


RESEARCH ON THE IMPACT OF HUMAN CAPITAL INVESTMENT AND ENTERPRISE INNOVATION PERFORMANCE BASED ON THE PERSPECTIVE OF ENTERPRISE HETEROGENEITY

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ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received 20 February 2023</p> <p>Accepted 11 May 2023</p>	<p>Purpose: This study aims to analyze the Impact of Human Capital Investment and Enterprise Innovation performance on the basis of the perspective of enterprise heterogeneity.</p> <p>Theoretical framework: Nowadays, Enterprises want to gain a foothold in the fierce competition of globalization. Therefore, the ability and level of developing new technologies and research and development of new products have become important factor in determining the long -term development of enterprises.</p> <p>Design/methodology/approach: The article is sampled by the data of China GEM1 listed companies from 2009 to 2020 to study the relationship between human capital investment and innovative performance, and empirical inspection of the heterogeneity of the scale and age of enterprises on human capital investment and innovative performance. The study also adopts panel OLS regression.</p> <p>Findings: The research results show that: First of all, the stock of human capital is being promoted to innovative performance, and human capital training is being promoted to innovative performance; Secondly, compared with young enterprises, the human capital stock of older enterprises has a greater impact on enterprise innovation performance.</p> <p>Research, Practical & Social implications: In young enterprises, human capital training has no significant impact on enterprise innovation performance, but in older enterprises, human capital training has a positive impact on innovation performance.</p> <p>Originality/value: After an enterprise develops to a certain stage, human capital can become an important factor restricting its development. Thus, strengthening human capital investment at this stage can effectively promote innovation.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i5.1311</p>
<p>Keywords:</p> <p>Blended Learning; Management Education; Executive Education; Bibliometric Analysis; Management; Business Education.</p> <div data-bbox="172 1055 480 1301" style="text-align: center;">  </div>	

PESQUISA SOBRE O IMPACTO DO INVESTIMENTO EM CAPITAL HUMANO E DESEMPENHO DA INOVAÇÃO EMPRESARIAL COM BASE NA PERSPECTIVA DA HETEROGENEIDADE EMPRESARIAL

RESUMO

Objetivo: Este estudo tem como objetivo analisar o Impacto do Investimento em Capital Humano e o desempenho da Inovação Empresarial na perspectiva da heterogeneidade empresarial.

Enquadramento teórico: Hoje em dia, as empresas querem ganhar posição na feroz concorrência da globalização. Portanto, a capacidade e o nível de desenvolvimento de novas tecnologias e pesquisa e desenvolvimento de novos produtos tornaram-se fatores importantes na determinação do desenvolvimento a longo prazo das empresas.

Design/metodologia/abordagem: O artigo é amostrado pelos dados das empresas listadas no GEM1 da China de 2009 a 2020 para estudar a relação entre investimento em capital humano e desempenho inovador e inspeção

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empírica da heterogeneidade da escala e idade das empresas em capital humano investimento e desempenho inovador. O estudo também adota a regressão OLS em painel.

Resultados: Os resultados da pesquisa mostram que: Em primeiro lugar, o estoque de capital humano está sendo promovido para o desempenho inovador e o treinamento de capital humano está sendo promovido para o desempenho inovador; Em segundo lugar, em comparação com as empresas jovens, o estoque de capital humano das empresas mais antigas tem um impacto maior no desempenho da inovação empresarial.

Implicações de pesquisa, práticas e sociais: Em empresas jovens, o treinamento de capital humano não tem impacto significativo no desempenho da inovação empresarial, mas em empresas mais antigas, o treinamento de capital humano tem um impacto positivo no desempenho da inovação.

Originalidade/valor: Depois que uma empresa se desenvolve até certo estágio, o capital humano pode se tornar um importante fator limitante de seu desenvolvimento. Assim, fortalecer o investimento em capital humano nesta fase pode efetivamente promover a inovação.

Palavras-chave: Ensino Híbrido, Educação Gerencial, Educação Executiva, Análise Bibliométrica, Gestão, Educação Empresarial.

