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The Impact of Innovation Input on Innovation Performance from the Perspective of Differentiation Strategy

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Abstract

Based on the sample of listed companies in China's GEM manufacturing industry from 2012 to 2017, this paper examines the impact of innovation input on innovation performance based on the perspective of differentiation. The research results show that innovation investment and innovation performance show a significant inverse U-shaped relationship. The sales efficiency dimension of the differentiation strategy has a significant positive impact on innovation performance. The differentiation strategy negatively regulates the inverted U-shaped relationship between innovation input and innovation performance. Enterprises should correctly recognize the impact of innovation investment on innovation performance and choose appropriate innovation input. At the same time, companies that develop different dimensions of differentiated strategies should adopt different measures to promote performance.

Keywords

Differentiation strategy; Innovation input; Innovation performance1 Introduction

1. Introduction

As development is put forward as the top priority of the CPC in governing and rejuvenating the country, the new era puts forward new requirements for implementing the innovation-driven development strategy and building an innovation-oriented country. The relationship between innovation input and business performance has been controversial. As the core driving force for the development of an enterprise, scientific and technological innovation can transform or apply the new discoveries, inventions, creations and processes in science and technology into new products, and maintain the exclusive and advanced nature of the enterprise's technology, so that the enterprise can avoid being eliminated and has a higher growth rate and market share. Some scholars also believe that increasing investment in innovation may not continuously promote the increase of enterprise performance. The influence between the two may also be limited by other factors (Yin Meiqun, 2018)[1].

From the perspective of strategy research, differentiation strategy, as an important factor affecting enterprise performance, plays an important role in the research. Differentiation strategy mainly refers to the heterogeneity between an enterprise and its competitors in terms of brand image, technical features, appearance features, customer service, distribution network, etc., so as to bring performance growth and competitive advantages to the enterprise. Therefore, the implementation of differentiation strategy can promote enterprise innovation investment and innovation performance has been widely recognized by the academic community.

At present, the conclusions of the impact of enterprise innovation investment on enterprise innovation performance are not consistent, indicating that there is a more complicated mechanism of action between the relationship between innovation investment and innovation performance. This paper intends to introduce the differentiation strategy as a moderator in the

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process of innovation investment and innovation performance, and explore the impact of the enterprise strategy layer on the relationship between innovation input and innovation performance.

2. Theoretical Analysis and Research Hypothesis

2.1 The Influence of Innovation Investment on Innovation Performance

In order to create value and produce market performance, enterprises need to increase the necessary investment in innovation, and then promote the continuous development of enterprises. By increasing innovation investment, enterprises can better attract external resources and stimulate employees' innovation ability, so as to improve the performance level of enterprises. From the existing research literature, there are different and even contradictory conclusions in the study of the relationship between innovation input and enterprise performance level. Most studies show that the relationship between innovation input and enterprise performance level is significantly positively correlated, that is, the greater the enterprise's innovation investment, the higher the enterprise performance level, the innovation investment can improve the performance level of the enterprise.(Qi Xiuhui,2016)[2].For example, Fan Xu (2018) verified the innovation investment in the analysis of small and medium-sized enterprises in Guangdong Province, which helps to enhance the independent innovation capability of enterprises, thus transforming innovation investment into enterprise income [3].

Xie Xuemei, Dai Zhihua, Liu Siyu (2013) established a panel data model based on CD production function, and empirically analyzed the relationship between R&D investment and new product innovation performance of high-tech enterprises in various regions of China. The research results show that there is a significant positive correlation between R & D investment and innovation performance of new products. From the research on the short-term impact of R & D investment on performance level of high-tech enterprises in China, it is found that the added value of innovation capital investment lags behind. Increase the input of innovative people in the same year, and reduce the investment in innovative capital to maximize the overall benefits of innovation [4].

