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The Impact of Host Country's Innovation Environment on the Performance of Overseas Subsidiaries from a Global Perspective

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Abstract

Based on more than 100,000 overseas subsidiaries, this paper explores the relationship between the innovation environment and the performance of overseas subsidiaries in the host country, and further discusses the moderating effect of institutional quality in the host country and the heterogeneity of different groups. The results show that the innovation environment of the host country has an inverted U-shaped relationship with the performance of overseas subsidiaries, which indicates that a moderate innovation environment promotes performance growth, while performance declines when the threshold is exceeded. The quality of the host country's institutions plays a positive role in regulating the scope of the innovation environment. The study also found that when the overseas subsidiary is on the same continent as the parent company, the inverted U-shaped relationship between the host country's innovation environment and the performance of the overseas subsidiary is more pronounced. This study enriches the theoretical framework and empirical evidence of the impact of the innovation environment on the performance of overseas subsidiaries in the host country, and provides theoretical basis and practical guidance for multinational enterprises to improve the performance of overseas subsidiaries.

Keywords

Overseas Subsidiary Performance; Host Country Innovation Environment; System Quality; Regional Synergies.

1. Introduction

Against the backdrop of the profound restructuring of global value chains and the rise of the knowledge economy, innovation capability has become a key element of a company's core competitiveness. It not only concerns the survival and development of companies in intense market competition, but also serves as the core driving force for companies to achieve sustainable growth and breakthroughs [1]. Overseas subsidiaries serve as crucial pillars in multinational corporations' global strategies, and their performance directly impacts the overall competitiveness of multinational corporations in global markets. Domestic and international literature has extensively explored the decision-making mechanisms of multinational corporations' foreign direct investment from multiple angles, including the host country's business environment, economic environment, socio-cultural environment, and infrastructure environment [2]. Although existing research has yielded significant results, studies on the impact of the host country's innovation environment on the performance of overseas subsidiaries remain relatively scarce. This study aims to enrich existing literature by exploring the impact of the host country's innovation environment on subsidiary performance and assessing the extent to which foreign subsidiary performance is influenced by institutional

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quality and knowledge spillovers, thereby providing a basis for multinational corporations to enhance subsidiary performance on a global scale.

While the academic community has extensively discussed topics related to multinational corporations' foreign investments and host country environments, such as the impact of host country institutional environments on multinational corporations' overseas investment location choices and cross-border merger and acquisition activities [3], research on the relationship between host country innovation environments and the performance of overseas subsidiaries has yet to reach a consensus. First, there is no unified definition of host country innovation environments within the academic community. First, some scholars approach the issue from the perspective of policy support, defining the host country's innovation environment as the policies and regulations established by the government to encourage innovative activities, such as R&D subsidies and intellectual property protection [4]. These policies and measures can reduce the cost of innovation for enterprises, increase the expected returns from innovation, and thereby stimulate enterprises' enthusiasm for innovation. Second, another group of scholars emphasizes the importance of market competition in shaping the innovation environment. They argue that intense market competition drives enterprises to continuously invest resources in innovation to gain a competitive advantage [5]. In a highly competitive market, companies can only meet consumers' increasingly diverse needs through continuous innovation. Additionally, some scholars define the host country's innovation environment from the perspective of innovation resources, including research institutions, talent resources, and technological infrastructure [6].

Second, the conclusions regarding the impact of the host country's innovation environment are inconsistent. Some studies indicate that a favorable host country innovation environment can provide overseas subsidiaries with abundant innovation resources and a broad market space, thereby significantly enhancing their performance levels. Conversely, other studies suggest that the host country's innovation environment may have a negative impact on the performance of overseas subsidiaries. On the one hand, excessively high innovation costs may impose a heavy burden on subsidiaries. On the other hand, intense market competition may subject overseas subsidiaries to significant survival pressures [7].

