The Impact of ESG Performance on Enterprise Innovation Resilience

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Abstract. Amid growing global environmental and market uncertainties, and at a critical juncture where China is striving to become a powerhouse of innovation and advancing its "dual carbon" goals and high-quality development, ESG initiatives have been integrated into the nation's overarching strategic framework. For enterprises, enterprise innovation resilience (EIR) has become a core capability for weathering risks and achieving sustainable development. Using a sample of firms from 2011 to 2024, this study—taking into account the uneven regional development and significant sectoral differences in China's financial markets—constructs a multi-period difference-in-differences model to empirically examine the impact of ESG performance on EIR. This paper offers practical insights to help enterprises improve their ESG performance and enhance their resilience to innovation, while also providing guidance for regulatory authorities to refine the ESG policy framework, support the implementation of China's "dual carbon" goals, and promote high-quality economic development.

Keywords: ESG; enterprise innovation resilience; high-quality development.

1 Introduction

With the deepening of global climate governance, shifting geopolitical dynamics, and increasing market uncertainties, the external shocks facing businesses are becoming increasingly complex. As a core dynamic capability that enables companies to weather crises, maintain their pace of innovation, and achieve iterative upgrades, enterprise innovation resilience (EIR) has become a critical factor in determining a company's long-term survival and core competitiveness. At the same time, ESG has long moved beyond mere compliance, evolving from a single evaluation framework into a core strategic tool for corporate sustainability. In the broader context of China's development, ESG initiatives have been deeply integrated into the country's overarching strategic framework. They serve as a crucial pillar for achieving the "dual carbon" goals and driving high-quality development. The 14th Five-Year Plan, along with a series of policies issued by the China Securities Regulatory Commission, the State-owned Assets Supervision and Administration Commission, and other relevant agencies, has established a multi-tiered system for advancing ESG. China is currently at a critical juncture in its transition from a major innovator to a leading innovation powerhouse.

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There is an urgent need to address key challenges such as the short-term focus of corporate innovation and weak risk resilience. Given that the ESG philosophy aligns closely with the core principles of EIR, exploring the intrinsic connection between ESG and EIR has gradually become a focal point of interest in both academic circles and corporate practice.

Resilience refers to an organization's ability to recover and adapt when faced with disruptions in abnormal environments; it is a key trait that enables enterprises to navigate diverse adversities and rebuild their competitive advantage in times of crisis [7].An EIR is the cornerstone of its sustainable development; it reduces the organization's vulnerability to risks, enables flexible self-reorganization in a changing environment, and facilitates efficient recovery in the shortest possible time and at the lowest possible cost [8].From a micro-level perspective, companies with strong innovation resilience are better able to maintain stable innovation investments in the face of external shocks, thereby reducing the likelihood of innovation projects failing due to interruptions in funding or resources. At the same time, this resilience helps companies quickly capitalize on market opportunities following such shocks, facilitating the commercialization and upgrading of innovation outcomes; From a macroeconomic perspective, the overall enhancement of EIR can drive the stable development of the social innovation system, promote the deep integration of scientific and technological innovation with the real economy, and provide sustained momentum for high-quality economic development.

This paper examines the impact of ESG performance on EIR, and its marginal contributions are primarily reflected in three areas: First, this study broadens the research perspective on the factors influencing EIR. While existing studies primarily examine these factors from the perspectives of corporate performance [4], internal governance [6], and the degree of marketization, this paper incorporates ESG performance into its analytical framework, thereby illustrating pathways for fostering EIR under the principles of sustainable development; Second, it clarifies the underlying mechanisms through which ESG performance influences EIR. By empirically testing the mediating effects of financing constraints and social capital, it addresses the shortcomings of existing research regarding the exploration of the causal pathways between these factors; third, it provides targeted guidance for corporate practice.

2 Literature Review

With regard to internal factors, scholars have found that the entrepreneur's personal resilience [1], the firm's technological capabilities [2], corporate governance structures [6], and corporate culture [2] play a significant role in enhancing resilience; with regard to external factors, government support [8], supply chain coordination, and capital market support are significantly correlated with corporate resilience.

From a risk management perspective, strong ESG performance can help companies build diverse stakeholder relationships and enhance their social capital reserves, making it easier for them to secure support from governments, financial institutions, and supply chain partners when facing external shocks, thereby effectively alleviating

resource constraints [10];From the perspective of resource acquisition, companies with strong ESG performance are more likely to attract the favor of capital markets, enjoy broader financing channels and lower financing costs [9], and are also able to attract high-caliber talent, thereby providing ample human and financial resources to help the company mitigate risks [5];From a strategic perspective, an ESG-driven business model places greater emphasis on long-term value creation. It enables companies to proactively position themselves in forward-looking sectors, enhance their technological capabilities and market adaptability, and thereby strengthen their resilience and ability to recover from crises [3]. Existing literature still lacks sufficient exploration of the specific area of innovation resilience, and no systematic theoretical or empirical findings have yet been established. There is currently no targeted theoretical analysis regarding how ESG performance—through actions across environmental, social, and governance dimensions—affects the acquisition and allocation of innovation resources, the management of innovation risks, and the commercialization of innovation outcomes, thereby driving improvements in EIR. This paper systematically explores the impact of ESG performance on EIR and its mechanisms based on relevant theories, with the aim of addressing the shortcomings of existing research.

