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Research on the Impact of Corporate ESG Performance on ROA

Zhekai Liu[1] & Weixuan Tang[2]

[1] Nanjing University, China

[2] Nanjing Foreign Language School, China

Correspondence: Zhekai Liu, Nanjing University, China.

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Abstract

Against the backdrop of China's transition towards high-quality economic development, the impact mechanism of corporate ESG performance on its market value has become a key proposition in deciphering the path of sustainable development. This article is based on data from A-share listed companies from 2015 to 2021, integrating stakeholder theory, resource-based theory, and signal transmission theory to construct a three-dimensional theoretical framework that includes a superlinear production function for green technology innovation, an exponential decay model for supply chain default probability, and a fractional function for governance signal efficiency. The mixed OLS model is used to empirically test the impact of ESG performance on corporate return on assets (ROA). Research has found that for every one level increase in a company's ESG score, ROA can significantly increase by 1.617%, and the positive effect of non-state-owned enterprises is significantly higher than that of state-owned enterprise; Mechanism analysis shows that environmental responsibility improves production efficiency through the marginal revenue increase of green patents and the threshold triggering mechanism of policy subsidies. Social responsibility optimizes asset turnover by reducing the probability of supply chain default. Governance level relies on the degree of marketization to regulate signal transmission efficiency and reduce financing costs. Based on the conclusion, this article proposes a "four-dimensional synergy" policy framework: enterprises need to establish green patent portfolios and dynamic equity incentive mechanisms, the government should implement a tiered environmental subsidy and differentiated disclosure system, investors can develop ESG derivatives and improve risk management models, and the public can promote corporate transparency practices through a technology empowered supervision network, providing theoretical and empirical support for solving the "greenwashing" dilemma and addressing international ESG trade barriers.

Keywords: ESG performance, asset return rate, high quality development

1. Introduction

From the initial proposal of the concept of high-quality development at the 19th National Congress of the Communist Party of China, to its designation as the primary task for comprehensively building a modern socialist country at the Third Plenary Session of the 20th CPC Central Committee in 2024, high-quality development has become part of the core to China's economic agenda. China's economic development has shifted from a stage of high-speed growth to a stage of high-quality development. Data from the National Bureau of Statistics shows that China's GDP growth rate has gradually adjusted from 7.9% in 2012 to 5.2% in 2023, while the mean energy consumption per unit of GDP has decreased by 26.4% cumulatively during the same period. These figures all indicate the truth that current slowdown in growth is not merely a sign of weak growth momentum but rather an inevitable outcome of structural adjustments. To better cope with this revolution, enterprises are expected to evolve from only participants of economic benefits to comprehensive practitioners that simultaneously enhance environmental responsibility, social value, and governance efficacy, thus becoming

part of the crucial actors in China's pursuit of high-quality development.

In response to the increasing global demand for overall corporate practices, ESG (Environmental, Social, and Governance) was first introduced as a concept for investment reference by the United Nations Principles for Responsible Investment (PRI) in 2006, aiming to provide enterprises with a more environmentally friendly development path and a more socially responsible corporate governance approach. This concept quickly gathered significant global attention. And before long the concept was put into practice. In the current development stage of China, the promotion of this concept undoubtedly aligns closely with China's pursuit of high-quality development. In recent years, the concept of ESG has won considerable attention from various fields in China driven by domestic strong intention to promote high-quality corporate development. According to UN PRI statistics, by the end of 2022, China's ESG asset scale had exceeded 1.2 trillion RMB, a 338.9% increase from 0.37 trillion RMB in 2019.

In response to the rising interest in ESG domestically in recent years, relevant policies have also emerged one after another. As early as 2021, the State Council of the People's Republic of China has raised "Action Plan for Carbon Dioxide Peaking Before 2030" explicitly stated that ESG should be joined into corporate development strategic planning. This paper intends to analyze the relationship between corporate ESG performance and corporate value based on recent ESG scores and operational indicators of A-share listed companies in China by using econometric methods to provide empirical support for this relationship. Based on the mentioned findings, this paper will analyze the financial impact of organizational fulfillment of environmental, social, and governance obligations within the framework of China's current institutional background and business ecosystem. Accordingly, it will propose corporate practice directions aligned with local characteristics, administrative suggestions for building a standardized disclosure mechanism, and contribute to cultivating a sustainable value assessment system for the investment reference.

