WEP Warwick Evans Publishing

Transactions on Social Science, Education and Humanities Research
ISSN: 2960-1770, eISSN: 2960-2262 | Volume 9
SSMI 2024

R&D internationalization and innovation performance: the moderating role of financial slack

Xinyang Dong

Liaoning University, Shenyang, China

xinyang.dong2@students.vu.edu.au

Abstract. Among enterprises in emerging economies represented by China, R&D internationalization is an important strategic choice, aiming to obtain advanced technological resources and achieve competitive advantages. Taking listed companies in the information transmission, software and information technology services, and scientific research and technology services industries in China from 2018 to 2022 as research objects, this paper explores the impact of R&D internationalization on innovation performance, and examines the moderating role of financial slack in this relationship from the perspective of slack resources in organizational theory. The results show that there is a positive relationship between R&D internationalization and innovation performance. Further research shows that from the perspective of organizational theory, financial slack will positively strengthen the role of R&D internationalization in promoting corporate innovation performance. This paper discusses the moderating role of financial slack in this relationship for the first time. The research results have important practical implications for enterprises in emerging economies to formulate R&D internationalization strategy and improve innovation performance.

Keywords: R&D internationalization, innovation performance, financial slack, emerging economies.

1. Introduction

Under the background of globalization, multinational enterprises (MNEs) are faced with fierce international competition and increasing pressure of technological innovation. In order to speed up technological progress and product innovation, many enterprises have begun to implement R&D internationalization strategy and obtain global innovation resources by carrying out overseas R&D activities. For example, as a representative of emerging economies, China's enterprises have shown a significant growth trend in the internationalization of R&D. Through international cooperation, the establishment of overseas research and development centers and the acquisition of foreign high-tech companies, Chinese enterprises have access to advanced technologies, market information and human resources, which are of great importance to enhancing their competitiveness and innovation ability. The internationalization process and innovation of firms has been the focus of the discipline of international business for decades (Welch & Paavilainen-Mäntymäki, 2014) and continues to attract considerable interest. Previous studies have examined several moderators of the impact of R&D internationalization on innovation performance, such as the institutional environment (Sanna-Randaccio & Veugelers, 2007; Li et al., 2023)Social networks(Van Beers & Zand, 2014; Zhong et al., 2021). However, there is a lack of research on whether financial slack in emerging economies can regulate R&D internationalization and innovation performance. Therefore, this paper explains the innovation effect of internationalization from the perspective of organizational slack.

In the 1950s, March and Simon (1958) proposed "slack" in Histology. Organizational slack was first proposed by Cyert and March (1963), who argued that organizational slack is the difference between the resources a firm has and the actual demand for those resources, which have not yet been put into use. According to the view of corporate behavior, organizational slack is the accelerator of corporate behavior change (Baumol et al., 1964). Organizational slack exists in different forms in enterprises(Y. Li et al., 2023), such as financial slack, human slack, relational slack, and technical slack. Among them, financial slack, as an important component of organizational slack, is composed of cash slack

and debt slack, which reflects the ability of an enterprise to meet the capital demand with low risk and is a direct reflection of the financial flexibility of an enterprise (Myers & Majluf, 1984). The role of financial slack on corporate performance has always been the focus of research. Organizational theory holds that financial slack can be used as a buffer for enterprises to cope with the pressure brought by changes in internal and external environment (Lu & Wong, 2019).

This study attempts to supplement previous findings. We introduce a unified theoretical framework to explain how R & D internationalization affects firm innovation performance. We used two variables: the firm's R & D internationalization intensity and the firm's innovation performance. In addition, we examine the moderating effect of financial slack on the relationship between R & D internationalization and innovation performance. We tested this framework using panel data on R&D internationalization for 328 listed companies over a 5-year period (2017-2021). Our findings suggest that financial slack may significantly affect R & D internationalization, and therefore innovation performance. The analysis based on the organizational slack perspective determines how the internationalization attributes of the firm relate to R&D internationalization.

