

## Research Article

# Exploring the Multidimensional Effect of ESG Performance on Corporate Innovation Capability

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**Abstract**— Recently, the focus on environmental responsibility has intensified due to the push for high-quality and sustainable development strategies. The concept of Environmental, Social, and Governance (ESG) has become an important tool for evaluating a company's long-term sustainability and social impact, serving as a critical reference indicator for investors' decision-making. This research employs a sample of A-share listed companies in China, designing an Innovation Capability (ICL) indicator to measure corporate innovation capability. By constructing a fixed panel model, the study analyzes the impact of ESG performance on corporate innovation capability. The findings reveal that: 1) A notable positive correlation exists between ESG performance and corporate innovation capability, with companies demonstrating strong ESG performance excelling in both innovation input and output; 2) Agency costs play a mediating role between ESG performance and corporate innovation capability. Good ESG performance can reduce agency costs, thereby promoting corporate innovation; 3) Factors such as corporate growth potential, cash flow levels, company size, and board size also significantly affect corporate innovation capability. Based on these findings, companies should emphasize ESG practices, as these can not only improve corporate governance and enhance financial performance but also boost innovation capability, guiding sustainable development and promoting high-quality socio-economic development.

**Keywords**— ESG, Corporate Innovation Capability, Mediation Effect, Agency Costs, Corporate Growth, Cash Flow Level

## 1. Introduction

In recent years, driven by high-quality and sustainable development strategies, environmental responsibility issues have received widespread attention. ESG, an acronym for Environmental, Social, and Governance, offers a holistic framework for evaluating companies and investors. It is recognized as an important tool for assessing a company's long-term sustainability and social impact, serving as a critical reference indicator for investors' decision-making. Unlike traditional corporate evaluation standards, ESG focuses more on non-financial performance, encouraging companies to take on social and environmental responsibilities in addition to financial returns, and to emphasize corporate governance from a sustainable development perspective. Companies with strong ESG performance often exhibit high internal governance standards, well-established mechanisms, reduced short-term behavior, effective use of external resources, and promotion of corporate innovation. An increasing number of companies are engaging in ESG practices, with the related industry scale gradually expanding, and academic interest in corporate ESG performance also increasing. Most of the contemporary research is centered around the interactions between ESG and

factors like corporate performance, investment, and financial performance. (Landi and Sciarelli, 2021; Aybars et al., 2019; Naimy et al., 2021; Cherkasova and Nenuzhenko, 2022) with relatively few studies examining the impact of ESG on corporate innovation [1] [2] [3] [4].

Meanwhile, active innovation activities are crucial for enhancing a company's competitiveness. However, due to the high risks and long cycles associated with R&D activities, most companies are not highly willing to invest in R&D, and their enthusiasm needs to be increased. Additionally, the efficiency of R&D output varies significantly among companies, making the study of factors influencing corporate innovation a popular topic. Based on this, this paper selects Chinese A-share listed companies as the main research object to explore how ESG performance affects corporate innovation capability and to study its mechanisms, aiming to provide new ideas for promoting corporate innovation and increasing stakeholders' attention to ESG performance.

The research starts by exploring the relationship between corporate social responsibility performance and innovation, offering new perspectives for companies, governments, and investors to enhance corporate innovation capability. On the

one hand, it helps companies to focus on non-financial performance, abandon short-term behavior, increase R&D investment, improve output efficiency, and enhance competitiveness. On the other hand, it assists governments and regulatory authorities in strengthening the construction of ESG disclosure mechanisms, formulating policies to encourage corporate innovation, and guiding sustainable corporate development. Additionally, it serves as a reminder for investors to consider corporate ESG performance, providing a more detailed evaluation framework for their decisions. This, in turn, urges companies to improve their ESG practices and stimulate innovation, contributing to high-quality socio-economic growth.

