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GREEN TECHNOLOGY INNOVATION AND CORPORATE RESILIENCE: EVIDENCE FROM CHINA UNDER THE DUAL-CARBON GOAL

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Abstract: Based on the panel data of Chinese A-share listed companies from 2008 to 2022, this study systematically examines the impact of green technology innovation on corporate resilience and its mechanism. The results show that green technology innovation significantly strengthens corporate resilience, and the relationship remains robust after multiple tests. Mechanism analysis suggests that the effect operates mainly through improved environmental performance and reduced stock price volatility. Moreover, the impact is more pronounced in technology-intensive industries and among firms in eastern regions. This study extends the literature by linking green innovation to organizational resilience in an emerging economy context and highlights the strategic importance of green technology for firms navigating the transition toward a low-carbon economy.
Keywords: Green technology innovation; Corporate resilience; Dual carbon strategy

1 INTRODUCTION

In the era of global climate change, achieving carbon peaking and carbon neutrality has become a shared goal among governments and enterprises. Environmental pressures increasingly constrain social and economic development, making green technology innovation a vital pathway toward dual-carbon targets. China has clearly put forward the goal of carbon peaking and carbon neutrality, and adopted a number of comprehensive measures to support green development. Green technology innovation not only reduces organizations' carbon footprints but also enhances energy efficiency, promotes sustainable material use, and strengthens long-term competitiveness. Despite its recognized importance, the role of green innovation in fostering corporate resilience remains underexplored.

Corporate resilience refers to a dynamic capability cultivated under sustained adversity, enabling firms to maintain stability, recover rapidly, and seize growth opportunities in the face of uncertainty[1]. Resilient firms are more adaptive to environmental shifts, more capable of recovering from disruptions, and better positioned to achieve renewed growth, thereby sustaining competitive advantage in volatile markets. Although green technology innovation is widely regarded as a potential driver of resilience, empirical studies examining its mechanisms and outcomes remain limited. In particular, questions persist regarding how green innovation strengthens adaptability, accelerates recovery, and supports long-term growth under conditions of environmental uncertainty.

This study seeks to explore the role of green technology innovation as a resilience enhancer in the context of "dual carbon". Using a panel dataset of A-share listed firms from 2008 to 2022, the analysis investigates both the relationship and mechanisms linking green innovation to corporate resilience. The study contributes to the literature in three ways. First, it enriches the theoretical perspective on corporate resilience by establishing a link between green innovation and firms' adaptive and dynamic capabilities. Second, it offers empirical evidence on the pathways through which green technology innovation promotes resilience, thereby providing insights for policy design and corporate strategy. Third, it explores heterogeneity across industries and firm types, yielding practical guidance on how enterprises can leverage green innovation to cope with environmental challenges.

Overall, this research underscores the strategic importance of green technology innovation in enhancing organizational resilience under the dual-carbon agenda. The findings not only advance understanding of the innovation–resilience nexus in emerging economies but also generate actionable implications for firms and policymakers seeking to balance environmental objectives with sustainable competitiveness.

2 THEORETICAL ANALYSIS AND HYPOTHESIS FORMULATION

Against the backdrop of the global pursuit of carbon peaking and carbon neutrality, it is essential to explore how green technology innovationinfluences corporate resilience. From the perspective of survival and competition theory, technological innovation enables firms to adapt to external shocks and internal pressures, thereby strengthening organizational resilience. Existing studies suggest that green innovation not only improves competitiveness and efficiency but also fosters organizational adaptability under environmental uncertainty. Moreover, green innovation strategies contribute to legitimacy and market recognition, which further reinforce firms ' ability to withstand shocks[2]. Lv et al. demonstrated that corporate green innovation enhances resilience by improving adaptability under environmental uncertainty[3]. Xu et al. examined environmental technological innovation strategies in China,

highlighting its role in addressing ecological challenges[4]. Lei et al. identified technological capability as the direct driver of green innovation, while corporate culture, market orientation, and government policy serve as contextual enablers[5]. Tao et al., using IPC patent data and a difference-in-differences approach, found that environmental responsibility systems increased the quantity but reduced the quality of green patents[6]. These findings suggest that enterprises should actively implement green innovation, adapting to contextual conditions while collaborating with policy institutions to promote sustainable development[7] .