This paper contributes to the R & D internationalization literature in the following aspects. Firstly, there is a lot of previous literature on R&D internationalization, on how R&D internationalization affects international performance (Tang et al., 2019), green innovation (Papanastassiou et al., 2020), company productivity (Rahko, 2021), etc. However, the research results of this paper help to reflect the importance of R & D internationalization for emerging economy firms, especially its incentive for innovation performance, which is crucial to enhance the international competitiveness of firms. Second, we fill the gap in organizational slack where financial slack has an impact on innovation performance in R&D internationalization. Previous studies focused on the characteristics of senior executives (Zhao et al., 2023), government support (Tse et al., 2021) and other regulatory factors. This paper starts from the Angle of financial slack regulation which has never been discussed before. Finally, the previous theoretical perspectives are mainly based on knowledge (Zander & Kogut, 1995), Social embedment (Meyer et al., 2011) Institutional theory (Zaheer, 1995; Rabbiosi & Santangelo, 2013). From the perspective of organizational theory (Liao et al., 2016), this paper discusses how R&D internationalization affects innovation performance.

2. Theory and hypothesis

2.1. R&D internationalization and innovation performance

For companies in emerging economies, overseas R&D subsidiaries should not only extend the competitive advantages of the parent company, but also use advanced technological knowledge acquired from overseas to flow resources to the parent company with less developed economy and improve its innovation performance (Bitzer & Kerekes, 2008; Awate et al., 2015). Specifically, the promotion effect of R&D internationalization on the innovation performance of enterprises in emerging economies is mainly reflected in the following aspects: First of all, enterprises with internationalized R&D can obtain richer and more heterogeneous innovation resources in the international market (Chen et al., 2012). By seeking and utilizing these differentiated innovation resources in a larger scope, multinational enterprises can improve innovation capability or reduce innovation cost, thus improving innovation performance. Specifically, companies entering the international market can obtain more information about innovation. By carrying out research and development activities on a global scale, enterprises can grasp the latest trends of technical knowledge and information in a timely manner. This kind of global innovation information search provides the basis for enterprise innovation. In the process of global research and development, multinational enterprises can make full use of the resource endowment advantages of different countries to promote their own innovation. For example, in countries with abundant R & D human resources, multinational enterprises can hire high-level technical experts to acquire more knowledge and creativity and enhance their innovation ability (Mavroudi et al., 2023).

Second, the special institutional constraints in emerging markets will affect the strategic choices of local firms (Lee et al., 2021), which will promote enterprises to invest in host countries with better institutional environments. In most emerging economies, capital markets and regulatory infrastructure are weak and markets change at a fast pace (Marquis & Raynard, 2014). The markets in these countries are undergoing rapid and evolving change, adding complexity for businesses trying to succeed and adjust. In addition, government policies in emerging economies seem to support more established industry leaders than innovative startups (Wu et al., 2016). This creates an institutional environment that does not support corporate R&D and innovation activities. As a result, many businesses encounter institutional discrimination, such as difficulty accessing financing and facing credit discrimination. These challenges make it difficult for them to obtain the necessary innovation resources in the domestic market, which ultimately restricts the development of their innovation capacity. To overcome institutional restrictions and improve innovation performance and competitive advantage, many start-ups are expanding their operations to developed countries overseas. These developed markets offer a more favorable institutional environment, more transparent market operations, better protection for intellectual property rights, and more efficient capital markets. The placement of R&D activities by emerging market enterprises in developed countries with well-established systems can better guarantee their international R&D and innovation activities, which will ultimately help improve the innovation performance of enterprises.

Therefore, this paper proposes hypothesis H1: R&D internationalization is positively correlated with innovation performance.

2.2. The moderating role of financial slack

Theoretical circles have different opinions on the definition of organizational slack. In organizational theory, Cyert and March (1963) point out that financial slack enables firms to respond to changes in internal and external environments and reduce internal conflicts through investment diversification. Bourgeois (1981) believes that financial slack can help enterprises adapt to the pressure of internal adjustment and external policy changes, and initiate strategic changes. This kind of knowledge inventory does not have a clear goal, but is ultimately usable in the face of uncertainty and dynamic environments (Levinthal & March, 1993). Hambrick and D 'Aveni (1988) prove that redundant resources have a positive impact on firm survival. Resources that have not yet been fully deployed, but which enable companies to adapt to changes in the environment, provide flexibility for companies to make strategic choices to pursue opportunities (Greenley & Oktemgil, 1998; Gentry et al., 2016). In general, according to organizational theory, financial slack has at least the following functions: First, it is a buffer mechanism, which can protect the development ability of enterprises and cope with the risks of environmental changes; Second, it can reduce internal conflicts, because it solves the problem of resource scarcity, so that all departments of the enterprise can allocate the required resources; Third, it is conducive to the innovation of enterprises. The existence of surplus resources makes enterprises have the ability and opportunity to innovate. However, agency theory is contrary to organization theory. For example, when studying the relationship between corporate risk and return, financial slack, as a moderating variable, will make managers reluctant to take risks to cope with changes in the market environment, thus reducing corporate performance (Miller & Leiblein, 1996).