INVESTIGACIÓN SOBRE EL IMPACTO DE LA INVERSIÓN EN CAPITAL HUMANO Y EL DESEMPEÑO DE LA INNOVACIÓN EMPRESARIAL DESDE LA PERSPECTIVA DE LA HETEROGENEIDAD EMPRESARIAL

RESUMEN

Objetivo: Este estudio tiene como objetivo analizar el Impacto de la Inversión en Capital Humano y el desempeño de la Innovación Empresarial desde la perspectiva de la heterogeneidad empresarial.

Marco teórico: Hoy en día, las empresas quieren hacerse un hueco en la feroz competencia de la globalización. Por lo tanto, la capacidad y el nivel de desarrollo de nuevas tecnologías y la investigación y desarrollo de nuevos productos se han convertido en factores importantes para determinar el desarrollo a largo plazo de las empresas.

Diseño/metodología/enfoque: el documento se muestrea con datos de empresas cotizadas en GEM1 de China de 2009 a 2020 para estudiar la relación entre la inversión en capital humano y el desempeño innovador y la inspección empírica de la heterogeneidad de escala y edad de las empresas en inversión y avance en capital humano. actuación. El estudio también adopta la regresión OLS de panel.

Resultados: Los resultados de la encuesta muestran que: Primero, se promueve el stock de capital humano para el desempeño innovador y se promueve la formación del capital humano para el desempeño innovador; En segundo lugar, en comparación con las empresas jóvenes, el stock de capital humano de las empresas más antiguas tiene un mayor impacto en el desempeño de la innovación empresarial.

Implicaciones sociales, prácticas y de investigación: En las empresas jóvenes, la formación del capital humano no tiene un impacto significativo en el rendimiento de la innovación empresarial, pero en las empresas más antiguas, la formación del capital humano tiene un impacto positivo en el rendimiento de la innovación.

Originalidad/Valor: Una vez que una empresa se ha desarrollado hasta cierto punto, el capital humano puede convertirse en un factor limitante importante en su desarrollo. Por lo tanto, fortalecer la inversión en capital humano en esta etapa puede promover efectivamente la innovación.

Palabras clave: Enseñanza Semipresencial, Educación Gerencial, Educación Ejecutiva, Análisis Bibliométrico, Gestión, Educación Empresarial.

INTRODUCTION

At present, the rapid development of technological innovation and global competition are unprecedented. However, most Chinese enterprises have not yet formed independent innovation mechanisms, and there are not enough attention to innovative talents, relatively backward independent innovation capabilities, and low innovation performance. The main body of technological innovation is human, and human capital is the inexhaustible motivation of technological innovation. The new innovation concept is to put forward new requirements

for "man management". Therefore, enterprises need to establish an enterprise development model based on human capital and incorporate human capital into key management work (Carvache-Franco et al., 2022).

In the era of knowledge economy, human capital has replaced traditional production factors and has become a resource with strategic importance. It played an increasingly important role in the process of corporate technology innovation (Sun & Wang, 2012; Zhou & Zhang, 2019). The human capital theory established in the 20th century has been widely used in research in various industries. The basic principle of human capital investment is the core content of modern human capital theory. However, the relationship between corporate human capital investment and corporate innovation performance is still an unstable stage of development (Atmaja et al., 2023). The relationship between the two has two main views, one is the promotion effect, and the other is the extrusion effect. The reason is that the innovative performance of the enterprise depends not only on the internal institutional environment of the enterprise, but also the heterogeneity of the enterprise. Situation, such as the age and scale of an enterprise (Bao, 2023).

Most of the GEM listed companies are small and medium -sized enterprises with more high -growth, technology or emerging industries with more innovative R & D investment. They pay more attention to human capital investment and have good market prospects and adaptability. Therefore, the research on the GEM listed company has a greater impact on China's innovation system. The influence of the heterogeneity characteristics of different enterprises on the relationship between human capital investment and innovation performance is conducive to the establishment of a human capital investment system that matches its own situation according to its own heterogeneous characteristics. The development of human capital investment in the GEM listed company is of great significance to the growth of corporate growth.

