The Impact of Open Innovation on Small and Medium Enterprises growth performance in Dynamic Environment

Can Peng[a], Yuhan Ding[*]

College of Economics and Management, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China

*dingyuhan221@163.com, [a]pengcan@nuaa.edu.cn

Abstract. Based on the existing research literature, this paper explores the impact of inbound and outbound open innovation on the resource bricolage and growth performance of enterprises with environmental dynamics as the moderating variable. Research data were obtained from 321 SMEs in China. The results show that: both inbound and outbound open innovation have a positive impact on the resource bricolage behavior and growth performance of SMEs. Resource bricolage partially mediates the impact of inbound and outbound open innovation on growth performance. Compared to inbound open innovation, outbound open innovation has a slightly larger contribution to the growth performance of SMEs. Environmental dynamism plays a positive moderating role between inbound and outbound open innovation and enterprise growth performance.

Keywords: Open innovation, resource bricolage, growth performance, environmental dynamism.

1 Introduction

Under the background of economic globalization, the competition among enterprises is increasing. It becomes more difficult for SMEs to seek survival and development in the market. The report of the 20th CPC National Congress points out that 'Improving the scientific and technological innovation system and adhering to the core position of innovation in the overall situation of Chinese modernization construction'. To get rid of the development dilemma, enterprises need to engage in continuous innovation. Traditional innovation behavior occurs mainly within enterprises. Exploration and research by technical personnel within enterprises to ensure the uniqueness and confidentiality of the technology. However, this form of innovation is no longer applicable to SMEs that are in urgent need of development in the current era. The deepening of economic globalization has blurred the boundaries between enterprises. The sources of value creation for enterprises have gradually expanded from internal to external[1].

From the perspective of resources, Chesbrough defines open innovation (OI) as the process of technological innovation in which enterprises simultaneously utilize complementary internal and external innovation resources to achieve innovation[2]. OI provides enterprises with the opportunity to obtain innovative resources from the outside, thus improving their technological innovation ability and competitiveness[3].Enterprises can constantly absorb advanced ideas and technologies in the external environment by OI and improve the research and development of their innovative products. OI is more important for SMEs than for large companies. They rely on OI that may help SMEs to compensate for their shortcomings. Specifically, the limitations of SMEs push them open up the organizational boundaries and embrace innovation strategies, thereby indicating that OI can help SMEs to overcome the challenge of limited resources and smallness[4,5]. According to the direction of resource flow, most scholars recognize that OI is divided into inbound open innovation (IOI) and outbound open innovation (OOI). IOI refers to the process of innovation and commercialization in which enterprises use external knowledge sources to integrate external valuable ideas and technologies into enterprises. OOI refers to the process in which enterprises become the knowledge source of other organizations, actively exporting valuable internal ideas, knowledge and technology outside the organization which are commercialized by other organizations[6,7]. OI in SMEs can not only solve the 'urgent need' when they face challenges and better utilize their internal and external resources but also strengthens their own innovation.

At present, scholars have gradually enriched the research on the relationship between OI and enterprise performance. However, there is still some research space mainly focusing on the following aspects: First, the conclusions of OI for various types, stages of development and sizes of enterprises in China are different. Most scholars recognize that OI can improve the level of enterprise performance[8,9]. Nevertheless, some scholars have argued that OI has a negative impact on enterprise growth and has limitations in resource acquisition[10]. Second, as an important part of the national economy, the growth of SMEs is mainly influenced by resources. Meanwhile, the heterogeneous and dynamic character of the resources owned by SMEs are important factors in promoting enterprise growth[11]. At present, most studies have focused on growth performance from the perspective of IOI, while there are few studies on the impact of OOI on the growth performance of enterprises. There are still some gaps in the research on the impact of OI on growth performance from the perspective of resources. The external environment faced by enterprises has become complicated, prompting them to formulate development strategies that can cope with outside dynamics. Studies show that the dynamic environment has a certain impact on the growth performance of enterprises. Therefore, environmental dynamics should also be included in the study of the impact of open innovation on the growth performance of enterprises.

In summary, the research goal of this paper is to take OI as the independent variable, enterprise growth performance as the dependent variable, resource bricolage as the mediating variable, and environmental dynamism as the moderating variable. On the basis of fully absorbing and drawing lessons from previous relevant research, this paper makes a theoretical analysis of the impact of IOI and OOI on enterprise growth perfor-

mance and adds the moderating effect of environmental dynamism on the above process. In addition, this paper puts forward corresponding theoretical hypotheses to reveal the mechanism of OI affecting enterprise growth performance through resource bricolage and the moderating effect of environmental dynamism on the above impact. This paper expands and deepens the relevant theoretical research and provides countermeasures and suggestions for SMEs to improve growth performance through OI.

