

# KNOWLEDGE MANAGEMENT, TALENT MANAGEMENT AND TECHNOLOGICAL INNOVATION COUPLED MODEL ANALYSIS

Jenny Hauck

*Management Information Systems Department, University of Arizona, USA.*

**Abstract:** Through the analysis of the coupling mechanism of knowledge management, talent management and technological innovation, we used a combination of questionnaire survey and Delphi expert discussion to investigate the technological innovation capabilities of domestic enterprises. On this basis, the enterprise is studied through empirical analysis methods such as factor analysis, correlation analysis and linear regression analysis. The impact of knowledge management and talent management on technological innovation, the specific results are as follows: Knowledge management and talent management form a coupling mechanism with each other, and through each other Integration promotes enterprise technological innovation. Finally, relevant suggestions are put forward to improve the technological innovation capabilities of Chinese enterprises.

**Keywords:** Knowledge management; Talent management; Technological innovation; Coupling

## 1 ANALYSIS OF THE COUPLING MECHANISM OF KNOWLEDGE MANAGEMENT, TALENT MANAGEMENT AND TECHNOLOGICAL INNOVATION

As an important driving force for enterprise development, technological innovation is to ensure that enterprises continue to The fundamental factors for survival and development in the fierce market competition environment. knowledge resources, people As a product of the knowledge age, talent resources have a much higher ability to create value than other traditional factors of production. The historical experience of industrialization in developed countries shows that: Continue to be stable Certain economic growth relies on continuous innovation of new technologies and effective knowledge management. and talent management accelerate the speed of corporate technological innovation. Knowledge management, talent management theory runs through the entire process of technological innovation, and the two integrate and penetrate each other. Transparent [1]. Human resources are the key subject of enterprise technological innovation, and all activities of enterprise technological innovation are inseparable from human resources. Enterprise knowledge resources exist in In the talent brain, the essence of knowledge resource management object is talent resource management. Theory, the two complement each other and promote each other. On the one hand, knowledge management realizes knowledge Sharing in the enterprise promotes talent exchange and stimulates talent's awareness of innovation; another In terms of talent management, it improves the efficiency of knowledge resource dissemination and ensures the sustainability of talent resources. Continue to acquire advanced technical knowledge [2].

At present, Chinese scholars are focusing on knowledge management, talent management and technological innovation. The research mainly includes the following aspects: From the perspective of content and application of knowledge management Look, Qiu Junping(2000)It is believed that knowledge management can be divided into broad knowledge management and chivalrous knowledge management. Broad knowledge management includes knowledge organization management, knowledge system research and knowledge management method application; Knowledge management in a narrow sense includes knowledge acquisition, knowledge integration, knowledge sharing and knowledge application. Jonathan D. Levy, Wang Ailin(2002), Cui Qinqing (2009)respectively elaborate on the relevant applications of knowledge management in improving the core competitiveness of enterprises, knowledge innovation and project management; From the perspective of technological innovation, Chinese scholars currently conduct research mainly from three aspects: corporate technological innovation strategic model, corporate technological innovation capabilities and corporate technological innovation diffusion; From the perspective of research on the relationship between knowledge management, talent management and technological innovation, Wang Yumei believes that enterprise technological innovation is a dynamic development process. Research on the coupling process of the two can help enterprises improve their innovation capabilities and promote the effectiveness of knowledge and talent resources. Management is of great significance [3].

In modern enterprises, knowledge management and talent management effectively accelerate enterprise innovation. At the new speed, knowledge management and talent management are not simple for enterprise technological innovation. A simple linear relationship, according to the previous analysis, knowledge management will tacit resources Transformed into explicit resources to provide new ways for technological innovation; Talent management integrates enterprise human capital and provides the main body for enterprise technological innovation. The two integrate and penetrate each other to form a certain coupling relationship and jointly promote enterprise technological innovation. Talent management provides the subject for knowledge management and technological innovation, and knowledge management provides the media for technological innovation and talent management. Technological innovation provides a carrier for knowledge management and talent management. knowledge management, The operation of talent management and technological innovation should follow the following rules: First of all, human resources are the main

body of enterprise activities. Talent management should run through the entire process of enterprise technological innovation. By establishing a complete talent selection, training and management system, the efficient operation of enterprise knowledge management and technological innovation can be ensured. Secondly, knowledge resources, as an intermediary media for talent management and technological innovation, provide an important source of power for enterprise technological innovation. Enterprises can effectively improve the dissemination efficiency of knowledge resources in the enterprise through knowledge management. Finally, technological innovation provides a carrier for knowledge management and talent management. In the entire development system of the enterprise, knowledge management and talent management ensure that the enterprise continues to gain competitive advantages and improve the core competitiveness of the enterprise. The formation of the coupling mechanism of knowledge management, talent management and technological innovation relies on the transformation of knowledge resources from implicit to explicit. Enterprises achieve the management of knowledge resources through the management of human resources, and the object of knowledge management is talent management. Therefore, knowledge management, talent management and technological innovation can influence and interact with each other in their respective operation processes, constantly generating new couplings [4].

