

Influencing Factors of Knowledge Workers' Innovation Behavior Based on Self-management

Yunmei Li, Yuan Gao and Mengxue Qiao

ABSTRACT

Knowledge workers' innovative behavior is an important driving force for enterprise development. The paper explores the influencing factors of knowledge worker's innovation behavior through the self-control ability and achievement motivation of knowledge workers. In the paper we introduce achievement motivation in the relationship between self-control ability and innovative behavior, built a relationship model for knowledge workers' influencing factors of innovation, and the model is validated by regression analysis of questionnaire data. The results show that the self-management ability of knowledge workers has a significant positive effect on innovation behavior, and the achievement motivation plays an intermediate role between them. Enterprises can influence knowledge workers' innovative behavior by interfering with self-management and achievement motivation of them.¹

KEYWORDS

knowledge workers, self-management, achievement motivation, innovative behavior.

¹Yunmei Li, Yuan Gao, Mengxue Qiao, Wuhan University of Science and Technology, School of Management, China, 430082.

INTRODUCTION

As an important source for enterprises to create value and an inexhaustible driving force for enterprise development, knowledge workers' innovative behavior has become the focus of attention of many scholars and managers. Knowledge workers, as a group that masters the use of symbols and concepts, and uses knowledge and information [1], have the characteristics of innovation and the pursuit of autonomy. Their work is highly independent, the process is difficult to monitor, and the results are difficult to measure accurately [2]. Traditional incentive strategies, especially traditional material incentive strategies, are difficult to accurately motivate knowledge workers to innovate [3]. Therefore, exploring the influencing factors of knowledge workers' creative behavior can provide a scientific management strategy for encouraging innovation.

There are many factors that influence the innovation of knowledge workers. Scholars in China and abroad have studied from different perspectives. At the individual level, Linda [4], Seibert [5], Seçil Bal Taştan [6], they pointed out that positive personality contributes to innovation; Amabile[7], Kim[8], Lu Xiaojun[9], Hou Erxiu [10],they pointed out that intrinsic motivation has a significant effect on the innovative performance of knowledge workers. At the organizational level, Amabile[11], Millikin[12], Zhang Wenqin[13], Gu Yuandong[14], Chen Jianwu[15], their research shows that a good organizational climate helps improve innovation behavior; Amabile[16], Woodman[17], Chen Bihui[18], they believe that the organization's support and innovation behavior are significantly related. Many factors influence the creative behavior of knowledge workers from different aspects, but external factors always act through the effect of internal factors. As a spontaneous voluntary behavior, innovation behavior is difficult to generate due to constraints. So this paper starts with non-material incentives and uses self-management variables as an entry point, based on a new paradigm of self-management[19], combined with the characteristics of knowledge workers. This paper explores the impact of self-management and achievement motivation of knowledge workers on innovation behaviors, and introduces achievement motivation as an intermediary variable based on the characteristics of knowledge worker's intrinsic motivation and self-achievement.

Although current studies have shown that self-management can help improve the work motivation of employees, there is not much research on the relationship between self-management and innovative behavior of knowledge workers. This paper uses self-management related theories to explore the impact of self-management and achievement motivation of knowledge workers on innovation behaviors. This paper enriches the theory of influencing factors of innovation behavior to a certain extent, and according to the results of the research, it gives a partial management practice strategy to promote the innovation behavior of knowledge workers. This paper enriches the theory of the influencing factors of innovation behaviors; and according to the results of the research, it gives a partial

management practice strategy that promotes the innovation behavior of knowledge workers.

ANALYSIS AND HYPOTHESES

Peter Drucker first proposed the concept of knowledge workers, and Francis Heribi pointed out that the value creation of knowledge workers is more from the brain. With the deepening of research, the connotation of knowledge workers has been continuously expanded and extended. Now, the knowledge workers are mainly referring to the group of employees who obtain output through mental work. Compared with ordinary employees, knowledge workers mostly engage in creative work. In terms of individual traits, knowledge workers are highly educated and knowledge capital is the core production factor. In terms of job characteristics, the work of knowledge workers is autonomous and challenging, and traditional management strategies are difficult to accurately and effectively motivate knowledge workers. In terms of demand, knowledge workers value more respect for the needs and self-realization needs.