2   Literature review and research hypothesis

2.1   Open innovation and enterprise growth performance

Chesbrough first defines corporate OI as the process of technological innovation, while using internal and external complementary innovation resources to achieve innovation[2]. Chesbrough and Crowther[12]divide open innovation into IOI and OOI. Based on the study of Chesbrough, this paper examines the relationship between OI and enterprise growth from the perspective of IOI and OOI. Enterprises not only need an outward strategy to find knowledge and resources with potential value outside the organization but also need to creatively use available resources internally when resources are constrained. This can help them seize the market opportunities brought by available resources.

The growth of enterprises is a process from quantitative change to qualitative change. This process is embodied in the expansion of enterprise scale, the continuous improvement and maturity of enterprise internal structure, and the optimization of enterprise functions. Domestic and foreign scholars generally believe that the growth of enterprises is affected by many internal and external factors. Corporate performance represents the operating results of enterprises in a certain time range and can be a measure of enterprise growth performance[13]. Enterprise growth performance can better reflect the long-term development trend of enterprises. It has a good effect on evaluating the future growth of SMEs in the early stage of development. Enterprise growth is a dynamic process, which is the trajectory of the evolution of the enterprise from one state to another. Zhang and Yu[14] believe that growth performance covers a wide range, such as financial, market, and innovation performance.

In the OI activities, the export of internal technology can not only gain economic benefits but also enhance the intangible assets of enterprises, which plays a key role in promoting the growth of enterprises. Similarly, enterprises use efficient OI to accelerate the absorption and digestion of external knowledge, promote the improvement of performance level and innovation potential, and thus enhance their growth performance. Under the background of OI, enterprises can exchange resources with outside parties, which is crucial for enterprise innovation and growth. Based on the above analysis, this paper proposes the following hypotheses:

H1a: Inbound open innovation has a positive impact on enterprise growth performance.

H1b: Outbound open innovation has a positive impact on enterprise growth performance.

2.2   Open innovation, resource bricolage and growth performance

Enterprises should not only emphasize internal innovation resources but also obtain sufficient external innovation resources. Enterprises integrate internal and external innovation resources into a structure for technological research and development, which can help them obtain valuable ideas from both outside and inside. West and Gallagher[15] propose that OI refers to an innovative model in which the enterprise system encourages and looks for innovative resources in a wide range of internal and external resources. It consciously integrates the capabilities and resources of the enterprise with external ones and develops market opportunities through various channels. Many scholars have defined OI from the perspective of resources. From this perspective, it can be seen that SMEs need to find and integrate internal and external resources when they innovate and use them reasonably to create value. This paper proposes the following hypotheses:

H2a: IOI has a positive impact on resource bricolage.

H2b: OOI has a positive impact on resource bricolage.

A large number of studies have shown that using resource bricolage can improve enterprises' innovation ability and innovation performance which are key parts of enterprise growth. The success of many enterprises is to focus on the little-known idle resources[16]. Resource bricolage can reasonably allocate idle resources and transform them into useful resources for enterprises. Meanwhile, after an enterprise grows into an SME from the initial stage, the growth disadvantage of the relatively large enterprise will hinder the entry of external resources and the creative use of internal resources. Resource bricolage can rationally allocate existing resources, change the use of resources and break through the existing established development model, which helps SMEs gain competitive advantages. Successful entrepreneurs can use limited corporate resources to continue to create new value, the role of bricolage in the survival, innovation and growth of enterprises has gradually received attention[17,18]. It can be seen that in SMEs with relatively scarce resources, resource bricolage is an effective strategic choice to improve growth performance. Therefore, this paper proposes the following hypotheses:

H3: Resource bricolage has a positive impact on enterprise growth performance.

