

Study on the Policy Factors of Innovative Talents Agglomeration in Jiangsu Province based on Data Analysis

Li Wenfei ^a, Li Min ^b

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

^a 1054577818@qq.com; ^b lingxao666@126.com

Keywords: Government policy, innovation talent pool, research funding into the household registration policy, outstanding achievements award, patent licensing, data analysis.

Abstract. Innovative talent is the key factor to promote the development of innovative economy and realize innovative drive in Jiangsu Province. Innovative talent agglomeration can fully play the effect of innovative talents through the agglomeration efficiency. Among many factors that affect the agglomeration of innovative talents, the guiding role of government policy factors is becoming more and more important. Based on the survey of domestic and foreign literature, through questionnaire survey, this paper combines relevant analysis and regression analysis to study the mechanism between the of scientific research funds investment, household registration policy, outstanding achievement award and patent licensing and the innovative talent agglomeration. The results show that the investment of scientific research funds, the household registration policy, the outstanding achievement award and the patent authorization have remarkable influence on the innovation talent agglomeration. The conclusion of this study not only expands the theoretical research field of government policy and innovative talent agglomeration, but also provides practical guidance for the government of Jiangsu Province in the era of innovation knowledge.

1.Theoretical support and research hypothesis

1.1 The research hypothesis of the government policy and the innovation oriented talent aggregation

1.1.1 Scientific research funding

(1) Theoretical support

Scholar Zhou Guirong(2006)[1] explained the significant impact of science and technology investment on the scientific and technological personnel. Chinese scholar Ji Jianyue (2010)[2]stressed that the strength of R & D funding is the key factor to affect the flow of scientific and technological personnel. Lou Feng, Pan Chenguang (2010)[3]proposed that technology investment and R&D funding is the key indicator to comprehensive evaluate human resources. Sun Xianhe(2010)[4]pointed out that the key factor to attract oversea talent is research investment and other good academic environment.

(2) Research hypothesis

H1a: Research funding and regional high-end talent is positive correlative

H1b: Scientific research funding is positive correlated with the amount of patent ownership

H1c: Research funding has positive correlation with the number of national scientific research projects

H1d: Scientific research funding and the acquisition of R&D innovation and market value of the proportion of talent is positively related

1.1.2 Household registration policy

(1) Theoretical support

Huang Zhongxi (2007)[5]pointed out that the flow of personnel involved in the personnel system, the household registration system, social security system and related laws and regulations. Shu Changgen, Lv Jianxing(2008)[6]pointed out that the household registration policy for the promotion of urbanization and economic development has a significant role, and then can be more effectively to promote the development of talents. Lu Yan (2009)[7]consider that through to analysis the Shanghai residence inform to the household registration policy, shows that the household registration plays an important role in attracting innovative talent, promoting innovation reform and practice. Chinese

scholar Shi Zhongliang (2013)[8]pointed out that improving the household registration management is the basic link to promote the flow of talent.

(2) Research hypothesis

H2a: Household registration and regional high-end talent is positively related

H2b: Household registration and effective patent ownership is positively correlated

H2c: Census register has a positive correlation with the number of national scientific research projects

H2d: Household registration and obtain R&D innovation and market value of the proportion of talent is positively related.

1.1.3 Outstanding achievement award

(1) Theoretical support

Tong Wensheng (2009)[9]etc. pointed out that science and technology award system is a necessary condition for training innovative talents, and government policy plays strong guiding role. Sun Xianhe (2010)[10]pointed out that the outstanding achievement evaluation is also a key factor in attracting overseas talent. Ma Shunbin(2012)[11]pointed out that the scientific and technological incentives could encourage the creation of scientific research personnel, and also promote the development of innovative career, Hsue-shen Tsien, a famous scientist, proposed that the scientific reward should be regarded as a national science and technology work (Wang Guangming,2014[12]).

(2) Research hypothesis

H3a: Outstanding achievement awards and regional high-end talent is positively related

H3b: Outstanding achievement award and effective patent ownership is positively correlated

H3c: Outstanding achievement award has a positive correlation with the number of national scientific research projects

H3d: Outstanding achievement awards and the talent proportion achieved R&D innovation and market value is positively related.