Additionally, existing research on the relationship between the host country's innovation environment and the performance of overseas subsidiaries has significant regional and industry limitations. Most literature focuses on specific countries or single industries for analysis, resulting in conclusions that lack universality and cross-contextual explanatory power. In terms of regional coverage, Buesa et al. used factor analysis to study the determinants of regional innovation in Europe. They identified five key aspects of the innovation system: national environment, regional environment, innovative firms, universities, and R&D activities conducted by public administrative departments [8]. At the industry level, existing research has primarily focused on the manufacturing sector, with insufficient attention given to other industries. This bias has led to inconsistent conclusions in the existing literature regarding the relationship between the host country's innovation environment and subsidiary performance.

Unlike most existing studies, this paper examines the effects of host country innovation environments from a global perspective. This study constructs a cross-industry cross-sectional database comprising 73,376 multinational companies from 164 home countries and 113,023 overseas subsidiaries in 102 host countries during the period from 2013 to 2022. This breaks through the traditional limitations of single-country or single-industry samples and systematically verifies the relationship between the host country's innovation environment and subsidiary performance, as well as its universality. Second, it breaks away from traditional linear assumptions, using an inverted U-shaped framework to reveal the nonlinear dynamic relationship between host country innovation environments and overseas subsidiary performance, providing a new explanation for the “innovation paradox” phenomenon. Third,

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this study provides empirical evidence for the "regionalization strategy" theory through tests of geographical proximity heterogeneity.

2. Theoretical Basis and Research Hypotheses

2.1. Host Country Innovation Environment Effects

According to the knowledge spillover theory, there are significant knowledge spillover effects in host countries with active innovation. Subsidiaries can absorb advanced technical knowledge and management experience through exchanges and cooperation with local enterprises, research institutions, and universities [9], bringing new ideas and solutions to subsidiaries, improving production processes, enhancing product quality, or developing new market opportunities, thereby positively impacting performance. Over time, the host country's innovation environment attracts an increasing number of companies into the market, including the emergence of local startups and intensified competition from other multinational corporations. The market gradually becomes saturated, and overseas subsidiaries face increasingly intense competition in terms of price and market share, leading to declining profit margins and suppressed performance. Additionally, in the host country's innovation environment, as technology continues to advance and market demands evolve, the difficulty and cost of innovation gradually increase. Overseas subsidiaries must continuously invest significant resources in R&D innovation and also face the issue of diminishing marginal returns. Based on this, this paper proposes Hypothesis 1.

Hypothesis 1: The host country's innovation environment and the performance of overseas subsidiaries exhibit an inverted U-shaped relationship.

2.2. The Moderating Role of Host Country Institutional Quality

Institutions, as an important external environmental factor, have a crucial impact on corporate operations and development [10]. The institutional quality of the host country encompasses multiple aspects, including the soundness of laws and regulations, policy stability, government governance levels, and the effectiveness of market regulation. When the host country possesses high institutional quality, its well-established laws and regulations can provide overseas subsidiaries with clear behavioral guidelines and safeguards when facing the uncertainties and risks posed by the host country's innovation environment, thereby reducing risks during the innovation process and enabling subsidiaries to better benefit from the host country's innovation environment. High-quality host country institutions enable overseas subsidiaries to fully utilize local innovation resources. A favorable institutional environment also attracts more innovation factors to aggregate [11] and promotes their more efficient flow and integration. For overseas subsidiaries, this means easier access to and integration of local innovation resources, such as talent, technology, and capital, thereby enhancing their performance. However, when the innovation environment exceeds a certain threshold, its negative impact on performance becomes more pronounced. Based on the above analysis, Hypothesis 2 is proposed.

Hypothesis 2: Host country institutional quality positively moderates the impact of the host country's innovation environment on the performance of overseas subsidiaries, i.e., the higher the quality of host country institutions, the stronger the positive impact of the host country's innovation environment on the performance of overseas subsidiaries.