But at the same time, some studies show that there is a negative correlation between innovation input and enterprise performance level, that is to say, the greater innovation input is not necessarily to improve the performance level of enterprises, it may also reduce the performance level of enterprises. For example, Zhu Weiping and Lun Rui (2004) found that innovation input has no significant positive improvement effect on corporate performance level. Empirical research shows that innovation investment will inhibit the improvement of corporate performance [5].

From the above review, it is known that the academic community has not reached a broad consensus on the impact of innovation input on the performance level of enterprises. Compared with the viewpoint that innovation investment has a significant positive impact on the level of innovation performance held by the majority of existing researches, in recent years, with the increasing emphasis on innovation investment, scholars began to notice the turning point of the relationship between innovation investment and innovation performance. A few studies have found that there is a nonlinear relationship between innovation input and firm performance.(Bao Xinzhong,2014)[6].Excessive investment in innovation is only a burden on the cost of innovation, which hinders the long-term development of enterprises. Therefore, we present H1.

H1: Innovation Investment has a positive effect on enterprise innovation performance.

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2.2 The Influence of Differentiation Strategy on Innovation Performance

The differentiation of enterprises can be realized by emphasizing advertising, strengthening investment in innovation, enhancing product performance and reliability, and enhancing the unsubstitutability of products (Mintzberg, 1978)[7]. An excellent implementer of differentiation strategy should have the characteristics of superiority, exclusivity and profitability(Philip Kotler,2002)[8]. The impact of differentiation strategy on innovation input heterogeneous innovation in product features, performance and services (Jin Tingting, 2018)[8]can effectively enhance the competitiveness of manufacturing enterprises (Lin Lei, Wu Guisheng, 2007)[10].

In many relevant studies abroad, scholars believe that when enterprises choose differentiation strategy, managers will increase resource investment in innovation (Leonidou and Fotiadis, 2015)[11]. When choosing differentiation strategy, because enterprises need to provide high-quality services and products with obvious advantages (Akan, 2006)[12], they need to constantly explore unknown areas and strive to form distinct differences with other enterprises. Therefore, enterprises need to continue to invest in brand building, technological innovation and service innovation (Zhang Aihui, 2017)[13].

Differentiation strategy is mainly embodied in the higher profitability and sales efficiency of enterprises. Only when the product has a high performance-price ratio, that is, the product has a certain degree of premium characteristics, can the enterprise obtain better profitability than its competitors. The higher the differentiation between the enterprises with the differentiation strategy and similar enterprises, the better the implementation level of the differentiation strategy will be on behalf of the enterprises, so that the enterprises will have a higher competitive advantage and occupy a place in the market. Therefore, this paper proposes the following assumptions:

H2: The differentiation strategy of enterprises can regulate the relationship between innovation input and innovation performance.

H2a: The profitability dimension of differentiation strategy can regulate the relationship between innovation input and innovation performance.

H2b: The sales efficiency dimension of differentiation strategy can regulate the relationship between innovation input and innovation performance. Based on the above analysis, this study constructs a conceptual model as shown in Figure 1.

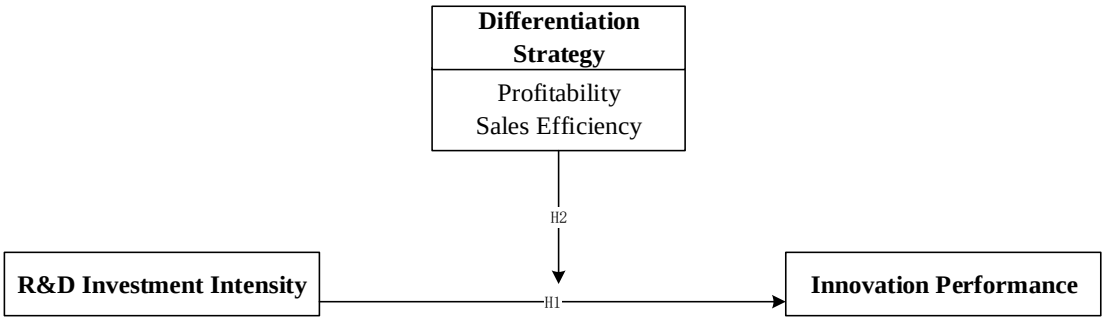

Figure 1. Conceptual Model

3. Research design

To ensure data authenticity, the data is derived from the CSMAR database. In order to meet the requirements of emerging manufacturing enterprises, this study selected the GEM manufacturing listed enterprises from 2012 to 2017 as the sample, and screened the data according to the following principles:

