

The Impact of Corporate ESG Performance on High-Quality Innovation Development: A Study Based on Listed Companies

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Abstract: Based on data from Chinese listed companies, this study explores the impact mechanism of corporate ESG performance on high-quality innovation development. It analyzes how ESG performance indirectly enhances innovation quality by improving corporate performance and risk management capabilities. The findings indicate that ESG performance not only directly promotes corporate investment in innovation, intellectual property capabilities, realization of innovation value, and market influence but also provides solid support for high-quality innovation development by strengthening corporate performance and risk control. Specifically, companies with superior ESG performance demonstrate stronger capabilities in technological research and development, achievement transformation, value realization, and market competitiveness while also exhibiting greater long-term resilience and risk resistance. This study enriches the theoretical framework of ESG and corporate innovation and provides important practical insights for enterprises on how to achieve high-quality innovation development through ESG management. Based on the research conclusions, this paper suggests that the government standardize ESG information disclosure and use policy tools such as tax incentives and subsidies to encourage enterprises to increase their ESG investments. Additionally, financial institutions should be encouraged to develop ESG-linked financing products to provide stable funding support for corporate innovation activities.

Keywords: ESG performance, high-quality innovation development, corporate performance, risk management capability

1. Introduction

With the deepening global emphasis on sustainable development, Environmental, Social, and Governance (ESG) performance has become an important indicator for measuring corporate competitiveness. In recent years, an increasing number of companies have incorporated ESG factors into their strategic decision-making to address growing environmental challenges and social responsibility demands. Meanwhile, innovation, as the core driving force of high-quality corporate development, has attracted extensive attention from both academia and industry. However, during the pursuit of innovation, companies often face resource constraints and inadequate risk management. How to enhance ESG performance to drive high-quality innovation development has become a crucial research topic. Based on data from Chinese listed companies, this study examines the impact

mechanism of ESG performance on high-quality innovation development and analyzes how ESG performance indirectly improves innovation quality by enhancing corporate performance and risk management capabilities. This research not only enriches the theoretical framework of ESG and corporate innovation but also provides valuable policy insights for companies seeking to achieve sustainable development through ESG management.

The marginal contributions of this study are as follows:

(1) Bridging a Research Gap – Existing literature mainly focuses on the impact of ESG performance on corporate financial performance or short-term market performance, while research on how ESG performance promotes high-quality innovation development remains relatively scarce. By introducing corporate performance and risk management capability as mediating mechanisms, this study systematically explores the impact pathways of ESG performance on high-quality innovation development, enriching the theoretical framework of ESG and corporate innovation.

(2) Uncovering the Mechanisms – This study not only verifies the direct positive effect of ESG performance on high-quality innovation development but also delves into the mediating role of corporate performance and risk management capability. It reveals how ESG performance indirectly enhances corporate innovation quality by improving performance and strengthening risk management, offering a new perspective on the relationship between ESG performance and corporate innovation.

(3) Providing Practical Guidance – The findings offer valuable insights into how companies can leverage ESG performance to drive high-quality innovation development. The results indicate that companies should not only focus on the short-term financial impact of ESG performance but also recognize its role in enhancing risk management capability and long-term innovation quality. This provides a useful reference for companies in balancing short-term interests with long-term sustainable development when formulating ESG strategies.

The remainder of this paper is structured as follows: Section 2 discusses the theoretical relationship between ESG performance and high-quality innovation development. Section 3 examines the changing trends in ESG and corporate high-quality innovation development. Section 4 conducts a mechanism analysis. Section 5 concludes the study.