Luthans and David [20] defined the concept of self-management from the perspective of self-control: the process by which the behavioral subject obtains standardized actions through conscious internal adjustments such as external stimuli and implicit responses. Bandura [21] point out from the perspective of self-recognition that self-management is the process by which an individual actively observes, evaluates, and reacts to achieve goals. Therefore, self-management is the process by which an individual manages his own initiative, such as his thoughts and actions[22]. Brief and Aldag divided the self-management under organizational behavior into two dimensions: self-management perception and self-management practice. Castaneda [23] present Self-Management Perceptions and Practices (SMPP). SMPP divides self-management perception into four dimensions: self-perceived performance level, self-efficacy, self-understanding of work focus, and superior feedback on job performance. It also divides self-management practices into four dimensions: plan or goal setting, path management, compensation behavior, and emotion management. The scale has high reliability and validity, and it is widely recognized. It is one of the most used self-management measurement scales.

Innovation begins with individual discovery problems and proposes innovative ideas. Individuals then seek external support to practice their innovation and ultimately transform innovation into a product or service. Knowledge workers are the main body of the production, dissemination and application of knowledge, their personal innovation behavior directly affects the organization's innovation performance. Scott and Bruce [24] divided personal innovation behavior into three stages: the creation of ideas, the generation of new ideas; the promotion of ideas, the search for external support for new ideas; the implementation of innovation, the creation of new ideas into products and services. LUO Jinlian[25]pointed out that

cognitive style is one of the important factors which influence innovation behavior. Self-management is based on certain psychological cognition. Based on the individual self-model of Brief and Aldag, this paper divides self-management into self-management perception and self-management practices.

Here are hypotheses as follow:

H1: Self-management perception of knowledge workers has a significant positive impact on innovation behavior.

H2: Self-management practices of knowledge workers have a significant positive impact on innovation behavior.

McClelland [26] pointed out that achievement motivation is the intrinsic motive of the individual struggling to complete meaningful work and seeking success through self-improvement.

According to Atkinson's expected value achievement motivation theory, achievement motivation includes the motivation to pursue success (Ms) and the motivation to avoid failure (Maf). Considering that Ye Renmin's Compiled Achievement Motive Scal (AMS) [27] complies with China's national conditions and gains widespread recognition, this paper also divides the achievement motive into two dimensions: pursuing success and avoiding failure. The self-management strategy adopted by the enterprise can give the knowledge worker more freedom and respect, which can meet the knowledge worker's need for respect and self-realization. This has positive significance for motivating the knowledge worker's achievement motivation. Empirical research shows that there is a close relationship between self-management and achievement motivation [28].

Here are hypotheses as follow:

H3: Self-management perception of knowledge workers has a significant positive effect on achievement motivation.

H4: Self-management practices of knowledge workers have a significant positive impact on achievement motivation

Studies have shown that people with higher motivation for achievement are usually willing to take challenging jobs and look forward to a great sense of achievement [29]. Innovative work is often a challenging job. Empirical studies have shown that the level of achievement motivation of knowledge workers influences innovative behavior and innovation performance [30].

Here is hypothesis as follows:

H5: Achievement motivation has a significant positive impact on knowledge workers' innovation behavior.

This paper proposes the theoretical hypothesis model of Figure 1.

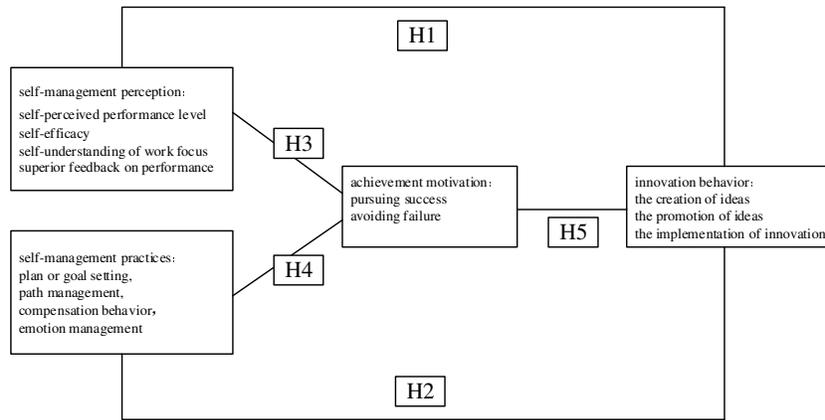


Figure 1. Theoretical hypothesis model.