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(1) Considering that enterprises with poor management may bring extreme value, exclude ST and *ST listed enterprises;

(2) Screening enterprises listed after 2012 to ensure the integrity of the six-year balanced panel research data;

(3) Eliminate enterprises that lack disclosure of R&D expenses;

(4) Eliminate the listed enterprises that lack other sample data. After the above processing, a total of 235 enterprises have obtained complete data for six years, and finally 1410 observations have been obtained Stata11 was used for regression analysis.

3.1 Independent variables

The explanatory variables of this study are innovation inputs. Currently, the indicators commonly used to represent innovation inputs are R&D investment and intangible assets. Considering the accounting standards of China, the measurement requirements for intangible assets include development expenses or outsourcing expenditures. There are differences in innovation investment. This paper considers the use of R&D investment intensity as a measure of innovation investment. The specific calculation methods include: the number of R&D investment projects, the proportion of R&D personnel in the total number of R&D personnel, the ratio of R&D investment to main business income, the ratio of R&D investment to total assets, and the ratio of R&D investment to total market capitalization..Considering the fit with this study, the ratio of R&D investment to main business income is selected as a measure of R&D investment intensity.

3.2 Dependent variables

The explanatory variable of this study is the innovation performance of enterprises. Based on Guo Lixin's practice, the growth of sales revenue growth rate and gross profit rate growth rate of main products mainly come from two aspects. First, it is possible to make breakthroughs in process innovation, improve production efficiency or reduce product costs.; The second is to improve the competitiveness of products by improving product quality or performance through product innovation. From the point of view of evolutionary economics and innovation theory, the biggest reason and motivation for economic growth is innovation. The most direct cause of changes or growth in corporate sales revenue and sales gross profit margin is mainly innovation. Therefore, these two indicators can be compared. Comprehensively reflect the performance of enterprise product or process innovation, which can be used as an effective indicator to evaluate and measure the performance of enterprise technology innovation.

Compared with the gross profit margin growth index, the sales income growth rate fluctuates less and is more stable. Therefore, the sales revenue growth rate is chosen as a measure of innovation performance.

3.3 Moderating variables

The Moderating variables of this study are differentiation strategies. The differentiation strategies of Daivd (2002)[14] and Li Jian (2012) [15]are used to measure the profitability dimension of enterprises with gross profit rate, and the sales revenue rate measures the dimension of enterprise sales efficiency. The gross profit margin indicates the profitability of the company's products or services. The higher the value, the stronger the profitability of the company and the higher the degree of corporate differentiation. The sales expense describes the related expenses paid by the enterprise in order to complete the sales. The higher the sales income rate indicates that the enterprise marketing has higher investment in advertising and marketing channels, and the higher the degree of enterprise differentiation.

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3.4 Control variables

Because the factors affecting R&D investment are very complex, for enterprises of different development stages and sizes, the degree of impact of these factors is also different. Considering other factors that may affect the R&D investment of enterprises, such as the speed of enterprise development, ownership structure, enterprise scale, age and profitability, this paper chooses the growth rate of business income, concentration of equity, proportion of independent directors, enterprise scale, age of enterprises and net interest rate of sales as control variables.