2. Theoretical hypotheses

A substantial body of research suggests that improvements in corporate ESG performance can enhance a company's innovation capabilities, specifically its capacity for innovation investment and intellectual property development, thereby driving innovation growth[1]. A company's ESG advantages are not only reflected in increased innovation input and output but also in the realization of innovation value and the expansion of market influence. Regarding innovation value, enterprises with superior ESG performance place greater emphasis on technological research and development as well as the transformation of research outcomes, making their innovative products more competitive in the market and driving the realization of innovation value[2]. Regarding market influence, effective ESG management enables companies to improve product quality control, such as implementing stricter quality audit mechanisms and reducing defect rates, thereby enhancing the market acceptance of innovative products. ESG performance fosters consumer trust and satisfaction, strengthens corporate brand reputation, and further expands market influence, ultimately increasing the commercial value of innovative products[3]. Furthermore, sound ESG management not only optimizes a company's innovation management mechanisms but also integrates greater social responsibility attributes into its innovation outcomes, thereby steering enterprises toward a higher-quality and more sustainable innovation trajectory[4]. Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 1: Corporate ESG performance promotes high-quality innovation development.

ESG performance not only directly fosters corporate innovation but also indirectly promotes high-quality innovation development by enhancing corporate performance. Extensive research has demonstrated a significant positive correlation between ESG performance and corporate performance [5-6]. Effective ESG management can elevate corporate reputation, bolster investor confidence, and increase recognition in capital markets, thereby alleviating financing constraints and improving a company's financing capabilities [7]. Moreover, enterprises with strong ESG commitments tend to exhibit higher market competitiveness and stronger brand loyalty, granting them advantages in product sales, market expansion, and capital returns. This ultimately results in greater excess returns. Enhanced corporate performance not only provides stable financial support but also strengthens a company's competitiveness in technological R&D, talent acquisition, and market promotion, laying a solid foundation for high-quality innovation development [8]. Additionally, improvements in corporate performance enhance long-term resilience, making companies more willing to engage in high-risk, high-reward innovation activities, thereby further advancing innovation quality and value realization. Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 2: Corporate ESG performance promotes high-quality innovation development by enhancing corporate performance.

Innovation activities inherently involve high uncertainty, and improving risk management capability is crucial for innovation stability and sustainable development. ESG performance has been shown to effectively strengthen corporate risk management, equipping companies with greater resilience against market fluctuations and unexpected risk events [9]. Studies indicate that companies with strong ESG performance demonstrate greater risk resistance when facing external shocks (such as the COVID-19 pandemic), with cumulative excess returns significantly outperforming firms with weaker ESG performance. This suggests that ESG management helps enterprises maintain stable innovation investments in uncertain environments, reducing the likelihood of innovation investment disruptions or resource wastage due to market risks, credit risks, or operational risks. [10] Furthermore, corporate ESG management systems often include stricter compliance measures, supply chain oversight, and environmental risk assessments, which help enterprises avoid unnecessary risks during the innovation process. This enhances the sustainability and market adaptability of innovation outcomes. As a result, companies with superior ESG performance tend to adopt a more proactive approach to risk management, ensuring the continuity of innovation investment and fostering high-quality innovation development. Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 3: Corporate ESG performance promotes high-quality innovation development by enhancing risk management capability.

3. ESG and high-quality corporate development

This section provides an in-depth discussion on the relationship between corporate ESG performance and high-quality corporate development. The ESG data used in this study is sourced from the Huazheng ESG database, while listed company data is obtained from the CSMAR database.