1.1.4 Patent license

(1) Theoretical support

Dumont M, Baudry B(2006)[13]pointed out that the patent application is the contribution of enterprise technology progress to society, but also the performance of enterprise innovation vitality. Cao Yong (2011)[14]believes that the timely transformation of patent can effectively improve the enterprise's innovation performance, save the enterprise's technological innovation cost, clear the innovative obstacle. Li Zhenliang, Li Shupeng[15]believe that the patent system not only provides excellent environment for technological innovation, but also provides resource conditions for the cultivation and introduction of innovative talents.

(2) Research hypothesis

H4a: Patent license and regional high-end talent is positively related

H4b: Patent license is positively correlated with the amount of effective patent ownership

H4c: Patent licensing and the number of national scientific research projects

H4d: Patent licensing and acquisition of R&D innovation results, the market value of the proportion of talent is positively related

1.2 The research hypothesis of innovation oriented talent agglomeration and innovative talent agglomeration

(1) Theoretical support

Innovative talent agglomeration is the four dimensions of innovative talents agglomeration which had explained above. Scholar Yang Zhi (2005)[16]consider that the regional economic development level, scientific and technological personnel policy, regional cultural heritage, industrial concentration etc. is the main reason for the impact of scientific and technological personnel.

(2) Research hypothesis

H5a: Regional high-end talent and innovative talent has positive correlation

H5b: Effective patent ownership is positively related to the agglomeration of innovative talents

H5c: The number of national scientific research projects and innovative talent gathering is positively related

H5d: The proportion of talent who achieved R&D innovation achievement and market value is positively related with innovative talent gathering

1.3 Model construction

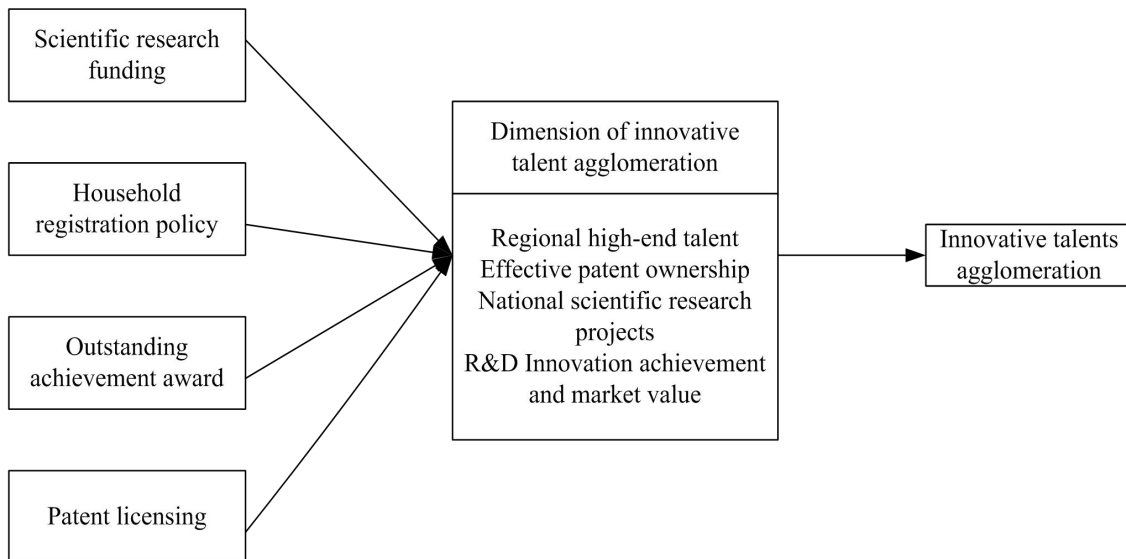


Figure 1. Theoretical framework and research hypothesis of this study

2. Research design

2.1 Questionnaire design

Based on previous studies, this study combined the interview with some innovative talents and some influential factors, and also combined with some analysis methods to make the initial questionnaire. In order to guarantee the data of this research real and effective, the questionnaire was distributed to the senior management of the enterprise's R & D innovation and these who access to intellectual property. Before the final questionnaire issued, first through telephone or mail tried to ask the permission of the enterprise, and also appointed it as the contact person in the enterprise. And then, issued the questionnaire, this method in a certain extent could guarantee the recovery rate and quality of the questionnaire. The method of questionnaire distribute mainly through e-mail, mailing and on-site payment of three forms.

