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The Impact of Overseas Backgrounds of Directors, Supervisors, and Senior Executives on the Green Innovation Ability of Enterprises: Based on Empirical Analysis of Listed Company Data from 2014 to 2023

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Abstract

In the face of the dual background of the national green development strategy and the difficulty of implementing enterprise green innovation, whether and how the overseas background of directors, supervisors, and senior executives, as the core decision-makers of corporate governance, can and how their overseas background can affect enterprise green innovation has become an important issue. The purpose of this study is to empirically test the impact of the overseas background of the directors, supervisors and senior management teams on the green innovation ability of enterprises, and to explore the moderating role of whether the enterprise is a key pollution monitoring unit in the external policy situation. The research method of this study is to select the data of China's A-share listed companies from 2014 to 2023 and construct a two-way fixed effect model for empirical analysis. Based on the company's green innovation ability, whether directors, supervisors and senior executives have overseas backgrounds are the core variables, and a series of corporate financial and governance variables are controlled. The research hypothesis was verified by benchmark regression, moderating effect test, heterogeneity analysis and robustness test. The study found that the overseas background of directors, supervisors and senior executives has a positive but not significant impact on enterprise green innovation. Key pollution monitoring policies have a significant positive moderating effect and can strengthen the promotion of green innovation from overseas backgrounds.

Keywords

overseas background, corporate green innovation, key pollution monitoring, corporate governance

1. Introduction

The Central Committee of the Communist Party of China and the State Council's "Opinions on Accelerating the Comprehensive Green Transformation of Economic and Social Development" proposes to guide enterprises to implement green procurement guidelines, encourage qualified enterprises to establish green supply chains, and drive the coordinated transformation of upstream and downstream enterprises. Establish and improve green product design, procurement, and manufacturing standards, strengthen the construction of green product certification and labeling systems, improve energy efficiency and water efficiency labeling systems, and establish product carbon footprint management systems and product carbon labeling certification systems. In order to meet the needs of national green development, how to increase investment in green development and promote green innovation has become an important issue. However, due

to the high investment cost and technical barriers of green technology innovation, as well as the shortage of green innovation talents and experience in enterprises, this may lead to a slow process of green innovation for companies.

Based on the importance of enterprise green development and the difficulty of implementation, there is a large number of literature on how to enhance the green innovation ability of enterprises, mainly studying the impact of environmental policies, government environmental concerns, corporate governance and other aspects on green innovation ability. For example, Liu and Xie (2025) have found that government environmental audits can help improve green productivity in enterprises. In addition, studies have shown that the participation of non-state-owned shareholders in the mixed reform of state-owned enterprises and the expansion of management power can promote green innovation in enterprises (Wang and Gou, 2025). These studies have delved into how to carry out green innovation and achieve sustainable development from multiple aspects.

Although the existing literature has proved that the overseas experience of company executives will have a certain impact on the green innovation ability of enterprises. Xing and Wang (2025) proposed that executives' overseas experience can significantly improve the level of green innovation in enterprises, and managers' short-sightedness plays a partial intermediary role, which is manifested in the fact that executives' overseas experience can reduce managers' short-sightedness, thereby improving the level of green innovation of enterprises. The overseas work experience of executives will greatly contribute to the green development of enterprises (Zheng et al., 2023). However, the overseas experience of the company's board of directors, board of supervisors, and senior executives has little impact on the company's green innovation. This study will select data from China's A-share listed companies from 2014 to 2023 to explore the impact of overseas experience of directors, supervisors and senior executives on enterprises' green innovation.

The marginal contribution of this paper is mainly reflected in the following two aspects: First, at the theoretical level, this study enriches the research framework of the driving factors of green innovation of enterprises from the perspective of the overseas background of directors, supervisors and senior executives, and provides a new theoretical explanation for understanding the strategic decision-making of enterprise environmental protection. Second, at the practical level, the management enlightenment based on the conclusions of empirical analysis provides practical suggestions for optimizing the corporate governance structure and formulating green innovation policies, which has important practical guiding significance for promoting the sustainable development of enterprises.