Table 1. Variable Definition Table

Variable Type	Variable Name	Variable Symbol	Calculation Formula
Dependent Variable	Operating income Growth Rate	RGR	Revenue Growth/Total Revenue of the Previous Year
Independent Variables	Investment in Research and Development	RD	R&D Investment Expenses/Operating Income
Control Variables	Profitability	OPER	Gross Profit Margin = (Sales Revenue-Cost of Sales)/Sales Revenue
	Sales Efficiency	OIER	Sales Expense Revenue Rate = Sales Revenue/Sales Expense
	Ownership Concentration	OC	Square Sum of Shareholding Proportions of Top Ten Shareholders
	Proportion of Independent Directors	INDEP	Number of Independent Directors / Board of Directors
	Enterprise Scale	SIZE	Natural Logarithm of Total Assets
	Net Profit Margin on Sales	NSR	Net Profit/Sales Revenue

In this paper, we build a multiple regression model to test the hypothesis of this paper. Considering that R&D investment has a lagging effect on innovation performance, we use the lag phase to test in the regression of R&D investment and innovation performance. According to the four hypotheses of this study, the following nine regression models are constructed:

(1) Regression model of innovation investment and innovation performance

$$RGR_{i,t} = \beta_0 + \beta_1 RD_{i,t\text{-}1} + \beta_2 CONTROLS_{i,t} + \mu \tag{1}$$

$$RGR_{i,t} = \beta_0 + \beta_1 RD_{i,t\text{-}1} + \beta_2 RD_{i,t\text{-}1}{}^2 + \beta_3 CONTROLS_{i,t} + \mu \tag{2}$$

(2) The moderating effect of competitive strategy on the relationship between innovation input and innovation performance

$$\begin{aligned} RD_{i,t} = {} & \beta_0 + \beta_1 STRATEGY_{i,t} + \beta_2 RD_{i,t} + \beta_3 RD_{i,t\text{-}1}{}^2 + \beta_4 RD_{i,t} * STRATEGY_{i,t\text{-}1} \\ & + \beta_5 RD_{i,t}{}^2 * STRATEGY_{i,t\text{-}1} + \beta_6 CONTROLS_{i,t} + \mu \end{aligned} \tag{3}$$

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Where, Controls represents the control variable, i.e., shareholding concentration, proportion of independent directors, enterprise size and net sales interest rate.STRATEGY represents different competitive strategies of enterprises.

4. Empirical results and discussion

4.1 Descriptive statistics

Table 2. Describes the statistical results

Variable	Obs	Mean	Std.Dev.	Min	Max
RGR	1410	0.265	0.645	-0.840	16.91
FF	1410	1.79e-10	0.280	-0.792	0.869
RD	1410	0.0663	0.0606	0.0055	0.728
OPER	1410	0.361	0.167	-0.144	0.951
OIER	1410	24.049	28.432	1.37	453.52
RGR	1410	0.265	0.645	-0.840	16.91
OC	1410	0.140	0.0856	0.00348	0.477
INDEP	1410	0.380	0.0554	0.250	0.600
SIZE	1410	21.24	0.735	19.56	24.11
NSR	1410	0.0964	0.294	-8.156	0.908

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

Table 2 shows that the average value of innovation performance of listed companies in the GEM manufacturing industry is 0.265, indicating that the overall innovation performance of the industry is poor. The minimum value of innovation performance is -0.840, the maximum value is 16.91, and the standard deviation is 0.645. There is a big difference in innovation performance. The average value of enterprise innovation investment is 0.0663, which indicates that the sample company's R&D investment accounts for 6.63% of the main business income. The innovation input range is from 0.0055 to 0.728, and the standard deviation is 0.0606, indicating that the sample company's R&D activities and innovation investment are not balanced. The gross profit margin is 0.361, the standard deviation is 0.167, the minimum is -0.144, and the maximum is 0.951, indicating that the sample companies' profitability is relatively balanced. The average sales revenue rate is 24.04, the standard deviation is 28, the minimum is 1.3706, and the maximum is 453.52, indicating that the sales efficiency of sample companies varies greatly. Descriptive statistics for other variables are also given in Table 2.