3.1. Trends in ESG development

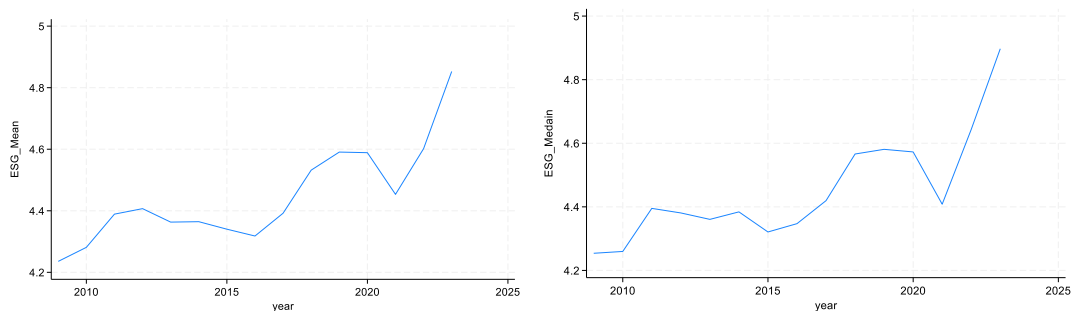


Figure 1: Trends in ESG development

Figure 1 illustrates the trends in the average ESG performance of Chinese enterprises over the past fifteen years. Whether observed from the perspective of the mean or the median, corporate ESG performance has shown a steady upward trend over time. This trend indicates that an increasing number of enterprises are prioritizing Environmental, Social, and Governance (ESG) factors and incorporating them into their strategic decision-making and corporate development planning. The improvements in ESG performance, reflected in both the average and median values, demonstrate the continuous progress of enterprises in fulfilling their social responsibilities.

3.2. Trends in high-quality corporate innovation development

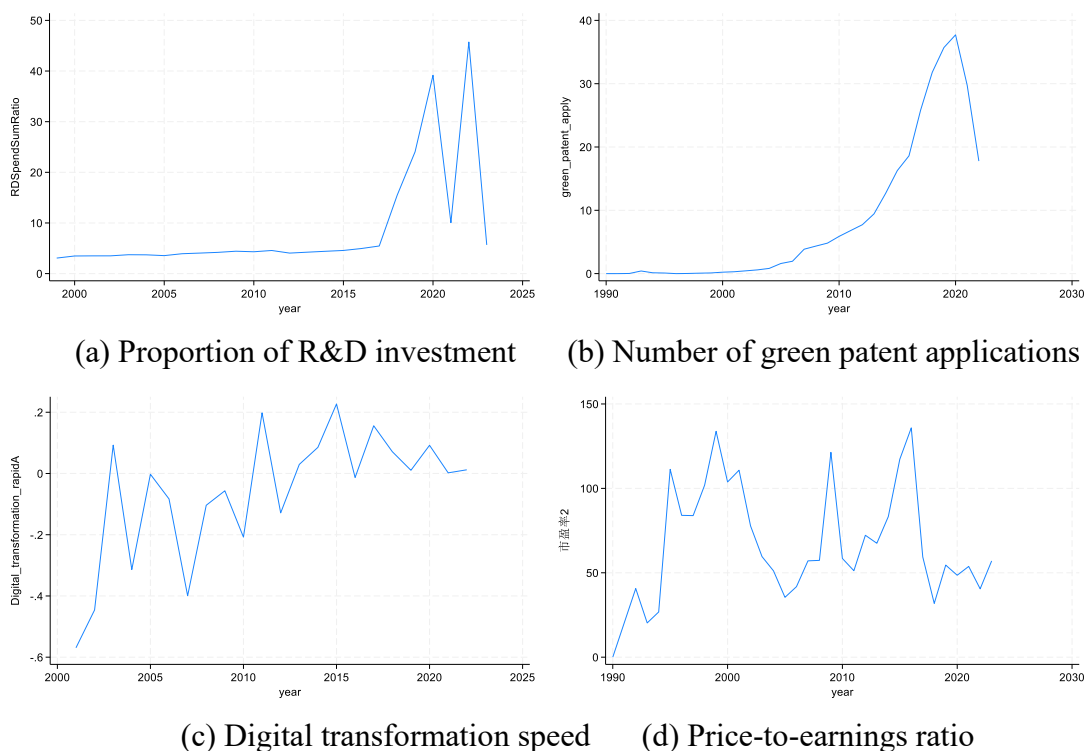


Figure 2: High-quality corporate innovation development

3.2.1. Innovation investment capability

As shown in Figure 2(a), the average proportion of R&D investment (the ratio of R&D expenditure to total revenue) has experienced a significant increase since 2017, accompanied by substantial fluctuations in recent years. This trend suggests that an increasing number of enterprises are ramping up their innovation investments, signifying an enhancement in innovation investment capability. As corporate ESG performance improves, firms gain greater financing capabilities and higher investor confidence, facilitating an increase in R&D investment. Strong ESG performance encourages enterprises to invest more in innovation while also improving the quality and sustainability of their innovation activities. This aligns with Hypothesis 1, which posits that ESG performance positively enhances corporate innovation investment capability.