2. Literature Review

2.1 Research on the Diversification of Directors, Supervisors, and Senior Executives

2.1.1 Research on the Functions of Directors, Supervisors, and Senior Executives

The board of directors is the core of corporate governance, and its functions cover multiple dimensions such as strategic decision-making, supervision and management, and risk control. Han et al. (2025) proposed that directors participate in the strategic decision-making and operation and management of the enterprise, and they are responsible for formulating the company's strategic goals, making decisions on major matters, supervising management, and being responsible for the company's business results. Yang and Pang (2014) pointed out that as an important participant in corporate governance, the board of supervisors is an important force to prevent the board of directors and internal executives from infringing on the interests of minority shareholders and employees, and to improve the company's legal compliance. According to the highest echelon theory, executive teams have important responsibilities in the execution of organizational strategies, and their characteristics, backgrounds, values, and cognitive tendencies influence their decisions and behaviors, which in turn influence the organization's strategic decision-making and performance (Hambrick and Mason, 1984). Yu and He (2019) give a more systematic description of the functions in the article, the highest decision-making department of the enterprise is composed of the board of directors, management and board of supervisors, respectively, and the responsibilities and division of labor of different positions are different. The board of directors is the permanent authority of the company, responsible for formulating the overall business plan, management system and investment plan of the enterprise. Management is the executive body of the

company and implements decisions made by the board of directors. The board of supervisors is the supervisory body of the enterprise, and its function is to supervise the decision-making of the board of directors."

2.1.2 Research on the Benefits of Diversification of Directors, Supervisors, and Senior Executives

In addition to the important functions of directors, supervisors, and senior executives, the importance of the diversification of directors, supervisors and senior executives also determines its huge impact on the sustainable development of enterprises. Xi et al. (2025) found that the diversification of the board of directors enhances the resilience of enterprises by improving the effectiveness of the board's supervisory and advisory functions. Boards with a higher diversity of directors have a wide range of backgrounds and experiences, which is expected to result in a wider range of problem alternatives or solutions, leading to more efficient innovation outcomes (Chen et al., 2023). They believe that director diversity can effectively improve the innovation ability of enterprises. Regarding the diversification of the board of supervisors, Xiong et al. (2022) pointed out that the adjustment of the characteristics of the board of supervisors and the improvement of enterprise operating efficiency have formed a linkage and complementary mechanism. Regarding the diversity of executives, Wen and Huang (2025) proposed that further analysis found that the heterogeneous performance of the executive team reduces the short-term ESG risk events faced by enterprises. It can be seen that the existing literature explores the benefits of diversification of directors, supervisors and senior executives from various aspects of enterprise development, such as performance, innovation, and social responsibility.

2.2 Causes and Influencing Factors of Enterprise Green Innovation

2.2.1 Reasons for Green Innovation of Enterprises

The report of the 20th National Congress of the Communist Party of China clearly pointed out that high-quality development is the primary task of our country to build a modern socialist country in an all-round way. High-quality development requires green development with the goal of efficiency, harmony and sustainability as the concept, and adhere to sustainable green development. Yang and Wang (2024) also proposed that the high-quality development of enterprises must pay more attention to the value demands of stakeholders, and create comprehensive value covering the economy, society and environment for the various stakeholders linked to the enterprise. Green patents formed by green innovation can save resources, improve energy efficiency, or be directly used for pollution prevention and control in the process of production and business activities, and are of great significance to industrial upgrading and transformation regardless of the aspect of innovation (Takalo and Tooranloo, 2021). It can be seen that on the one hand, enterprises carry out green innovation to meet the requirements of national environmental policies, and on the other hand, to save resources in the production process, improve the efficiency of resource utilization, and promote the transformation and upgrading of industries and the sustainable development of enterprises.