Green technology innovationalso contributes to profitability and competitiveness by optimizing production processes and reducing costs, which improves firms' adaptability to market fluctuations and economic uncertainty[8]. Enhanced innovation capability can further attract sustainable investors, thereby improving financial stability and securing long-term capital support[9]. Yue et al. argued that under ecological constraints, technological innovation has become a key pathway for China's industrial green transformation[10]. Similarly, Su and Li found that green innovation capability positively influences competitiveness through product differentiation and firm scale[11].

Institutional arrangements and policies also play a pivotal role in promoting green technological innovation. Xu and Cui showed that low-carbon city pilot policies foster corporate innovation in energy conservation and renewable energy[12]. Wu et al confirmed that both general and green innovation positively affect total factor productivity[13]. Wang and Wang observed that green credit guidelines stimulated innovation performance in restricted industries[14]. Song et al. further demonstrated that smart city construction significantly enhances green technological innovation, with profound implications for China's green transformation and innovation-driven development[15].

Building on this foundation, we argue that green technology innovationenhances corporate resilience through two main mechanisms. First, by improving environmental performance—such as reducing carbon emissions, lowering resource consumption, and increasing energy efficiency—firms can better adapt to regulatory pressures, reduce compliance risks, and strengthen their legitimacy with stakeholders. Second, green technology innovationstabilizes firms' financial performance by mitigating stock price volatility. Firms that demonstrate strong green innovation capability tend to attract long-term, sustainability-oriented investors, which reduces trading frequency and dampens price fluctuations. This dual pathway—environmental performance enhancement and financial stability—constitutes the core mechanism through which green technology innovationreinforces corporate resilience.

In view of the above analysis, this paper proposes the following hypotheses for further empirical research verification:

H1: Green technology innovationpositively influences corporate resilience.

H2: Green technology innovationenhances corporate resilience through improved environmental performance.

H3: Green technology innovationenhances corporate resilience by reducing stock price volatility.

3 RESEARCH DESIGN

3.1 Sample Selection and Data Sources

This study uses Chinese A-share listed firms from 2008 to 2022 as the initial research sample. The following screening criteria are applied: (1) firms in the information technology and financial sectors are excluded, following the 2012 CSRC industry classification, specifically C39 (computer, communication, and other electronic equipment manufacturing) and I63–I65 (information transmission, software, and IT services); (2) firms classified as ST or *ST and those with abnormal financial structures (gearing ratios exceeding 100%) are removed; (3) firms with missing data on key variables are excluded. After these adjustments, the final sample ensures data reliability and comparability. Firm-level financial and governance data are primarily sourced from the CSMAR database. To minimize the influence of extreme values, all continuous variables are deflated at the 1% and 99% levels.

3.2 Definition of Variables

3.2.1 Green technology innovation(EnvrPat)

Referring to prior research[16-18], green technology innovationis measured as the natural logarithm of one plus the sum of green invention patent applications and green utility model patent applications. This measure captures both the quality and quantity of a firm's innovation activities in the green domain.

3.2.2 Corporate resilience (Res)

Drawing on Ivanov et al[19], corporate resilience is assessed across two dimensions: **long-term growth** and **financial volatility**. Long-term growth is proxied by the cumulative growth rate of net sales over three consecutive years. Financial volatility is measured by the variance of stock returns. The entropy method is then applied to integrate these two dimensions into a composite resilience index.

3.2.3 Environmental performance (EP)

Based on Qu et al[20], environmental performance is proxied by a cumulative scoring approach across nine criteria: (1) advocacy of environmental protection concepts; (2) setting of environmental protection goals; (3) implementation of an environmental management system; (4) provision of environmental training; (5) organization of dedicated environmental activities; (6) establishment of contingency plans for environmental emergencies; (7) compliance with the "three simultaneities" principle; (8) receipt of environmental honors or awards; and (9) certification under ISO14001. Each criterion is scored as one if met, and zero otherwise, yielding an additive index of corporate environmental performance.

3.2.4 Stock price volatility (VAR)

Following Xin[21], stock price volatility is measured using the variance of monthly stock returns for firm *i* in year *t*, calculated from May of year *t* to April of year *t+1*. The average monthly variance is computed and multiplied by 100 to obtain the *VAR* index.

