplier diversification and community ties to manage power shortages, currency risk, and regulatory gaps (Yadav et al., 2020).

7. The developed-developing economy gap is structural across three dimensions: decades of regulatory capacity, deep green finance ecosystems, and broad ESG coverage, all underdeveloped in emerging markets, weakening the business case for sustainability and supporting **H4**.

8. ISSB and GRI frameworks were built within European and North American traditions. Pizzi et al. (2021) warned they may burden firms least able to comply while missing the sustainability issues that matter most in lower-income settings.

Key Findings

1. Stronger sustainability regulations produce deeper, more genuine ESG adoption, with EU evidence confirming that tougher rules drive real change rather than surface-level compliance.

2. Enforcement is what turns rules into reality. Strong enforcement embeds sustainability across operations; weak enforcement produces box-ticking with no lasting impact.

3. Firms in India, Brazil, and South Africa adopt sustainability because foreign buyers and investors demand it, not because domestic governments enforce it.

4. The EU Carbon Border Adjustment Mechanism and global buyer requirements outperform domestic regulation in emerging economies, but the adoption they produce is narrow, externally driven, and fragile.

5. Green finance markets, ESG rating coverage, and sustainable procurement systems drive sustainability embedding independently of regulation, proving the commercial ecosystem matters as much as the rules.

6. Emerging economies lack deep green finance, broad ESG coverage, and developed procurement systems, making the business case for sustainability structurally weaker regardless of firm willingness.

7. The sustainability gap reflects three structural problems: weaker regulatory institutions, thinner green finance markets, and global standards designed without developing-economy input.

8. ISSB and GRI standards reflect developed-economy priorities, placing disproportionate compliance burdens on firms least equipped to meet them while overlooking what sustainability means in lower-income contexts.

RECOMMENDATIONS FOR INSTITUTIONS AND INDUSTRY

What Institutions Should Do

National Governments in Developing Economies

- Treat sustainability regulation as a driver of development, not a reward for it
- Invest in specialized regulatory agencies and train environmental inspectors regardless of income level
- Strengthen judicial capacity to handle environmental cases consistently and credibly
- Clear, enforced sustainability rules attract sustainability-oriented foreign investment and reduce business uncertainty

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International Standard-Setting Bodies (ISSB, GRI, ESG Rating Agencies)

- Restructure governance to give developing-economy institutions real decision-making power
- Test framework implementability across diverse institutional contexts before finalizing global standards
- Recognize that representation reform is a technical necessity for effective global governance, not just an ethical aspiration

Multilateral Development Banks (World Bank, ADB, African Development Bank)

- Prioritize sustainability market infrastructure alongside physical infrastructure in lending programs
- Support domestic green bond market development in emerging economies
- Embed sustainable procurement standards into development lending conditions
- Fund credible local ESG rating capacity to reduce dependence on foreign agencies

Universities and Management Schools

- Integrate institutional economics, sustainability governance, and Industry 5.0 strategy into management curricula
- Build cross-disciplinary research and leadership capacity the Industry 5.0 transition requires
- Produce researchers and practitioners who can design and evaluate sustainability governance across diverse national contexts

What Industry Should Do

Multinational Companies Sourcing from Developing Country Suppliers

- Move beyond audit-and-sanction approaches that punish non-compliance without addressing its root causes
- Share technical knowledge with suppliers and co-invest in infrastructure needed to meet standards
- Offer purchasing commitments long enough to make sustainability investment financially rational for suppliers

Companies Operating in Developing Economies

- Treat international sustainability requirements as a strategic opportunity to build competitive advantage
- Engage domestic regulators proactively to advocate for clearer, more consistently enforced sustainability rules
- Recognize that a level playing field where all firms are held to serious standards benefits every firm that takes sustainability seriously

Industry Associations Across All Sectors and Countries

- Build shared sustainability measurement and benchmarking infrastructure at the sector level
- Develop collective reporting platforms that create public goods no single company would build alone

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- Play a catalytic role in developing economies by creating ecosystem conditions that make deeper sustainability adoption commercially rational

All Companies Regardless of Context

- Design Industry 5.0 transition strategies around all three pillars, human centricity, sustainability, and resilience, as a coherent and integrated whole
- Invest in workers to build the organizational knowledge needed for future sustainability requirements and the flexibility needed for resilience
- Embed environmental sustainability in supply chains to build resilience against carbon pricing and regulatory tightening already arriving in major markets

Scope of Study

This study compares corporate sustainability adoption across two institutional contexts, EU member states as the world's most advanced regulatory regime, and India, Brazil, and South Africa as major emerging economies with formal frameworks but significant enforcement and market gaps. All secondary evidence draws from 2020 to 2025, capturing key developments including the CSRD, the establishment of the ISSB, and early CBAM effects. The analysis focuses on three outcome dimensions: ESG governance quality, supply chain sustainability practices, and CSR formalization depth, using a comparative qualitative design that offers theoretically grounded analysis rather than causal statistical claims. Within-group variation across economies, micro-level organizational processes, and sector-specific dynamics fall outside the scope of this study.

Future Research Directions

This study opens several promising avenues for future investigation. While the comparative qualitative design adopted here is well suited to generating theory and mapping institutional patterns, it is deliberately exploratory rather than conclusive. The hypotheses proposed in this paper need to be tested with primary data, the model needs to be estimated quantitatively, and the micro-level processes that lie beneath the structural patterns identified here need to be examined through fieldwork.

CONCLUSION

This paper argues that institutional context, not company intent, is the primary determinant of how deeply firms adopt sustainability under the Industry 5.0 framework. EU firms embed sustainability because binding regulations and mature green finance markets make it both obligatory and commercially rational. Firms in India, Brazil, and South Africa adopt it selectively because foreign buyers and investors demand it, not because domestic institutions compel it. This gap is structural, spanning regulatory capacity, market infrastructure, and global governance representation, and it will not close on its own.

The Industry 5.0 vision of human-centric, sustainable, and resilient industry cannot be realized equally everywhere until its institutional foundations exist equally everywhere. Closing that gap is not a peripheral concern. It is the precondition for a genuinely equitable global sustainability transition.

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