2.2.2 Influencing Factors of Enterprise Green Innovation

Zhang and Yin (2025) found that the green and high-quality development of the macroeconomy requires the green transformation of micro enterprises. Supply chain customer stability has a role in promoting green innovation of enterprises. In addition, flexible tax collection and management can have a positive effect on corporate ESG performance Xu et al. (2025). Investor attention can have a positive impact on green innovation in enterprises, with mechanisms such as reducing information asymmetry, easing financing constraints, and curbing agency issues (He et al., 2022). Saunila et al. (2018) suggest that the more companies pay attention to economic, institutional, and social sustainability, the more likely they are to invest in green innovation. Wang et al. (2024) also proposed that the adoption of AI technology within companies can significantly improve the company's green innovation index. The existing literature delves into the impact of various factors on the green innovation ability of enterprises from two perspectives: the external environment of the company, such as policy, supply chain, etc., and the internal of the company, such as attention and productivity change.

2.3 Literature Review

Through the systematic review of the research results of scholars at home and abroad, it is found that the existing literature has conducted in-depth research on the influence mechanism of the diversity of the board of

directors, the board of supervisors and the senior executives and the influencing factors of the green innovation ability of enterprises. However, there is a relatively lack of research on how this specific heterogeneous characteristic of overseas experience of directors, supervisors and senior members affects the green innovation of enterprises. As the core decision-making body of the corporate governance system, directors, supervisors and senior executives play a key role in the formulation and implementation of corporate green innovation strategies. Based on this, this study will focus on the relationship between the overseas background of directors, supervisors and senior executives and green innovation performance, in order to expand the new perspective of the intersection of corporate governance and green innovation in theory, and provide stronger theoretical support and policy basis for the in-depth promotion of the national green development strategy in practice.

3. Theoretical Basis and Research Hypothesis

Wang and Wang (2021) pointed out that enterprises' investment in environmental governance will inevitably have a "crowding out effect" on productive investment in the short term, which also makes enterprises lack green innovation motivation. Therefore, in the process of investing in green innovation research and development, enterprises will encounter the dilemma of whether to continue to maintain the production level or abandon part of the production to pursue green innovation. Due to the lack of existing experience and technology, the cost of green innovation of enterprises is high and the risk of failure is high, and a lot of capital and manpower are required in the process. From the perspective of the benefits of green innovation, the green innovation activities of enterprises are not only for economic benefits, but also pay more attention to environmental and social benefits, but the social and environmental benefits are often not so direct, and it takes a certain amount of time to accumulate reputation and social capital before they can be finally fed back to the enterprise Xing and Wang (2025). Therefore, in the process of green innovation, in order to ensure the sustainable development of the company and reduce risks, the major decisions of company managers play a crucial role.

The top management of a company is influenced by their own experience when making strategic choices and decisions, proposed by Hambrick and Mason (1984). Based on the high-level echelon theory, our country's returnee executives mainly have rich study and work experience in developed countries in Europe and the United States, and this knowledge base will be transformed into explicit or implicit knowledge applied to the daily corporate strategic decision-making process (Xiao et al., 2021). Therefore, directors with overseas experience can give full play to their own experience advantages in the process of green innovation in enterprises, use the knowledge and vision accumulated in European and American countries, strengthen the supervision of enterprises, and rationally plan and allocate resources to ensure the green innovation and sustainable development of enterprises. In summary, this paper proposes the following hypothesis:

Assuming H1: Directors, supervisors and senior executives with overseas backgrounds can better make major decisions about the company, and ultimately improve the company's green innovation capabilities.

Liu and Zhang (2023) mentioned in their study that in order to strengthen environmental law enforcement against various pollutant emissions, the central government has launched a national key monitoring policy, setting up a list of key monitoring enterprises for exhaust gas and wastewater according to pollutant emission categories, and placing key industrial polluters under special monitoring at the national level. At the same time, they found that key monitoring policies can help enterprises reduce pollution and emission reduction, and will have a significant impact on the production mode of enterprises, and increase the amount of clean energy input on the production side of enterprises to carry out cleaner production.