3.2.2. Intellectual property capability

Figure 2(b) illustrates a significant increase in the number of green patent applications, particularly since 2010, reflecting a noticeable surge in innovation within the green technology sector. The number of green patents serves as an indicator of a company's intellectual property capability, which is a key component of high-quality sustainable development. As ESG performance improves, enterprises tend to allocate more resources to green innovation and environmentally friendly technologies. This not only enhances their intellectual property creation capabilities but also strengthens their market competitiveness. In line with Hypothesis 1, improvements in ESG performance drive the accumulation of intellectual property in green technology and innovative products.

3.2.3. Realization of innovation value

Figure 2(c) depicts advancements in corporate digital transformation speed. As an important indicator for evaluating innovation value realization, digital transformation speed has exhibited significant fluctuations but has generally remained at a high level. Digital transformation enhances corporate operational efficiency and facilitates the development of new innovative products and services. The overall upward trend in Figure 2(c) suggests that enterprises are increasingly integrating digital technologies into their innovation processes, thereby enhancing the adaptability and commercialization of innovative products. As ESG performance improves, enterprises gain access to more resources and policy support, strengthening their capacity for sustained and rapid digital transformation. This finding aligns with Hypothesis 1, demonstrating that ESG performance enhances the realization of innovation value.

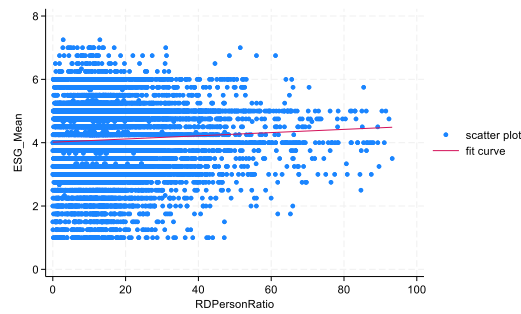
3.2.4. Market influence

As shown in Figure 2(d), corporate price-to-earnings (P/E) ratios exhibit considerable fluctuations but maintain an overall upward trajectory. The P/E ratio serves as a key metric for assessing a company's market performance and is closely linked to its market influence.

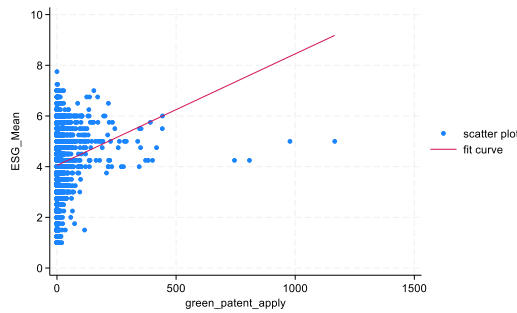
With improved ESG performance, enterprises can strengthen their brand reputation, boost consumer trust, and enhance market recognition, ultimately increasing their market share and raising their P/E ratios. Strong ESG management enhances corporate market competitiveness, enabling firms to establish a favorable position in the market. This, in turn, drives revenue growth from innovative products and strengthens market influence, supporting Hypothesis 1, which suggests that ESG performance positively impacts market influence.

3.3. Correlation analysis

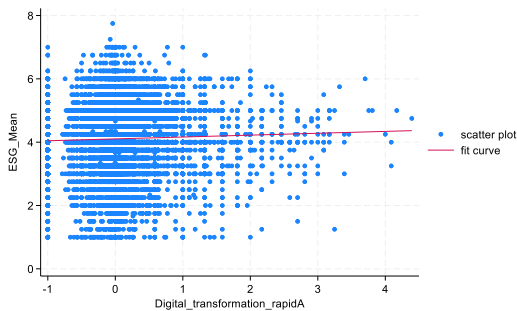
As corporate ESG performance improves, its impact on high-quality innovation development becomes increasingly evident. This study further explores the relationship between ESG performance and innovation investment, intellectual property capability, innovation value realization, and market influence to provide a more in-depth understanding of the connection between ESG performance and high-quality corporate innovation development.