2.2 The research data acquisition

Finally, 320 questionnaires were issued, 278 were recovered, the effective rate was 86.9%. Among the total people, 65.8% is male; The position of senior scientific research personnel accounts 34.2%, middle level scientific research personnel accounts 34.9%, basic level scientific research personnel accounts 20.1%, and others accounts 8.3%;For the educational degree, doctor accounts 42.8%, master accounts 29.8%, undergraduate accounts 28.4%,none is junior college and below. The monthly profit 5000 yuan or less accounts 10.8%,5000-10000 yuan accounts 35.3%, 10000 — 15000yuan accounts 30.6%, more than15000yuan accounts 23.3%; Unit property, Unit Nature Research Institute accounts 30.2%,the proportion of institutions of higher learning is 26.9%, high tech enterprise is 13%,and more than 16 years accounts 11.9%.

2.3 Variables measurement

In order to ensure the reliability and validity of the measurement scale, this study use mature quantity table which has been accepted in internal and external literature, and then according to the characteristic of this study, combined with the actual situation of innovative talents in Jiangsu Province to conduct some modification (As table 1, table 2, table 3).It choose Liket scale which has high reliability and validity (Liket scale) to ensure representative, comprehensive and measurement of the scale. Each question item available answer is divided into quite disagree, disagree, neither on one side nor the other, approval, and deeply sympathetic etc. five options in the questionnaire design, each option gives different numerical, such as in accordance with quite disagree to deeply sympathetic followed by 1 to 5 minutes. Finally obtain different attitudes and ideas of every investigated object.

Table 1. Measurement scale of government policy

Variable name	Item	Source or basis
Scientific research funding	1.Government research funding to support the research and development project	EN Shomova (2013)
	2.The government's scientific research funding is timely	DCzarnitzki, AAToole(2011)
	3.Amount of scientific research grant is strict accordance with the regulations	

	4. Innovation and technology related research projects can be accorded priority	
Household registration policy	5. Settled procedure is relatively simple, can not waste a lot of energy	YangPeifeng (2002)
	6. My spouse and children can also enjoy certain benefits	XWu, DJTreiman (2004)
	7. Bring great convenience to my life	
	8. Settled conditions is gradually relaxed	
Outstanding achievement award	9. Reward is justice and clear	MHTschP, RDDimarchi (2012)
	10. Reward is timely	
	11. Reward is relatively large	Chen (2003)
	12. Incentive forms are diverse	
Patent licensing	13. Greater number of regional patent licensing	JOLanjouw (2004)
	14. There are many kinds of regional patent authorization	
	15. The proportion of patent license and patent application is higher	LILinet al(2008)
	16. Largely attracted by the local licensing scale	JZheng, PTang (2007)

Table 2. Dimensions of innovative talents agglomeration

Variable name	Item	Source or basis
high-end talent	1. At least won one national titles	JA Stam(2010)
	2. More people at my side with same profession get similar professional title Regional	YHuang, YSun, QWang (2013)
	3. Different areas of expertise around have more people with similar title	
Effective patent ownership	4. At least one patent	JOLanjouw JZheng, PTang(2007)
	5. The type of patents we can apply for is more and more	
	6. More and more outstanding talents in the field own a patent	
Number of national scientific research projects	7. At least participate one national scientific research project	BJohnsto, L Wheeler (2000)
	8. With more and more people participate in the national scientific research project	
	9. The national scientific research project attract more foreign talent to participate in	EW Burgess(2007)
	10. Compared with other regions, this region has more scientific research team	
R&D innovational and market value	11. Personal or team achievement output ratio constantly improve	NMurovec, IProdan (2009)
	12. More new types of output	
	13. Individual or team innovation market value conform to expected level	RMWalker, EJanes, RRowlands (2002)
	14. The market value of innovation achievement is higher and higher	

Table 3. Innovative talent agglomeration scale

Variable name	Item	Source or basis
Innovative talent agglomeration	1. Even if other places have the same welfare policy, I prefer to choose the employment in Jiangsu Province	WANG Rui wen, J Zhang(2011)
	2. If the rest has not particularly obvious advantages, I think it is more sensible to choose Jiangsu province to innovate	
	3. Even if other places like Jiangsu Province, I also prefer to work here	

2.4 Research methods

This paper use SPSS17.0 statistical software for data process. Specific data analysis as follows: using SPSS17.0 for reliability and validity, and then carried out correlation analysis and regression analysis, verify the feasibility of the proposed research hypotheses.