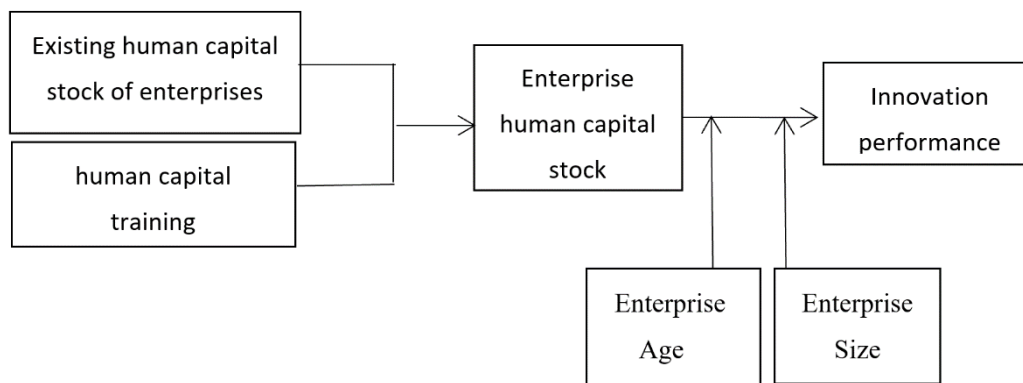
LITERATURE REVIEW

Enterprise resource theory believes that enterprises are a collection of various resources. It is precisely because of the different resources of different enterprises, that is, corporate resources have heterogeneity and unsightly imitation, resulting in different innovative performance of different enterprises. The heterogeneity of corporate resources is the source of the competitive advantage of the enterprise. Only those valuable, scarce, unable to be completely imitated, and unable to replace special heterogeneous resources are the origin of

competitive advantages. Corporate human capital is valuable and scarce, and it is difficult to imitate and replace. According to corporate resources theory, corporate human capital is a special resource that can bring competitive advantages to enterprises, and will directly affect corporate innovation performance. The corporate human capital is formed by investing. Therefore, the greater the investment in corporate human capital, the greater the innovative performance brought by the enterprise.

Becker (1962) proposes that there are generally two ways to obtain human capital: one is through regular education, and the other is to conduct job training for employees. The former forms a corporate human capital stock, which can significantly improve the level of R & D (Winne & Sels, 2010). The latter forms an increase in human capital of the enterprise, which has a significant positive impact on enterprise innovation activities (Nazarov & Akhmed, 2012; Diebolt et al., 2022). Lado and Wilson (1994) and Ferris (1998) agreed that the key factor in the success of corporate innovation was the human resources practice activities including human capital investment. Meyer (2011) High -quality human capital acts on corporate innovation performance by promoting the use of internal knowledge and promoting external knowledge absorption. Zhang et al. (2023) state that human Capital Investment can act on technological innovation through the acquisition, digestion, transformation and utilization of knowledge. According to the theory of corporate resources, not all resources can bring competitive advantages to enterprises. Only those valuable and scarce resources will bring competitive advantages to enterprises. Enterprise's human capital is an important source of corporate competitive advantages. The formation of corporate human capital is the formation of human capital investment. The size of the existing stock of human capital is determined by the existing stock and investment level of human capital (Zhang Hongfeng, 2017; Pravdiuk et al., 2022). For enterprises, the collective learning of professional knowledge and the introduction and training of professional and technical talents need to be obtained through human capital investment. Therefore, the relationship between corporate human capital investment, corporate human capital stock and innovative performance is shown in Figure 1.

Figure 1: The relationship between human capital investment and innovation performance



Therefore, the following assumptions are proposed:

H₁: Human capital investment positively affects corporate innovation performance

H_{1a}: The stock of human capital positively affects the innovation performance of enterprises

H_{1b}: Human capital training positively affects enterprise innovation performance

Schumpeter (1969), Qu and Bai, (2021). believed that large enterprises often have more all -available internal and external resources, which have significant advantages in gathering innovative elements, undertaking innovative risks, and acquisition of innovation income. As a result, the scale of enterprises is conducive to enterprises to carry out research and development and innovation activities. Sorensen and Stuart (2000) companies with older ages often have more time to accumulate knowledge, which helps promote corporate innovation activities. Wang and Wang (2017) in their research on the relationship between intellectual capital and enterprise innovation performance, it proposed that when taking the establishment years of enterprises as the adjusting variable, human capital investment only played a significant driving role in innovative performance during the relatively mature stage of enterprise development. Therefore, the following assumptions are proposed:

H₂: Enterprises of different sizes, there is a difference in the impact of human capital investment on the innovative performance of enterprises. The larger the scale, the more obvious the promotion effect.