## **2 EMPIRICAL DESIGN OF THE COUPLING MECHANISM OF KNOWLEDGE MANAGEMENT, TALENT MANAGEMENT AND TECHNOLOGICAL INNOVATION**

### **2.1 Conceptual Model and Research Hypotheses**

Knowledge management and talent management form a complex coupling mechanism through the mutual integration and influence at the micro level, which provides an important promotion role for enterprise technological innovation. Knowledge management can be divided into four processes: knowledge acquisition, knowledge integration, knowledge sharing and knowledge application [5]; Talent management content is divided into talent selection, Talent training and talent incentives. Among them, talent selection and talent training will produce significant changes in the knowledge structure of the enterprise, thereby effectively improving the company's technological innovation capabilities. Talent incentives directly act on talent resources through performance compensation and accelerate the willingness to flow knowledge [6]. Therefore, in order to determine the respective connotations and mechanisms of knowledge management and talent management on technological innovation, this article establishes a coupling mechanism model between the two and puts forward relevant hypotheses to verify the coupling relationship between the two.

#### ***2.1.1 Analysis of the impact of knowledge management on technological innovation***

According to the above research findings, knowledge management and technological innovation influence each other. sound and interaction. This article analyzes the impact of the four processes of knowledge management on technological innovation. The following assumptions are made regarding the impact:

- H1: Knowledge management positively promotes technological innovation;
- H2: Knowledge acquisition positively promotes technological innovation;
- H3: Knowledge integration positively promotes technological innovation;
- H4: Knowledge sharing positively promotes technological innovation;
- H5: Knowledge application positively promotes technological innovation.

#### ***2.1.2 Analysis of the impact of talent management on technological innovation***

Human resources are the direct subject of enterprise activities. Any enterprise innovation behavior cannot be separated from the participation of people. The level of innovation of human resources determines the technological innovation ability of enterprises [7]. The main content of talent management is divided into three parts: talent selection, talent training and talent motivation [8]. In order to improve the technological innovation needs of enterprises, enterprises can directly recruit technical R&D personnel suitable for job requirements through talent selection activities. Through the talent training mechanism and talent incentive mechanism, employees can quickly adapt to work requirements and improve the innovation enthusiasm of technology R&D personnel. Therefore, this article puts forward the following hypotheses about the impact of talent management on technological innovation:

- H6: Talent management positively promotes technological innovation;
- H7: Talent selection positively promotes technological innovation;
- H8: Talent cultivation positively promotes technological innovation;
- H9: Talent incentives positively promote technological innovation.

#### ***2.1.3 The impact of the coupling effect of knowledge management and talent management on technological innovation Impact analysis***

Knowledge management and talent management have a positive impact on enterprise technological innovation role, and knowledge management, talent management and technological innovation interact to form a coupling The cooperation mechanism has a positive and superimposed effect on the innovation ability of enterprises. Therefore, this This paper puts forward the following hypothesis regarding the impact of the coupling mechanism between the two on technological innovation:

- H10: The coupling mechanism of knowledge management and talent management positively promotes technology Innovation.

### **2.2 Questionnaire Design and Data Sources**

**2.2.1 Questionnaire design**

The survey process is divided into three stages. At the beginning of the questionnaire design, the knowledge The existing literature on knowledge management, talent management and technological innovation was sorted out, and based on the literature Present existing results to refine measurement factors. In the middle stage of questionnaire design, use Delphi The measurement factors were repeatedly revised through expert group discussion to ensure that the measurement factors The third stage is the distribution of questionnaires. This questionnaire includes Including paper questionnaires and email questionnaires, a total of 18 00 questionnaires were distributed portion, recycling 1765 valid questionnaires 1702 copies, the recycling efficiency reached 96%. As shown in Table 1.