Direct environmental regulations have a strong and significant incentive effect on green technology innovation in heavily polluting industries (Cai et al., 2020). For the enterprises themselves, Fan and Zhao (2025) found that enterprises will invest more resources in green innovation elements and innovative technologies to change the production mode of high energy consumption and high pollution, which will greatly promote the improvement of green innovation efficiency, and appropriate intensity of environmental regulation can improve the green innovation efficiency of heavy polluting enterprises. In summary, this paper makes the following assumptions:

Hypothesis H2: Compared with non-key pollution monitoring enterprises, key pollution monitoring enterprises will strengthen the positive impact of the overseas background of directors, supervisors and senior

executives on the green innovation of enterprises.

4. Research Design

4.1 Data Sources and Data Collation

This paper selects A-share listed companies excluding ST and financial industry (CSRC 2012 edition industry classification) from 2014 to 2023 as the initial research sample, green innovation data from the CNRDS database, and overseas backgrounds of directors, supervisors and senior executives and other financial data of companies from the CSMAR database. After removing the missing values and shrinking the tail, 33002 observations were obtained, and the panel data was used for regression.

4.2 Variable Setting

4.2.1 Interpreted Variables

Green innovation ability of enterprises. Green innovation refers to the general term for technologies, processes or products that reduce environmental pollution and reduce the use of raw materials and energy, including environmentally related pollutant disposal and technologies related to climate change mitigation. This paper refers to the research of Wang and Wang (2021), and measures the total number of green patents applied for by companies in the year plus 1 to take the natural logarithm, of which green patents include green inventions and green utility models.

4.2.2 Explanatory Variables

Directors and supervisors have a high overseas background (overseas). Yu and He (2019) pointed out that the formation of an enterprise network through the connection of directors, supervisors and senior executives is conducive to the dissemination of information and resources among companies, which has a significant impact on corporate governance. Therefore, this paper selects the overseas background of directors, supervisors and senior executives as the independent variable. In order to ensure the authenticity and reliability of the data, this paper uses the dummy variable of the overseas background of the directors and supervisors in the CSMAR database as the data source, and assigns the value of listed companies with overseas backgrounds to 1 and the values of listed companies without overseas backgrounds to 0.

4.2.3 Control Variables

This paper refers to the relevant research of Xing and Wang (2025) and selects variables that may have an impact on enterprise green innovation as control variables. Including: (1) industry, defined according to the industry code given by the CSMAR database. (2) Return on assets (ROA), that is, the ratio of net profit to total assets. (3) Enterprise debt ratio, that is, the ratio of the company's total liabilities to total assets. (4) Management shareholding ratio (management) is measured by the ratio of the number of shares held by the regulator to the total number of shares. (5) The proportion of independent directors is measured by the ratio of the number of independent directors to the number of directors. (6) The nature of the enterprise is used as the control variable, and the value of state-owned enterprises is assigned to 1 and that of non-state-owned enterprises is 0.

4.2.4 Adjusting Variables

This variable is inspired by Yang and Wang (2024), who propose that whether it belongs to a heavy polluting industry or a non-heavy pollution industry has a significant effect on improving the ESG performance of returnees. Therefore, speculating whether it is a key pollution monitoring unit will have an impact on the correlation between independent variables and dependent variables. This article will assign a value of 1 to the key pollution monitoring unit, otherwise it will be 0.

4.3 Model Setting

In order to verify this inference, this paper uses model (1) to analyze

$$green_{i,t=}\beta_1 + \beta_2 oversea_{i,t} + \beta_3 ROA_{i,t} + \beta_4 debt_{i,t} + \beta_5 management_{i,t} + \beta_6 independent_{i,t} + \beta_7 nature_{i,t} + \gamma_i + \delta_t + \theta_{ind} + \varepsilon_{i,t} \quad (1)$$

In model (1), i represents the enterprise, t represents the year, β-1. is the constant term, β-2.−, β-7. is the coefficient, and ε is the random disturbance term, where the dependent variable is the enterprise green innovation level (green) measured by the total number of various green patents applied by the company in the year plus 1 taken as the natural logarithm, and the independent variable is the overseas experience of directors, supervisors and senior executives (oversea), and controls the company-level factors, as well as the control of industry and annual fixed effects. It is expected that the assumption H1, that is, the regression correlation coefficient of the overseas experience of directors, supervisors and senior executives (overseas) is positive.