2.3. Regional Synergy Effects

The geographical layout of overseas subsidiaries plays a critical role in their ability to effectively overcome the foreigner disadvantage [12]. When subsidiaries and parent companies are located on the same continent, geographical proximity significantly reduces psychological distance and institutional friction in cross-border operations. This proximity not only accelerates the transfer efficiency of intangible assets such as technology and management

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practices between parent and subsidiary companies but also enables subsidiaries to quickly identify and adapt to policy orientations, technical standards, and market demands within the host country's innovation ecosystem [13]. The local knowledge accumulated by subsidiaries is more easily synergized with the core capabilities of the parent company, thereby more efficiently converting the host country's R&D resources and industry-academia-research networks into tangible competitive advantages. Additionally, geographical proximity reinforces the dynamic interaction mechanism between parent and subsidiary companies, enabling subsidiaries to adjust their strategies in real time to align with the changing pace of the host country's innovation environment. Based on this, this paper proposes Hypothesis 3.

Hypothesis 3: When overseas subsidiaries and parent companies are located on the same continent, the host country innovation environment effect is more significant.

Based on the above analysis, this paper proposes the aforementioned three hypotheses and constructs a research framework diagram (see Figure 1):

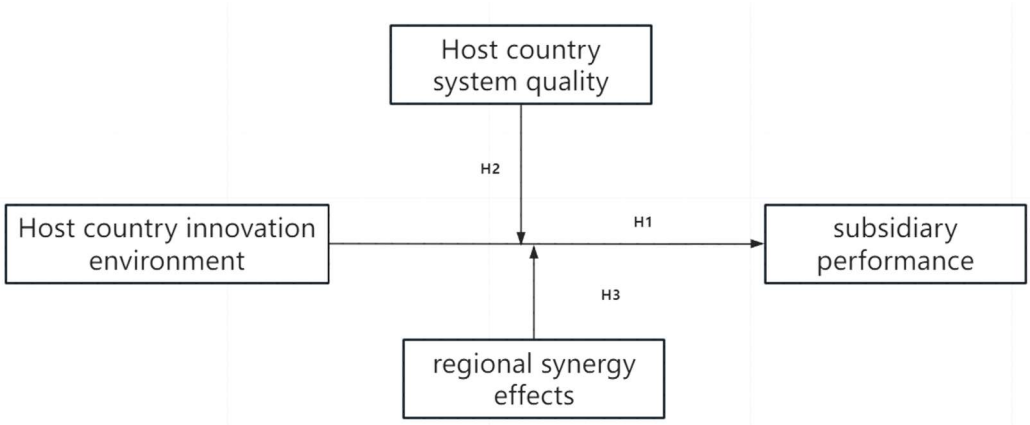


Figure 1. Research framework

3. Research Design

3.1. Sample Selection

This paper is based on the Orbis database, the World Bank database, and the World Intellectual Property Organization database. First, we matched parent companies with their subsidiaries in the Orbis database to establish a parent-subsidiary relationship database. Second, we determined the geographical relationship between parent companies and subsidiaries based on their locations. Third, we merged all necessary financial information with the parent-subsidiary association database. We calculated the sales per worker and capital per employee based on the overseas subsidiaries' sales, capital, and number of employees. We excluded subsidiaries that did not provide the necessary variables, had outlier values for sales per employee or capital per employee, or were in the financial industry. Finally, we merged host country innovation environment data with firm-level data to screen out the overseas subsidiary sample. After organizing the data according to the above steps, we ultimately obtained 573,288 observations of overseas subsidiaries from 2013 to 2022.

3.2. Variable Measurement

Dependent variable: Overseas subsidiary performance (ROA). We use the ratio of pre-tax profit to total assets of overseas subsidiaries of multinational corporations to measure the operational performance of subsidiaries. In robustness tests, this study uses return on equity (ROE) instead of return on assets (ROA) to measure the performance of overseas subsidiaries.

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Explanatory variable: Host country innovation environment (GII). The Global Innovation Index published by the World Intellectual Property Organization is used to measure the innovation environment of countries. Additionally, in the robustness section, this study uses the proportion of R&D expenditure to national income in the host country for robustness testing.

Moderating Variable: Host Country Institutional Quality (RUL).The World Bank's Global Governance Index (WGI) measures host country institutional quality across six dimensions: host country voice and accountability, political stability and non-violence, government efficiency, regulatory quality, rule of law, and control of corruption. This study calculates the average of these six indicators to measure host country institutional quality.