H₃: Enterprises of different ages, the impact of human capital investment on corporate innovation performance is different, the more obvious the promotion of the age.

METHODS

Measurement Model Setting

Because the innovative performance of the enterprise uses the enterprise to apply for patented data, the value is not negative, which does not meet the assumption of normal distribution. Therefore, the enterprise innovation performance is logarithmically treated. The paper adopts panel OLS regression. According to the results of Hausman test, the paper selects the fixed effect model of panel OLS regression. In order to verify the impact of human capital investment on enterprise innovation performance, the paper sets the model as:

$$\ln(\text{PAT}_{i,t}) = \beta_0 + \beta_1 \text{Cpst}_{i,t} + \beta_2 \text{Train}_{i,t} + \beta_k \text{Controls} + v_i + v_t + \varepsilon_{i,t} \quad (1)$$

Where, $\text{PAT}_{i,t}$ are Explained variable, representing the number of patent applications of the i th enterprise in year t , Explanatory variables: $\text{Cpst}_{i,t}$ represents the human capital stock of the i th enterprise in year t , $\text{Train}_{i,t}$ represents the per capita training fees of the i th enterprise in year t , and Controls are a series of control variables: enterprise size, enterprise age, nature of ownership, industry, R&D investment intensity, β is the parameter to be estimated; v_i refers to individual effect, v_t refers to time effect, i and t refer to enterprise and year respectively, $\varepsilon_{i,t}$ is random interference term.

Variable Selection and Data Source

This study selects the data of China's GEM listed companies from 2009 to 2020, and the sample data involved are all from the CSMAR database. The sample was processed as follows: ST, * ST, PT and delisted companies were excluded, companies with incomplete or abnormal data were excluded, and the financial statements of financial companies were different from other listed companies, and financial listed companies were excluded. This paper winsorize continuous variables. See Table 1 for specific variable selection and description.

Table 1 Variable selection and description

Variable class	index	Variable symbol	Selection and description of variables
Explained variable	innovative performance	PAT	Ln (Patent Application +1)
Explanatory variables	Human capital stock	Cpst	The average number of years of higher education for enterprise employees, $\ln(\text{number of college students} * 3 \text{ years} + \text{number of undergraduates} * 4 + \text{number of masters} * 7 + \text{number of doctors} * 10 \text{ years} + 1) / \text{total number}$
	Money training	Train	$\ln(\text{Per capita amount of enterprise trade union funds})$

	fee for employees		and employee education funds+1)
	Enterprise size	Size	Ln(total assets of enterprise+1)
	Ownership	Own	1 for state-owned enterprises, 0 for the rest.
	Enterprise age	Age	ln (current year - establishment year)
Control	Industry	Ind	1 for manufacturing, 0 for non manufacturing
variable	R & D investment intensity	RD	ln(R&D expenditure/Total assets+1)

RESULTS

Model Regression and Empirical Analysis

Descriptive statistical analysis of each variable

Table 2 analyzes the innovation performance of the explained variables and the human capital investment of the core explanatory variables from the four aspects of average, standard deviation, minimum and maximum.