The remainder of the paper is structured as follows: Section 2 reviews related research on ESG performance and corporate innovation capability, offering a thorough overview of previous studies in this field. Section 3 presents the measures and methodology used in this study, detailing the data sources, variables, and model construction. Section 4 outlines the architecture and essential steps of the empirical analysis, including the robustness and endogeneity tests. Finally, Section 5 explains the conclusions drawn from the study, along with policy implications and recommendations for future research.

## 2. Literature Review

### 2.1 Corporate ESG Performance

A significant number of scholars have conducted in-depth studies on various aspects of ESG performance, including elements such as business performance, financing costs, and company worth. In terms of ESG performance and corporate performance, Friede et al. (2015) synthesized findings from approximately 2200 individual studies and found that the majority indicate a non-negative relationship between ESG and corporate financial performance (CFP) [5]. Zhang et al. (2021) showed that companies with high ESG scores perform better in market performance and financial performance [6]. Li et al. (2021) demonstrated that all three dimensions of ESG significantly enhance corporate innovation performance [7]. Chen (2023) further validated the positive correlation between ESG and financial performance; however, this relationship diminishes over the long, medium, and short terms, particularly in short-term financial performance where the effect is not significant [8].

Regarding ESG performance and financing costs, Fan et al. (2023) found that improving a company's ESG score can significantly reduce its debt financing costs. They analyzed the three facets of ESG—environmental, social, and governance—and found that the social and governance components have a particularly strong effect on decreasing debt financing costs, while the impact of the environmental aspect is relatively smaller. The study also discovered that differences in evaluations by various rating agencies and inconsistencies within ESG indicators can affect debt financing costs and weaken the effect of reducing these costs through ESG scores [9]. Qiu and Yin (2019) found that a company's ESG performance has a significant negative

impact on equity financing costs, with all ESG components negatively affecting equity financing costs. They also noted that the impact of ESG performance on equity financing costs varies across industries, being more significant in highly polluting industries [10].

Liu and Bai (2021) argued that the impact of ESG essentially prompts companies to "internalize" the effects of their business activities on the environment and society. In this process, the boundaries between companies and markets are redefined, and changes in the products and services provided by companies will lead to changes in demand, thereby affecting corporate value [11]. Wang (2022) found that there is an inverted U-shaped relationship between corporate value and ESG information disclosure. In the short term, increasing ESG information disclosure may negatively affect corporate value; however, in the long term, fully disclosing ESG information has a positive effect on enhancing corporate value [12].

### 2.2 Impact of Corporate ESG Performance on Corporate Innovation Capability

Numerous studies support the positive impact of ESG on corporate innovation. Li et al. (2021) found that improving ESG scores significantly promotes corporate innovation activities, especially in non-state-owned, high-tech, and highly competitive industries [13]. Fang and Hu (2023), based on stakeholder theory, confirmed that ESG performance can significantly increase corporate innovation output, primarily by alleviating financing constraints, enhancing employee innovation efficiency, and increasing risk-taking [14]. Yao and Jiang (2023) discovered that actively implementing ESG principles significantly improves corporate innovation output. They emphasized that high levels of ESG practices can enhance a company's ability to obtain social capital, mitigate management's short-term behavior, and alleviate financing constraints, thereby promoting corporate innovation [15].

However, a minority of scholars argue that ESG practices may occupy resources that are beneficial for corporate innovation, thus inhibiting innovation. Broadstock et al. (2020) observed that the early adoption of ESG policies enhances a company's innovation capabilities, which in turn positively influences value creation and financial/operational performance [16]. Liu et al. (2021) indicated that under limited corporate resources, corporate social responsibility might inhibit R&D investment to some extent [17]. Tang (2022) determined that ESG performance not only increases the quantity and quality of corporate innovation but also mediates this effect by reducing financial constraints and agency costs [18].