**Table 1** Survey object analysis

	Indicator name	The proportion(%)
Enterprise size	medium size	75.20%
	Small and micro enterprises	25.34%
	State-owned enterprises	30.42%
business ownership	Foreign capital	14.32%
	private	55.26%
Industrial Distribution	New energy, information technology, computers, high-end	78.33%
	manufacturing manufacturing, new materials	twenty one.67%
	other	

**2.2.2 Data source**

This questionnaire is mainly distributed to large, medium and small start-ups in my country. New enterprises are mainly distributed in the southeastern region. within the questionnaire The content is divided into two parts. The first part is the basic information of the interviewer, mainly including the age, education, working years and work content of the interviewee. The second part is Survey on the implementation of enterprise knowledge management and talent management, in which knowledge management totaled count 8 questions, each covering knowledge acquisition, knowledge integration, knowledge sharing and knowledge application. Two questions. Total talent management 6 questions, talent selection, talent training and talent motivation, two items each. Total technological innovation 4 questions, product creation There are two items each for newness and process innovation. The evaluation criteria for this questionnaire are Lik - ERT is a 5 -point measurement scale, with 5 being the highest score and 1 being the lowest score.

**3 EMPIRICAL ANALYSIS OF THE COUPLING MECHANISM OF KNOWLEDGE MANAGEMENT, TALENT MANAGEMENT AND TECHNOLOGICAL INNOVATION**

**3.1 Descriptive Statistical Analysis**

Among the respondents in this survey, men 55.5%, female 44.5% ; 30 Accounting for those under the age of 35%, 30 to 40 years old 35.5%, 41 ~ 50 suizhan 21%, 51 ~ 55 suizhan 5%, for those over 56 years old 3.5% ; Master’s degree or above accounted for 18.3%, and bachelor’s degree accounted for 18.3%. 63.5%, college degree accounted for 10.2%, accounting for junior college or below 8% ; Less than 3 years old 28.5%, 3 to 5 years 42.5%, 6 to 10 years 18.2%, accounting for more than 10 years 10.8% ; Technical R&D personnel accounted for 42.5%, managers account for 22.5%, sales staff account for 25.5%, skilled personnel account for 9.5%. The subjects of this study are mainly companies in the new energy, information technology, computer, high-end manufacturing, and new materials industries. Employees in these industries have the characteristics of more young people, higher education levels, and a higher proportion of R&D personnel, which are highly consistent with the content of this study.

**3.2 Factor Analysis**

The second part of this questionnaire contains 18 test items, this time The data results obtained from the survey questionnaire were processed in a programmable and quantitative manner to facilitate use SPSS18.0 software was used to perform factor analysis on the data, and the results showed: this survey Questionnaire Part 2 The KMO value is 0.91, indicating knowledge management and talent management There is a high correlation between various variables and factors of technological innovation, so it is suitable for factor analysis. Analysis, Bartlett's test of sphericity The Sig value is 0.01, which is highly significant. specific The results are as shown in the Table 2 shown.

**Table 2** knowledge management scale KMO and Bartlett test of sphericity

KMO and Bartlett test
-----------------------

Bartlett sphericity test	Sampling is sufficient KMO	0.91
	Approximate chi-square	382.76
	df	121. twenty three
	Sig.	0.01

According to the high-order fitting analysis of factor analysis, each factor was rotated using the maximum variance rotation method to calculate the factor loading matrix. As can be seen from the table below, the components involved in the knowledge management rotation component matrix. The 8 test items formed four factors through high-order fitting analysis. Among them, the characteristic value of the knowledge organization factor is 1.65, including Q 1 and Q 2. For two questions, the characteristic value of the knowledge application factor is 1.54, including For questions Q3 and Q4, the characteristic value of the knowledge acquisition factor is 1.60. include For questions Q5 and Q6, the characteristic value of the knowledge sharing factor is 1.63, including Q7. Q 8 two questions. In the same way, the rotated component matrix of talent management involves 6 question items, among which the characteristic value of the talent selection factor is 1.62, including For questions Q9 and Q10, the characteristic value of the talent training factor is 1.59 including Q 11, Q 12 Two questions, talent motivation factors. The characteristic value is 1.64, including Q 13, Q 14 Two questions. Knowledge management, talent management II. The eigenvalue of the fusion mechanism factor is 1.67, including There are two questions, Q 15 and Q 16. Innovation ability. The force rotation component matrix involves 4 questions, among which the characteristic value of product innovation factor for 1.63, including For questions Q17 and Q18, the characteristic value of process innovation is 1.53, including Q 19, Q 20 Two questions.

### 3.3 Related Analysis of Knowledge Management, Talent Management and Technological Innovation

Conduct correlation analysis on knowledge management, talent management and technological innovation, It can further determine the degree of coupling between the two on technological innovation. The value range of the correlation analysis result is -1 to + 1, where a positive value of the correlation coefficient means that the two factors are positively correlated, and a negative value of the correlation coefficient means that the two factors are negatively correlated. The greater the absolute value of the correlation coefficient, the higher the degree of correlation between the two factors. The specific results are as shown in the Table 3 shown.

