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A Review of Factors Influencing Corporate Environmental Performance

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Abstract. With mounting multi-stakeholder pressure on carbon emission reduction, Corporate Environmental Performance (CEP) has emerged as both a critical indicator of social legitimacy and a constitutive element within sustainable business frameworks. Based on authoritative literature for the period 2020-2025, this review adopts a systematic analytical approach that aims to identify and categorize the key factors influencing CEP. The review first examines the regulatory and disclosure mechanisms that incentivize companies to improve CEP, and explores internal drivers including initiatives such as corporate social responsibility and environmental management systems. Subsequently, the study elucidates the dual catalytic role of green financial instruments and digital transformation in accelerating environmental initiative adoption at scale. Market dynamics and stakeholder pressures are subsequently analyzed. The review also identifies gaps in the research, especially the aspect that the interaction of multiple factors is under-researched. The findings underscore that factor synergies constitute the most effective pathway for CEP enhancement to advance the theory and practice of sustainable environmental performance in business.

Keywords: Corporate environmental performance, Green finance, Environmental management system, Digital transformation, Corporate social responsibility

1. Introduction

Over the past decade, public concern over climate change, resource depletion and environmental pollution has risen dramatically; meanwhile, environmental regulations have been tightened and investors have increasingly demanded ESG transparency [1]. Against this backdrop, corporate environmental performance (CEP), defined as a firm's measurable outcomes in managing and mitigating its ecological impacts (e.g., greenhouse gas emissions, energy and water consumption, and waste generation), has evolved from an optional initiative to a cornerstone of corporate sustainability strategies. Empirical research demonstrates how evolving regulatory frameworks compel firms to internalize environmental externalities while incentivizing cleaner technology adoption [2,3]. At the same time, growing stakeholder expectations are pushing companies to integrate environmental considerations into their core strategies. Internally, companies are deploying corporate social responsibility (CSR) programs, environmental management systems (EMS), and fostering supportive corporate cultures to institutionalize environmentally responsible practices.

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Moreover, the emergence of green finance instruments provides companies dedicated funding streams linked to environmental performance targets [4]. However, the relative impacts and interactions of these multifaceted drivers remain underexplored. This review enriches current studies through systematic integration of the literature from the last 5 years, with the aim of (1) categorizing the main factors affecting corporate environmental performance (CEP); (2) assessing the individual and combined effects of these factors; and (3) identifying directions for future research. The interdisciplinary research results provide valuable references for academic research and management practices in corporate environmental governance. These findings enable enterprises to optimize resource allocation and reconfigure governance architectures, ultimately generating synergistic sustainability outcomes across operational, financial, and environmental dimensions.

2. Institutional and regulatory factors

This section situates external governance mechanisms at the forefront of CEP improvement, demonstrating how public policy and mandatory disclosure serve as the initial catalysts in our framework. By understanding these top-down pressures, the section sets the stage for examining how firms respond internally.

2.1. Environmental information disclosure

By mandating the regular disclosure of emissions data, energy consumption, and environmental compliance records, the government's environmental information disclosure system builds a multidimensional oversight network, encompassing the public, investors, and other stakeholders, and establishes a sustained pressure-transmission mechanism that drives continuous improvements in corporate environmental performance [5]. Stringent disclosure mandates—including quarterly emissions and compliance reports due within 30 days of period closure, coupled with penalties of up to USD 1 million or 5% of annual revenue for non-compliant disclosure—compel corporate leadership to prioritize environmental metrics in strategic decision-making, thereby mitigating legal and reputational exposure [5,6].

2.2. Strength of environmental regulation enforcement

Strength of environmental regulation enforcement refers to the frequency of supervision and inspection, the strength of enforcement, and the severity of penalties imposed by regulatory agencies on corporate environmental compliance beyond the legislative level. Empirical studies confirm that enhanced regulatory scrutiny drives significant emission reductions. Under Japan's 1992 Automobile NO_x Law, inspection mandates and elevated penalties cut NO_x emissions by 87% and SO_2 levels by 52% over a six-year implementation cycle [7]. Concurrently, U.S. EPA data show TSP concentrations in non-attainment zones declined 46% during 1972–1982 following Clean Air Act enforcement [8]. In addition, the strict regulatory environment also encourages companies to incorporate environmental performance into the top incentive assessment system, resulting in a steady improvement in ESG performance in the three dimensions of environmental responsibility, social responsibility and corporate governance [6].

3. Internal organizational drivers

Building on the external mandates outlined previously, this section delves into how companies translate regulatory expectations into concrete internal practices. It highlights the bridge between

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outside pressure and internal action, preparing the ground for the financial enablers that mobilize resources to support these initiatives.