Table 2 Descriptive statistics of each variable

variable	N	Mean	Std.Dev.	Min	Max
PAT	5,175	1.986	1.345	0	5.043
Train	5,175	5.731	2.368	0	8.455
Cpst	5,175	7.533	1.029	3.912	10.25
RD	5,175	7.332	6.607	0	98.39
Age	5,175	2.716	0.342	1.609	3.367
Ind	5,175	29.95	18.36	1	55
Size	5,175	21.28	0.818	19.80	23.64
Own	5,175	0.0634	0.244	0	1

The results in Table 2 show that the minimum value of innovation performance of the explained variable is 0 and the maximum value is 5.043, which indicates that the innovation performance gap of the sample enterprises is large. Some enterprises attach great importance to innovation, have strong innovation ability, and have a large number of patent applications, while some enterprises have poor innovation ability and no innovation output. The standard deviation of innovation performance is 1.345, and the average value is 1.986, indicating that the innovation performance of sample enterprises is highly dispersed, and the innovation ability still needs to be further improved. The minimum value of training cost per employee is 0, the maximum value is 8.455, the standard deviation is 2.368, and the average value is 5.731. This shows that the sample enterprises have a large gap in the input of training cost per employee. Some enterprises attach great importance to employee training, while a few enterprises do not attach importance to the input of employee training. The minimum value of human capital stock is 3.912, the minimum value is 10.254, the standard deviation is 1.029, and the average value is 7.533. This shows that there is a large gap between the human capital stock among enterprises, with a relatively large degree of dispersion. Some enterprises should improve the existing

human capital stock, and most enterprises pay more attention to the human capital stock of enterprises.

Related Coefficient Analysis

From the correlation results in Table 3, all independent variables, regulatory variables and control variables are significantly related to innovation performance. Among them, the correlation coefficients of human capital stock (Cpst), R&D investment intensity (RD), enterprise age (Age), enterprise size, ownership and innovation performance (PAT) are significantly positive at the level of 1%, and the correlation coefficients of human capital training, industry characteristics and innovation performance are positive at the level of 5%.

The collinearity between independent variables will affect the accuracy of regression results. The variance inflation coefficient (VIF) is mainly used to test the multicollinearity of the model. The variance inflation coefficient of each variable is less than 2.5. Therefore, there is no multicollinearity problem among the variables.

Table 3 Correlation analysis

	PAT	Train	Cpst	RD	Age	Ind	Size	Own
PAT	1.23							
Train	0.035**	1.20						
Cpst	0.156***	0.087***	1.79					
RD	0.071***	-0.015	0.192***	1.22				
Age	0.036***	0.159***	0.158***	-0.027*	1.50			
Ind	0.031**	-	0.093***	0.153***	0.013	1.04		
Size	0.145***	0.086***	0.608***	-0.081***	0.192***	0.029**	2.17	
Own	0.055***	0.083***	0.036***	0.0100	0.034**	0.049***	0.068***	1.02

Note: ***, ** and * respectively indicate that the statistical significance level of the two tailed test is 1%, 5% and 10%.

Empirical Analysis

This paper uses the fixed effect model of panel OLS regression to test the hypothesis, and the test results are shown in Table 4. In M2, the regression coefficient of human capital stock to innovation performance is positive at the significance level of 1%, and the regression coefficient is 0.086. It shows that with the increase of the stock level of human capital, the innovation ability is gradually enhanced. High level human capital stock, strong information processing ability, scientific understanding of industry development trend and enterprise development status, keen discovery of potential innovation opportunities, and practical innovation strategy. Therefore, enterprises should select, recruit and introduce high-level talents

to improve their innovation performance. Therefore, H_{1a} is verified. In M3, the regression coefficient of human capital training on innovation performance is positive at the significance level of 5%, and the regression coefficient is 0.0134. It shows that through human capital training, employees' satisfaction and loyalty to the enterprise have been improved, and their work enthusiasm has been improved, so that they can devote more attention to the production and operation of the enterprise, and the innovation strategy can be perfectly implemented. To improve innovation performance. So suppose H_{1b} is true.