Control variables: Referring to the relevant research by Yong Yang (2024) [14], this paper simultaneously selects macro-level control variables and micro-level enterprise control variables. Macro-level national control variables include: gross domestic product (GDP), per capita GDP growth rate (PGDPG), trade openness (Export_GDP), and economic attractiveness (FDI inflow). Micro-level firm-level control variables include: per capita sales of subsidiaries (Psales), per capita assets of subsidiaries (Pcapital), age of subsidiaries, and debt-to-equity ratio of subsidiaries . The statistical characteristics of each variable are presented in Table 1.

Table 1. Summary statistics

Variables	Mean	Std. Dev.	Obs.
ROA	7.51	12.87	573,288
GII	48.00	7.86	573,288
RUL	0.71	0.62	573,288
Avg.intangibles_in two-digit industry(US$1000,000)	5150.87	18705.31	573,288
Avg.intangibles_in three-digit industry (US$1000,000)	4920.79	19811.82	573,288
GDP(US$1000,000,000)	2517.59	4608.14	573,288
PGDPG	2.14	3.68	573,288
Export_GDP	46.52	20.47	573,288
FDI inflow(US$1000,000,000)	24.02	34.76	573,288
Psales	502030.80	889887.00	573,288
Pcapital	82904.97	419527.00	573,288
gearing	69.41	134.14	573,288
age	21.69	17.38	573,288

3.3. Model Specification

To examine the impact of the host country's innovation environment on overseas subsidiaries and the moderating effect of host country institutional quality, the following econometric model is constructed:

$$ROA_{ij,t}=\beta_0+\beta_1 GII_{j,t}+\beta_2 GII_{j,t}^2+\beta_3 \sum Controls_{ij,t}+\sum Year+\sum Subsidarise+\varepsilon_{ijt} \quad (1)$$

$$ROA_{ij,t}=\beta_0+\beta_1 GII_{j,t}+\beta_2 GII_{j,t}^2+\beta_3 RUL_{j,t}+\beta_4 GII_{j,t}\times RUL_{j,t}+\beta_5 GII_{j,t}^2\times RUL_{j,t}^2+\beta_6 \sum Controls_{ij,t}+\sum Year+\sum Subsidarise+\varepsilon_{ijt} \quad (2)$$

Where i, j, and t represent firm, country, and year; $ROA_{ij,t}$ represents the performance of overseas subsidiaries; and $\sum Controls_{ij,t}$ represents the set of control variables; $\sum Year$,

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$\sum$ Subsidariserepresent the year and subsidiary-specific fixed effects; $\varepsilon_{ijt}$is the random error term.