However, compared with agency theory and organization theory, if analyzed from the perspective of agency theory, firstly, it overemphasizes the contract mechanism and focuses on resolving the conflict of interest between principal and agent through contract, which may not fully reflect the influence of informal relationship and social factors on the interaction between the two parties. Second, it does not take into account the diversity and complexity of the relationship between principal and agent under different organizational environment and cultural background. Third, agency theory can be limited when dealing with complex organizational problems, because its models may not cover all the factors that influence agent behavior. Organization theory provides a comprehensive perspective to analyze by considering a variety of internal and external factors.

Therefore, this paper proposes hypothesis H2: financial slack positively regulates the relationship between R&D internationalization and innovation performance.

3. Research design

3.1. Sample selection and research methods

The research samples of this paper are listed companies in China's information transmission, software and information technology service industry and scientific research and technology service industry from 2018 to 2022. These two industries are selected because their R&D internationalization activities are more active. This paper selects listed companies in two industries from the RESSET financial research database, then excludes the enterprise samples with missing values and abnormal values in the financial data, and finally selects the data of 328 enterprises from 2018 to 2022 as the sample data.

The number of patents used in this paper to measure enterprise innovation is a typical counting data, which follows the Poisson distribution, and whether an enterprise has R & D internationalization conforms to the negative bidirectional distribution. Therefore, this paper uses the Poisson panel and the negative bidirectional model to estimate. This paper constructs the Poisson panel fixed effect model to analyze the relationship between R&D internationalization and firm innovation performance and the moderating effect of financial slack on both.

Table 1. Variable definitions and data sources

Variable type	Variable	Definitions	Sources
Explained variables	Patents	Innovation performance	Intellectual Property Office
Explanatory variables	R&D_Int	If there is R&D internationalization, the value is 1; otherwise, it is 0	Corporate annual report
Moderators	Fslack	Financial slack	RESSET
Control variables	Age	The age of the enterprise	RESSET
	ROE	Return on equity diluted	RESSET
	Surres	The Surplus reserve	RESSET
	Invtr	Company's inventory	RESSET
	Netinvincm	Net investment	RESSET
	NRecProLos	Total share capital	RESSET

3.2. Variable Definition

3.2.1. Explained variables

Patents. Most existing studies use patent data as an indicator of innovation performance (Zhu et al., 2021). In this paper, patent application flow, namely the total number of new patent applications in the current year, is selected to measure innovation performance. The source of information for R&D innovation may be domestic R&D collection or overseas subsidiaries. Patent application data are from the website of the State Intellectual Property Office of the People's Republic of China.

3.2.2. Explanatory variables

R&D Internationalization (R&D_Int). Inspired by the global pipeline perspective, enterprises' R&D internationalization activities can be carried out across organizational and national boundaries through the establishment of international technology alliances, cross-border mergers and acquisitions, and greenfield investments in overseas research institutions (Si et al., 2021). This paper uses a binary approach to measure R&D internationalization. If an enterprise establishes an independent R&D center overseas, acquires or establishes an overseas subsidiary whose business scope is related to R&D activities, or engages in R&D alliance cooperation with a foreign company, it is considered R&D internationalization, and the value is 1. If there is no R&D alliance, the value is

0. Information related to R&D internationalization is obtained from the company's annual report and supplemented from the company's official website and major information networks.

3.2.3. Moderators

Financial slack (Fslack). Domestic and foreign scholars mainly use two methods to measure financial slack, one is the questionnaire survey method, the other is the use of specific financial indicators. Considering that financial indicators are more stable, this paper also uses financial indicators to measure financial slack. Financial slack is measured as annual cash divided by total assets (Vanacker et al., 2017).

3.2.4. Control variables

This paper selects enterprise Age (Age), return on equity (ROE), surplus reserve (Surres), inventory (Invtr), net investment income (Netinvincm) and non-recurring profit and loss (NRecProLos) as control variables. Control variable data is obtained from the RESSET database. Table 1 summarizes the variable definitions and data sources.