2.3   The mediating role of resource bricolage

Open innovation internalizes external knowledge resources and externalizes internal ones. In the resource transformation, the innovation ability and sustainable development ability of enterprises are gradually enhanced, which is conducive to the healthy and long-term growth of enterprises. IOI can input resources from the external environment into enterprises, but it cannot directly improve the growth performance only through external access to different resources because resources need to be identified, defined and recombined from acquisition to utilization. Resource bricolage is conducive to enterprises creating unique resource utilization schemes from similar resources. OOI can output the results of the patchwork of enterprise resources to external enterprises and stakeholders and exchange idle resources with other knowledge sources, and

commercialize them in the external environment. Through the implementation of OI, enterprises can improve their ability to cobble together resources. Resource bricolage is one of the important means adopted by SMEs to grow. SMEs rely on resource bricolage to make up for resource shortages[19]. Moderate OI can help SMEs improve their patchwork ability, use new resources from the outside of the enterprise, transfer internal resources to the outside of the enterprise, and change the thinking mode of existing resource utilization. In a turbulent environment, the external environment puts forward higher requirements on the frequency of transformation of various resource combinations of enterprises, leaving a shorter time for the reorganization of resources, and only using existing resources is not enough to meet the growth needs of enterprises. Therefore, this paper proposes the following hypotheses:

H4a: Resource bricolage plays an intermediary role between IOI and SMEs growth performance.

H4b: Resource bricolage plays an intermediary role between OOI and SMEs growth performance.

2.4   Moderating effect of environmental dynamism

The competition among enterprises has become more intense due to economic globalization. Therefore, enterprises need to consider the factors of environmental dynamics when carrying out reform and innovation. In a highly dynamic environment, enterprises face more opportunities, which increases the probability of successful exploration. Jansen and Kristof-Brown[20] believe that large-scale and uncertain environmental changes reflect environmental dynamism. Li[21] defines environmental dynamics as the environment that affects corporate performance, which is unrecognized, unpredictable, and related information lacks appropriateness or sufficiency. The turbulence of the environment is an opportunity for SMEs. Enterprises face to the role and influence of environmental changes, actively explore new uses of resources at hand and develop new resource combinations[22]. It encourages SMEs to improve existing technologies to meet the needs of the market or customers, which is conducive to obtaining short-term performance and ensuring the normal income and operation of enterprises[23] At the same time, the unpredictable environment can bring more innovation possibilities to enterprises, which promotes them to change and facilitate adaptation to environmental changes. As a result, enterprises can form unique competitive advantages and market share to achieve high-quality and sustainable enterprise growth. Therefore, this paper proposes the following hypotheses:

H5a: Environmental dynamism plays a positive moderating role between IOI and SMEs growth performance.

H5b: Environmental dynamism plays a positive moderating role between OOI and SMEs growth performance.

Based on the above research and assumptions, a theoretical model (conceptual model) of the relationship between open innovation, resource bricolage, growth performance and environmental dynamics is constructed, as shown in Figure 1.
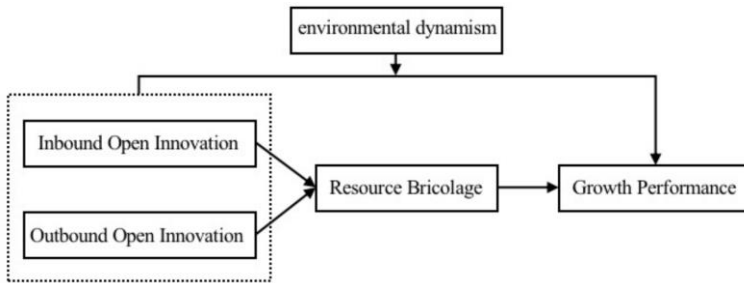
Fig. 1. Theoretical model

3   Research design

3.1   Sample source and data collection

This paper selects SMEs in most industries, mainly in Jiangsu, Zhejiang, Shanghai, Anhui, and Liaoning as the research object, and collects data through questionnaires. According to the definition of SME in China, the questionnaire collection object focuses on enterprises with a scale of less than 1000 people. Finally, 321 completed questionnaires remained (80.3% response rate).

3.2   Variable measurement

In order to ensure that each scale has high reliability and validity, IOI, OOI, resource bricolage, growth performance, and environmental dynamics are all measured by mature scales. The Likert five-point scale is used to measure each variable, where 1 represents "strongly disagree" and 5 represents "strongly agree."

The measurement of IOI draws on the scales of Sisodiya et al[24] and Zhang et al[25], including 5 items. The measurement of OOI mainly draws on Chen's scale[26], including 4 items. The measurement of resource bricolage draws on the scale of Zhao et al[27], including 4 items. The measurement of enterprise growth performance draws on the scales of Xu[28] and Yang et al[29]. The growth of SMEs is measured from two aspects of financial and non-financial indicators, including 9 items. For environmental dynamism, this paper draws on the scale of Jansen et al[30], including five items. Since the growth performance of enterprises correlates with their age, scale and industry, this paper selects them as control variables to ensure the stability and accuracy of the research.