4. Empirical Results

4.1. Benchmark Regression

Table 2. Host Country Innovation Environment and Overseas Subsidiary Performance

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	ROA	First stage	First stage	Second stage
				GII	GII²	ROA
GII	0.251*** (0.059)	1.162*** (0.339)				9.619*** (17.55)
GII²	-0.004*** (0.001)	-0.012*** (0.004)				-0.093*** (-17.56)
RD			1.417** (0.705)			
RD²			-1.960*** (0.347)			
Avg.intangibles_in two-digit industry				0.084*** (48.32)	8.353*** (49.16)	
Avg.intangibles_in two-digit industry²				-0.001*** (-41.53)	-0.048*** (-40.92)	
Avg.intangibles_in three-digit industry				0.005*** (5.93)	0.534*** (6.81)	
Psales	4.780*** (0.029)	15.769*** (0.165)	4.812*** (0.031)	4.780*** (0.029)	15.769*** (0.165)	4.812*** (0.031)
Pcapital	-1.800*** (0.026)	-6.376*** (0.152)	-1.862*** (0.028)	-1.800*** (0.026)	-6.376*** (0.152)	-1.862*** (0.028)
gearing	-0.016*** (0.000)	-0.075*** (0.001)	-0.016*** (0.000)	-0.016*** (0.000)	-0.075*** (0.001)	-0.016*** (0.000)
age	-2.192*** (0.110)	-24.563*** (0.636)	-2.444*** (0.123)	-2.192*** (0.110)	-24.563*** (0.636)	-2.444*** (0.123)
GDP	-2.607*** (0.336)	-4.728** (1.934)	-3.409*** (0.390)	-2.607*** (0.336)	-4.728** (1.934)	-3.409*** (0.390)
PGDPG	0.106*** (0.007)	0.311*** (0.040)	0.101*** (0.008)	0.106*** (0.007)	0.311*** (0.040)	0.101*** (0.008)
Export_GDP	0.058*** (0.005)	0.142*** (0.029)	0.071*** (0.006)	0.058*** (0.005)	0.142*** (0.029)	0.071*** (0.006)
FDI inflow	0.002 (0.021)	-0.073 (0.119)	-0.061*** (0.021)	0.002 (0.021)	-0.073 (0.119)	-0.061*** (0.021)
Kleibergen-Paap rk LM						104.048***
Kleibergen-Paap Wald rk F						28.623***
Hansen Jtest P						0.340
Year fixed effect	YES	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES
No. of observations	557777	556495	500824	573,288	573,288	573,288
F	4239.743	1802.815	3617.225			
R^2	0.542	0.336	0.552	0.555	0.540	0.008

Notes: Values in parentheses are P-values. Significance levels are ***: <0.01; **:<0.05; *:<0.1.

Table 2 presents the empirical results of the host country's innovation environment on the performance of overseas subsidiaries. Column (1) of Table 2 includes year and individual fixed effects. The coefficient for GII is 0.251, and the coefficient for GII2 is -0.004, both of which are

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significant at the 1% level. This indicates that there is an inverted U-shaped relationship between the host country's innovation environment and the performance of overseas subsidiaries, meaning that the host country's innovation environment first promotes and then inhibits subsidiary performance. Hypothesis 1 is thus validated.

4.2. Robustness Test

(1) Replacing the measurement method for overseas subsidiary performance. We conducted a robustness test using return on equity (ROE) instead of return on assets (ROA) to measure the performance of overseas subsidiaries. The regression results are shown in Column (2) of Table 2. The coefficient for GII is 1.162, and the coefficient for GII2 is -0.012, both of which are significant at the 1% level. This indicates that the empirical results remain consistent with the previous findings even after replacing the measurement method of the explanatory variable.

(2) Replacing the measurement method for the host country's innovation environment. The proportion of R&D investment to the host country's GDP (RD) was used to measure the host country's innovation environment. The regression results are shown in Column (3) of Table 2. As shown in columns (1) to (3) of Table 2, regardless of whether the measurement method for the performance of overseas subsidiaries or the measurement method for the host country's innovation environment is replaced, the host country's innovation environment and overseas subsidiaries exhibit an inverted U-shaped relationship, further validating the robustness of the previous findings.

4.3. Endogeneity Test

Considering the potential endogeneity issue of reverse causality between the host country's innovation environment and the performance of overseas subsidiaries, this paper employs the instrumental variables method to conduct an endogeneity test. The study selects the average intangible assets of companies with the same three-digit industry code in the host country, the average intangible assets of companies with the same two-digit industry code in the host country, and their squares as instrumental variables. First, the host country's innovation environment is closely related to the average intangible assets of companies in the host country's industry, satisfying the correlation condition. Second, the average intangible assets of companies in the host country's industry have no direct relationship with a company's decision to invest abroad, satisfying the exogeneity condition. As shown in the empirical results in columns (4) to (6) of Table 2, the Under-identification test (Kleibergen-Paap rk LM statistic) yields an LM statistic p-value less than 0.05, strongly rejecting the null hypothesis of “under-identification”; The Cragg-Donald Wald F statistic from the weak identification test exceeds the 10% critical value of 13.43 for the Sock-Yogo weak instrumental variable test (where the null hypothesis is weak instrumental variables), indicating the absence of weak instrumental variables. These tests further confirm the appropriateness of the instrumental variables. Additionally, the P-value from the Hansen J test is not significant, indicating no over-identification issues. Furthermore, the coefficient for GII in column (6) of Table 3 is 9.619, and the coefficient for GII2 is -0.093, both of which are significant at the 1% level. This indicates that the inverted U-shaped relationship between the host country's innovation environment and overseas subsidiaries remains valid, further validating the robustness of the previous results.