3.2.5 Control variables

Consistent with existing literature[22,23], the following firm-level characteristics are included as controls: firm size (Size), capital structure (Lev), ownership concentration (Top1), current ratio (Liquid), return on equity (ROE), state ownership (SOE), board size (Board), proportion of independent directors (Indep), CEO duality (Dual), and Tobin's Q (TobinQ). To address potential omitted variable bias, firm fixed effects and year fixed effects are further incorporated into the regression models, see Table 1.

Table 1 Variable Definitions and Measurements

Variable Name	Variable Symbol	Variable Calculation Method
Corporate resilience	*Res*	Composite index from entropy method: (i) 3-year cumulative net sales growth, (ii) variance of stock returns
Green technological innovation	*EnvrPat*	ln(1 + green invention patents + green utility model patents)
Environmental Performance	*EP*	Additive score of nine criteria (environmental goals, training, activities, ISO14001, etc.)
Stock price volatility	*VAR*	Variance of monthly returns (May *t* – Apr *t+1*), ×100
Firm Size	*Size*	Measured by the natural logarithm of the number of employees
Leverage	*Lev*	Total liabilities / total assets
Profitability	*ROE*	Net income / shareholders' equity
Liquidity	*Liquid*	Current Assets/Total Assets
Board Size	*Board*	Number of directors
Independent directors	*Indep*	% of independent directors on board
CEO duality	*Dual*	Dummy: 1 if CEO = Chairman, 0 otherwise
Ownership concentration	*Top1*	% shares held by largest shareholder
State ownership	*SOE*	Dummy: 1 if SOE, 0 otherwise
Tobin's Q	*TobinQ*	(Market value of equity + total liabilities) / total assets

3.3 Model Setting

To examine the impact of green technology innovationon corporate resilience, we first specify the baseline panel regression model as follows:

$$Res_{i,t} = \alpha_0 + \alpha_1 \times EnvrPat_{i,t} + \sum Controls + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

Where $Res_{i,t}$ represents the resilience of firm *i* at time *t*, and $EnvrPat_{i,t}$ denotes its green technological innovation. We add the control variables $\sum Controls$ in the model, μ_i and λ_t denote firm and year fixed effects, respectively, and $\varepsilon_{i,t}$ is the error term.

Mediating Effect Models To investigate whether green technology innovationaffects corporate resilience through **environmental performance** (*EP*) and **stock price volatility** (*VAR*), we adopt a three-step panel mediation framework following Wen et al [24]. The models are specified as:

$$EP_{i,t} = \beta_0 + \beta_1 \times EnvrPat_{i,t} + \sum Controls + \mu_i + \lambda_t + \eta_{i,t} \quad (2)$$

$$VAR_{i,t} = \gamma_0 + \gamma_1 \times EnvrPat_{i,t} + \sum Controls + \mu_i + \lambda_t + \mu_{i,t} \quad (3)$$

$$Res_{i,t} = \delta_0 + \delta_1 \times EnvrPat_{i,t} + \delta_2 \times EP_{i,t} + \delta_3 \times VAR_{i,t} + \sum Controls + \mu_i + \lambda_t + \zeta_{i,t} \quad (4)$$

Here, $EP_{i,t}$ represents the environmental performance of firm *i* at time *t*, $VAR_{i,t}$ denotes the stock price volatility of firm *i* at time *t*, $Res_{i,t}$ is the resilience of firm *i* at time *t*, and the definitions of the variables $EnvrPat_{i,t}$, μ_i and λ_t are the same as those of the model in (1).

4 ANALYSIS OF EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2 presents descriptive statistics for the main variables. Corporate resilience (*Res*) averages 0.874, indicating generally stable adaptability across firms. Green technology innovation(*EnvrPat*) exhibits substantial heterogeneity, reflecting varied engagement in green innovation. Environmental performance (*EP*) has a mean of 1.696; while most firms perform moderately, the maximum of 9.000 highlights a subset of high achievers. Stock price volatility (*VAR*) averages 1.255, suggesting notable differences in market stability. The remaining control variables are broadly consistent with prior studies. Collectively, these statistics reveal meaningful variation in resilience, innovation, environmental outcomes, and financial stability, providing a clear empirical foundation for the subsequent analyses.