Therefore, Hypothesis 1 holds, Human capital investment positively affects corporate innovation performance

Table 4 Analysis of the impact of human capital investment on innovative performance

variable	M1	M2	M3
RD	0.015*** (0.000)	0.014*** (0.000)	0.014*** (0.000)
Age	-0.520** (0.024)	-0.527** (0.022)	-0.528** (0.022)
Ind	-0.002 (0.473)	-0.002 (0.432)	-0.002 (0.449)
Size	0.211*** (0.000)	0.153*** (0.000)	0.152*** (0.000)
Own	-0.086 (0.390)	-0.077 (0.445)	-0.078 (0.438)
Cpst		0.086*** (0.003)	0.088*** (0.002)
Train			0.013* (0.090)
Year	Y	Y	Y
_cons	-4.498** (0.047)	-3.899* (0.085)	-3.956* (0.081)
N	5.2e+03	5.2e+03	5.2e+03
r2	0.096	0.097	0.098

Heterogeneity Regression Results

The heterogeneity of the size and age of the enterprise's scale and age on the heterogeneity of human capital investment and innovative performance is shown in Table 5. The enterprise scale is divided into two groups according to the average number of total assets. Small enterprises (Size0) are smaller than the average size, and large enterprises (Size1) are larger than the average size. From the comparison of scale heterogeneity results, it can be concluded that in large enterprises, human capital stock has a more significant role in promoting enterprise innovation performance. Only in large enterprises, human capital training has a positive impact on enterprise innovation performance. It shows that large-scale enterprises have the advantage of gathering talents, accelerating the change of internal and external knowledge, improving the learning efficiency of enterprises, and promoting the good use of innovation

resources and harvesting efficient innovation returns. However, small enterprises have less resources, so H_2 was established.

According to the average age of enterprises, the sample is divided into two groups: young enterprises and older enterprises. Young enterprises (Age0) are younger than the average age, and older enterprises (Age1) are older than the average age. From the comparison of age heterogeneity results, it can be concluded that compared with young enterprises, the human capital stock of older enterprises has a greater impact on enterprise innovation performance. In young enterprises, human capital training has no significant impact on enterprise innovation performance, but in older enterprises, human capital training has a positive impact on innovation performance. It shows that at the initial stage of the establishment of the enterprise, due to the relative lack of financial and material resources, and relatively little innovation experience, there is a crowding out effect in attracting high-level human capital or conducting human capital training, which is not conducive to the output of enterprise innovation activities. After gradual development, with the improvement of enterprises' ability to control resources and the increase of innovation experience, it may have a positive spillover effect on enterprises' innovation performance at this time. Therefore, H_3 was established.

Table 5 Regression Results of Size and Age Heterogeneity

variable	M4 Age0	M5 Age1	M6 Size1	M7 Size0	permutation test Age(b0-b1)	permutation test Size(b0-b1)
Cpst	0.097** (2.55)	0.139** (2.26)	0.084** (2.23)	0.160** (2.50)	-0.142***	-0.076***
Train	0.011 (1.17)	0.077*** (3.37)	0.014 (1.49)	0.039* (1.87)	-0.035***	-0.025***
Control	Y	Y	Y	Y	Y	Y
Year	Y	Y	Y	Y	Y	Y
_cons	7.620 (1.02)	-5.396 (-1.52)	-8.827*** (-2.85)	-0.485 (-0.08)		
N	2749	2426	2733	2442		
r2	0.058	0.185	0.072	0.200		
P-value					0.000	0.000

Note: ***, ** and * respectively indicate that the statistical significance level of the two tailed test is 1%, 5% and 10%.

Stability Test and Endogenous Treatment

The paper uses two methods to test the robustness of the research conclusions: First, the paper uses the existing literature for reference, considering that the innovation performance of enterprises in the sample is a non negative counting variable, the paper considers using panel Poisson regression and panel negative binomial regression to test the robustness of the results. The test results are shown in Table 6 O1-O2. The results of Poisson regression and negative

binomial regression are mostly consistent with those in Table 3, indicating that the research results in this paper are stable.