Next, in order to further test whether it is the moderating effect of key pollution monitoring enterprises, a model (2) is constructed:

$$green_{i,t} = \beta_1 + \beta_2 oversea_{i,t} + \beta_3 pollution_{i,t} + \beta_4 green_{i,t} * pollution_{i,t} + \beta_5 ROA_{i,t} + \beta_6 debt_{i,t} + \beta_7 management_{i,t} + \beta_8 independent_{i,t} + \gamma_i + \delta_t + \theta_{ind} + \varepsilon_{i,t} \quad (2)$$

In model (2), i represents the enterprise, t represents the year, β-1. is the constant term, β-2.−, β-8. is the coefficient, and ε is the random perturbation term. The moderating variable is whether it is a key pollution monitoring enterprise (pollution), and the intersection term between the independent variable and the moderating variable is green*pollution. It is expected that the assumption H2 is tested, that is, the regression correlation coefficient of the multiplication term is positive.

5. Analysis of Empirical Results

5.1 Descriptive Statistics

According to Table 1, the average value of green innovation ability (green) of enterprises is 0.361, the standard deviation is 0.767, and the maximum value is 3.611, indicating that the overall green innovation level of listed enterprises is low, and the green innovation level among enterprises varies greatly. The average overseas background of directors, supervisors and senior executives is 0.582, and the standard deviation is 0.493, indicating that more than half of the companies currently have directors, supervisors and senior executives with overseas backgrounds, but the differences between enterprises are still large.

Table 1： Descriptive statistical results of variables

VarName	Obs	Mean	SD	Min	Max
green	33002	0.361	0.767	0.000	3.611
oversea	33002	0.582	0.493	0.000	1.000
ROA	33002	0.035	0.070	-0.308	0.201
debt	33002	0.410	0.206	0.055	0.938
management	33002	0.155	0.202	0.000	0.690
independent	33002	0.378	0.053	0.333	0.571
pollution	33002	0.276	0.447	0.000	1.000
nature	33002	0.301	0.459	0.000	1.000

5.2 Correlation Analysis

As shown in Table 2, the correlation coefficient between the green innovation of enterprises and the overseas background of directors, supervisors and senior executives (overseas) is 0.036, indicating that directors, supervisors and senior executives with overseas backgrounds will promote the improvement of enterprises' green innovation capabilities, which preliminarily verifies the validity of the H1 hypothesis, but the more convincing results will be obtained through regression after fixed industries and years.

At the same time, in order to ensure the reliability of the results, the multicollinearity test was carried out

in this paper, and finally the vif=1.18 (<10) was obtained, so there is no multicollinearity problem in this study.

Table 2: Correlation coefficient matrix

	green	oversea	ROA	debt	management	independent	pollution	nature
green	1							
oversea	0.036	1						
ROA	0.041	0.015	1					
debt	0.091	-0.012	-0.377	1				
management	0.011	-0.000	0.170	-0.311	1			
independent	0.005	-0.015	-0.018	-0.008	0.069	1		
pollution	0.021	-0.015	0.013	0.100	-0.155	-0.033	1	
nature	0.040	-0.107	-0.067	0.267	-0.473	-0.060	0.106	1

5.3 Hausman Test and Benchmark Regression Results Analysis

In this study, the two-way fixed effect model - model (1), fixed industry and year (year) are used to perform regression. According to Table 3, the correlation coefficient between overseas background and green innovation (green) of directors and supervisors is 0.004233 (>0), and P=0.966 (>0.1), indicating that directors, supervisors and senior executives with overseas backgrounds will have a positive impact on the green innovation ability of enterprises, but the impact is not significant. The hypothesis of H1 was verified.