Table 2 Descriptive Statistics

Variables	Sample	Mean	SD	Min	Median	Max
Res	36571	0.875	0.085	0.500	0.900	0.980
EnvrPat	36571	0.316	0.718	0.000	0.000	3.780
EP	36571	1.696	1.989	0.000	1.000	9.000
VAR	36571	1.256	0.738	0.150	1.100	5.620
Size	36571	22.189	1.311	19.240	22.010	26.480
Lev	36571	0.434	0.206	0.040	0.430	0.920
ROE	36571	0.063	0.141	-1.070	0.070	0.470
Liquid	36571	2.372	2.445	0.200	1.620	25.480
Board	36571	2.129	0.198	1.610	2.200	2.710
Indep	36571	37.505	5.361	25.000	36.360	57.140
Dual	36571	0.267	0.442	0.000	0.000	1.000
TOP1	36571	34.572	14.819	8.820	32.280	76.440
SOE	36571	0.391	0.488	0.000	0.000	1.000
TobinQ	36571	2.062	1.430	0.800	1.610	17.680

4.2 Correlation Analysis

Table 3 presents the correlations between green technology innovationand corporate resilience. Green innovation is positively and significantly associated with resilience at the 1% level, providing preliminary support for Hypothesis 1. It also correlates positively with firm size, capital structure, return on net assets, and governance variables such as the proportion of independent directors and dual positions, indicating that green innovation is linked not only to financial performance and organizational scale but also to aspects of corporate governance. These patterns underscore the interconnected role of green innovation in shaping resilience, performance, and governance, motivating the subsequent regression analyses.

Table 3 Correlation Analysis Table

Variable	*Res*	*EnvrPat*	*Size*	*Lev*	*ROE*	*Liquid*	*Board*	*Indep*	*Dual*	*TOP1*	*SOE*	*TobinQ*
Res	1											
EnvrPat	0.061***	1										
Size	0.160***	0.182***	1									
Lev	-0.064***	0.064***	0.452***	1								
ROE	0.027***	0.048***	0.123***	-0.190***	1							
Liquid	0.034***	-0.047***	-0.317***	-0.642***	0.085***	1						
Board	-0.059***	0.036***	0.239***	0.147***	0.042***	-0.126***	1					
Indep	0.046***	0.011**	0.021***	-0.009*	-0.021***	0.019***	-0.524***	1				
Dual	0.039***	0.011**	-0.169***	-0.144***	0.010*	0.129***	-0.186***	0.102***	1			
TOP1	-0.018***	0.024***	0.214***	0.048***	0.148***	-0.025***	0.036***	0.036***	-0.065***	1		
SOE	-0.074***	0.010*	0.332***	0.290***	-0.018***	-0.214***	0.292***	-0.063***	-0.313***	0.226***	1	
TobinQ	0.077***	-0.044***	-0.369***	-0.226***	0.052***	0.170***	-0.115***	0.040***	0.067***	-0.129***	-0.139***	1

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

4.3 Primary Regression

Table 4 reports the benchmark regression results for the effect of green technology innovationon corporate resilience. Across models, green innovation exhibits a positive and statistically significant impact, with coefficients of 0.001 at the 1% level in both the baseline and control-variable specifications, indicating that firms investing in green technology demonstrate higher resilience in responding to environmental challenges. These findings provide robust support for the role of green technology innovationin enhancing enterprise adaptability and stability.

Table 4 Main Regression Analysis Table

	(1)	(2)
	Res	*Res*
EnvrPat	0.001***	0.001***
	(3.29)	(3.35)
Control Variables	No	Yes
Constant	0.874***	0.878***
	(8720.70)	(95.69)
Individual fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	36571	36571
Adj_R²	0.919	0.921

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

4.4 Mediation Analysis

Table 5 reports the mediating regression results. Green technology innovationpositively influences corporate resilience through environmental performance (coefficient = 0.002, p < 0.01), supporting Hypothesis 2, and exerts a negative indirect effect via stock price volatility (coefficient = -0.022, p < 0.01), supporting Hypothesis 3, indicating that green innovation enhances resilience both by improving environmental outcomes and by stabilizing market valuation.