4.2 Correlation analysis

All variables were standardized so that they were at the same order of magnitude. Correlation analysis of all variables in this study was shown in table 3.

The correlation coefficient between R&D investment intensity and innovation performance of sample enterprises is significantly negative (β=-0.106, α<0.01), indicating that the current innovation investment will negatively affect the business performance of the enterprise, which may be due to the large amount of funds invested by the current innovation investment. This has caused the company to lose the benefits of putting this part of its resources into the production and operation process. The relationship between gross profit margin and innovation performance is not significant, indicating that there is no direct relationship between the profitability of enterprises and the innovation performance of enterprises. Their impact on innovation performance may be reflected by enterprise factors or other factors. There is a significant positive correlation between sales revenue and expense ratio and

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enterprise innovation performance (β=0.120, α<0.01), indicating that the current sales efficiency and innovation performance of the company have a significant positive correlation, indicating that the current sales efficiency of the enterprise will promote the current sales revenue growth of the enterprise. There is a significant negative correlation between equity concentration and innovation performance (β=-0.064, α<0.0), which indicates that among the enterprises with concentrated equity, the rights of large shareholders are not restrained, the decision-making process lacks democracy, and it is easy to make mistakes in decision-making, which weakens the innovation performance of the enterprise. There is a significant positive correlation between the proportion of independent directors and innovation performance (β = 0.046, α < 0.1), which indicates that the higher the self-regulation efficiency of the enterprises with high proportion of independent directors, the better the safe and effective operation of the management, and the better the innovation performance of the enterprises. There is a significant positive correlation between company size and innovation performance (β = 0.206, α < 0.01), indicating that the company is in the state of large-scale operation at this time, with high market share and good innovation performance. The net sales rate is significantly positively correlated with the innovation performance (β=0.086, α<0.01). Enterprises with high sales net profit have better control over sales expenses, financial expenses and management expenses in the process of expanding sales, which brings positive benefits to the company.

Table 3. Relevance analysis

	RGR	RD	OPER	OIER	OC	INDEP	SIZE	NSR
RGR	1							
RD	-0.106***	1						
OPER	-0.00500	0.280***	1					
OIER	0.120***	-0.154***	-0.383***	1				
OC	-0.064**	-0.129***	-0.0150	0.079***	1			
INDEP	0.046*	0.0360	0.0230	-0.101***	0.051*	1		
SIZE	0.206***	-0.084***	-0.072***	0.187***	-0.192***	-0.110***	1	
NSR	0.086***	-0.108***	0.328***	0	0.069***	-0.0160	0.0130	1

4.3 Regression analysis

The multiple regression of panel data requires Hausman test to judge the applicable model, so as to determine whether to use the fixed effect model or the random effect model. As a result, each model passed the Hausman test, so a fixed model was used for regression analysis.

Model 1 is a regression test of the control variables. Model 2 verifies the influence between innovation input and innovation performance, and the results show a significant positive correlation (beta =0.2936, alpha <0.01). Model 3 is added to the square of the R&D input intensity. The results show that the primary item of R&D input intensity is significantly positively correlated with innovation performance (β=0.6367, α<0.01), and the quadratic item of R&D input intensity is significantly negatively correlated with innovation performance (β= -0.3355, α<0.01), assuming that the H1 R&D investment intensity and the enterprise's innovation performance are inverse U-shaped.

In order to verify the moderating role of the differentiation strategy in the relationship between innovation investment and innovation performance, this paper divides the differentiation strategy into the profitability dimension and the sales efficiency dimension, and examines the moderating role of the two dimensions in the relationship between innovation input and innovation performance. Model 4 examines whether profitability has a regulatory role in the relationship between innovation input and innovation performance. In the regression analysis

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of innovation performance in Model 4, the coefficient of the primary term of R&D input intensity is significantly positive (β=0.960, α<0.01), and the coefficient of the quadratic term of R&D input intensity is significantly negative (β=-0.7864, α <0.01), the coefficient of the intersection term between the R&D input intensity and the profitability is significantly negative (β=-0.4005, α<0.01), and the coefficient of the intersection of the R&D input intensity quadratic term and the cost efficiency is positive and significant (β = 0.5490, α < 0.01). It shows that the moderating effect of profitability between innovation input and innovation performance is significant. That is, the profitability dimension of the differentiation strategy can moderate the inverted U-type relationship between innovation input and innovation performance relationship, assuming H2a is verified.