3.1. Corporate Social Responsibility (CSR)

As a voluntary, reputation-oriented management tool, CSR programs usually cover public welfare and environmental protection projects, community involvement, and employee environmental education. Companies that actively engage in CSR activities not only gain a higher external reputation premium, but also cultivate green capabilities internally. For instance, they recruit individuals with environmental backgrounds and train them in green skills, thereby enhancing the potential for long-term environmental performance improvement. In addition, the degree of organizational support for CSR and green transformational leadership at the top are important mediating variables in the relationship between CSR and CEP: CSR's direct effect on CEP was $\beta = 0.16$ ($p < 0.01$), accounting for roughly 10 % of CEP's variance, while the indirect effects via green dynamic capabilities ($\beta = 0.04$, 95 % CI [0.01, 0.08]) and transformational leadership ($\beta = 0.03$, 95 % CI [0.01, 0.07]) were both statistically significant [9].

3.2. Environmental Management System (EMS)

EMS certifications such as ISO 14001 provide companies with a systematic environmental management framework, including identifying environmental impacts, setting environmental objectives, implementing monitoring and auditing, and continuous improvement. Quantitative evidence further underscores the effectiveness of EMS. A recent meta-analysis of 7,834 effect sizes across 53 studies shows that the mean effect size of the relationship between ISO 14001 certification and emissions reduction is $r = 0.30$ (95 % CI [0.15, 0.44], $p < 0.01$), indicating a moderate positive impact on pollutant control [10]. Thus, it shows that companies with EMS certification have, on average, lower pollutant emission intensity than non-certified companies, and are better at integrating environmental objectives with quality management and safety processes [11]. EMS promotes data-driven performance assessment, enabling companies to make scientific decisions based on measured data, and to maintain dynamic optimization of the system through internal audits and management reviews.

3.3. Corporate culture

An environmentally oriented corporate culture is not only embodied in written value statements, but also in daily behavioral guidelines and incentive mechanisms. Recent empirical research, using 7,199 firm-year observations from 2002 to 2018, underscores the critical role of corporate culture in driving environmental outcomes. It finds that a one-standard-deviation increase in corporate culture score leads to a 3.85 % reduction in toxic chemical release, approximately 44,600 lbs per firm annually, which is both statistically and economically significant. After the implementation of a green value-centered corporate culture, the willingness of employees to behave in an environmentally friendly manner is significantly increased, which makes employees more willing to maintain and improve their environmental performance, and creates a positive feedback loop [12]. The shaping of such a culture usually requires top management to take the lead, the inclusion of environmental indicators in the performance appraisal system, and the provision of rewards for excellent environmental performance, thus forming a combination of "bottom-up" and "top-down" cultural atmosphere throughout the organization.

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4. Financial enablers

With internal structures in place, firms require targeted funding mechanisms to implement and scale environmental improvements. This section shows how green bonds, sustainability-linked loans, and investor scrutiny align capital flows with CEP goals, thereby linking organizational intent to real investment.

Financial instruments such as green bonds and sustainability loans provide dedicated capital flows and incentives for innovation by linking interest rate concessions or the amount of financing to the environmental performance indicators achieved by the firm. Analysis of 356 Chinese A-share manufacturing firms (2015–2022) demonstrates that green bond issuance triggers a 15-percentage-point surge in cleantech CAPEX allocation (from a baseline of 12% to 27%) within a 24-month implementation window [13]. At the same time, financial institutions also incorporate environmental risks into their loan approval and investment decision-making processes through ESG due diligence, thus creating positive incentives on the capital side.

As institutional investors pay more attention to ESG performance, companies that perform poorly in terms of environmental performance may face capital market risks such as fund reductions or share price volatility. More than 30% of studies find that institutional investors' shareholding is positively related to corporate CEP, and this relationship is more significant in regions with lax regulations, where the role of market self-regulation mechanisms is more prominent [14]. For example, empirical evidence from U.S. firms over the period 2007–2017 shows that companies with higher proportions of independent, long-term, domestic institutional investors exhibit significantly lower carbon emissions compared to those dominated by short-term or foreign investors [15].

5. Technology and innovation factors

Having secured both the mandate and the means to act, companies increasingly turn to digital tools and novel processes. Here this section illustrates how IoT, AI, and green R&D function as accelerators within the framework, translating financial support into measurable environmental gains.

Digital technologies, including the Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain, enable real-time collection, analysis, and traceability of environmental data. Based on multi-country manufacturing panel data, companies increased their energy efficiency by an average of 9% and customer satisfaction with their green products by nearly 15% for each level of digitization [16]. Digitalization not only optimizes process parameters, but also reduces the environmental risks of equipment failure through predictive maintenance.