3. Research result

3.1 Reliability and validity analysis

3.1.1 Reliability analysis

The coefficient validated that normal alpha coefficient ranged between 0 and 1, when the coefficient is less than 0.6, we consider it lack of reliability; between 0.7 to 0.8 we think it basically meet the requirements; when reached between 0.8 and 0.9, which means that it has high reliability and good stability. In this table, the alpha coefficient is 0.898, after normalized is 0.899, also bigger than 0.8, indicating that reliability of the scale is high.

Table 4. The Cronbach alpha coefficient of the scale

Variable name	Cronbach's Alpha	Scale name	The number of questions	Cronbach's Alpha
Gross list	.854	Scientific research funding	4	0.841
		Household registration policy	4	0.883
		Outstanding achievement award	4	0.840
		Patent licensing	4	0.872
		Regional high-end talent	3	0.853

	Effective patent ownership	3	0.861
	Number of national scientific research projects	4	0.868
	R&D innovation and market value	3	0.870
	Innovative talent agglomeration	3	0.854

3.1.2 Validity analysis

To test the validity and relevant of the scale, we mainly adopted KMO and Bartlett spherical. The KMO of this study is 0.829, equal closed to 1, indicating that the correlation between variables is stronger, and more suitable for correlation and regression analysis. The Bartlett test was used to check out whether each variable is independent with each other, the Approx. Chi-Square is 3027.628, the Df is 362, so, after analysis, I affirm these variable quantity are variables for correlation and regression analysis.

3.2 Correlation analysis

In this paper, two tailed test method is adopted in the analysis, The correlation analysis of two variables was carried out on eight factors such as the regional high-end talent, patent ownership, the number of national level research projects, the proportion of innovation and market value of R & D personnel, research funding, residence, outstanding achievement award, patent authorized etc. On the table of correlation analysis we can see that between the eight variables of two always presented significant correlation, suggesting that hypothetical relation between the variables may exist.

Table 5. Correlation coefficient

Item	1.	2	3.	4.	5.	6.	7.	8.	9.
1.Scientific research funding	1.000								
2.Household register	0.322 *	1.000							
3.Outstanding achievement award	0.293 **	0.223 *	1.000						
4.Patent licensing	0.315 **	0.305 *	0.421 **	1.000					
5.Regional high-end talent	0.408 **	0.298 **	0.330 **	0.430 **	1.000				
6.Effective patent	0.375	0.401	0.417	0.479	0.405	1.000			

ownership	**	**	*	**	**				
7.Talentwith national scientific research projects	0.427 *	0.326 **	0.371 **	0.308 *	0.357 **	0.421 **	1.000		
8.R&D innovation and market value	0.433 **	0.420 **	0.369 **	0.379 **	0.390 **	0.475 **	0.422 **	1.000	
9.Innovative talent agglomeration	0.389 **	0.376 **	0.420 **	0.320 **	0.379 **	0.401 **	0.382 **	0.378 **	1.000

* Significant at 0.01 level * Significant at 0.05 level

3.3 Regression analysis

The first step, put the innovative talents demographic variables into the regression equation (M1); the second, put the research funding into regression equation (M2); the third step, the household registration is introduced to the M3 regression equation; the fourth step, outstanding achievement award introduced M4 regression equation; the fifth step, introduce the patent licensing into M5 regression equation. Specific results show in the following table.