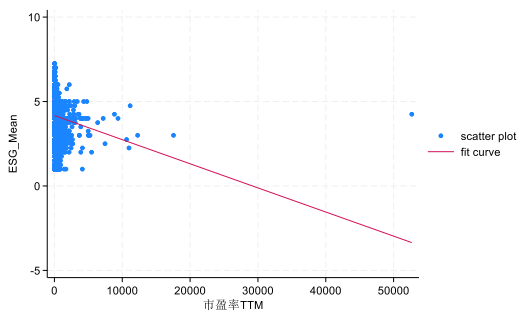
(a) ESG and innovation investment capability



(b) ESG and intellectual property capability



(c) ESG and innovation value realization



(d) ESG and market influence

Figure 3: Correlation analysis

Figure 3 illustrates the relationship between corporate ESG performance and high-quality corporate development.

First, ESG performance enhances innovation investment capability. As shown in Figure 3(a), ESG performance is positively correlated with the proportion of R&D investment, indicating a positive relationship between ESG performance and innovation investment capability. As ESG performance improves, enterprises also enhance their ability to invest in innovation. Strong ESG performance helps businesses secure more capital support and gain investor confidence, thereby facilitating increased innovation investments and promoting high-quality innovation development.

Second, ESG performance strengthens intellectual property capability. Figure 3(b) demonstrates a positive correlation between ESG performance and the number of green patent applications, indicating that ESG performance is positively associated with intellectual property capability. Corporate investments in environmental protection drive green innovation and strengthen intellectual property capabilities. By maintaining strong ESG performance, enterprises not only improve their public image but also reinforce their technological barriers and better protect intellectual property rights related to innovation. This, in turn, enhances their intellectual property capability and fosters high-quality innovation development.

Third, ESG performance facilitates innovation value realization. Figure 3(c) presents the relationship between ESG performance and digital transformation speed. The results indicate that strong ESG performance accelerates digital transformation, thereby improving the market adaptability of innovative products and facilitating the realization of innovation value. Digital transformation enhances the commercialization of innovative products. ESG performance provides enterprises with stable financial support and stronger brand credibility, enabling them to maximize the value of their innovations. This finding is consistent with the hypothesis that ESG performance promotes innovation value realization and drives high-quality innovation development.

Finally, ESG performance and market influence. Figure 3(d) illustrates a negative correlation between ESG performance and the price-to-earnings ratio (P/E ratio), which serves as an indicator of market influence. The fitted curve between ESG performance and P/E ratio TTM shows a downward slope, suggesting that the market may undervalue enterprises with strong ESG performance. Although these firms excel in environmental, social, and governance aspects, the market may not fully recognize the long-term value contributions of ESG performance, leading to lower P/E ratios. The P/E ratio primarily reflects market expectations of short-term profitability, whereas ESG performance embodies a company's long-term sustainability and competitive advantage. Enterprises with strong ESG performance generally demonstrate greater resilience and long-term competitiveness. However, they may face higher short-term costs (such as environmental investments and social responsibility expenditures), which could negatively impact short-term profitability and result in lower P/E ratios. Nevertheless, over time, these investments enhance a company's long-term competitiveness and sustainable profitability, ensuring the high-quality and sustainable development of innovation.