Table 4. The impact of innovation investment on innovation performance

	(1) RGR	(2) RGR	(3) RGR
RDt-1		0.2936***	0.6367***
		(0.0685)	(0.1277)
RDt-12			-0.3355***
			(0.1055)
OC	-0.2476***	-0.2926***	-0.2888***
	(0.0823)	(0.1007)	(0.1002)
SIZE	0.6202***	0.7320***	0.7556***
	(0.0666)	(0.0814)	(0.0814)
NSR	0.0616**	0.0480	0.0548
	(0.0306)	(0.0347)	(0.0346)
INDEP	0.0621	0.0587	0.0560
	(0.0456)	(0.0550)	(0.0548)
Cons	0.3060***	-0.3834***	-0.4001***
	(0.0789)	(0.0909)	(0.0906)
YEARS	CONTROL	CONTROL	CONTROL
N	1410	1175	1175
R2	0.253	0.3024	0.310
Adj-R2	0.0976	0.1204	0.1289
F	15.54***	14.85***	14.51***

Model 5 verifies the moderating role of sales efficiency in the relationship between innovation input and innovation performance. In the regression analysis of innovation performance in Model 5, the coefficient of the primary term of R&D input intensity is significantly positive (β=0.5737, α<0.01), and the coefficient of the quadratic term of R&D input intensity is significantly negative (β=-0.3120, α <0.01), the coefficient of the intersection term between the R&D input intensity and the sales efficiency is significantly positive (β=-0.2469, α<0.1), and the coefficient of the intersection of the R&D input intensity quadratic term and the sales efficiency is significantly positive (β =-0.2200, α < 0.01). Explain that the sales efficiency dimension of the differentiation strategy has a significant negative adjustment effect between the innovation input and the innovation performance relationship, assuming that H2b is verified (Table 5).

In order to show the effect of each path regulation more intuitively. Therefore, the moderating effects of each dimension of differentiation are plotted as follows:

When the profitability of enterprises is at a low level, there is a significant inverted U-shaped relationship between innovation input and innovation performance. When the profitability of

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enterprises is at a high level, the inverted U-shaped relationship between innovation input and innovation performance is significantly weakened. It is clear that the differentiated profitability dimension can significantly negatively regulate the inverted U-shaped relationship between innovation input and innovation performance (Figure 2).

Table 5. The Moderating Role of Differentiation Strategy in the Relationship between Innovation Input and Innovation Performance

	(4) RGR	(5) RGR
L.OPER	-0.1961*	
	(0.1059)	
L.OIER		-0.331**
		(0.0991)
L.RD	0.9600***	0.5737***
	(0.1491)	(1.065)
L.RD2	-0.7864***	-0.3120***
	(0.1507)	(0.1065)
L.RD * OPER	-0.4005***	
	(0.1371)	
L.RD 2*OPER	0.5490***	
	(0.1434)	
L.RD * OIER		-0.2469*
		(0.1401)
L.RD 2* OIER		0.2201**
		(0.09966)
OC	-0.2952***	-0.2561***
	(0.0993)	(0.0998)
SIZE	0.7972***	0.8116***
	(0.0816)	(0.0818)
NSR	0.0674*	0.0531
	(0.0345)	(0.0344)
INDEP	0.0562	0.0557
	(0.0540)	(0.0544)
Cons	-0.4335***	-0.4252***
	(0.0902)	(0.0900)
YEARS	CONTROL	CONTROL
N	1175	1175
R2	0.325	0.324
Adj-R2	0.145	0.144
F	12.95***	12.82***

When the industry sales efficiency is at a low level, the inverted U-shaped relationship between innovation input and innovation performance is significant; when the enterprise sales efficiency is at a high level, the inverted U-shaped relationship between innovation input and innovation performance becomes larger. It shows that the sales efficiency of differentiation strategy has a significant negative regulatory effect on the inverted U-shaped relationship between innovation input and innovation performance (Figure 3).