4. Empirical results and analysis

4.1. Descriptive Statistics

Before the regression analysis, descriptive statistics were carried out in this paper. The mean value, standard deviation and correlation coefficient matrix of each variable were listed in Table 2. As can be seen from Table 2, the average number of patent applications of the sample enterprises is 23.141, of which 16.2% enterprises have carried out R&D internationalization activities. In order to accurately verify and analyze the relationship between various variables, panel Poisson fixed effect regression is used in the following hypothesis test.

Table 2. Descriptive statistics and correlations

Variable	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
1. patents	23.141	72.165	1.000								
2. rd int	0.162	0.369	0.448*	1.000							
3. fslack	0.638	0.192	0.078*	0.116*	1.000						
4. age	20.33	5.55	0.016	0.053*	-0.059*	1.000					
5. roe	-3.622	59.014	0.055*	0.073*	0.095*	-0.089*	1.000				
6. surres	376200000	4469000000	0.078*	0.108*	-0.158*	-0.016	0.011	1.000			
7. invtr	428300000	859100000	0.330*	0.256*	0.027*	0.140*	0.046*	0.243*	1.000		
8. netinvincm	69417909	328900000	0.048*	0.093*	-0.258*	0.004	0.050*	0.416*	0.247*	1.000	
9. nrecprolos	64507023	236700000	0.050*	0.020*	-0.158*	0.026*	0.112*	0.112*	0.188*	0.535*	1.000

4.2. Full sample regression analysis of R&D internationalization and innovation performance

In this paper, innovation performance is used as the dependent variable, and the dependent variable R & D internationalization, the financial slack of the adjustment term, and the control variable are regression using the panel Poisson fixed effect model. The results are shown in Table 3. Model 1 is a benchmark model composed of control variables, and the results show that the dilution of return on equity has a significant impact on innovation performance, and it is significant at 1% level, and has a positive impact on enterprise innovation performance. Whether R & D internationalization and the interaction between the moderating variables and R & D internationalization affect the innovation performance of enterprises still needs to be further tested. Model 2 added R&D internationalization variables to test hypothesis H1. The variable coefficient is 2.083 and significant at the 1% level, indicating that the average number of patent applications for R&D internationalization activities of enterprises increases by e^2.083, about 8.029, when other variables are controlled. Hypothesis H1 is verified. Model 3 introduces the interaction term between financial slack and R&D internationalization to verify whether H2's moderating effect can be established. As can be seen from model 3, the interaction term between R&D internationalization and financial slack positively promotes enterprise innovation performance, with a coefficient of 0.676 and significant at 1% level.

Therefore, H2 is supported. That is, R&D internationalization activities positively affect innovation performance, and the interaction between financial slack and R&D internationalization positively affects innovation performance.

Table 3. Results of Poisson estimation of full sample panel based on main effect and moderating effect

Variables	Model 1	Model 2	Model 3
age	0.0001	-.011***	-.012***
	(1.01)	(-11.29)	(-11.66)
roe	0.011***	.003***	.003***
	(39.89)	(14.10)	(13.23)
surres	0.00000000002***	0.000000000007***	0.000000000009***
	(18.19)	(9.28)	(11.09)
invtr	0.0000000004***	0.0000000002***	0.0000000002***
	(157.29)	(86.93)	(85.31)
netinvincm	-0.00000000007***	-0.0000000002***	-0.0000000001***
	(-4.03)	(-11.91)	(-6.00)
nrecprolos	-0.0000000001***	0.0000000002***	0.0000000002***
	(-4.74)	(6.88)	(-6.73)
rd_int		2.083***	1.605***
		(174.75)	(34.99)
fslack			.017
			(0.34)
rd_int * fslack			.676***
			(10.21)
Prob>chi2	0.000	0.000	0.000

*** p<0.01, ** p<0.05, * p<0.1

4.3. Robustness test

Two kinds of robustness tests are set up in this paper. One is to use negative binomial regression for further robustness test, and the other is to randomly select 80% of the total sample to continue the Poisson test. Table 4 reports the results of regression estimates based on negative binomial distributions. The results of all enterprises show that the estimated coefficients of R & D internationalization are significantly positive, which is basically consistent with the previous research results of Poisson model. Although the coefficient of the interaction term between financial slack and R&D internationalization is not significant, the symbol is basically the same as before. Overall, it maintains good robustness. Tables 5 and 6 report the results of Poisson's test and negative bidirectional regression based on 80% of the sample. In Table 5, the estimated results of its main effect and moderating effect are consistent with the estimated results of the main model in Table 3, that is, the internationalization coefficient of R&D is significantly positive at the 1% level. For the moderating effect of financial slack, the coefficient of interaction between financial slack and R&D internationalization is significantly positive at 1% level. This is consistent with the previous conclusion of this paper, that is, enterprises with high financial slack are more likely to create favorable conditions for R&D internationalization activities and promote innovation. In Table 6, the R&D internationalization coefficient of its main effect is significantly positive at the 5% level. Although the interaction terms of financial slack and R&D internationalization are not significant, their symbols are basically the same as before. On the whole, the robustness test is passed.