Although the benchmark regression results confirm that all assumptions have been tested, there are still two possible reasons for the endogeneity problem of the model built above. First, although many variables are controlled in the model, there may still be missing variables that cause endogeneity problems; Second, the explained variable and the core explanatory variable may influence each other, and there is a reverse causal relationship, thus causing endogenous problems. In order to minimize the impact of endogenous problems on the regression results of the model to obtain the most accurate regression results, this part uses the tool variable least square method (IV-2SLS) to test the hypothesis again. In this paper, the variables with independent variable lagging one period are selected as instrumental variables, and 2SLS is used for endogenous test. The results are shown in Table 6, O3. In the unidentifiable test, the P value of Kleibergen Paaprk LM statistic of each variable is 0.000, strongly rejecting the original hypothesis that cannot be identified. The F statistic value in the weak instrumental variable test results is far greater than the critical value of 10%, which indicates that there is no weak instrumental variable problem and the selection of instrumental variables is reasonable. Most of the results in Table 6 are consistent with those in Table 4, indicating that the empirical results of this paper are still robust after considering endogenous issues.

Table 6 Results of robustness test and endogenous test

	O1 inva	O2 inva	O3 lv
lcpst	0.127*** (2.67)	0.168** (2.44)	0.114* (1.74)
ltrain	0.020* (1.89)	0.016 (1.25)	0.005 (0.20)
RD	0.009* (1.89)	0.013** (2.34)	0.015* (1.94)
debt	-0.208 (-0.99)	-0.337 (-1.42)	0.014 (0.05)
area2	0.000*** (3.89)	0.000 (0.08)	0.000*** (4.87)
age2	-0.194 (-1.27)	0.005 (0.01)	0.157 (1.03)
ind2	-0.001 (-0.48)	0.002 (0.43)	0.001 (0.31)
TAsset	0.135** (2.13)	0.295*** (3.00)	0.250*** (3.00)
prn	0.086 (0.72)	-0.072 (-0.42)	0.329** (2.28)
year	Y	Y	Y
_cons	-3.786*** (-3.09)		-5.815*** (-3.52)
N	5001	5001	4478
adj. R ²			0.078

This research is based on the empirical conclusions of China's GEM listed companies, which objectively has a certain inspiration and verifiability for the theoretical analysis of this research topic. However, as a more common innovation subject in China, small and micro enterprises have better growth and corporate governance needs to be improved. How to design corresponding innovation support tools for them is an urgent problem to be solved and considered.

From the perspective of specific research issues, this study attempts to analyze the effectiveness of human capital investment on innovation performance support under different age and size characteristics of enterprises, so it takes into account the age and size of enterprises.

CONCLUSIONS

Focusing on the issue of human capital investment, the impact of human capital investment on corporate innovation performance and his heterogeneity from micro data. The study found:

- (1) Human capital investment is being promoted to corporate innovation performance. Human capital stock is being promoted to innovative performance, and human capital training is being promoted to innovative performance;
- (2) Compared with young enterprises, the human capital stock of elderly enterprises has a greater impact on enterprise innovation performance. The impact of human capital training in young enterprises has no significant impact on enterprise innovation performance. Innovation of the positive impact of innovative performance.
- (3) In the large enterprise, human capital stocks have a more obvious role in promoting corporate innovation performance. Only among large enterprises, human capital training has a positive impact on enterprise innovation performance.

With the deepening of scientific and technological revolution and industrial reform, human capital has become an important element of the core competitiveness of enterprises. Based on the findings, the following recommendations studies are made.

First, enterprises should further increase their investment in human capital and implement the strategy of giving priority to human capital investment; Build an efficient system that is conducive to the planning, allocation and use of enterprise human capital investment to promote innovation performance, build a learning organization, create a good autonomous learning atmosphere for the entire enterprise, and achieve the growth of human capital knowledge, skills and experience. Continuously improving the value level of human capital is

a strategic choice to promote the efficient allocation of resources, increase innovation output and obtain the core competitiveness of enterprises.

Second, in the initial stage of establishment, enterprises need resources in all aspects. If human capital investment is greatly increased, It can cause crowding out effect on other required resources. After an enterprise develops to a certain stage, human capital may become an important factor restricting its development. Therefore, strengthening human capital investment at this stage can effectively promote innovation.

Third, enterprises should appropriately expand their scale to seek more resources and market position.

There are other dimensions of heterogeneity, such as the nature of ownership, region, industry, etc., which have not been included in this discussion, and these perspectives can become the foothold of the future studies.

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