Table 5 Intermediation Test

	(1)	(2)
	Res	*EnvrPat*
EnvrPat	0.002***	0.003***
	(3.5985)	(5.0463)
EP	0.001***	
	(6.1404)	
VAR		-0.022***
		(-35.9160)
Control Variables	Yes	Constant
Constant	0.506***	0.556***
	(44.0390)	(50.4242)
Individual Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	36571	36571
Adj_R²	0.089	0.120

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

4.5 Robustness Test

To verify robustness, green technology innovationis remeasured using the number of invention-based patents (*EnvrInvPat*) and their share (*RatioEnvrPat*), and the 2017 data are excluded to account for potential anomalies. Across all specifications (Table 6, Columns 1–3), the coefficients on green innovation remain positive and significant at the 1% level, confirming that the baseline findings are robust to alternative measures and sample adjustments.

Table 6 Robustness Tests

	(1)	(2)	(3)
	Res	*Res*	*Res*
EnvrInvPat	0.001***		
	(3.20)		
RatioEnvrPat		0.004***	
		(2.70)	
EnvrPat			0.001***
			(3.03)
Control variables	Yes	Yes	Yes
Constant	0.878***	0.877***	0.887***
	(95.72)	(95.75)	(90.17)
Individual Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	36571.000	36571.000	33084.000
Adj_R²	0.921	0.921	0.921

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

4.6 Endogeneity Test

To address potential endogeneity, a two-stage least squares (2SLS) approach is employed using firms' greening transitions as instrumental variables. Table 7 shows that green innovation is strongly predicted by the instruments in the first stage (p < 0.01) and remains positive and significant in the second stage (p < 0.01), confirming that the baseline results are robust to endogeneity concerns.

Table 7 Endogeneity Test Results

	(1)	(2)
	GI	*Res*
EnvPat	0.046***	
	(17.03)	
GI		1.575***
		(32.09)
Control variables	Yes	Yes
Constant	0.164***	-12.642***
	(17.75)	(-65.30)
Individual Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes

Observations	36003.000	36003.000
Adj_R²	0.009	0.424

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

4.7 Heterogeneity Test

Table 8 reports the heterogeneity analysis across industry and regional dimensions. Green technology innovationexerts a stronger positive effect on resilience in technology-intensive industries than in traditional ones, and its impact is more pronounced in the eastern region compared with the western region, highlighting that the effectiveness of green innovation in enhancing corporate resilience varies with industry characteristics and regional contexts.

Table 8 Heterogeneity Test

	Panel A:Industry attributes				Panel B:regional differences			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Res	*Res*	*Res*	*Res*	*Res*	*Res*	*Res*	*Res*
EnvrPat	0.0010***	0.0012*	0.0008**	0.0014**	0.0009	0.0010***	0.0021**	0.0009***
	(2.8451)	(1.7557)	(2.1446)	(2.4251)	(1.2442)	(2.9185)	(2.2408)	(2.6032)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.8743***	0.8745***	0.8761***	0.8700***	0.8712***	0.8748***	0.8685***	0.8751***
	(5.7e+03)	(7.9e+03)	(7.1e+03)	(5.2e+03)	(3.5e+03)	(8.0e+03)	(3.9e+03)	(7.9e+03)
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21351	15178	25387	11165	6080	30477	5085	31476

Note: * stands for P< 0.1, ** stands for P< 0.05, *** stands for P< 0.01

5 CONCLUSION

Against the backdrop of global environmental challenges and the pursuit of the “dual-carbon” goal, this study examines how green technology innovationenhances corporate resilience to market volatility and environmental pressures. The findings indicate that green innovation significantly strengthens firms’ adaptability, enabling them to better manage external shocks while simultaneously improving competitiveness. This effect operates through enhanced environmental performance and reduced stock price volatility, suggesting that green innovation not only facilitates regulatory compliance but also bolsters market trust and lowers capital costs. The impact is particularly pronounced in technology-intensive industries and firms located in the eastern region, highlighting the importance of industry and regional contexts for managerial and policy decisions. These findings suggest that targeted government support for green R&D, strategic integration of green innovation, and alignment with CSR initiatives can collectively bolster corporate resilience, sustainable competitiveness, and societal progress toward carbon reduction targets.