Green innovation emphasizes resource conservation, pollution reduction and recycling in product design, process and business models. A study of the top 500 global manufacturing companies revealed that those with dedicated green R&D teams and environmental themes in their patent portfolios had pollutant emission intensities that were approximately 18% lower than the industry average [17]. The diffusion of green innovations also relies on external networks, including industry-university-research collaborations, industry alliances, and policy incentives.

6. Market and stakeholder dynamics

Beyond rules and resources, marketplace signals and civil society pressures shape corporate behavior in powerful ways. This section integrates consumer preferences, media scrutiny, and NGO

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activism into our model, showing how external demand and reputation concerns feed back into strategic decision-making.

Modern consumers are increasingly valuing environmentally friendly products and are willing to pay a premium for them. Over 60 % of respondents preferred to buy a product when it was labeled “low carbon” or “eco-friendly”, driving companies to incorporate environmental performance into their marketing and product development strategies [16]. This shift in market demand affects not only consumers but also the supply chain, prompting suppliers to provide more environmentally friendly raw materials and services. For instance, Delta Cafés implemented a multi-tier certification system across its entire coffee supply chain, including spanning farmers, processors, roasters, and distributors, ensuring that by 2020 all raw materials and packaging suppliers met rigorous environmental and social standards. This not only enhanced traceability and food-safety compliance but also led to measurable reductions in energy use and waste along the supply chain [18].

Media exposure of incidents and NGO monitoring reports can quickly amplify the social impact of negative environmental behaviors, which in turn can trigger consumer boycotts or investor divestment. After the negative environmental incidents of their sample companies (e.g., American International Group) were exposed, stock prices fell by an average of 4% on average on the first trading day and underperformed the industry benchmark for roughly three months, as demonstrated in an event study of 45 U.S. manufacturing firms following media reports of environmental violations [19].

7. Driver synergy mechanism

Finally, this section brings together all preceding elements, including regulation, organizational practices, finance, technology, and market forces, to demonstrate their combined impact. By exploring coupling paths and industry heterogeneity, this section reveals how multi-factor interaction delivers the greatest improvements in CEP.

Research indicates that a single driver yields diminishing marginal returns in enhancing CEP, whereas the combination of external pressure and internal kinetic energy can create a synergistic effect where “1+1>2”. For example, when a company simultaneously obtains green bond financing and launches an IoT and AI-driven energy management system, its carbon intensity is reduced by 22% on average compared to a company relying on a single measure [13]. The internal–external synergy necessitates a three-dimensional alignment of regulatory pressure (linked to ESG ratings), technical capability (AI algorithms), and data feedback (via blockchain) to achieve carbon intensity reduction. This coupled path not only helps to accelerate both finance and technology, but also further consolidates the effectiveness of environmental governance through a closed-loop mechanism of internal data sharing and external regulatory feedback.

There are significant differences in the degree of response of different industries in the coupling mechanism. Highly polluting industries (e.g., steel, chemical) are more sensitive to the coupling path due to higher regulatory and market pressures, with their CEP improvement averaging about 1.3 times faster than that of low-carbon industries [20]; whereas, in the service and software industries, the combination of internal digital transformation and corporate culture makes a more prominent marginal contribution to CEP. This industry heterogeneity suggests that coupling strategies need to fully consider industry characteristics and technology maturity to maximize synergies.

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8. Conclusion

This review categorizes the multi-faceted drivers of enterprise environmental performance into institutional and regulatory aspects, internal organizational practices, financial empowerment, technological innovation, and market and stakeholder dynamics. Recent evidence suggests that no single factor can fully exert its effect in isolation. Instead, the combined synergy of multiple factors is the most effective way to enhance an enterprise's environmental performance. It is worth noting that green finance and regulatory disclosure have emerged as powerful external catalysts, while corporate social responsibility, corporate culture, and digitalization serve as key internal levers. Therefore, the key for enterprises to cope with increasingly severe environmental challenges and gain sustainable competitive advantages lies in adopting an integrated approach. Despite these insights, research gaps still exist. Future research should also examine the relative cost-benefit trajectories of different combinations of driving factors, thereby providing a reference for the best investment portfolio for sustainable development. More detailed analysis across industries and enterprise scales can clarify the effects of various driving factors in specific scenarios, which is conducive to customizing more targeted environmental performance improvement strategies for different types of enterprises. By integrating interdisciplinary perspectives, this review provides a foundation for scholars seeking to advance the theory of sustainable environmental performance and practitioners designing comprehensive environmental strategies.

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