4. Mechanism analysis

4.1. Corporate performance and risk management capability

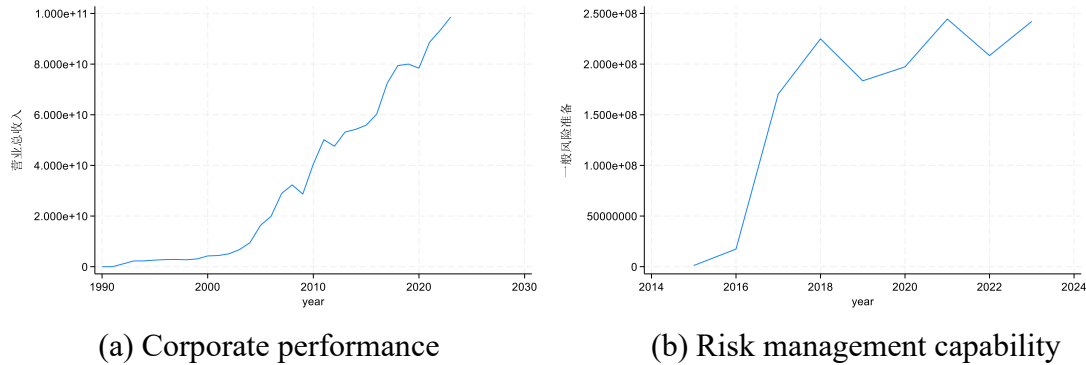


Figure 4: Trends in the average corporate performance and risk management capability of listed companies

Figure 4 illustrates the trends in total operating revenue and general risk provisions of listed companies.

First, from the perspective of corporate performance, total operating revenue has been increasing steadily since 2000, with a significant acceleration in growth after 2010. This trend indicates that the overall business scale and market influence of listed companies have been expanding continuously, while their profitability has been consistently improving. This strong financial foundation provides solid support for high-quality innovation development.

Second, regarding risk management capability, general risk provisions have surged since 2016 and have remained at a high level after 2020. This reflects a continuous improvement in corporate resilience against external shocks. Higher risk management and response capabilities mean that enterprises can better mitigate the impact of market fluctuations on innovation activities, ensuring the quality and long-term sustainability of innovation development.

4.2. ESG performance, corporate performance, and risk management capability

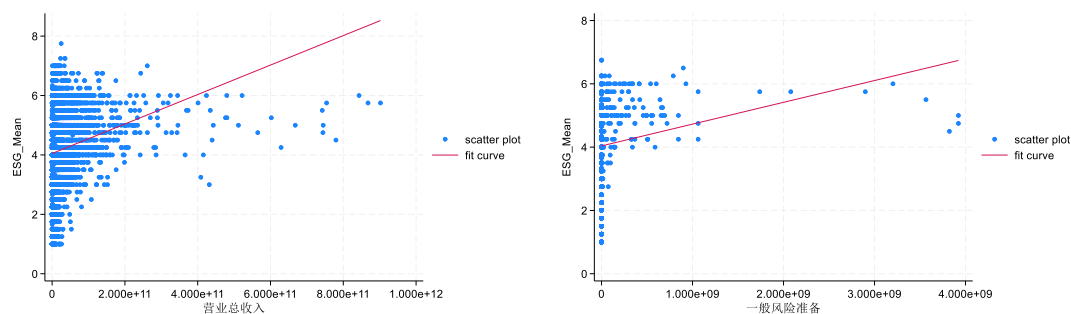


Figure 5: Mechanism analysis

Figure 5 depicts the relationships between ESG performance and corporate performance (total operating revenue) as well as ESG performance and risk management capability (general risk provisions).

First, in terms of corporate performance, ESG performance is positively correlated with total operating revenue. The fitted curve shows that as corporate revenue grows, ESG performance improves accordingly. This indicates that strong ESG performance enhances a company's ability to

expand business scale and improve profitability. A solid ESG foundation ensures steady corporate performance growth, providing sufficient financial support for innovation-related projects, strengthening R&D investment and technological development, and further promoting high-quality innovation development. This finding aligns with the theoretical analysis of Hypothesis 2.

Second, from the perspective of risk management capability, ESG performance is also positively correlated with general risk provisions. The fitted curve suggests that companies with better ESG performance tend to have stronger risk management capabilities. This implies that through strengthened ESG management, companies prioritize long-term sustainability and resilience to external shocks, improving their ability to mitigate operational risks and ensuring the continuity of innovation activities. This result supports the theoretical analysis of Hypothesis 3.

By improving ESG performance, enterprises can enhance both their corporate performance and risk management capabilities, ultimately fostering high-quality innovation development and maintaining long-term sustainable growth.