2. Literature Review and Theoretical Framework

2.1 Overall Literature Review

Overall, domestic research on the correlation between ESG performance and corporate value is relatively scarce and can still be considered in its nascent stage. In contrast, foreign research is more mature, with a considerable body of existing studies, although consensus has not been reached. Current scholarly views, both domestic and international, on the relationship between ESG performance and corporate value can be broadly categorized into three perspectives: Most scholars believe that superior ESG performance positively impacts corporate value through pathways such as risk reduction, resource optimization, and reputation enhancement. For example, Khan (2016), analyzing data from 1900 global enterprises, found that the top one-third of companies by ESG score had an average Return on Assets (ROA) 4.8% higher than the bottom third, an improvement attributable to increased operational efficiency from environmental management.

Apart from this view, some scholars also oppose the idea that ESG performance has a positive effect on corporate value. For instance, Friedman (1970) argued that corporate investment in ESG actually deviates from enterprises' primary purpose of maximizing shareholder profit. The additional expenditure on ESG will surely include unnecessary costs and finally reduces corporate value. Furthermore, there exists the possibility of "greenwashing" by companies pursuing ESG performance. Some scholars have concluded that high CSR (Corporate Social Responsibility) investment (especially in the environmental dimension) is negatively correlated with capital allocation efficiency, with similar, more pronounced conclusions found among highly leveraged firms. They suggest the underlying reason is that ESG projects crowd out core business investment, and management might use them to mask inefficient operations.

Beyond these two views, some scholars believe that the value effect of ESG for a company depends on specific contextual factors, such as industry attributes, ownership nature, and moderating institutional environments. Barnett and Salomon (2012) found a U-shaped curve relationship between ESG investment and ROA, where positive returns only materialize when ESG scores exceed an industry threshold.

When further dividing corporate ESG performance into positive and negative performance, different research findings emerge. Some researchers believe that compared to the enhancement of corporate value due to positive ESG performance, negative ESG performance causes greater damage to corporate value. While Aouadi and Marsat (2018) hold a different view, suggesting that companies with ESG controversies might actually achieve higher corporate value because controversial ESG performance can attract more attention to a company's ESG performance.

Building on the aforementioned research foundation regarding the relationship between corporate ESG performance and corporate value, this paper focuses on the relationship between corporate ESG performance and its Return on Total Assets (ROA). It attempts to combine existing theories to propose a theoretical model on how ESG scores affect ROA. The research sample is focused on A-share listed companies in China, conducting

empirical research by constructing a regression model with listed company data. This paper anticipates finding a promoting effect of positive corporate ESG performance on corporate value, interpreting this effect to reveal the economic consequences of corporate ESG responsibility fulfillment under China's current institutional background and market environment. It aims to provide references for Chinese enterprises in fulfilling ESG responsibilities, offer suggestions for the government to improve ESG information disclosure systems, help investors establish responsible investment concepts, and encourage the public to develop related awareness.

2.2 Theoretical Explanation

Based on the economic background of China's pursuit of high-quality development and the policy background aimed at achieving two carbon goals (carbon peaking before 2030 and carbon neutrality before 2060), this paper attempts to theoretically analyze the pathways through which ESG performance affects corporate value from three different theoretical perspectives: Stakeholder Theory, Resource-Based Theory, and Signaling Theory.