Table 3: Baseline regression results

	(1)	(2)
	S1	S2
VARIABLES	green	green
oversea	0.0135	0.0122
	(0.0174)	(0.0174)
ROA		0.2368**
		(0.1148)
debt		0.1826***
		(0.0687)
management		0.1011
		(0.0733)
independent		0.0570
		(0.2295)
nature		-0.0381
		(0.0735)
Constant	0.2182*	0.0583
	(0.1135)	(0.1395)
Observations	12,817	12,817
R-squared	0.0202	0.0219
Number of id1	2,806	2,806

*Robust standard error is shown in parentheses *** p<0.01, ** p<0.05, * p<0.1*

5.4 Moderating Effect Analysis

In order to explore the moderating effect of the variable whether it is a key pollution monitoring enterprise, this study adds the multiplication term of the independent variable and the moderating variable (GreenPo), and uses model (2), fixed industry and year for regression. As shown in Table 4, it is found that the correlation coefficient between enterprise green innovation (green) and green PO is 0.655425 (>0) and P=0.014, and the correlation coefficient between enterprise green innovation and the overseas background of directors, supervisors and senior executives is 0.0003229 (>0), indicating that enterprises with key pollution monitoring will strengthen the positive impact of the overseas background of directors, supervisors and senior executives on the green innovation of enterprises, that is, there is a positive moderating effect, and the impact is significant.

This result validates the hypothesis of H2.

Table 4: Moderating effect results

	(1)	(2)
	S1	S2
VARIABLES	green	green
oversea	0.0121	0.0108
	(0.0157)	(0.0156)
greenpo	0.6408***	0.6418***
	(0.0399)	(0.0397)
ROA		0.2142*
		(0.1102)
debt		0.2001***
		(0.0621)
management		0.0652
		(0.0659)
independent		0.0852
		(0.1960)
nature		-0.0850
		(0.0556)
Constant	0.2503**	0.0924
	(0.1138)	(0.1349)
Observations	12,817	12,817
R-squared	0.1535	0.1554
Number of id1	2,806	2,806

*Robust standard error is shown in parentheses *** p<0.01, ** p<0.05, * p<0.1*

6. Heterogeneity Analysis

Feng and Lang (2023) pointed out that state-owned enterprises, as an important pillar of the socialist economic system with Chinese characteristics, are the key carriers for the government to implement macroeconomic regulation and industrial policies. State-owned enterprises are subject to comparatively more severe government intervention than non-state-owned enterprises (Fan and Zhao, 2025). In view of the special attributes of state-owned enterprise property rights and their close connection with the government, compared with non-state-owned enterprises, state-owned enterprises are more inclined to respond to the national green development strategy orientation in strategic decision-making, thus showing a stronger willingness to innovate green. Based on this theoretical framework, this paper further proposes that the difference in the nature of the enterprise may moderate the relationship between the overseas background of the directors, supervisors and senior teams and the green innovation performance of the enterprise.

As shown in Table 5, it is found that when the enterprise is a state-owned enterprise (nature=1), directors, supervisors and senior executives with overseas background will have a positive impact on the green innovation of enterprises, but the impact is not significant. When the enterprise is a non-state-owned enterprise (nature=0), it is found that directors, supervisors and senior executives with overseas backgrounds are negatively correlated with enterprise green innovation, and the impact is not significant. Therefore, the different nature of the property rights of enterprises will affect the relationship between the overseas background of directors, supervisors and senior executives and the green innovation of enterprises.