RESEARCH DESIGN AND DATA ANALYSIS

This paper uses questionnaires to collect data. The contents of the questionnaire included: self-management scale; achievement motivation scale; innovation behavior scale; basic information of personnel. The scale item uses Likert's five-point method. The measurement of relevant variables in this paper mainly draws on the mature scales. The measurement of self-management mainly draws from Brief and Aldag's self-management perception and self-management practice scale. Self-management perception includes self-perceived individual's performance level, self-efficacy, self-understanding of work performance, and superior's feedback on job performance. Self-management practices include four dimensions: planning or goal setting, path management, compensation behavior, and emotion management. The Achievement Motivation Scale uses Ye Renmin's Achievement Motivation Scale for Translation, which is divided into two dimensions: the motivation to pursue success (Ms) and the avoidance of failure (Mf). The measurement of knowledge worker's innovation behavior draws on the scales of Scott and Bruce. It contains six items to measure the employee's innovation behavior in the organization, such as the establishment of the problem, the conception, the search for innovation support, and the implementation of the innovation plan and so on.

This paper surveys the knowledge workers from the high-tech industries such as the information technology industry and the optoelectronics industry. Questionnaires are distributed on paper and online and are completely voluntary and anonymous. Finally, 242 questionnaires were returned, of which 216 were valid and the effective recovery rate was 89.3%. In the sample, men and women accounted for 42% and 58%; bachelor degree or above accounted for 86%. In terms of employee sources, state-owned enterprises accounted for 20%, private enterprises accounted for 32%, foreign companies accounted for 15%, and others accounted for 33%; technical posts accounted for 34%, management positions accounted for 45%, law

enforcement posts accounted for 2%, and other posts accounted for 19%. Participants were distributed and involved different types of personnel in different corporate natures.

The commonly used reliability test method of the scale is Cronbach α coefficient, which can reflect the degree of consistency of the measurement items and the degree of internal structure. The general requirement is above 0.70. Cronbach α of self-management is 0.864. Cronbach α of self-management perception is 0.805. Cronbach α of self-management practices is 0.749. Cronbach α of achievement motivation is 0.778. Cronbach α of innovation behavior is 0.838. Cronbach α are all greater than 0.70, indicating that the measurement results in this paper have a good level of confidence.

The scales used in this paper are classic scales to ensure content validity. This paper also uses KMO sample measurement and Bartlett sphere test to judge the structural validity of the sample. The results show that KMO values of all factors are all greater than 0.7, which is very suitable for factor analysis; Bartlett's hemispherical test is 0.000, less than 0.001, supporting exploratory factor analysis. The results of the analysis are shown in Table I.

The empirical hypothesis of the previous research hypothesis will now be tested. In this paper, Pearson's correlation coefficient r is used to measure the degree and direction of correlation between variables. Correlation analysis of each variable, the results are shown in Table II.

In Table II, all correlation coefficients are positive and both are significantly correlated at the 0.01 level. This shows that the corresponding two variables have a correlation. In order to clarify the causality and size between variables, a regression analysis will be conducted below.

This paper uses SPSS to conduct regression analysis on the causality among four variables of self-management perception, self-management practice, achievement motivation and innovation behavior, and regards gender and education level as control variables. The specific regression data is shown in Table III.

TABLE I. KMO AND BARTLETTSPHERICITY TEST.

		self-management	self-management perception	self-management practices	achievement motivation	Innovation behavior
KMO		.860	.815	.736	.796	.884
Bartlett sphericity test	Approximate Chi-square	1060.702	479.041	322.777	867.173	866.440
	Df	120	28	28	91	55
	Sig.	.000	.000	.000	.000	.000

TABLE II. DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS.

Variable	Mean	SD	1	2	3	4
1 self-management perception	3.45	0.60	1			
2 self-management practices	3.59	0.56	.680**	1		
3 Achievement motivation	1.72	5.6	.306**	.277**	1	
4 Innovation behavior	3.58	0.71	.641**	.665**	.374**	1

Note: N=216; * represents $p < 0.1$, ** represents $p < 0.01$

Model 1 represents the regression analysis of the innovative behavior with gender and educational level as a control variable, and the data show that gender differences have no obvious effect on innovation behavior. The standardization coefficient of educational level for innovation behavior is 0.129, and the sig value is 0.057. There is a significant positive correlation at the level of 0.1, which indicates that employees' educational level will have a certain impact on innovation behavior. The higher the educational level of employees, the more conducive to employees' innovative behavior.