## 3. Variable Setting and Model Construction

### 3.1 Data Sources and Sample Selection

The study focuses on Chinese A-share listed companies between 2019 and 2023 as the research sample. We exclude ST, \*ST, PT, and financial industry companies, as well as samples with substantial missing values or obvious anomalies in key variables during the sample period. The final dataset

comprises 2895 companies with a total of 9972 observations. The ESG performance data for the companies is sourced from the China Securities Index Co., Ltd., which provides the China Securities ESG scores. Other relevant data primarily come from the Wind and CSMAR databases.

### 3.2 Variable Setting

The dependent variable in this study is Innovation Capability (ICL). To ensure that the innovation capabilities of different companies can be directly quantified and compared, this study draws on the research of Yang et al. (2019) [19].

Corporate ESG performance serves as the independent variable in this research. The ESG scores provided by the China Securities Index Co., Ltd., known as the China Securities ESG scores, are the most comprehensive. Their percentage-based scoring system (ranging from 0 to 100) is more precise compared to the ABC rating system, facilitating empirical research. Therefore, this study uses the China Securities ESG scores (ESGP) to measure the independent variable.

The mediating variable in this study is corporate agency costs. Following the methodology of Zheng et al. (2024), the management expense ratio is utilized in this study to quantify corporate agency costs [20]. Additionally, this study selects eight indicators as control variables:

**Corporate Growth (RGR):** Reflects the company's operational status and growth potential. Companies with higher growth rates often place more emphasis on R&D and innovation. This is measured by the revenue growth rate.

**Cash Flow Level (CL):** Reflects the company's cash holdings. Higher cash levels provide more funds for innovation investment and stronger willingness for innovation activities. This is measured by the ratio of operating cash flow to total assets.

**Debt Leverage (DER):** Reflects the company's debt level. This is measured by the debt-to-asset ratio.

**Profitability (PR):** The company's ability to generate profits is demonstrated by the ratio of net profit to average total assets.

**Company Size (SIZE):** The company's scale and market share are represented by the logarithm of total assets.

**Board Size (BS):** Reflects the level of management oversight and decision-making efficiency. This is measured by the number of board members.

**Company Age (AGE):** It indicates the company's age and maturity, calculated as the logarithm of the number of years since its establishment plus one.

**Ownership Concentration (SC):** Reflects the structure of the board and ownership. This is measured by the combined shareholding ratio of the top three shareholders.

**Table 1.** Variable descriptions and sources

Variable Type	Variable Name	Symbol	Variable Description
Dependent Variable	Innovation Capability	ICL	The ratio of total R&D expenditure to total assets of the company
Independent Variable	ESG Performance	ESGP	Logarithm of China Securities ESG score
Mediating Variable	Agency Costs	MGR	Management expense ratio of the company
Control Variables	Corporate Growth	RGR	Revenue growth rate of the company
	Cash Flow Level	CL	Operating cash flow / Total assets
	Debt Leverage	DER	Debt-to-asset ratio of the company
	Profitability	PR	Net profit / Average total assets
	Company Size	SIZE	Logarithm of total assets of the company
	Board Size	BS	Number of board members of the company
	Company Age	AGE	Logarithm of the years since establishment by the end of the current year
	Ownership Concentration	SC	Combined shareholding ratio of the top three shareholders of the company

### 3.3 Model Construction

In order to analyze the influence of ESG performance on corporate innovation capability, this research utilizes the approaches proposed by Broadstock et al. (2020) and Long et al. (2023) to construct a two-way fixed effects panel model [16, 21]:

$$ICL_{i,t} = \alpha_0 + \alpha_1 ESGP_{i,t} + \alpha_2 RGR_{i,t} + \alpha_3 CL_{i,t} + \alpha_4 DER_{i,t} + \alpha_5 PR_{i,t} + \alpha_6 SIZE_{i,t} + \alpha_7 BS_{i,t} + \alpha_8 AGE_{i,t} + \alpha_9 SC_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t} \tag{1}$$

In the above equation: i denotes firm and t denotes year. The explained variable ICL is the innovation capability of firm i in year t; ESGP is firm i's ESG performance in year t,  $\gamma$  is the fixed effect and  $\epsilon$  denotes the random disturbance term, respectively; the other variables are control variables.