Table 5: Heterogeneity analysis

	(1)	(2)
	S1	S2

VARIABLES	green	green
oversea	0.0701	0.0158
	(0.0495)	(0.0179)
ROA	0.4022	0.2320*
	(0.3783)	(0.1200)
debt	0.1405	0.1860***
	(0.2770)	(0.0683)
management	0.7596*	0.0650
	(0.4221)	(0.0744)
independent	-0.7391	0.1523
	(0.5028)	(0.2550)
Constant	0.4817*	0.0646
	(0.2757)	(0.1625)
Observations	1,293	11,524
R-squared	0.0648	0.0209
Number of id1	321	2,551

*Robust standard error is shown in parentheses *** p<0.01, ** p<0.05, * p<0.1*

7. Robustness Test

In this study, the robustness test of the regression results is carried out by the following methods: the level of enterprise green innovation (green), measured by the total number of green patents applied for by the company in the year plus 1 taken as the natural logarithm, is replaced with the green innovation level of the enterprise measured by the total number of green utility model patents independently filed by the company in the year plus 1 taken by the natural logarithm (green1). According to Table 6, the overseas background of directors, supervisors and senior executives still has a positive impact on green innovation of enterprises, and the impact is not significant, which is consistent with the conclusion of the previous regression The CPC Central Committee and The State Council of China (2024).

Table 6: Robustness test results

	(1)	(2)
	S1	S2
VARIABLES	green1	green1
oversea	0.0106	0.0107
	(0.0126)	(0.0125)
ROA		0.1160
		(0.0813)
debt		0.0937*
		(0.0513)
management		0.0605
		(0.0525)
independent		0.3039*
		(0.1760)
nature		0.0350
		(0.0467)
Constant	0.1566	-0.0226
	(0.0977)	(0.1160)
Observations	12,817	12,817
R-squared	0.0257	0.0269
Number of id1	2,806	2,806

*Robust standard error is shown in parentheses *** p<0.01, ** p<0.05, * p<0.1*

8. Conclusion and Limitations

This study shows that: 1. Directors, supervisors and senior executives with overseas backgrounds will have a positive impact on the green innovation of enterprises. 2. The moderating effect shows that enterprises that focus on pollution monitoring strengthen directors, supervisors and senior executives with overseas backgrounds will have a positive impact on enterprise green innovation. This shows that under the supervision of policies, directors, supervisors and senior executives are more motivated to perform their functions and give full play to the advantages of their overseas backgrounds, thereby promoting green innovation in enterprises. 3. Further analysis shows that the heterogeneity of enterprise nature will have an impact on the relationship between the overseas background of directors, supervisors and senior executives and the green innovation of enterprises, and in state-owned enterprises, directors, supervisors and senior executives with overseas backgrounds will promote the green innovation of enterprises, while in non-state-owned enterprises, directors, supervisors and senior executives with overseas backgrounds will have a negative impact on the green innovation of enterprises.

In the process of regression, it was found that some regression results were not significant, which may be due to the following reasons: 1. The number of green patent applications may not fully reflect the green innovation ability of enterprises, and green R&D investment, the proportion of environmental protection technology experts, and the proportion of green product revenue are all factors that measure the green innovation ability of enterprises. 2. The overseas background of directors, supervisors and senior executives may mask the difference in depth and breadth as a virtual variable, and the impact of different overseas experiences is also different, and the impact of overseas background may take longer to appear. 3. The internal environment of the enterprise also affects the results to a certain extent, for example, some enterprises may resist new ideas brought by people with overseas backgrounds, or even if there is a willingness to innovate green, the enterprise lacks the necessary resources to implement it.

In view of the above points, future research will be systematically improved from the following aspects to improve the reliability and scientific nature of the research conclusions: First, in terms of variable measurement, the independent variable, the overseas background of directors, supervisors and senior executives, will be carried out multi-dimensional refined operation, not only examining the presence or absence of overseas background, but also subdividing the type, duration, country and professional field relevance of overseas experience. For dependent variables, a more complex and comprehensive system will be built, including patent quality, green product innovation, and environmental performance. For the analysis method, a more rigorous method will be used to analyze the data regression in the future to ensure the reliability of the results.

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Conflicts of Interest

The authors declare no conflict of interest.

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