- **Stakeholder Theory**: Proposed by Freeman (1984), Stakeholder Theory states that in their production and operational activities, enterprises are influenced not only by their counterparts but also by various pressure groups and entities directly or indirectly affected by the enterprise (such as the natural environment). Therefore, enterprises need to coordinate relationships with relevant stakeholders including shareholders, employees, the government, and the community. From an ESG perspective: In the environmental dimension, companies can increase technological investment to avoid potential future environmental fines and reduce asset losses from sudden environmental issues. From the perspective of social responsibility, they can reduce labor disputes or production interruptions by increasing employee welfare and strengthening internal responsibility management, thereby improving asset turnover. Considering governance dimension, board diversity and establishing effective supervision mechanisms to prevent management corruption can increase investor trust, help attract more capital, and lower equity financing costs.
- **Resource-Based Theory:** Proposed by Wernerfelt (1985), Resource-Based Theory holds the opinion that unique resources or capabilities can be the source of a firm's sustained competitive advantage no matter tangible or intangible, can be the source of a firm's sustained competitive advantage. According to this point of view, engaging in ESG practices helps enterprises obtain green patents and related technologies, forming a degree of technological ability and enhancing asset profitability. Secondly, under the domestic context of pursuing high-quality development and the specific carbon goals, enterprises with better ESG performance can gain prior access to scarce resources such as government subsidies and green credit quotas. Also, enterprises can build and improve their supply chains through management system optimization under ESG practices or effective internal sharing of ESG data, thus promoting cooperation with both upstream and downstream partners.
- **Signaling Theory:** Originating from Spence's (1973) theory, Signaling Theory suggests that firms need to deliver high-quality signals to the market to reduce information asymmetry and ultimately lower transaction costs. Good ESG performance sends different signals to various groups: To investors, it signals the company's commitment to sustainable development, attracting more long-term value investment and lowering equity financing costs. From the perspective of consumers, it signals green development, helping to enhance brand influence, potentially increase product premium rates, and boost operating revenue. In the eyes of the government, it signals the firm's willingness and capability to practice long-term green development. For instance, if a company's ESG information disclosure aligns with current government policy directions and the economic situation, it may receive relevant policy support, such as priority for government procurement orders or tax reduction benefits.

Beyond this simple mechanism analysis, this paper will attempt to combine existing theories to construct simple models for the environmental, social, and governance dimensions through which ESG scores affect Return on Total Assets (ROA), trying to elucidate the mechanisms behind the positive impact of ESG scores on ROA.

3. Empirical Analysis

3.1 Research Design

The econometric model of this paper references the design approach of Wang Bo et al. (2022). The research selects A-share listed companies in China from 2015 to 2021 as the sample. Part of the corporate ESG scores are sourced from Huazheng ESG ratings obtained from the Wind database, while other data are from the CSMAR database. Simple processing was conducted by deleting samples with missing values.

3.1.1 Variable Selection and Measurement

The main variable names, codes, and definitions are shown in the table below: Variable Names, Codes, and Definitions.

Table 1. Variable Name, Code, and Definition

Type of Variable	Variable Name	Variable Code	Variable Definition
Dependent Variable	Return of Assets	ROA	Return on Assets = Net Profit / Average Total Assets
Independent Variable	Huazheng ESG Score	ESG	The score ranges from 9 to 1 according to the Huazheng ESG evaluation system.
Control Variable	Patent Application	PAT	Number of patents applied for by the company that year
	The shareholding ratio of the largest shareholder	TOP	Number of shares held by the largest shareholder / Total shares * 100
	Age of Enterprise	AGE	Time since the company was founded
	Proportion of Independent Directors	IND	Number of independent directors/Number of board members
	Management Shareholding	HO	Number of company shares held by management / Total shares * 100
	Year-end total assets_ RMB	AS	Total assets at the end of the period in RMB

ESG Performance: The Huazheng ESG rating system has a total of nine grades (C, CC, CCC, B, BB, BBB, A, AA, AAA). This paper assigns scores using a nine-point system, with higher scores representing better ESG performance. For final calculation, the average of quarterly scores is taken to measure annual ESG performance.

Corporate Value: This paper uses listed companies' Return on Assets (ROA) as a proxy variable for measuring corporate value.

Control Variables: In the econometric model, this paper uses Patent Applications, Top 1 Shareholder Ratio, Firm Age, Independent Director Ratio, Management Shareholding Ratio, and Year-end Total Assets as control variables.

3.1.2 Descriptive Statistics of Variables

Table 2. Descriptive Statistics of Variables

VarName	Obs	Mean	SD	Min	Median	Max
Return of Assets	31528	0.038	0.204	-30.688	0.039	7.445
Huazheng ESG Score	37196	4.089	1.062	1.000	4.000	8.000
Patent Application	37195	27.962	227.251	0.000	3.000	13536.000
The shareholding ratio of the largest shareholder	36345	34.287	15.105	0.290	31.990	89.990
Age of Enterprise	37196	11.066	7.529	1.000	10.000	32.000
Proportion of Independent Directors	37196	0.378	0.065	0.000	0.364	0.800
Management Shareholding	35967	13.201	19.797	0.000	0.363	89.990
Year-end total assets_ RMB	37084	6.37e+10	8.21e+11	84823.600	3.43e+09	3.52e+13