## 4. Empirical Analysis

### 4.1 Descriptive Statistics

The descriptive statistics results are shown in Table 2. Overall, the values of the variables selected in this study fall within a reasonable range. There are no obvious anomalies in the sample data, allowing for further analysis.

**Table 2.** Descriptive statistics of main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ESGP	9972	2.236	0.042	2.093	2.315
ICL	9972	0.032	0.026	0.0	0.15
RGR	9972	0.156	0.397	-0.638	2.177
CL	9972	0.067	0.078	-0.148	0.305
DER	9972	0.515	0.23	0.085	1.09
PR	9972	0.037	0.095	-0.416	0.26
SIZE	9972	11.69	0.674	10.489	13.774
BS	9972	1.093	0.101	0.839	1.375
AGE	9972	1.578	0.14	1.176	1.866
SC	9972	0.558	0.185	0.192	1.021

### 4.2 Correlation Analysis

Table 3 displays the results of the correlation analysis between ESG performance and the key variables of the sample companies. According to the data, the correlation coefficient between ESGP and ICL is positive and significantly positive at the 1% significance level. Additionally, significant correlations with ICL are observed for other related variables at the 1% significance level. This indicates that, without considering other influencing factors, there is a certain positive correlation between ESG performance and corporate innovation capability. Moreover, the control variables also have a significant impact on corporate innovation capability, demonstrating the validity of the selected variables.

**Table 3.** Correlation analysis of main variables

Variable	ICL	ESGP	RGR	CL	DER	PR	SIZE	BS	AGE	SC
ICL	1.000									
ESGP	0.045	1.000								
RGR	0.053	0.039	1.000							
CL	0.022	0.235	0.118	1.000						
DER	-0.118	-0.402	0.043	-0.183	1.000					
PR	0.270	0.221	0.443	0.453	-0.445	1.000				
SIZE	-0.196	0.148	0.042	0.123	0.431	0.067	1.000			
BS	-0.222	0.136	0.022	0.045	0.087	0.044	0.115	1.000		
AGE	0.332	-0.012	-0.092	-0.067	0.126	-0.042	0.352	0.146	1.000	
SC	-0.343	0.146	0.041	0.133	-0.020	0.146*	0.048	0.062	0.118	1.000

Note: The correlation coefficients in the table are all significant at the 1%, 5%, or 10% levels.

### 4.3 Collinearity Test

To verify whether there is a multicollinearity issue in the data, this study uses the Variance Inflation Factor (VIF) method for analysis. The results show that the mean VIF for the variables is 1.274, which is well below the threshold of 10. This indicates that there is no significant collinearity problem among the variables.

**Table 4.** Analysis of covariance test of variables

Variable	VIF	1/VIF
PR	1.652	0.581
SIZE	1.552	0.618
DER	1.55	0.619
CL	1.244	0.772
ESGP	1.155	0.831
RGR	1.127	0.853
SC	1.078	0.891
BS	1.073	0.896
AGE	1.034	0.929

### 4.4 Baseline Regression Analysis

The baseline regression results are shown in Table 5. Both regression analyses include time and industry fixed effects to control for individual characteristics and industry traits that do not change over time. In regression model (1), the analysis considers only the independent variable and the dependent variable. The results show that the regression coefficient of ESGP is positively significant at the 5% significance level. Building on this, regression model (2) further introduces other control variables. The analysis finds that the coefficient of ESGP slightly increases and remains positively significant

at the 1% significance level. This comparative analysis indicates a significant positive relationship between corporate ESG performance and innovation capability. Additionally, this positive correlation persists even after controlling for other variables, which suggests the robustness of the regression results.