3.3   Reliability and validity

In order to ensure the accuracy and availability of the sample data, SPSS 27.0 was used to examine the reliability and validity. The reliability and validity of the five variables involved in this study are shown in Table 1. From Table 1, Cronbach's α of each variable is greater than 0.7, and the combined reliability (CR) values are between 0.851 and

0.919, which are greater than the critical value of 0.7. It means that the internal consistency of all scales is high and the reliability is good. In addition, the KMO values are between 0.813 and 0.946 when the Pareto sphere test results are significantly different from 0, which meets the requirement of greater than the critical value of 0.7. Therefore, all scales have good validity. The factor loadings are greater than 0.5, indicating that the convergent validity of the scales is at a good level. The AVE values are between 0.558 and 0.610, which meet the requirement of greater than 0.5, showing good discriminant validity of each scale. In Table 2, the correlation coefficients between variables are less than the square root of AVE, indicating that the scales have good discriminant validity.

Table 1. Reliability and validity test

Variable	Item	Factor loading	KMO	α	AVE	CR
IOI	IOI1	0.760	0.874	0.872	0.577	0.872
	IOI2	0.753				
	IOI3	0.740				
	IOI4	0.782				
	IOI5	0.761				
OOI	OOI1	0.785	0.813	0.849	0.587	0.851
	OOI2	0.745				
	OOI3	0.778				
	OOI4	0.757				
RB	RB1	0.759	0.838	0.878	0.610	0.862
	RB2	0.784				
	RB3	0.799				
	RB4	0.781				
GP	GP1	0.753	0.946	0.923	0.558	0.919
	GP2	0.751				
	GP3	0.760				
	GP4	0.717				
	GP5	0.710				
	GP6	0.766				
	GP7	0.743				
	GP8	0.765				
	GP9	0.754				
ED	ED1	0.718	0.871	0.878	0.560	0.864
	ED2	0.760				
	ED3	0.721				
	ED4	0.739				
	ED5	0.800				

4   Test and analysis of research hypothesis

4.1   Correlation analysis

Through correlation analysis, the mean, standard deviation and correlation coefficient of the five variables in this study are shown in Table 2. The mean value of each variable is 3.344 ~ 3.475, which is in line with expectations. At a significant level of 0.01, there are significant positive correlations between IOI, OOI, resource bricolage, SMEs growth performance and environmental dynamism.

4.2   Main effect analysis

Table 2. Correlation analysis

Item	AVG	SD	1	2	3	4	5
IOI	3.400	0.919	**0.759**				
OOI	3.344	0.946	.460**	**0.766**			
RB	3.475	1.000	.416**	.428**	**0.781**		
GP	3.344	0.886	.406**	.421**	.451**	**0.747**	
ED	3.368	0.976	.454**	.437**	.518**	.479**	**0.748**

* * at the 0.01 level (two-tailed), the correlation is significant; the coarsened number is the square root of AVE.

SPSS27.0 software was used for multiple regression analysis. A collinearity test was performed before analysis. The results showed that the variance expansion factor of the variable was 1 ~ 2, the tolerance was greater than or equal to 0, and there was no multicollinearity problem. The main effect test results are shown in Table 3. Model 1 and Model 3 test the influence of control variables on resource bricolage and enterprise growth performance. Model 2 and Model 4 test the influence of IOI and OOI on resource bricolage and growth performance respectively. Model 5 tests the influence of resource bricolage on growth performance. The results show that both IOI (P < 0.001, β = 0.261) and OOI (P < 0.001, β = 0.299) have a positive impact on growth performance. Accordingly, H1a and H1b are supported. IOI (P < 0.001, β = 0.271) and OOI (P < 0.01, β = 0.290) also have a positive impact on resource bricolage. Accordingly, H2a and H2b are supported. Resource bricolage (P < 0.001, β = 0.444) has a positive impact on growth performance. Accordingly, H3 is supported.

Table 3. Regression analysis of main effects

Item	Resource Bricolage		Growth Performance		
	Model 1	Model 2	Model 3	Model 4	Model 5
Age	0.102	0.091	-0.047	-0.06	-0.093
Scale	0.006	-0.054	0.082	0.023	0.079

Industry	0.146	0.104	0.129	0.087	0.064
IOI		0.271		0.261	
OOI		0.290		0.299	
RB					0.444
R^2	0.037	0.259	0.022	0.243	0.212
F	4.053**	22.032***	2.352*	20.254***	21.242***

* * *, * *, * indicate $P < 0.01$, $P < 0.05$ and $P < 0.1$, respectively.