**Table 3** Related analysis of knowledge management, talent management and technological innovation

person correlation	knowledge integration	knowledge application	knowledge acquisition	Knowledge Sharing	Talent selection	talent development	Talent incentives	Product Innovation	Process innovation
knowledge integration	1								
knowledge application	0.82 **	1							
knowledge acquisition	0.83 **	0.82 **	1						
Knowledge Sharing	0.81 **	0.86 **	0.85 **	1					
Talent selection	0.64 **	0.65 **	0.64 **	0.58 **	1				
talent development	0.62 **	0.64 **	0.65 **	0.57 **	0.83 **	1			
Talent incentives	0.65 **	0.63 **	0.59 **	0.84 **	0.82 **	0.82 **	1		
Product Innovation	0.72 **	0.73 **	0.78 **	0.72 **	0.76 **	0.78 **	0.76 **	1	
Process innovation	0.78 **	0.73 **	0.75 **	0.71 **	0.69 **	0.71 **	0.73 **	0.81 **	1

Note: \*\* means in Significant at the 1% level

According to the table 4 The results show that the correlation coefficients between the three major factors of knowledge management, talent management and technological innovation are all positive, indicating that the correlation between the three major factors is positive. From the analysis of the correlation between knowledge management and technological innovation, the correlation coefficient of knowledge integration, knowledge application, knowledge acquisition, and knowledge sharing on product innovation is 0.72, 0.73, 0.78 and 0.72, while knowledge integration, The correlation coefficients of knowledge application, knowledge acquisition, and knowledge sharing on process innovation are 0.78, 0.73, 0.75, and 0.71, the impact of various knowledge management processes on technological innovation. The impact is more significant. From the perspective of the relevance of talent management to technological innovation, The correlation coefficients of talent selection, talent training, and talent incentives on product innovation are respectively 0.76, 0.78, 0.76, and the correlation coefficients for process innovation are 0.69, 0.71, and 0.73. The impact of talent management on technological innovation is equally significant. From the analysis of the correlation between knowledge management and talent management, knowledge management and talent management show a

positive correlation, and the correlation coefficient remains at  $0.55 \sim 0.7$  between, Talent incentives can effectively promote the sharing of corporate knowledge resources, and the correlation between the two reaches 0.84 and both are significant at the 1% level.

### 3.4 Regression Analysis of Knowledge Management, Talent Management and Technological Innovation

In order to further study the impact of knowledge management and talent management on technological innovation, this article uses multiple linear regression methods to conduct a quantitative analysis of the three. Among them, knowledge acquisition, knowledge integration, knowledge sharing, knowledge application, talent selection, talent training, talent incentives and the integration mechanism of the two are set as independent variables  $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ , set technological innovation as the dependent variable  $Y$ , using the regression equation, the following conclusions can be drawn (See Table 4).

**Table 4** Regression coefficient table of knowledge management, talent management and technological innovation

Model	B	Std. Error	t	sig
knowledge acquisition	0.879	0.023	12.481	0.012
knowledge integration	0.848	0.024	20.916	0.008
Knowledge Sharing	0.872	0.022	9.84	0.013
knowledge application	0.865	0.023	13.421	0.003
Talent selection	0.874	0.021	14.412	0.006
talent development	0.812	0.028	13.556	0.005
Talent incentives	0.822	0.024	18.482	0.003
Fusion mechanism	0.875	0.021	19.52	0.002

The regression equation is:

$$Y = 0.879X_1 + 0.848X_2 + 0.872X_3 + 0.865X_4 + 0.874X_5 + 0.812X_6 + 0.822X_7 + 0.875X_8$$

It can be seen from the regression equation that knowledge acquisition, knowledge integration, and knowledge sharing, knowledge application, talent selection, talent training, talent motivation and knowledge management. The influence coefficients of the coupling mechanism with talent management on technological innovation are respectively 0.879, 0.848, 0.872, 0.865, 0.874, 0.812, 0.822, 0.875, average value higher than 0.8, and  $\text{sig} < 0.05$ , therefore, to summarize the above analysis, knowledge management, talent management and the coupling mechanism formed by the two all have an important impact on enterprise technological innovation. It has a significant positive effect, assuming  $H_1 \sim H_{10}$  Get verified.