Table 4. Robustness test of full sample panel negative bidirectional regression based on main effect and moderating effect

Variables	Model 1	Model 2	Model 3
age	0.015	-0.007	-0.07
	(1.51)	(-0.76)	(-0.82)
roe	0.01***	0.009***	0.009***
	(6.66)	(6.06)	(6.04)
surres	0.00000000002	0.00000000002	0.00000000002
	(0.72)	(0.91)	(1.01)
invtr	0.0000000005***	0.0000000002***	0.0000000002***
	(6.76)	(3.29)	(3.22)
netinvincm	0.00000000009	0.0000000002	-0.0000000001
	(-0.47)	(-1.19)	(-0.76)
nrecprolos	0.0000000001	0.0000000002	-0.0000000003
	(0.26)	(-0.79)	(-0.88)
rd_int		2.088 ***	1.609***
		(16.26)	(2.86)
fslack			-0.051
			(0.15)
rd_int * fslack			0.676
			(0.84)
Prob>chi2	0.000	0.000	0.000

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Robustness test of Poisson estimates for 80% sample panels based on main effects and moderating effects

Variables	Model 1	Model 2	Model 3
age	-0.002*	-0.021***	-0.022***
	(-1.79)	(-18.00)	(-19.23)
roe	0.011***	0.003***	0.003***
	(40.41)	(12.50)	(11.88)
surres	0.00000000001***	0.000000000006***	0.000000000008***
	(15.26)	(7.34)	(10.05)
invtr	0.0000000004***	0.0000000002***	0.0000000002***
	(159.38)	(85.32)	(81.17)
netinvincm	-0.00000000004**	-0.0000000002***	-0.00000000009***
	(-2.18)	(-12.69)	(-5.65)
nrecprolos	-0.00000000003	0.0000000003***	0.0000000002***
	(-1.45)	(12.38)	(10.55)
rd_int		2.194 ***	1.413***
		(165.59)	(28.63)
fslack			-.313
			(-5.50)
rd_int * fslack			1.166***
			(15.90)
Prob>chi2	0.000	0.000	0.000

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Robustness test of negative bidirectional regression of 80% samples based on main effect and moderating effect

Variables	Model 1	Model 2	Model 3
age	0.02*	-.021	-.012
	(1.65)	(-0.85)	(-19.23)
roe	0.01***	.003***	.003***
	(6.31)	(5.67)	(11.88)
surres	0.00000000001	0.00000000001	0.00000000002
	(0.60)	(0.80)	(10.05)
invtr	0.0000000005***	0.0000000002***	0.0000000002***
	(6.41)	(3.04)	(81.17)
netinvincm	-0.00000000008	-0.0000000002	-0.0000000001
	(-0.41)	(-1.23)	(-5.65)
nrecprolos	0.0000000002	-0.0000000001	-0.0000000003
	(0.52)	(-0.46)	(10.55)
rd_int		2.181 ***	1.262**
		(14.57)	(2.03)
fslack			-.314
			(-0.77)
rd_int * fslack			1.365
			(1.52)
Prob>chi2	0.000	0.000	0.000

*** p<0.01, ** p<0.05, * p<0.1

5. Research conclusions and discussions

5.1. Research Conclusions

Taking the listed companies in China's information transmission, software and information technology service industry and scientific research and technology service industry from 2018 to 2022 as samples, this paper examines the impact of Chinese enterprises' R & D internationalization on their innovation performance. From the perspective of organizational theory, this paper also examines its moderating effect on R & D internationalization and innovation performance from the perspective of financial slack, and draws the following conclusions Overall, R&D internationalization has significantly improved the innovation performance of Chinese multinational enterprises. Enterprises entering the international market with better institutional environment can obtain more innovation information. In the process of global research and development, multinational enterprises can make full use of the resource endowment advantages of different countries to promote their own innovation. As the company continues to gain experience, it is becoming more adept at finding and cultivating relationships with various innovation network partners in various markets to continue to harvest innovation resources. Second, financial slack has a moderating effect on the relationship between R&D internationalization and innovation performance. Financial slack enables enterprises to respond to changes in internal and external environments, and provides flexibility for companies to make strategic choices to seek opportunities, thereby positively regulating the relationship between R&D internationalization and enterprise innovation performance, that is, the higher the financial slack of enterprises, the greater the promotion effect of enterprise R&D internationalization on innovation performance.