4.3 Mediation effect test

Table 4. Mediation model test of resource bricolage (IOI)

Item	GP		GP		RB	
	t	b	t	b	t	b
Age	-1.001	-0.072	-0.418	-0.032	1.583	0.118
Scale	0.562	0.041	0.286	0.022	-0.729	-0.055
Industry	1.112	0.055	1.765	0.092	2.113	0.109
IOI	4.841***	0.259	7.621***	0.395	7.841***	0.402
RB	6.314***	0.339				
R^2	0.266		0.174		0.194	
F	22.889		16.603		18.988	

* * *, * *, * indicate $P < 0.01$, $P < 0.05$ and $P < 0.1$, respectively.

First, the mediating role of resource bricolage between IOI and enterprise growth performance and between OOI and enterprise growth performance is tested respectively. From Table 4, the predictive effect of IOI on enterprise growth performance is significant (standard regression coefficient $b = 0.40$, t value = 7.62, $P < 0.001$). When the intermediary variable is included, the direct predictive effect of IOI on enterprise growth performance is still significant ($b = 0.26$, $t = 4.84$, $P < 0.001$). The positive predictive effect of IOI on resource bricolage is also significant ($b = 0.40$, $t = 7.84$, $P < 0.001$). In addition, it can be seen from Table 5 that the upper and lower limits of the 95 % confidence interval of the bootstrap test of the direct effect of IOI on the growth performance of enterprises and the mediating effect of resource bricolage do not include 0. This proves that IOI can not only directly affect the growth performance, but also affect the growth performance through resource bricolage. The direct effect (0.250) and mediating effect (0.132) account for 34.5% and 65.5% of the total effect (0.381), respectively. And resource bricolage behavior plays a partial mediating role between IOI and growth performance.

Table 5. Dissolution table of total, direct and mediation effect (IOI)

Item	Value	Boot stderr	LLCI	ULCI	Proportion
ME	0.132	0.027	0.082	0.185	34.5%
DE	0.250	0.052	0.148	0.352	65.5%
TE	0.381	0.050	0.283	0.480	

LLCI represents the lower limit of the 95 % confidence interval of the bootstrap test, and ULCI represents the upper limit of the 95 % confidence interval of the bootstrap test.

Table 6. Mediation model test of resource bricolage (OOI)

Item	GP		GP		RB	
	t	b	t	b	t	b
Age	-1.442	-0.102	-1.06	-0.079	0.948	0.07
Scale	0.862	0.062	0.726	0.055	-0.281	-0.021
Industry	1.31	0.064	2.027	0.104	2.387	0.122
OOI	5.279***	0.281	8.12***	0.416	8.088***	0.411
RB	6.092***	0.327				
R^2	0.276		0.191		0.202	
F	22.889		16.603		20.01	

* * *, * *, * indicate $P < 0.01$, $P < 0.05$ and $P < 0.1$, respectively.

From Table 6, OOI has a positive impact on enterprise growth performance ($b = 0.42$, $t = 8.12$, $P < 0.001$). When the intermediary variable is included, the positive impact of OOI on growth performance is still significant ($b = 0.22$, $t = 7.21$, $P < 0.001$), and the positive impact of OOI on resource bricolage is also significant ($b = 0.41$, $t = 8.09$, $P < 0.001$). From Table 7, the bootstrap test of the direct effect of OOI on growth performance and the mediating effect of resource bricolage does not include 0 in the upper and lower limits of the 95 % confidence interval. This proves that OOI can not only directly affect growth performance, but also affect growth performance through resource bricolage. The direct effect (0.264) and the mediating effect (0.126) account for 67.7% and 32.3% of the total effect (0.390) respectively, and the resource bricolage behavior plays a partial mediating role between OOI and growth performance. H4b is supported.

Table 7. Dissolution table of total, direct and mediation effect (OOI)

Item	Value	Boot stderr	LLCI	ULCI	Proportion
ME	0.126	0.025	0.078	0.178	32.3%
DE	0.264	0.050	0.165	0.362	67.7%
TE	0.390	0.048	0.295	0.484	

LLCI represents the lower limit of the 95 % confidence interval of the bootstrap test, and ULCI represents the upper limit of the 95 % confidence interval of the bootstrap test.