**Table 5.** Benchmark regression results

Variable	(1)	(2)
ESGP	0.008** (2.53)	0.009*** (0.001)
RGR		0.001*** (0.000)
CL		0.005*** (0.002)
DER		-0.001 (0.004)
PR		-0.008*** (0.908)
SIZE		-0.015*** (0.787)
BS		0.004* (0.001)
AGE		0.018* (0.961)
SC		0.01*** (0.952)
_cons	0.002 (0.337)	0.116*** (0.765)
N	9972	9972
R2	0.032	0.078
F	5.745	12.88

### 4.5 Mediation Effect Analysis

To test the mediating effect of ESG performance on corporate innovation capability through agency costs, this study follows the approaches of scholars such as Tang (2022) and Chen et al. (2023) by constructing the following stepwise regression two-way fixed effects models [18, 8]:

$$MGR_{i,t} = \beta_0 + \beta_1 ESGP_{i,t} + \beta_2 RGR_{i,t} + \beta_3 CL_{i,t} + \beta_4 DER_{i,t} + \beta_5 PR_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 BS_{i,t} + \beta_8 AGE_{i,t} + \beta_9 SC_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t} \tag{2}$$

$$ICL_{i,t} = \mu_0 + \mu_1 ESGP_{i,t} + \mu_2 RGR_{i,t} + \mu_3 CL_{i,t} + \mu_4 DER_{i,t} + \mu_5 PR_{i,t} + \mu_6 SIZE_{i,t} + \mu_7 BS_{i,t} + \mu_8 AGE_{i,t} + \mu_9 SC_{i,t} + \mu_{10} MGR_{i,t} + \gamma_i + \gamma_t + \epsilon_{i,t} \tag{3}$$

where:  $\beta$  and  $\mu$  are coefficients, the mediating variable is MGR,  $i$  denotes firms, and  $t$  denotes year.

Table 6 presents the results of testing the mediating effect of agency costs using the stepwise regression method. In the main effect regression, the coefficient of ESGP is positive and significantly positive at the 1% significance level, indicating a positive correlation between ESG performance and corporate innovation capability. In regression model (2), the coefficient for ESGP and agency costs is both negative and significant at the 1% level, indicating that strong ESG performance may lower agency costs. In regression (3), the coefficient of agency costs on corporate ICL is negative and significant at the 1% significance level, indicating that higher agency costs have a negative impact on corporate innovation capability. Additionally, although the impact of ESGP on corporate ICL remains positively significant in regression (3), its coefficient and t-value decrease compared to regression (1). This suggests that agency costs partially mediate the

relationship between ESG performance and corporate innovation capability.

**Table 6.** Results of the analysis of intermediary effects

Variable	(1)	(2)	(3)
ESGP	0.01*** (0.061)	-0.043*** (0.143)	0.019*** (0.043)
MGR			-0.010*** (0.080)
RGR	0.001*** (0.796)	-0.02*** (0.051)	0.001*** (0.000)
CL	0.006*** (0.75)	-0.021*** (0.088)	0.006*** (0.619)
DER	-0.000 (0.338)	0.01*** (0.965)	-0.000 (0.255)
PR	-0.009*** (0.363)	-0.108*** (0.616)	-0.009*** (0.876)
SIZE	-0.016*** (0.232)	-0.052*** (0.034)	-0.017*** (0.443)
BS	0.004* (0.101)	-0.007 (0.07)	0.004* (2.072)
AGE	0.019* (0.112)	0.077** (2.65)	0.019* (0.186)
SC	0.011*** (0.41)	-0.001 (0.035)	0.011*** (6.405)
_cons	0.125*** (0.362)	0.511*** (0.423)	0.13*** (0.617)
N	9972	9972	9972
F	13.871	53.155	13.783

**4.6 Heterogeneity Analysis**

Table 7 shows the relationship between ESGP and ICL in companies with different board sizes. In companies with small to medium-sized boards, the coefficient between ESGP and ICL is positive but not significant; in companies with larger board sizes, the coefficient is also not significant. This indicates that in small to medium-sized companies, the positive effect of ESG performance on corporate innovation capability increases with the expansion of the board size. However, when the board size becomes too large, this effect is no longer significant.