Table 6. Regression coefficient

Independent variable	Dependent variable				
	M1	M2	M3	M4	M5
Demographic variable					
Gender	.087**	-.088**	.085**	.089**	.101**
Education degree	.163**	.134**	.101**	.130**	.124**
Work unit	.142*	.120*	.100*	.102*	.127*
Position	.155**	.144**	.123**	.111**	.124**
Income	.366**	.311**	.303**	.307**	.301**
Scientific research funding		.297*			
Household register			.201**		
Outstanding achievement award				.288*	
Patent licensing					.334*

ΔR^2	0.134	0.030	0.026	0.032	0.073
Adjusted ΔR^2	0.134	0.164	0.190	0.222	0.295

4. Data Analysis and Conclusions

4.1 Hypothesis testing

Table 7. Hypothesis test

Relationship	Corresponding hypothesis	Conclusion
Research funding -regional high-end talent	H1a	establish
Scientific research funding - effective patent ownership	H1b	false
Research funding - with the national scientific research project number	H1c	establish
Research funding - R&D innovation and market value of the proportion of qualified personnel	H1d	establish
Household registration: regional high-end talent	H2a	establish
Household effective patent ownership	H2b	establish
Household registration: the number of national scientific research projects	H2c	establish
Household - achieved R&D innovation and market value of the proportion of qualified personnel	H2d	false
Outstanding achievement award - regional high-end talent	H3a	false
With outstanding achievements Award - Patent	H3b	establish
The outstanding achievement awards - with the national scientific research project number	H3c	establish
The outstanding achievement award -R&D innovation and market value of the proportion of qualified personnel	H3d	establish
Patent license - regional high-end talent	H4a	establish
Patent license - effective patent ownership	H4b	establish
Patents - with the national scientific research project number	H4c	false

R&D - patent innovation and market value of the proportion of qualified personnel	H4d	establish
Agglomeration of high-end talent - Innovative Talents	H5a	establish
Effective patent ownership innovation talents	H5b	establish
With the national scientific research projects and innovative talents	H5c	establish
Get the proportion of talents of innovative talents - R&D innovations and market value of the agglomeration	H5d	establish

4.2 Conclusions

From the regression analysis results, some policy dimension and innovative talent agglomeration does not exist significant correlation, but comprehensive regression analysis results show that innovative talents agglomeration has high correlation with government policy. Overall speaking, it shows that government policy has great influence on innovative talents agglomeration. In addition, fitting coefficient of regression equation also shows that government policy plays a significant role in guiding and promoting innovative talents agglomeration, and this also corresponds to domestic and foreign research results.

References

1. Zhou Guirong, Liu Wenjiang. Problems and countermeasures in the distribution of scientific and technical personnel in China[J]. Science and technology management, 2006.
2. Ji Jianyue, Zhang Xuehai. An Empirical Study on the causes of China's scientific and technological personnel flow[J]. Journal of Ocean University of China: Social Science Edition, 2010.
3. Lou Feng, Pan Chenguang. A comprehensive evaluation index system of the competitiveness of human resources construction and empirical analysis[J]. China collective economy, 2010.

4. Sun Xianhe. Career: the key of attracting high level overseas talents [J].Science & Technology Review, 2010.
5. Huang Zhongxi. Problems and Countermeasures in the current talent flow [J]. Development study,2007.
6. Shu Changgen, Wang Feijun, Lv Jianxing. Household registration policy and population urbanization [J].Urban problem, 2008.
7. Lu Yan. Shanghai: the first loose household registration policy [J]. Hangzhou monthly newsletter, 2009.
8. Shi Zhongliang. Status, problems and countermeasures of scientific and technical personnellflow in China[J].Hubei University, 2013.
9. Tong Wensheng,WeiHuai. Policy oriented of national science award andresearch on the cultivation of innovative talents[J].Science and technology, 2009.
10. Sun Xianhe. Building a good academic environment to attract overseas talents [J].International talent exchange, 2010.
11. Ma Shunbin. Research on the impact of China's science and technology award system on scientific and technological innovation[J]. Chengdu University of Technology 2012.
12. Wang Guangming. Mirror. Model. Flag--Exalted scientific morality, style of study and spirit of Hsue-shen Tsien[J]. Association Forum, 2014.
13. M Baudry,B Dumont. Patent Renewals as Options: Improving the Mechanism for Weeding Out Lousy Patents[J].Review of Industrial Organization, 2006.
14. Cao Yong, Zhaoli, Su Fengjiao. Enterprise patent management and technological innovation performance coupling measurement model and index evaluation [J]. Science research management "in 2011.

15. Li Zhenliang, Li. Based on patent system of innovative talents training path [J]. 2015, Heilongjiang Education: research and evaluation of higher education.

16. Yang Zhi. Enterprise human resources cost control of the [J]. Special Economic Zone, 2005.

The ring mechanism, to provide the basis for the latter study.