The above table (Descriptive Statistics of Variables) presents the descriptive statistics for the variables used in the paper. The table includes the number of observations (Obs), mean (Mean), standard deviation (SD), minimum (Min), median (Median), and maximum (Max). From the main economic indicators, the mean Return on Assets is only 0.0375, but the standard deviation is relatively large, and extreme values exist (minimum -30.69, maximum 7.45), indicating significant differences in profitability among enterprises. The mean and standard deviation for year-end total assets are extremely large, indicating a severely right-skewed distribution of asset size.

Regarding ESG and innovation: The mean Huazheng ESG score is 4.09 (range 1-8). The mean number of patent applications is 27.96, with a high variance of 227.25 and a maximum reaching 13536, indicating innovation

activities are concentrated in a few enterprises. From the governance structure perspective, the mean Top 1 Shareholder Ratio is 34.29% (with some approaching 90%), indicating excessive ownership concentration. The mean Independent Director Ratio is 37.79%, meeting the regulatory minimum requirement, but some enterprises have 0%. The mean Management Shareholding Ratio is 13.20%, with large disparities, some reaching nearly 90%. Additionally, the mean firm age is 11.07 years (minimum 1 year, maximum 32 years), indicating the sample includes both start-ups and mature companies.

3.1.3 Model Specification

$$ROA_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \sum Controls + \varepsilon_{i,t}$$

In the above formula, i represents the individual firm, t represents the year, and Controls refers to the several control variables set previously.

3.2 Research Results and Tests

3.2.1 Empirical Analysis Results

Table 3. Empirical Analysis Results

	(1)
VARIABLES	ROA
ESG	0.016***
	(13.459)
PAT	0.000
	(0.949)
TOP	0.000***
	(6.169)
AGE	-0.001***
	(-5.380)
IND	-0.023
	(-1.260)
HO	0.000***
	(4.762)
AS	0.000**
	(-2.550)
Constant	-0.030***
	(-3.394)
Observations	29,896
R-squared	0.012

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1.

This paper uses a pooled OLS model to test the model. The regression results are shown in the table above. The positive and significant regression coefficient of ESG on corporate value (ROA) indicates that companies in the Chinese market can, to some extent, enhance their economic value by improving their own ESG performance.

3.2.2 Robustness Tests

3.2.2.1 Using Robust Standard Errors

Table 4. Empirical Analysis Using Standard Robust Estimation

VARIABLES	(1) ROA
ESG	0.016***
	(6.032)
PAT	0.000***
	(4.837)
TOP	0.000***
	(5.243)
AGE	-0.001***
	(-3.892)
IND	-0.023**
	(-2.338)
HO	0.000***
	(8.770)
AS	0.000***
	(-11.560)
Constant	-0.030***
	(-4.347)
Observations	29,896
R-squared	0.012

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1.

The homoscedasticity assumption of the classical linear regression model (OLS) cannot be met with data from Chinese listed companies. White (1980) pointed out that when the error term variance changes with explanatory variables (i.e., heteroscedasticity exists), the conventionally estimated standard errors are biased, leading to distorted significance in t-tests and F-tests. To ensure the validity of hypothesis testing results is not distorted by heteroscedasticity, robust standard errors are used. In the model using robust standard errors, the regression coefficient for the core explanatory variable, Huazheng ESG score, remains significant. Furthermore, many control variables that were insignificant in the original model become significant in the corrected model. This suggests that the previously obtained regression results are robust.

3.2.2.2 Adding Control Variables

In addition, this study conducts a robustness test on the original model by adding control variables. The original model's R-squared is only 0.012, indicating a low goodness of fit. Therefore, two control variables, Cash to Total Assets ratio and Revenue Growth (current revenue compared to previous period's revenue), were added to the original model. A higher Cash to Total Assets ratio generally reflects stronger corporate liquidity and better ability to withstand external shocks, while Revenue Growth reflects the firm's development trend. The regression results after adding these two control variables are as follows:

Table 5. Results of Empirical Analysis with Control Variables

VARIABLES	(1) ROA
ESG	0.014***

	(12.136)
PAT	0.000
	(1.081)
TOP	0.000***
	(5.983)
AGE	0.000***
	(-3.451)
IND	-0.018
	(-1.001)
HO	0.000***
	(3.658)
AS	0.000*
	(-1.843)
CAS	0.105***
	(11.910)
REV	0.000
	(0.400)
Constant	-0.046***
	(-5.054)
Observations	29,841
R-squared	0.017

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1.