## 4 RESEARCH CONCLUSIONS AND COUNTERMEASURES AND SUGGESTIONS

Enterprise knowledge management and talent management play a positive role in enterprise technological innovation enhancement. Knowledge management is divided into knowledge acquisition, knowledge integration and knowledge sharing, and knowledge application. The above four processes have great significance in the process of enterprise knowledge management. They can generate new knowledge in their respective stages of action, thereby promoting technological innovation in enterprises [9]. Talent resources are the core element of enterprise technological innovation. As the leader of corporate activities, human resources and any corporate technological innovation, it is inseparable from the practice of human resources. Enterprise talent management is mainly divided into talent selection, talent training and talent motivation. Among them, talent selection and talent training can change the corporate knowledge structure, improve corporate technological innovation capabilities, and stimulate talent. Acting directly on corporate employees through material incentives has become a way to improve corporate technological innovation. The most effective way to develop new capabilities [10]. Knowledge management and talent management are both in micro. The perspectives interact and integrate with each other to form a positive effect for enterprise technological innovation.

To sum up, in order to improve the technological innovation capabilities of enterprises, we should start from the following points: First, establish the organizational management structure of knowledge-based enterprises. The traditional pyramid enterprise organizational structure can easily cause distortion in the transmission and sharing of enterprise knowledge resources and reduce work efficiency. Therefore, establishing a knowledge-based enterprise organizational structure is conducive to improving the acquisition, integration, sharing and application efficiency of enterprise knowledge resources. Second, establish a knowledge management technology platform. The knowledge management technology platform is a technical tool for enterprises to collect, store, transfer and share knowledge resources. It uses the Internet and knowledge management database systems to fully share knowledge resources, thereby realizing the conversion of knowledge resources from implicit to explicit. Third, create an innovative atmosphere for enterprises and improve the level of incentives for technological innovation. In order to achieve continuous technological innovation in enterprises, the introduction and training of high-tech talents should be strengthened, a good innovation atmosphere should be created, technological innovation thinking should be integrated into various modules

of human resources management, and a comprehensive and multi-level technological innovation incentive model should be formed [11, 12]. Finally, establish an evaluation system for technological innovation based on knowledge management and talent management. By establishing an evaluation system for technological innovation through knowledge management and talent management, enterprises can effectively feedback the execution efficiency of knowledge management and talent management to employees and form a complete evaluation system. However, during the establishment of the evaluation system, the selection of indicators should be strengthened. Scientific nature ensures that the evaluation system is fair and effective.

## COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

## REFERENCES

- [1] Xia Xunjia, Liao Xin. Research on enterprise knowledge management and technological innovation issues. *economic vertical Horizontal*, 2011, 56 (8): 116-117.
- [2] Chen Heng, Xu Ruishu, etc. Research on the coupling evaluation of enterprise technological innovation capabilities and knowledge management capabilities. *Economic Journal*, 2014, 42 (1): 101-102.
- [3] Wang Yumei. Coupling of knowledge management and talent management in the dynamic development process of enterprise technological innovation Analysis of the combined evolution process. *Intelligence Theory and Practice*, 2011, 35 (6): 35-36.
- [4] Hu Zhenya, Li Shuye. Research on the " technological innovation - knowledge management " coupling mechanism for enterprises to improve their independent innovation capabilities. *Scientific Management Research*, 2013, 48 (1): 88-89.
- [5] Guy Alerts. Closing the Knowing-applying Gap in Organizations Through Incentives: Experience from the National Water and Sewerage Corporation in Uganda. *Utilities Policy*, 2016(9): 33-34.
- [6] Wei Yaping, Yan Jingyi, etc. Research on the integrated framework model of corporate social capital, knowledge management and technological innovation capabilities. *Information Science*, 2013, 53 (9): 29-30.
- [7] Jia Weifeng, Dang Xinghua. Research on coupling control of knowledge flow in core enterprises of technological innovation network. *Scientific Research Management*, 2010, 56 (1): 56-57.
- [8] Minghui Liu. Why do Employees Resist Knowledge Management Systems? An Empirical Study from the Status Quo Bias and Inertia Perspectives. *Computers in Human Behavior*, 2016(8): 122-125.
- [9] Lucie Vnoucková. Approaches to the Talent Management Agenda in Forestry Companies. *Forestry Journal*, 2016(4): 29-31.
- [10] TN Krishna. Talent Management and Dynamic View of Talent in Small and Medium Enterprises. *Human Resource Management Review*, 2016(10): 42-43.
- [11] Wang Yumei, Lin Shuang. Research on enterprise technological innovation promotion strategies based on the dual factors of knowledge innovation and talent management. *Journal of Huazhong Agricultural University (Social Sciences Edition)*, 2012, 49 (1): 70-71.
- [12] Yu Xiaoyu, Xie Fuji, etc. Coupling of knowledge management and technological innovation model of high-tech enterprises Study on the synthesis mechanism. *Information Science*, 2007, 55 (2): 302-303.