5.2. Research Contribution

The research contribution of this paper is mainly reflected in the following aspects. First of all, this paper supports the existing research results on the impact of internal environment on non-market behavior of firms, and extends them to the context study on R&D internationalization and innovation performance, clarifies the external institutional conditions of organizational theory affecting the relationship between R&D internationalization and innovation, and explains the interaction

mechanism and influence logic of internal organizational factors on the relationship between R&D internationalization and innovation performance. The results of this paper show that financial slack has a significant positive impact on the relationship between R&D internationalization and innovation performance. Secondly, this paper discusses the role of financial slack in the relationship between R&D internationalization and innovation performance of multinational corporations from the perspective of organizational theory, which expands the research boundaries of R&D internationalization and innovation in the context of China, and enricfies the research on R&D internationalization and technological innovation from the perspective of organizational theory. Most studies from the perspective of developed countries and those based on R&D internationalization and innovation generally discuss the background influencing factors of the relationship between R&D internationalization and innovation performance of the parent company from the perspectives of technological resource diversity and domestic R&D investment, but few studies examine the relationship between the two from the perspective of financial slack.

5.3. Implications

Building an innovation-oriented country is one of the major strategic decisions of China at this stage. As the main body of the national innovation system, enterprises are an important factor to promote the development of the national economy, so improving the innovation ability of enterprises is the key to building an innovative country. The research in this paper shows that active R&D internationalization can significantly improve the innovation performance of enterprises. Enterprises gradually realize the important role of R&D internationalization in enterprise innovation, take overseas market as an important way for enterprises to obtain innovation resources, and actively seek technology and innovation resources from the international market, so as to make them flow to the domestic market. Enterprises can actively carry out R&D internationalization activities through various channels such as cooperating with foreign enterprises or scientific research institutions, establishing independent overseas R&D institutions, and acquiring foreign high-tech enterprises. By making full use of international R & D resources, we can quickly improve the innovation ability of enterprises and establish their own competitive advantages. At the same time, corporate executives should actively accumulate financial slack and adopt appropriate non-market strategies to build corporate social resources. As a regulating variable, financial slack plays an important role in this process. Financial slack can provide enterprises with the necessary resources to support research and development activities, especially in the face of high uncertainty in the international market, adequate financial slack can help enterprises better take risks and make long-term research and development investment. In addition, financial slack can ease internal competition for resources, allowing companies to focus more on innovative activities rather than short-term financial performance.

There are also some shortcomings in this study. First of all, based on the annual report of the enterprise and supplemented by other information networks, this paper obtains whether the enterprise cooperates with foreign enterprises or scientific research institutions, establishes independent overseas R&D institutions or acquires foreign high-tech enterprises and other R&D internationalization activities every year. However, if the R&D internationalization of enterprises is not manifested in the above forms, but in more implicit ways, such as informal international cooperation and exchange, secret recruitment of overseas R&D talents, implicit acquisition of intellectual property rights, participation in international academic conferences and seminars. This can affect the study data and thus skew the results. Secondly, this paper only makes rough statistics on the binary variables of whether the R&D internationalization is transnational or not, and cannot further study the impact of the intensity and breadth of R&D internationalization on the innovation performance of enterprises. This limitation will be overcome as more and more Chinese companies internationalize their R&D activities and data becomes better available. Research on the subdivision dimension of R&D internationalization will get more practical and instructive conclusions.

References

[1] Arrow, K. J. (1962). The Economic Implications of Learning by Doing. The Review of Economic Studies, 29(3), 155. https://doi.org/10.2307/2295952.

[2] Awate, S., Larsen, M. M., & Mudambi, R. (2015). Accessing vs sourcing knowledge: A comparative study of R&D internationalization between emerging and advanced economy firms. Journal of International Business Studies, 46(1), 63–86. https://doi.org/10.1057/jibs.2014.46.