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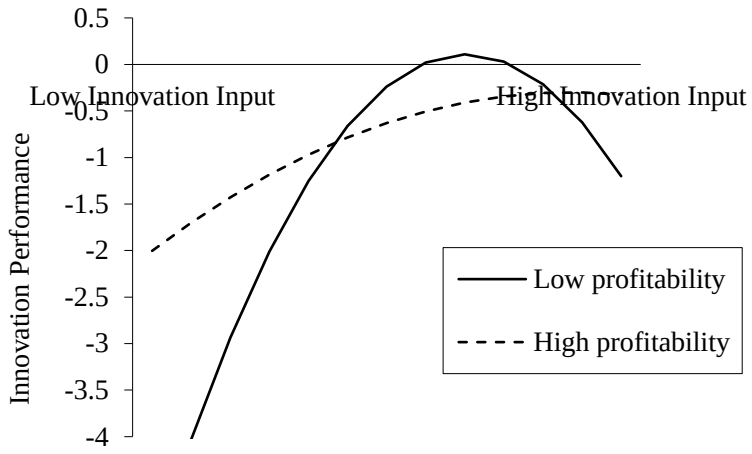

Figure 2. The moderating role of profitability in the relationship between innovation input and innovation performance

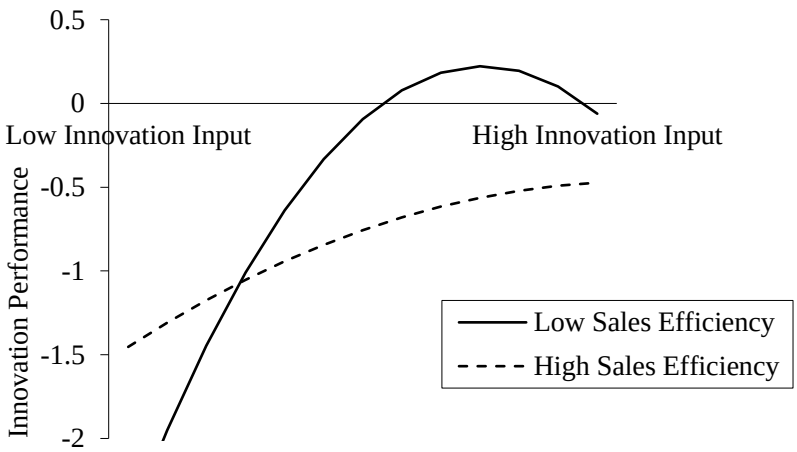

Figure 3. The moderating effect of sales efficiency on the relationship between innovation input and innovation performance

5. Conclusions and implications

5.1 Conclusions

(1) The impact of innovative R&D on innovation performance.

The impact of the relationship between innovation input and innovation performance has become a hot issue in recent years, although innovation input has a significant positive correlation with innovation performance. However, due to the principle of diminishing marginal benefits, the positive impact of innovation investment on innovation performance is gradually weakened. When innovation investment reaches a certain level, further increase of innovation investment will become a burden on enterprises, resulting in a decline in innovation performance.

(2) The moderating role of differentiation strategy.