Model 2 represents the regression analysis of innovation behaviors with the addition of self-management perception variables on the basis of control variables. From the table, it can be seen that the self-management perception has a normalization coefficient of 0.630, an sig value of 0.000, and a significant positive correlation at the level of 0.002, and the R2 is 0.408. It shows that the regression model has a good degree of fit. From this we can infer that self-management perception has a significant positive effect on innovation behavior, assuming hypothesis H1 is validated.

Model 3 represents the regression analysis of achievement motivation with the addition of self-management perception variables on the basis of control variables. From the table, it can be seen that the normalization coefficient of self-management perception on achievement motivation is 0.301, and the sig value is 0.000, R2 is 0.084. It can be inferred that self-management perception has a significant positive effect on achievement motivation, hypothesis H3 is validated.

Model 5 adds self-management practice variables on the basis of control variables, and performs regression analysis on innovation behaviors. The paper obtained self-management practices with a normalization coefficient of 0.658 for innovation behavior and a sig value of 0.000, the R2 is 0.444. It shows that the regression model has a good fit. It can be inferred from this that self-management practices have a significant positive effect on innovation behavior, hypothesis H2 is validated.

Model 6 represents the regression analysis of achievement motivation with the addition of self-management practice variables based on the control variables. From the table, it can be seen that the self-management practice has a standardized

coefficient of 0.276 for achievement motivation and a sig value of 0.000. It can be inferred that self-management practices have a significant positive impact on achievement motivation, hypothesis H4 is verified. Based on model 5, adding mediator variable achievement motivation to build model 7. Model 7 is a regression model of achievement motivation and innovation behavior. The regression coefficient of achievement motivation for innovation behavior is 0.200, and the sig value is 0.000. It shows that the motivation of achievement has a significant positive effect on innovation behavior. Hypothesis H5 is verified. After the achievement motivation was added, the regression coefficient of self-management practice on innovation behavior decreased from 0.658 in model 5 to 0.603 in model 4. It shows that the achievement motivation plays a partial intermediary role between self-management practice and innovative behavior, and the size of the intermediary role is 0.055. It shows that the achievement motivation plays a partial intermediary role between self-management practice and innovative behavior, and the intermediary effect is 0.055.

Based on the regression analysis above, this paper verifies the relationship among knowledge employees' self-management perception, self-management practice, achievement motivation, and innovation behavior. Therefore, the all hypotheses have been effectively verified.

TABLE III. REGRESSION ANALYSIS.

	Non-standardized		Standard	t	Sig	R ²	Ad R ²	F
	B	Standard	B					
MOD1						.028	.019	3.086
gender	.150	.097	.104	1.542	.124			
education level	.151	.079	.129	1.911	.057			
MOD 2						.417	.408	50.463
gender	.064	.076	.044	.843	.400			
education level	.071	.062	.060	1.146	.253			
self-management perception	.739	.062	.630	11.881	.000			
MOD3						.097	.084	7.576
gender	1.129	.752	-.011	-1.71	.864			
education level	.506	.610	.055	.830	.407			
self-management perception	2.810	.615	.301	4.566	.000			
MOD4						.450	.440	43.230
gender	.067	.074	.047	.909	.365			
education level	.058	.060	.050	.970	.333			
self-management perception	.671	.063	.572	10.574	.000			
Achievement motivation	.024	.007	.193	3.602	.000			
MOD5						.451	.444	58.120
gender	.071	.074	.012	.232	.817			
education level	.107	.060	.091	1.788	.075			
self-management perception	.842	.066	.658	12.786	.000			
MOD6						.082	.069	6.332
gender	-.244	.762	-.012	-.320	.749			
education level	.664	.612	.071	1.084	.280			
self-management practices	2.803	.677	.276	4.141	.000			
MOD7						.488	.478	50.252
gender	.023	.072	.016	.325	.746			
education level	.090	.058	.077	1.553	.122			
self-management practices	.772	.066	.603	11.638	.000			
Achievement motivation	.025	.006	.200	3.883	.000			

RESULTS AND DISCUSSION

The conclusions of the paper are as following.

First, there is a significant positive correlation between self-management level and achievement motivation of knowledge workers. The path coefficient of self-management perception on achievement motivation is 0.301, and that of self-management practice on achievement motivation is 0.276. It shows that high self-management knowledge workers have higher self-cognition level and self-control ability, which can increase the motivation to pursue success, and both have similar effects on achievement motivation. In management practices, managers should enhance the identification of knowledge workers' self-management skills. Employees with low self-management skills can be trained in self-management skills. For employees with high self-management skills, appropriate management strategies can be adopted to guarantee their achievement motivation is not frustrated.