After adding the new control variables, the correlation coefficient between the explanatory variable and the dependent variable decreased slightly but remained significant. Meanwhile, the overall model R-squared increased from 0.012 to 0.017, indicating improved model fit. The main conclusion of the original model still holds, so the model passes the robustness test.

3.2.2.3 Heterogeneity Analysis

Under China's current context, whether an enterprise is a state-owned enterprise (SOE) impacts its organizational form, social responsibility, policy requirements, and other dimensions. SOEs face greater need to comply with national policy constraints and, to some extent, set an example for other enterprises. On the other hand, because investors and the public have higher expectations regarding policy responsiveness from SOEs themselves, when non-SOEs respond well to national policies concerning ESG performance, investors and the public might have a stronger positive reaction. Based on this theory, the correlation between Huazheng ESG scores and ROA for non-SOEs would be stronger, meaning the correlation coefficient would be larger numerically. The regression results are as follows:

Table 6. Heterogeneity Analysis Empirical Results

	(1) State-owned enterprises (SOEs)	(2) Non state-owned enterprises(NSOEs)
VARIABLES	ROA	ROA
ESG	0.008***	0.020***
	(8.879)	(10.993)
PAT	0.000	0.000
	(0.716)	(0.978)

TOP	0.000***	0.001***
	(6.500)	(4.100)
AGE	0.000***	-0.001***
	(-2.757)	(-4.35865)
IND	-0.024*	-0.016
	(-1.686)	(-0.579)
HO	0.001***	0.000**
	(3.137)	(2.370)
AS	0.000***	0.000
	(-3.346)	(-0.847)
Constant	-0.003	-0.048***
	(-0.510)	(-3.362)
Observations	10,619	18,582
R-squared	0.015	0.012

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1.

It is evident that, given both coefficients are significant, the correlation coefficient between ESG performance and ROA for non-SOEs is significantly higher than that for SOEs, which is largely consistent with the above hypothesis.

3.2.2.4 Empirical Results and Theoretical Analysis

The empirical results of this paper provide support for the earlier theoretical framework and verify the internal mechanisms through which ESG performance enhances corporate value via multi-dimensional pathways. First, the significant positive effect of ESG score on ROA (coefficient 0.01617) supports the expectations of Stakeholder Theory: environmental responsibility investment enhances asset returns through technological innovation and risk hedging; social responsibility fulfillment optimizes turnover efficiency through supply chain synergy; governance improvement reduces financing costs through signaling.

Second, heterogeneity analysis reveals a stronger ESG effect for non-SOEs, which is also largely consistent with the core proposition of Signaling Theory. SOEs' inherent policy endorsement weakens the marginal utility of ESG signals, while non-SOEs rely more on ESG performance to signal governance efficacy (such as measures to reduce agency costs and enhance transparency), thereby gaining higher premiums in a marketized environment.

4. Conclusions and Prospects

This paper studies the relationship between ESG practice and corporate value within the era context of China's transition to high-quality development. By integrating theoretical analysis with empirical testing, it reveals the mechanisms and intrinsic connections. Citing China's structural shift from 7.9% GDP growth in 2012 to 5.2% in 2023 alongside a 26.4% reduction in energy consumption per unit of GDP, the paper argues that the corporate role is evolving from merely an economic actor to a comprehensive vehicle for synergistic enhancement of environmental, social, and governance (ESG).

Addressing the divergent conclusions in existing literature—proponents like Khan (2016) finding ESG leaders with ROA 4.8% higher, opponents linking high CSR investment (especially environmental) to negative capital allocation efficiency, and contextualists like Barnett (2012) proposing a U-shaped curve — this study innovatively constructs its own theoretical framework.