5. Extensional Analysis

5.1. Moderating Effect Test

Host country institutional quality, through mechanisms such as legal enforceability, policy stability, and property rights protection, determines the availability and conversion efficiency of innovation resources. A high-quality institutional environment can effectively reduce the uncertainty of cross-border operations and provide legal safeguards for the flow of innovation

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factors. Table 4 presents the regression results for the moderating effect of host country institutional quality. As shown in Column (2) of Table 3, the coefficient of RUL × GII is 0.129, significant at the 10% level, while the coefficient of GII is 0.047, not significant. The signs of the coefficients are the same, indicating that as the quality of the host country's institutional environment improves, the inverted U-shaped curve shifts upward to the right. This suggests that a high level of institutional quality not only expands the positive impact range and depth of the host country's innovation environment on subsidiary performance but also delays the critical point of the marginal effect of the host country's innovation environment on subsidiary performance. This indicates that the quality of the host country's institutional environment positively moderates the relationship between the host country's innovation environment and the performance of overseas subsidiaries, thereby validating Hypothesis 2.

Table 3. Regression results for moderation effects

Variables	(1)	(2)
	ROA	ROA
GII	0.251***	0.047
	(0.059)	(0.074)
GII^2	-0.004***	-0.001
	(0.001)	(0.001)
RUL		-1.966
		(1.662)
RUL×GII		0.129*
		(0.069)
RUL×GII^2		-0.002***
		(0.001)
Psales	4.780***	4.778***
	(0.029)	(0.029)
Pcapital	-1.800***	-1.801***
	(0.026)	(0.026)
gearing	-0.016***	-0.016***
	(0.000)	(0.000)
age	-2.203***	-2.189***
	(0.111)	(0.110)
GDP	-2.670***	-2.883***
	(0.341)	(0.343)
PGDPG	0.105***	0.111***
	(0.007)	(0.007)
Export_GDP	0.058***	0.059***
	(0.005)	(0.005)
FDI inflow	0.004	0.007
	(0.021)	(0.021)
Fixed effect	YES	YES
No. of observations	557777	557777
F	4239.743	3263.098
R^2	0.542	0.542

5.2. Heterogeneity Analysis

5.2.1. Heterogeneity of Geographic Location Types of Overseas Subsidiaries

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Table 4. Geographic Location Types of Overseas Subsidiaries

	(1)	(2)
	On the same continent	Not on the same continent
	ROA	ROA
GII	0.324***	0.076
	(0.069)	(0.121)
GII^2	-0.004***	-0.001
	(0.001)	(0.001)
Psales	4.886***	4.485***
	(0.033)	(0.055)
Pcapital	-1.740***	-1.933***
	(0.031)	(0.051)
gearing	-0.016***	-0.017***
	(0.000)	(0.000)
age	-2.059***	-2.594***
	(0.126)	(0.227)
GDP	-2.671***	-3.118***
	(0.388)	(0.694)
PGDP	0.106***	0.103***
	(0.008)	(0.015)
Export_GDP	0.058***	0.033***
	(0.006)	(0.010)
FDI inflow	0.020	-0.115**
	(0.023)	(0.049)
Fixed effect	YES	YES
No. of observations	433824	123953
R^2	0.540	0.548