4.4 Moderating effect analysis

The moderating effect of environmental dynamism on IOI, OOI and enterprise growth performance is shown in Table 8. To avoid multicollinearity, IOI and OOI are centralized before interacting with environmental dynamism. The VIF values of the four models are less than 10, indicating that there is no multicollinearity. Model 6 examines the moderating effect of environmental dynamism on the relationship between IOI and

growth performance. The interaction coefficient is 0.223 at the level of $P < 0.001$, indicating that environmental dynamism positively regulates the relationship between IOI and growth performance. That is, in an increasingly dynamic environment, enterprises can obtain better growth performance through the implementation of IOI. Model 8 examines the moderating effect of environmental dynamism on the relationship between OOI and growth performance. The interaction coefficient is 0.230 at the level of $P < 0.001$, indicating that environmental dynamism positively moderates the relationship between OOI and growth performance. That is, in an increasingly dynamic environment, enterprises can have a better growth trend through the implementation of OOI. Accordingly, H5b is supported.

Table 8. Regression analysis of IOI AND OOI on growth performance

Item	GP			
	Model 5	Model 6	Model 7	Model 8
Age	-0.032	-0.019	-0.079	-0.05
Scale	0.022	-0.023	0.055	0.026
Industry	0.092	0.078	0.104	0.090
IOI	0.395***	0.197***		
OOI			0.416***	0.231***
ED		0.352***		0.317***
IOI×ED		0.223***		
OOI×ED				0.230***
R^2	0.174	0.326	0.191	0.341
F	16.603***	25.351***	18.61***	27.116***

* * *, * *, * indicate $P < 0.01$, $P < 0.05$ and $P < 0.1$, respectively.

5 Conclusion and prospect

5.1 Research conclusion

In order to reveal the influence mechanism of open innovation on enterprise growth performance, this paper takes resource bricolage as the intermediary variable and explores the relationship between the two dimensions of OI and growth performance in a highly dynamic environment. The results show that: (1) There are direct positive correlations between inbound and outbound open innovation and resource bricolage and growth performance. (2) Resource bricolage has a positive impact on growth performance and plays a partial mediating role between the IOI and OOI and the growth performance. (3) For enterprises that want to obtain short-term growth performance to improve their growth rate, the effect of OOI on growth performance is slightly more obvious than that of IOI. OI can help enterprises to carry out more effective resource bricolage and have a favorable impact on growth performance. (4) Environmental dynamism positively moderates the relationship between OI and enterprise growth performance. This indicates that the more dynamic the industry environment is, the more enterprises should implement open innovation to obtain healthy and sustainable growth.

5.2   Management Inspiration

For SMEs, they should pay attention to the development of IOI and OOI activities. Enterprises should attach importance to the acquisition of external resources and the absorption of knowledge concepts. They should use the acquired resources and the existing ones at hand to evaluate, redefine, and find new combinations and utilization ways of these resources, thus constantly improving the internal operation mode of enterprises and the competitive advantage of products. In this context, SMEs can obtain enterprise growth with both speed and quality. Meanwhile, SMEs can make full use of policy advantages, seize opportunities for enterprise development, establish enterprise alliances with peers or upstream and downstream industries, and learn from each other to seek common development. They should also pay attention to technology output, patents and other authorized transfer and other forms, which can improve their conversion rate. Obtaining funding through the OOI enables enterprises to obtain more external resources for R&D and innovation, accumulate corporate reputation and industry recognition, and thus achieve sustainable growth.

Due to the increasingly fierce changes in the external environment, the ability of SMEs to cope with risks is relatively weak. They should maintain a high degree of sensitivity to external changes, pay close attention to and predict possible trends, grasp the direction of environmental changes, and upgrade their products, services and R&D directions according to the speed of industry technology updates and customer preferences, combined with open innovation activities. Lay a solid foundation for the future growth of the enterprise.

5.3   Research limitations and prospects

This paper studies and analyzes the impact of IOI and OOI on enterprise growth in a dynamic environment. In addition, this paper reveals the mediating role of resource bricolage between the two and enriches the relevant theoretical research on open innovation and growth performance to a certain extent. However, there are still some limitations in this paper: the samples selected in this paper are mainly concentrated in several provinces of China, and the geographical scope of the samples should be expanded to increase the universality of the research conclusions. Since different enterprises are at different stages of growth, the open innovation adopted to obtain the growth performance of the enterprise is also different. The targeted impact of OI on the growth speed, quality and sustainability of enterprises at all stages has not been fully explored. Finally, since the study uses cross-sectional data and mainly selects data from the past three years for research, the conclusion may be temporary. Future research can use longitudinal data for empirical testing to make up for the shortcomings of this study.

Acknowledgment

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