Second, the self-management level of knowledge workers is significantly positively related to innovation behavior. The total effect of self-management perception on innovation behavior is 0.630, and the total effect of self-management practice on innovation behavior is 0.658. Both contribute similarly to innovation behavior. Employees with a high level of self-management can more accurately perceive their own performance at work, and can strive to improve their performance through self-management practical activities, which are beneficial to the emergence of innovative behavior. In the management practice, when carrying out work plans, employees with different levels of self-management can be treated differently. Different types of jobs and positions can be assigned to employees with different levels of self-management so that they can play their own characteristics to ensure the realization of corporate goals. It is possible to assign jobs and positions with high degree of difficulty, high degree of freedom, and need for innovation to employees with high self-management level, and more regular jobs and positions are allocated to employees with lower self-management levels. In management practice, attention should be paid to creating a suitable work environment and atmosphere so that employees can form good self-management perception capabilities.

Third, the achievement motivation of knowledge workers plays a part in mediating self-management and innovation behaviors. The indirect effect of self-management practice on innovation behavior through achievement motivation is 0.276×0.200 . The indirect effect of self-management perception on innovation behavior through achievement motivation is 0.301×0.193 . The indirect effect of the two on the innovation behavior through the achievement motivation is similar. The total effect of achievement motivation on innovation behavior is 0.200, which shows that achievement motivation is important for self-management perception and self-management practice in the impact of innovation behavior. In management practice, employees' self-management level should be considered when planning work and management. In this way, managers can reasonably expect employees' achievement motivation and make plans that meet the employees' abilities. When conducting

actions related to employee achievement motivation, such as planning a career vision for knowledge workers and non-material incentives for knowledge workers, training of knowledge workers in self-management skills can be considered.

This paper explores the impact of self-management and achievement motivation of knowledge workers on innovation behaviors. It gives suggestions for improving the innovation behaviors of knowledge workers from the aspects of creating a suitable work environment, carrying out targeted work and job assignments, and identifying and training employees. But this paper also has many deficiencies: (1) the paper only explores the impact of self-management and achievement motivation on innovation behavior from the individual level of knowledge workers. The actual innovative behavior of knowledge workers is a very complicated process and is affected by many factors. In the follow-up research, we should consider the internal factors of the individual level of knowledge workers more comprehensively, and we should also consider the external factors and the influence of environment. (2) The paper only studies the non-material incentive of knowledge workers. Many studies show that the innovative behavior of knowledge workers is also influenced by material incentives. Therefore, follow-up research should consider the combined effects of material incentives and non-material incentives. (3) Questionnaire research methods have limitations. Subsequent studies may consider improving the comprehensiveness and authenticity of data samples by improving data acquisition methods.

REFERENCES

1. Drucker P. F. *Management Challenges for the 21st Century* [M]. Boston: Butterworth Heinemann Press, 1999.
2. Erxiu Hou, Shuwen Chen, Qing Chang. The Effect of Knowledge Worker Psychological Capital on Innovative Performance: The Mediating Effect of Psychological Contract. [J]. *Science of Science and Management of Science and Technology*, 2012, 33(6): 149-155.
3. Manso G. Motivating Innovation [J]. *Journal of Finance*, 2011, 66(5): 1823-1860.
4. Linda S. Scratchley, A. Ralph Hakstian. The Measurement and Prediction of Managerial Creativity [J]. *Creativity Research Journal*, 2001, 13(3): 367-384
5. Seibert, S. E., Kraimer, M. L., & Crant, J. M.. What do proactive people do? A longitudinal model linking proactive personality and career success. *Personnel Psychology*, 2006, 54(4), 845-874.
6. Seçil Bal Taştan. The Influences of Participative Organizational Climate and Self-Leadership on Innovative Behavior and the Roles of Job Involvement and Proactive Personality: A Survey in the Context of SMEs in Izmir [J]. *Procedia - Social and Behavioral Sciences*, 2013, 75:407-419
7. Amabile T. Creativity in Context: Update to the Psychology of Creativity [J]. *High Ability Studies*, 1996(2): 100-101.
8. Kim T. T., Lee G. Hospitality employee knowledge-sharing behaviors in the relationship between goal orientations and service innovative behavior [J]. *International Journal of Hospitality Management*, 2013, 34(6): 324-337.
9. Xiaojung Lu, Guoliang Zhang. The Relationship between Work Motivation and Individual Innovation Behavior. [J]. *Soft Science*, 2007, 21(6): 124-127.
10. Erxiu Hou, Shuwen Chen, Qing Chang. Relationship among Knowledge Workers' Psychological Capital, Intrinsic Motivation and Innovative Performance [J] *Journal of Dalian University of Technology (Social Sciences)*, 2012, 33(2): 65-70.