[3] Baumol, W. J., Cyert, R. M., & March, J. G. (1964). A Behavioral Theory of the Firm. Journal of Marketing Research, 1(1), 74. https://doi.org/10.2307/3150326.

[4] Bitzer, J., & Kerekes, M. (2008). Does foreign direct investment transfer technology across borders? New evidence. Economics Letters, 100(3), 355–358. https://doi.org/10.1016/j.econlet.2008.02.029.

[5] Bourgeois, L. j. (1981). On the Measurement of Organizational Slack. Academy of Management Review, 6(1), 29–39. https://doi.org/10.5465/amr.1981.4287985.

[6] Chen, C.-J., Huang, Y.-F., & Lin, B.-W. (2012). How firms innovate through R&D internationalization? An S-curve hypothesis. Research Policy, 41(9), 1544–1554. https://doi.org/10.1016/j.respol.2012.06.008.

[7] Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. Prentice Hall/Pearson Education.

[8] Gentry, R., Dibrell, C., & Kim, J. (2016). Long–Term Orientation in Publicly Traded Family Businesses: Evidence of a Dominant Logic. Entrepreneurship Theory and Practice, 40(4), 733–757. https://doi.org/10.1111/etap.12140.

[9] Greenley, G. E., & Oktemgil, M. (1998). A Comparison of Slack Resources in High and Low Performing British Companies. Journal of Management Studies, 35(3), 377–398. https://doi.org/10.1111/1467-6486.00098.

[10] Hambrick, D. C., & D'Aveni, R. A. (1988). Large Corporate Failures as Downward Spirals. Administrative Science Quarterly, 33(1), 1–23. https://doi.org/10.2307/2392853.

[11] Khasawneh, A. Y., & Dasouqi, Q. A. (2017). Sales nationality and debt financing impact on firm's performance and risk: Evidence from Jordanian companies. EuroMed Journal of Business, 12(1), 103–126. https://doi.org/10.1108/EMJB-05-2016-0015.

[12] Lee, J. Y., Xiao, S., & Choi, B. (2021). Unpacking the drivers of emerging market firms' international joint venture formation: The interplay between technological innovation strategies and home- and host-institutional pressures. Journal of Business Research, 134, 378–392. https://doi.org/10.1016/j.jbusres.2021.05.049.

[13] Levinthal, D. A., & March, J. G. (1993). The myopia of learning. Strategic Management Journal, 14(S2), 95–112. https://doi.org/10.1002/smj.4250141009.

[14] Li, Y., Gao, Y., & Gao, S. (2023). Organizational slack, entrepreneurial orientation, and corporate political activity: From the behavioral theory of the firm. Humanities and Social Sciences Communications, 10(1), 117. https://doi.org/10.1057/s41599-023-01605-1.

[15] Li, Z., Li, M., Han, Y., & Ye, X. (2023). Sustainable Development: R&D Internationalization and Innovation. Polish Journal of Environmental Studies, 32(2), 1645–1659. https://doi.org/10.15244/pjoes/159076.

[16] Lu, L.-H., & Wong, P.-K. (2019). Performance feedback, financial slack and the innovation behavior of firms. Asia Pacific Journal of Management, 36(4), 1079–1109. https://doi.org/10.1007/s10490-018-9634-4.

[17] March, J.G., & Simon, H.A. (1958). Organizations. Wiley.

[18] Marquis, C., & Raynard, M. (2014). INSTITUTIONAL STRATEGIES IN EMERGING MARKETS. Harvard Business School Working Paper, 15, 13.

[19] Mavroudi, E., Kafouros, M., Jia, F., & Hong, J. (2023). How can MNEs benefit from internationalizing their R&D across countries with both weak and strong IPR protection? Journal of International Management, 29(1), 100994. https://doi.org/10.1016/j.intman.2022.100994.

[20] Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational Enterprises and Local Contexts: The Opportunities and Challenges of Multiple Embeddedness. Journal of Management Studies, 48(2), 235–252. https://doi.org/10.1111/j.1467-6486.2010.00968.x.

[21] Miller, K. D., & Leiblein, M. J. (1996). CORPORATE RISK-RETURN RELATIONS: RETURNS VARIABILITY VERSUS DOWNSIDE RISK. Academy of Management Journal, 39(1), 91–122. https://doi.org/10.2307/256632.