**Table 7.** Results of Heterogeneous Analysis

Variable	Small	Medium	Large
ESGP	0.001** (0.262)	0.018*** (0.066)	-0.008 (0.931)
RGR	0.003*** (4.583)	0.001*** (0.029)	0.003*** (0.369)
CL	0.003 (0.793)	0.009*** (0.063)	0.006 (0.816)
DER	-0.003 (0.075)	-0.001 (0.076)	-0.006 (0.707)
PR	-0.014*** (0.535)	-0.009*** (0.004)	-0.003 (0.476)
SIZE	-0.021*** (0.085)	-0.015*** (0.158)	-0.024*** (0.341)
BS	0.005 (0.096)	-0.006 (0.098)	-0.001 (-0.217)
AGE	0.059*** (0.073)	0.023 (1.847)	-0.029 (-1.167)
SC	0.016*** (0.198)	0.013*** (5.108)	0.009 (1.56)
_cons	0.161*** (0.077)	0.11*** (4.978)	0.323*** (7.663)
N	2876	3269	1875
R2	0.116	0.091	0.231
F	8.484	9.315	10.29

**4.7 Robustness and Endogeneity Tests**

**4.7.1 Robustness Analysis**

This study uses the logarithm of the lagged one-period patent application count as a measure of corporate innovation capability. The results are shown in Table 8. Regardless of whether control variables are included, the regression coefficient between ESGP and corporate innovation capability is significantly positive at the 1% significance level. This indicates that when using the lagged one-period dependent variable as a measure, the statistically significant positive relationship between ESG performance and corporate innovation capability remains strong and reliable.

**Table 8.** Robustness test results

Variable	(1)	(2)
ESGP	1.617*** (1.094)	1.481*** (2.363)
RGR	-0.019 (-0.362)	
CL	0.325 (0.242)	
DER	-0.131 (0.025)	
PR	-0.185 (0.588)	
SIZE	0.502*** (0.013)	
BS	0.14 (0.355)	
AGE	-0.303 (0.195)	
SC	0.033 (0.088)	
_cons	-0.884 (0.014)	-5.163* (-1.978)
N	5687	5687
R2	0.035	0.044
F	2.93	2.31

**4.7.2 Endogeneity Test**

This study draws on Zhou et al.'s research by selecting the average ESG rating of the city where the company is located (CM) as an instrumental variable and uses the two-stage least squares (2SLS) method for testing. Table 9 reports the regression results of the two-stage least squares (2SLS) method. In the first-stage regression analysis, the correlation coefficient between the instrumental variable and the company's ESG performance is 0.644 and statistically significant. In the second-stage regression analysis, the regression coefficient of the company's ESG performance, obtained through the instrumental variable method, is positive and significant. The results indicate that after controlling for endogeneity issues, the positive effect of corporate ESG performance on corporate innovation capability is still validated.

**Table 9.** Endogeneity test results

Variable	ICL	First-order	Second-order
ESGP	0.011*** (0.296)		0.142*** (0.292)
CM		0.644*** (0.538)	

RGR	0.011*** (0.296)	-0.001*** (0.163)	-0.0 (-0.109)
CL	0.006*** (0.038)	0.027*** (0.704)	0.023*** (0.416)
DER	-0.0 (0.364)	-0.048*** (0.592)	0.00 (0.205)
PR	-0.01*** (0.851)	0.014*** (0.813)	-0.002 (0.017)
SIZE	-0.017*** (0.785)	0.024*** (0.007)	-0.005*** (0.836)
BS	0.005* (0.262)	0.008* (0.231)	-0.004 (0.242)
AGE	0.021* (0.275)	-0.01*** (0.666)	-0.014*** (0.164)
SC	0.012*** (0.902)	0.035*** (0.462)	-0.002 (-1.23)
Constant	0.135*** (0.004)	0.796*** (0.604)	-0.18** (0.533)
Observations	9972	9972	9972
R-squared	0.09	0.259	0.316