11. Amabile, T. M. A Model of Creativity and Innovation In Organizations, In B. M. Staw & L. L. Cummings (Eds). *Research in Organizational Behavior*, 1988, 10: 123-167. Greenwich, CT:JAI Press.
12. Millikin J. P., Hom P. W., Manz C. C. Self-management competencies in self-managing teams: Their impact on multi-team system productivity [J]. *Leadership Quarterly*, 2010, 21(5): 687-702.
13. Wenqin Zhang, Jintao Shi, Yun Liu. Effect of Goal Orientation and Team Climate on Innovation Behavior. [J]. *Nankai Business Review*, 2010, 13(5): 22-30.
14. Yanzi Wang, Jinlian Luo. A Study about the Influence of Goal Orientation on Employee Innovative Behavior: The Mediating Role of Knowledge Sharing [J]. *Science of Science and Management of S. & T*, 2011, 32(5): 164-169.
15. Jian-wu Chen, Xiangqian Zhang. Overview of the Influence of Organizational Innovation Climate to Employee's Innovative Behaviors. [J]. *Science Technology and Industry*, 2013, 13(7): 104-109.
16. Amabile T. M., Staw B. M. Affect and Creativity at Work [J]. *Administrative Science Quarterly*, 2005, 50(3): 367-403.
17. Yuan F., Woodman R. W. Innovative Behavior in the Workplace: The Role of Performance and Image Outcome Expectations [J]. *Academy of Management Journal*, 2010, 53(2): 323-342.
18. Yun Liu, Jin-tao SHI. Does Psychological Empowerment Mediate the Relationship between Organizational Innovative Climate and Employee Innovative Behavior? [J]. *China Soft Science*, 2010(3): 133-144.
19. Hongshan Qi, Jianzhong Wang, Junqing Song. From Organization Management to Self-Management—the Evolution of Management Paradigm from the Perspective of Subjectivity [J]. *Science and Technology Management Research*, 2008, 07: 272-275
20. Luthans F., David T. Behavioral Self-management: the missing link in managerial effectiveness [J]. *Organization Dynamics*, 1979, 8: 42-60.
21. Bandura A. Social cognitive theory: An agentic perspective [J]. *Annual Review of Psychology*, 2001, 52(1): 1.
22. XiaoMin Sun, Gang Xue. A Review of Study on Self-management [J]. *Advances in Psychological Science*, 2008, 01: 106-113.
23. Castaneda M., Kolenko T. A., Aldag R. J. Self-management perceptions and practices: a structural equations analysis [J]. *Journal of Organizational Behavior*, 1999, 20(1): 101–120.
24. Scott S. G., Bruce R. A. Determinants of Innovative Behavior: A Path Model of Individual Innovation in the Workplace [J]. *Academy of Management Journal*. 1994, 37(3): 580-607.
25. Lu-cheng Huang, Jiang Li. Ecological Process of the Increase of Patent Technology Populations: Cooperation and Competition A Case Study on Optical Lithography Patent Technology Population [J]. *R&D Management*, 2010, 22(2):1-8.
26. Covington, M. V. Goal theory, motivation, and school achievement: An integrative review [J]. *Annual Review of Psychology*, 2000, 51(1): 171-200.
27. Renming Ye, Kunt A. Hagtvet. Measurement and Analysis of Achievement Motivation [J]. *Psychological Development and Education* 1992, 8(2): 14-16.
28. Guoli Zhang, Peiyu He. Relationship between Self-management and Achievement Motivation of College Students [A]. *Proceedings of Conference on Psychology and Social Harmony(CPSH2012)* [C]. Wuhan University, Scientific Research Publishing., 2012: 4.
29. Hirst G., Van Knippenberg D., Zhou J. A cross level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity [J]. *Academy of Management Journal*, 2009(52): 280-293.
30. Xuehe Zhang, Wei Song, Shijian Fang. An Empirical Study on the Individual Innovative Performance of Knowledge-oriented Staff under the Achievement Motivation Theory Perspective: Data Collected from the Sci-Tech Organizations. [J]. *Science of Science and Management of S. & T.*, 2013, 34(1): 164-171.