[22] Myers, S., & Majluf, N. (1984). Corporate Financing and Investment Decisions When Firms Have InformationThat Investors Do Not Have (w1396; p. w1396). National Bureau of Economic Research. https://doi.org/10.3386/w1396.

[23] Papanastassiou, M., Pearce, R., & Zanfei, A. (2020). Changing perspectives on the internationalization of R&D and innovation by multinational enterprises: A review of the literature. Journal of International Business Studies, 51(4), 623–664. https://doi.org/10.1057/s41267-019-00258-0.

[24] Rabbiosi, L., & Santangelo, G. D. (2013). Parent company benefits from reverse knowledge transfer: The role of the liability of newness in MNEs. Journal of World Business, 48(1), 160–170. https://doi.org/10.1016/j.jwb.2012.06.016.

[25] Rahko, J. (2021). R&D internationalization and firm productivity. Does the host country matter? Applied Economics, 53(16), 1807–1825. https://doi.org/10.1080/00036846.2020.1853668.

[26] Sanna-Randaccio, F., & Veugelers, R. (2007). Multinational knowledge spillovers with decentralised R&D: A game-theoretic approach. Journal of International Business Studies, 38(1), 47–63. https://doi.org/10.1057/palgrave.jibs.8400249.

[27] Si, Y., Zhang, Y., & Teng, T. (2021). R&D internationalization and innovation performance of Chinese enterprises: The mediating role of returnees and foreign professionals. Growth and Change, 52(4), 2194–2212. https://doi.org/10.1111/grow.12555.

[28] Tang, C., Tang, Y., & Su, S. (2019). R&D internationalization, product diversification and international performance for emerging market enterprises: An empirical study on Chinese enterprises. European Management Journal, 37(4), 529–539. https://doi.org/10.1016/j.emj.2018.11.003.

[29] Tse, C. H., Yim, C. K. B., Yin, E., Wan, F., & Jiao, H. (2021). R&D activities and innovation performance of MNE subsidiaries: The moderating effects of government support and entry mode. https://doi.org/10.17863/CAM.66492.

[30] Van Beers, C., & Zand, F. (2014). R&D Cooperation, Partner Diversity, and Innovation Performance: An Empirical Analysis. Journal of Product Innovation Management, 31(2), 292–312. https://doi.org/10.1111/jpim.12096.

[31] Vanacker, T., Collewaert, V., & Zahra, S. A. (2017). Slack resources, firm performance, and the institutional context: Evidence from privately held European firms. Strategic Management Journal, 38(6), 1305–1326. https://doi.org/10.1002/smj.2583.

[32] Welch, C., & Paavilainen-Mäntymäki, E. (2014). Putting Process (Back) In: Research on the Internationalization Process of the Firm. International Journal of Management Reviews, 16(1), 2–23. https://doi.org/10.1111/ijmr.12006.

[33] Wu, J., Wang, C., Hong, J., Piperopoulos, P., & Zhuo, H. (2016). Internationalization and innovation performance of emerging market enterprises: The role of host-country institutional development. Journal of World Business, 51(2), 251–263. https://doi.org/10.1016/j.jwb.2015.09.002.

[34] Zaheer, S. (1995). Overcoming the Liability of Foreignness. Academy of Management Journal, 38. https://doi.org/10.2307/256683.

[35] Zander, U., & Kogut, B. (1995). Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test. Organization Science, 6(1,), 76–92.

[36] Zhao, Q., Lee, B. H., Luo, J., & Chen, H. (2023). R&D Internationalization and Innovation Performance: The Impact of Executives' Characteristics. Journal of the Knowledge Economy. https://doi.org/10.1007/s13132-023-01418-2.

[37] Zhong, X., Song, T., & Chen, W. (2021). Can R&D internationalization improve EMNES' innovation efficiency? The moderating effects of TMT human capital. Baltic Journal of Management, 16(2), 190–207. https://doi.org/10.1108/BJM-03-2020-0098.

[38] Zhu, S., Hagedoorn, J., Zhang, S., & Liu, F. (2021). Effects of technological distance on innovation performance under heterogeneous technological orientations. Technovation, 106, 102301. https://doi.org/10.1016/j.technovation.2021.102301.

[39] Liao, Z., Huang, C. & Yao, C. (2016). Organizational resource slack: concept, measurement, cause and effect. Foreign Economics and Management,38(10), 49–59. https://doi.org/10.16538/j.cnki.fem.2016.10.004.