Site selection decisions are important strategic decisions for multinational companies when investing overseas, and there are significant differences in the positioning and strategies of subsidiaries in different locations. Overseas subsidiaries can leverage the internal resources of their parent companies, including the transfer and sharing of knowledge, technology, and management experience, to accelerate the absorption of advanced technology and experience from the host country and enhance their own capabilities. This study identifies the countries where the parent and subsidiary companies are located to determine the location information of the home country and host country. If the host country and home country are in the same continent, a value of 1 is assigned; otherwise, 0 is assigned. Table 4 presents the regression results for groups where overseas subsidiaries and parent companies are in the same continent and those where they are not in the same continent. Cohen's D is a method for measuring the magnitude of differences between two groups and has been widely used in studies comparing the effects of differences between different sub-samples [15]. Based on the regression results, Cohen's D was calculated to be 2.518 and 3.000, respectively, indicating that the differences between the two groups fall into the large category. In Column (1) of Table 4, the coefficient for GII is 0.324, and the coefficient for GII2 is -0.004, both of which are significant at the 1% level. In Column (2), the coefficient for GII is 0.076, and the coefficient for GII2 is -0.001, neither of which is significant. Comparing columns (1) and (2), when overseas subsidiaries and parent companies are located in the same continent, the inverted U-shaped curve shifts to the right and becomes steeper, indicating that the host country's innovation environment effect is more significant, thereby validating Hypothesis 3.

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6. Conclusion and Implications

This paper uses observational data from 113,023 overseas subsidiaries and employs econometric models to empirically study the relationship between the host country's innovation environment and the performance of overseas subsidiaries. It further examines the moderating effect of the host country's institutional quality and the heterogeneity among different subgroups. The main findings are as follows: First, there is an inverted U-shaped relationship between the host country's innovation environment and the performance of overseas subsidiaries. This indicates that as the host country's innovation environment improves, the performance of overseas subsidiaries gradually increases. However, once the innovation environment exceeds a certain threshold, excessive innovation may lead to intense competition, resource concentration, and other issues, increasing the operational costs and risks for subsidiaries. Continuing to enhance the innovation environment may actually result in a decline in subsidiary performance. Second, the quality of the host country's institutional environment plays a positive moderating role in the relationship between the host country's innovation environment and the performance of overseas subsidiaries. The host country's sound legal system, stable policy environment, efficient market regulation, and effective property rights protection provide overseas subsidiaries with stable operational guarantees and a fair competitive order, thereby enhancing the effects of the host country's innovation environment. Third, when overseas subsidiaries and parent companies are located on the same continent, the parent company can better support the overseas subsidiaries by leveraging knowledge spillovers, enabling the subsidiaries to more effectively utilize the host country's innovation environment to improve performance.

This study offers the following insights for improving the performance of overseas subsidiaries: First, companies should make reasonable use of the host country's innovation environment. When selecting overseas investment locations, companies need to fully consider the level of the host country's innovation environment. They should not blindly pursue countries with excessively high innovation environment levels but instead leverage the resource advantages of moderately innovative environments while vigilantly avoiding risks associated with excessive competition and resource concentration. Second, companies should also prioritize the quality of host country institutions when engaging in international direct investment. Well-established legal frameworks, stable policy environments, efficient market regulation, and effective intellectual property protection provide overseas subsidiaries with stable operational guarantees and fair competitive order, thereby reducing operational risks and enhancing performance. Third, the synergistic effects between the parent company and subsidiaries should be fully leveraged. The parent company can better support and manage nearby overseas subsidiaries, promoting knowledge spillover and resource sharing. Companies should strengthen strategic coordination between the parent company and subsidiaries, establish effective communication and coordination mechanisms, ensure subsidiaries can promptly access the parent company's technology and management experience, and enhance innovation capabilities and performance. Meanwhile, subsidiaries should also provide feedback on local market information and innovation trends to inform the parent company's strategic decision-making.

This study has some limitations, and future research directions are proposed. First, although the sample size is relatively large, only a few multinational companies have overseas subsidiaries, and the coverage of industries and regions remains limited. Second, the generalizability of the conclusions to technology-intensive and non-technology-intensive industries needs further verification. Finally, the measurement of the innovation environment focuses on macro indicators, and future research could combine micro- and meso-level innovation data for multi-level analysis. Future research could introduce emerging variables

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such as artificial intelligence and digital infrastructure to explore the reshaping effects of digital transformation on the inverted U-shaped relationship.

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