5. Conclusion and recommendations

Based on data from Chinese listed companies, this study explores the impact mechanism of corporate ESG performance on high-quality innovation development, revealing how ESG performance indirectly enhances innovation quality by improving corporate performance and risk management capabilities. The findings indicate that ESG performance not only directly promotes corporate investment in innovation, intellectual property capabilities, innovation value realization, and market influence but also provides solid support for high-quality innovation development by strengthening corporate performance and risk control. This discovery not only enriches the theoretical framework of ESG and corporate innovation but also offers important policy insights for enterprises on how to achieve sustainable development through ESG management. Specifically, companies should recognize the positive impact of ESG performance on long-term innovation capabilities, particularly in optimizing resource allocation and enhancing risk management capacity, to ensure continuous improvements in innovation quality and greater market competitiveness. The study provides a useful reference for businesses in balancing short-term interests with long-term sustainable development when formulating ESG strategies, while also offering a theoretical basis for policymakers to promote high-quality corporate innovation development.

By examining the impact mechanism of corporate ESG performance on high-quality innovation development, this study reveals that ESG performance not only directly enhances innovation investment, intellectual property capabilities, innovation value realization, and market influence but also indirectly promotes innovation quality by improving corporate performance and risk management capabilities. Based on the research conclusions, the following recommendations are proposed:

First, the government should standardize and enhance the transparency of ESG information disclosure, establish a comprehensive ESG evaluation system, and provide clear ESG management guidelines for enterprises.

Second, policymakers should utilize tax incentives, subsidies, and other policy tools to encourage businesses to increase their investment in ESG initiatives.

Finally, financial institutions should be encouraged to develop more ESG-linked financing products, reducing the financing costs for companies with strong ESG performance and providing stable financial support for corporate innovation activities.

References

- [1] Pavelin, S., Porter, L. A., & Tracey, P. (2008). **Corporate Social Performance and Technological Innovation**. *Journal of Business Ethics*, 80(3), 381-394

- [2] Wang Xiaohong, LuAN Xiangyu, ZHANG Shaopeng. *R&d investment, ESG performance and Market value: The moderating effect of firm digitalization* [J]. *Science and research*, 2023, 9 (5) : 896-904 + 915. DOI: 10.16192 / j.carol carroll nki. 1003-2053.20220606.001.
- [3] Qiang Qunli, WANG Tong, Wang Yiling. *ESG performance, green innovation and enterprise market value* [J]. *Journal of central south forestry university of science and technology (social science edition)*, 2024, 18 (01) : 30 to 44, DOI: 10.14067 / j.carol carroll nki. 1673-9272.2024.01.004.
- [4] Liu Huihong, Zhang Zheyuan. *ESG performance, financing constraints and sustainable innovation ability: The moderating role of executive equity incentives* [J]. *Wuhan Finance*, 2023, (10): 25-33.
- [5] Peng Manru, Chen Jie, Yin Junming. *ESG performance, innovation ability and firm performance* [J]. *Friends of Accounting*, 2023, (07): 11-17.
- [6] LI Jinglin, Yang Zhen, Chen Jin, et al. *Research on the mechanism of ESG promoting firm performance: from the perspective of firm innovation* [J]. *Science of Science and Science and Technology Management*, 2019, 42(09): 71-89. (in Chinese)
- [7] Li Jianjun. *Can ESG Performance affect a firm's ability to raise capital?* [J]. *Journal of accounting communications*, 2023, (17) : 70-75. The DOI: 10.16144 / j.carol carroll nki issn1002-8072.2023.17.010.
- [8] Wang Chuyao. *ESG performance of enterprise innovation ability* [D]. *The influence of the central university of finance and economics*, 2023. The DOI: 10.27665 / , dc nki. Gzcju. 2023.000713.
- [9] Tan Jinsong, Huang Renyu, Zhang Jingxin. *ESG performance and firm risk: An explanation based on resource acquisition perspective* [J]. *Management Science*, 2023, 35(05): 3-18. (in Chinese)
- [10] Wang Yandong, Wang Yaqi. *Corporate ESG performance, risk taking and green technology innovation* [J]. *Friends of Accounting*, 2023, (10): 94-102.