A. The Influence of the Profitability Dimension of Differentiation Strategy on the Relationship between Innovation R&D and Innovation Performance

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The profitability dimension of the differentiation strategy has a significant negative impact on innovation performance, indicating that the increase in corporate profitability will have a negative impact on the innovation performance of enterprises. When the profitability is low, the innovation input of the enterprise has a significant inverted U-shaped impact on the innovation performance. At this time, the degree of differentiation of the enterprise is low. Therefore, the innovation input of each additional unit of the enterprise can see a significant increase in the innovation performance. When the profitability is high, the impact of the innovation input of the enterprise on the innovation performance is weakened, because at this time, the degree of differentiation of the enterprise is high. Even if enterprises increase innovation input and further enlarge the gap between competitors, the attraction to customers will gradually weaken due to the influence of marginal effect.

B. The influence of sales efficiency dimension of differentiation strategy on the relationship between innovation R&D input and innovation performance.

The sales efficiency dimension of the differentiation strategy has a significant positive impact on the current innovation performance, and has a significant negative impact on the lag one-stage innovation performance, indicating that the improvement of the current sales efficiency of the enterprise will have a positive impact on the innovation performance of the enterprise. The sales of products are less difficult and have greater advantages than competitors; the sales efficiency of enterprises has a significant negative impact on the innovation performance of the next year, which may be due to the advantage of the previous year, and the importance of marketing promotion is ignored by enterprises. As a result, enterprises are weak in the competition. When the sales efficiency of the enterprise is low, the innovation investment of the enterprise has a significant U-shaped impact on the innovation performance. At this time, the degree of differentiation of the enterprise is low. Therefore, the innovation investment of each unit of the enterprise can see obvious innovation performance growth; When the sales efficiency is high, the effect of the innovation investment of the enterprise on the innovation performance is weakened. At this time, the advanced product of the enterprise is high and the degree of differentiation is high, but the excessive sales efficiency means that the enterprise does not promote the product. It may cause the product to be less well-known than the competition.

5.2 Management revelation

(1) Enterprises should correctly understand the impact of innovation investment on innovation performance. They should not blindly carry out innovation investment. Excessive innovation investment may reduce the efficiency of innovation, waste resources, redundant innovation results, and possibly increase financing constraints.

(2) A company with a high degree of differentiation may be characterized by two different dimensions of profitability and sales efficiency. The sales efficiency dimension has a significant effect on the promotion of innovation performance, while the profitability dimension has a low correlation. For companies with outstanding performance in the profitability dimension, they should invest more resources in market operations, take advantage of the existing differentiated advantages of enterprise products or services, expand the market, increase the market share, and achieve the goal of maximizing financial performance. For enterprises with outstanding sales efficiency dimensions, they should pay more attention to product marketing and promotion, expand the brand awareness of the company, optimize the user experience of the consumer, and increase the current income of the company.

5.3 Limitations and future research

This paper tests the relationship between innovation input and innovation performance, and introduces differentiation strategy as a regulating variable to explore the internal mechanism

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of the three. It is different from the previous research: ①It verifies the inverted U-shaped relationship between innovation input and innovation performance.②This paper uses multi dimension to measure the difference strategy, and verifies the difference between different dimensions on the relationship between innovation input and innovation performance, and puts forward different measures that enterprises should take. At present, although there are many researches on the effect of differentiation strategy on innovation investment and efficiency, the results of measuring different dimensions of differentiation strategy are relatively lacking. This paper has made some useful explorations on the basis of previous researches, but there are still some deficiencies in the research process and results that need to be further considered in the future research.

(1) In the process of research, this paper selected GEM manufacturing listed companies as samples. However, due to the limited sample size, there is no further industry segmentation in the measurement, and it is impossible to identify the impact of industry factors on the conclusion. In the future, we can study the differences between different industries.

(2) This paper chooses 2012-2017 as the research period. The limitation of the time range of the research sample makes the research on the dynamic cycle of enterprise growth insufficient. In the future, we need to study the evolution law of R&D investment intensity and competitive strategy on innovation performance through the expansion of research time limit.

(3) This paper only studies the moderating effect of enterprise differentiation strategy on innovation input and innovation performance, and does not consider the possible intermediary effect of innovation input. This is a subject that needs to be studied systematically in the future.

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