3 Theoretical Analysis and Hypothesis Development

Stakeholder theory posits that a company's survival and growth depend heavily on the support of its various stakeholders. By fulfilling its responsibilities toward these stakeholders, a company can establish strong cooperative relationships and achieve mutually beneficial development for both itself and its stakeholders [6]. ESG performance essentially reflects a company's fulfillment of its responsibilities toward stakeholders such as the environment, employees, the supply chain, investors, and society. Strong ESG performance can quickly earn the recognition and trust of stakeholders, create a stable internal and external environment for the company's innovation activities, and ensure a steady supply of innovation resources. From the perspective of resource-based theory, strong ESG performance constitutes a scarce, intangible strategic resource for companies; it is difficult to imitate and possesses unique value, and can gradually be transformed into a core competitive advantage. Compared to companies with poor ESG performance, those with higher ESG standards are better positioned to secure high-quality resources in areas such as R&D funding, innovative talent, and technological partnerships. This provides a solid foundation for the continuity and stability of innovation activities, thereby strengthening the company's resilience to withstand external shocks and sustain a cycle of innovation. Based on the dual theoretical framework outlined above, this paper proposes the following central research hypothesis:

H1: The better ESG performance, the stronger its innovation resilience.

4 Empirical Analysis

Empirical Model: To empirically test the impact of ESG on EIR, drawing on the research of Lu Zhengwen, Xu Kang [11], and other scholars, this paper establishes the following DID:

$$EIR_{ct} = \alpha + \beta ESG_{ct} + \gamma' Controls_{ct} + Year_t + Firm_{ct} + \varepsilon_{ct}$$

In this model, EIR_{ct} represents the level of *EIR* in year *t*. ESG is the policy shock variable representing environmental, social, and governance factors. The coefficient β measures the extent to which ESG influences *EIR*. Additionally, $Controls_{ct}$ denotes a set of control variables, $Year_t$ represents the year fixed effect, $Firm_{ct}$ represents the firm fixed effect, and ε_{ct} denotes the random error term.

Dependent Variable: EIR is a counterfactual forecasting framework that measures a company's resilience and ability to bounce back in the face of environmental shocks by comparing the "actual changes" in its innovation output with the "expected changes" derived from overall regional trends. Key Explanatory Variables: ESG performance is measured using the Huazheng ESG (Environmental, Social, and Governance) ratings.

Data Sources: This study adopts ESG as its core research perspective and empirically examines its impact on EIR. To ensure the comprehensiveness of the sample and the integrity of the data, corporate data from 2011 to 2024 were selected as the research sample. The ESG data used in this study were sourced from the CSMAR database, and the underlying data and core indicators required for measuring EIR were also obtained from this database. Table 1 presents the descriptive statistics for the key variables included in this study.

Table 1. Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	N	mean	sd	min	p50	max
ESG	38,451	73.7051	4.3109	61.4200	73.7400	84.2500
EIR	20,857	3.3194	19.4853	-66.7719	-0.1169	251.5847

5 Analysis of Benchmark Regression Results

The baseline estimates of the impact of ESG on EIR are shown in Table 2. As shown in the three models in Table 2, the coefficients for ESG are all significantly positive. This indicates that ESG effectively promotes EIR, thereby confirming research hypothesis H1. Strong ESG performance can help companies gain stakeholder recognition, expand access to high-quality resources, ensure the continuity and stability of their innovation activities, and build a solid foundation for innovation resilience. Through these combined effects, ESG plays a significant role in enhancing EIR.

Table 2. Benchmark Regression Results

	(1)	(2)	(3)
	EIR	EIR	EIR
ESG	0.3770***	0.353***	0.3238***
	(13.4637)	(8.9106)	(8.3100)
_cons	-24.7407***	-22.3909***	-20.7950***
	(-12.2486)	(-7.8581)	(-7.2529)
Individual fixed effects	No	Yes	Yes
Time fixed effects	No	No	Yes
N	18413	18108	18108
r2	0.0066	0.1579	0.1636

t statistics in parentheses

*p<0.10,**p<0.05,***p<0.01

6 Conclusion and Policy Recommendations

Using companies from 2011 to 2024 as the research sample, this paper constructs a multi-period difference-in-differences model to empirically test the impact of ESG performance on EIR. The results indicate that ESG performance has a significant positive impact on EIR, Excellent ESG performance can ensure the continuity and stability of corporate innovation activities by gaining stakeholder recognition and broadening access to high-quality resources, thereby strengthening the foundation of innovation resilience. Based on the findings of this study, to fully leverage the empowering role of ESG in EIR and promote sustainable and innovative corporate development, a multi-stakeholder collaborative effort is required. First, at the corporate level, companies should integrate ESG initiatives into their long-term development strategies, establish a comprehensive framework encompassing environmental, social, and governance dimensions, and develop tailored ESG enhancement strategies that take into account their specific geographic location and industry characteristics to precisely align with the needs of innovative development. Second, at the government level, it is necessary to improve the ESG disclosure and evaluation system, establish positive incentive mechanisms, coordinate the allocation of regional financial resources, accelerate the development of green finance systems, and implement differentiated ESG guidance and regulatory policies tailored to specific regions and industries. Finally, financial institutions should integrate ESG principles into the entire credit and investment process, establish differentiated credit pricing mechanisms, develop targeted ESG financial products tailored to a company's geographic location and industry characteristics, and strengthen cooperation with third-party rating agencies to ensure that financial resources are directed precisely toward companies with high ESG performance, thereby helping to improve EIR.

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