## 5. Conclusion

Drawing on data from Chinese A-share listed companies between 2019 and 2023, this paper examines the diverse effects of ESG performance on a company's ability to innovate and analyzes the heterogeneity of the effect of ESG performance on corporate innovation capability under different corporate governance structures and maturity levels. The main conclusions drawn from the study are as follows: Firstly, ESG performance has a significant positive impact on corporate innovation capability. Empirical analysis shows that the impact of corporate ESG performance on innovation capability is positive and significant at the 1% significance level, and this impact is robust. Specifically, good ESG performance can effectively enhance corporate innovation capability by reducing agency costs. This result emphasizes that ESG practices not only improve a company's social responsibility image but also directly enhance its innovation potential.

Secondly, the positive impact of ESG performance on corporate innovation capability exhibits significant heterogeneity concerning the size of the company's board. The study finds that compared to companies with too large or too small board sizes, companies with moderately sized boards see a more significant positive effect of ESG performance on innovation capability. This indicates that an optimal board size can better facilitate the positive relationship between ESG practices and innovation capability, possibly due to improved decision-making efficiency and the effectiveness of governance structures.

Thirdly, in robustness tests, this paper further verifies the robustness of the empirical results by substituting the measurement method of the dependent variable and conducting a time-lagged analysis of the independent variable. Even after changing the measurement method, the results remain valid; in the time-lagged analysis of the independent variable, the regression coefficient remains significantly positive, indicating that the positive impact of ESG performance on corporate innovation capability has a certain

long-term effect. This further validates the long-term value of ESG practices in promoting corporate innovation.

Therefore, a company's ESG performance not only significantly promotes its innovation capability but also demonstrates this promotion effect more prominently under a moderately sized board structure. This suggests that combining active ESG practices with an optimal governance structure can produce more significant positive effects in promoting corporate innovation.

Based on the above research findings, it is recommended that policymakers and corporate management focus on the following points to further promote corporate innovation capability:

Firstly, strengthen ESG regulations and incentives. Policymakers should formulate and improve ESG-related policies and regulations, encouraging companies to implement effective ESG practices. Incentive measures such as financial subsidies and tax benefits can be provided to encourage companies to invest more resources in ESG, thereby enhancing their innovation capability.

Secondly, optimize board structure. Companies should optimize their board size based on their specific circumstances to achieve the best balance in governance structure. The research indicates that companies with moderately sized boards exhibit a more significant positive impact of ESG practices on innovation capability. Therefore, companies should strive to maintain a reasonable board size to enhance the effectiveness of ESG practices.

Thirdly, support long-term investment. Policies should encourage companies to make long-term investments, especially in ESG-related fields such as green technology and sustainable development projects. Long-term investments not only help improve a company's social responsibility image but also provide stable support for enhancing its innovation capability.

Lastly, promote transparency in ESG performance. It is recommended that companies enhance the transparency of ESG information disclosure, making specific measures and outcomes of ESG practices publicly available. This not only helps improve the company's social credibility but also provides clearer decision-making criteria for investors and other stakeholders, fostering a positive interaction between ESG practices and innovation capability.

### Data Availability

Data can be requested from the author, but due to the complexity and diversity of the sources, obtaining them may be challenging.

### Conflict of Interest

No conflict of interest exists.

### Funding Source

No funding sources were received for this work.

### Authors' Contributions

Yu Tan completed all aspects of the work, including research, data analysis, and manuscript preparation.

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