COMPETING INTERESTS

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REFERENCES

[1] Shan Y, Xu H, Zhou L X, et al. Digital and intelligent empowerment: how to form organizational resilience in crisis?: an exploratory case study based on forest cabin’s turning crisis into opportunity. Journal of Management World, 2021, 37(3): 84-104.
[2] Soewarno N, Tjahjadi B, Fithrianti F. Green innovation strategy and green innovation: The roles of green organizational identity and environmental organizational legitimacy. Management decision, 2019, 57(11): 3061-3078.
[3] Lv W D, Tian D, Wei Y, et al. Innovation resilience: A new approach for managing uncertainties concerned with sustainable innovation. Sustainability, 2018, 10(10): 3641.
[4] Xu Q, Wu W, Lv Y. Research on Environmental Technology Innovation of Chinese Enterprises. China Soft Sci, 1995, 5: 16-20.
[5] Lei S Y, Wang H R, Zhang S H. Dynamic mechanism of the environmentally sound technology innovation of environmental friendly enterprises: An exploratory research based on grounded theory. Journal of Management Case Studies, 2014, 7(4): 283-296.

[6] Tao F, Zhao J, Zhou H. Does environmental regulation improve the quantity and quality of green innovation: Evidence from the target responsibility system of environmental protection. China Ind. Econ, 2021, 2: 136-154.
[7] Yanan J, Nuo C, Li W, et al. The impact of green innovation on organizational resilience. Frontiers of Society, Science and Technology, 2023, 5: 43-49.
[8] Liao Y, Qiu X, Wu A, et al. Assessing the impact of green innovation on corporate sustainable development. Frontiers in Energy Research, 2022, 9: 800848.
[9] Wen H, Shi J, Lu P. Can green technology innovation reduce the operational risks of energy-intensive enterprises?. Systems, 2023, 11(4): 194.
[10] Yue H F, Xu Y, Wu L. Empirical analysis of the choice of technological innovation mode and the green transformation of China's industry. China Population, Resources and Environment, 2017, 27(12): 196-206.
[11] Su Y, Li G. Green technological innovation ability, product differentiation and enterprise competitiveness: Analysis of energy saving and environmental protection industry listed companies. Chinese Journal of Management Science, 2021, 29(04): 46-56.
[12] Jia X, Jingbo C. Low-carbon cities and corporate green technology innovation. China Industrial Economy, 2020, 12: 178-196.
[13] Wu J, Xia Q, Li Z. Green innovation and enterprise green total factor productivity at a micro level: A perspective of technical distance. Journal of Cleaner Production, 2022, 344: 131070.
[14] Wang X, Wang Y. Research on the green innovation promoted by green credit policies. J. Manag. World, 2021, 37(6): 173-188.
[15] Song D, Li C, Li X. Does the construction of new infrastructure promote the 'quantity'and 'quality'of green technological innovation-evidence from the national smart city pilot. China population, resources and environment, 2021, 31(11): 155-164.
[16] Yang I, XU Q. Research on Green Technology Innovation of Enterprises. China Soft Science, 1998(3): 47-51.
[17] Amores-Salvadó J, Martín-de Castro G, Navas-López J E. Green corporate image: Moderating the connection between environmental product innovation and firm performance. Journal of Cleaner Production, 2014, 83: 356-365.
[18] Dong Z, Wang H. Local-neighborhood effect of green technology of environmental regulation. China Ind. Econ, 2019, 1: 100-118.
[19] Ivanov D, Dolgui A, Sokolov B(Eds). Handbook of ripple effects in the supply chain. New York: Springer. 2019, 276. DOI: https://doi.org/10.1007/978-3-031-85508-5.
[20] Qu Y X. The impact of digital financial inclusion on corporate environmental performance. Statistics and Decision, 2023, 39(20): 184-188.
[21] Xin Q, Kong D, Hao Y. Transparency and stock return volatility. Journal of Financial Research, 2014, 10: 193-206.
[22] Li Z, Ling Z. The impact of media coverage on enterprise green technology innovation: The moderating role of marketization level. Management Review, 2020, 32(9): 132.
[23] Fan D, Sun X. Environmental regulation, green technology innovationandgreen economic growth. China population,resources and environment, 2020, 30(6): 105-115.
[24] Wen Z, Fang J, Xie J, et al. Methodological research on mediation effects in China's mainland. Advances in Psychological Science, 2022, 30(8): 1692.