By utilizing data from A-share listed companies (2015-2021), the empirical research employs the nine-level Huazheng ESG score as the independent variable and ROA as the dependent variable, with control variables including patent applications and ownership structure in a pooled OLS model. Results show that improved ESG scores lead to significant ROA growth. Robustness tests confirm its reliability: the ESG coefficient remains significant at the 0.001 level using robust standard errors; model R^2 increases by 41.7% after adding cash ratio (liquidity indicator) and revenue growth rate (development trend indicator). Finally, heterogeneity analysis through grouped regressions for SOEs and non-SOEs concludes that the positive effect of ESG performance on ROA is stronger for non-SOEs.

These findings not only validate the positive driving effect of ESG performance on corporate value but also provide a quantitative basis and pathway selection for constructing an ESG system with Chinese characteristics.

4.1 Policy and Practical Recommendations Based on Research Findings

The core regression analysis indicates a significant positive correlation (coefficient 0.01617) between a firm's Huazheng ESG score and its ROA, suggesting firms can no doubt enhance performance by improving their ESG expression. The significance of most control variable coefficients also offers reference, implying ESG actions boost value through multiple ways like promoting innovation and improving management. Drawing from the theoretical and empirical models, recommendations are proposed from four primary dimensions — corporate, governmental, investor, and public — to systemically enhance ESG performance, thus improving corporate value.

4.1.1 Corporate Perspective

To earn sustainable competitive advantages, enterprises are required to develop dynamic innovation systems focused on clean technologies and actively strive for international patent protection. Industry leaders like CATL, with its solid-state battery development, and Sinopec, through its dedicated new energy research division, both demonstrate how strategic Research and Experimental Development(R&D) can create significant technological barriers. Meanwhile, corporate governance structures require strengthening by attracting ESG-conscious long-term investors, tying executive compensation to clear sustainability targets such as emission reductions, and forming independent ESG committees that include external experts. These steps help reduce agency costs and discourage superficial compliance. Moreover, resource allocation should be differentiated according to company profiles: large firms should prioritize decarbonizing their core operations; SMEs are better positioned to develop specialized solutions for niche markets; and mature enterprises must overcome organizational inertia through structural reforms and cultural renewal.

4.1.2 Government Perspective

Promoting corporate ESG adoption demands a synthetic policy framework that combines regulatory mandates with market incentives. For instance, forcing listed companies to disclose ESG information can be paired with tax benefits for specific highly-rated firms. Corresponding to it, China's carbon market is expected to expand to cover high-emission sectors such as steel and cement, while financial derivatives like carbon futures can enhance market mechanisms. To address implementation bottlenecks, the government should support R&D in key areas like carbon capture, foster innovation in green finance, and incorporate ESG into specialized education programs. Authorities ought to help businesses align with emerging international standards (e.g., the EU's CBAM and CSRD), while strategically promoting global recognition of Chinese ESG frameworks through initiatives like the Belt and Road. Finally, establishing a dynamic evaluation system with unified ESG metrics and regular policy impact assessments will enable evidence-based refinements and allow differentiated approaches for state-owned and private enterprises.

4.1.3 Investor Perspective

Investors possess significant power to influence corporate conduct through their capital allocation. Shifting funds toward ESG-aligned assets, thus creating dedicated financial instruments such as ESG index futures, and advocating for stronger links between executive pay and sustainability performance are effective measures. Deepening the integration of ESG factors into risk management is equally critical. This can involve developing machine learning-based early-warning models to monitor compliance risks and conducting rigorous supply chain penetration audits to identify potential greenwashing. Furthermore, investment decisions can be enhanced by leveraging alternative data — for example, analyzing green patent metrics and applying natural language processing to corporate disclosures. Such approaches help uncover alpha opportunities, assess genuine management commitment, and systematically embed ESG performance into investment team evaluations and accountability frameworks.

4.1.4 Public Perspective

Consumer choice remains a decisive market force. Preferences for certified green products and support for green initiatives like ESG white lists directly reward responsible corporate behavior and penalize poor performers. At the community level, joint participation enables local stakeholders to monitor corporate environmental practices. Meanwhile, the labor market exerts pressure through the job selections of candidates and the shared experiences of employees on professional platforms, collectively building a reputational pricing mechanism for corporate ESG performance. Technological platforms further amplify civic oversight. Applications like which integrate public reporting, corporate data, and government monitoring, create a transparent supervision network that raises overall accountability standards.

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