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Research Article

Cross-level Influencing Factors of Employees' Innovative Behavior in Chinese Enterprises: The Mediating Role of Psychological Capital

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ABSTRACT

In today's dynamic and competitive global market, innovation is a critical driver of regional and organizational success. This study investigates the factors influencing employees' innovative behavior within Chinese enterprises, focusing on four key constructs: Psychological Capital, Knowledge Sharing, Organizational Innovation Climate, and Leader-Member Exchange. The research objectives are: (1) to examine the effects of these four factors on employees' innovative behavior; (2) to explore the mediating role of Psychological Capital in the relationship between Organizational Innovation Climate and innovative behavior; (3) to assess the mediating role of Psychological Capital in the link between Leader-Member Exchange and innovative behavior; and (4) to analyze the mediating role of Psychological Capital in the relationship between Knowledge Sharing and innovative behavior.

A mixed-methods approach was employed, including a literature review, in-depth interviews, and a questionnaire survey yielding 445 valid responses. Quantitative data were analyzed using SPSS 23.0 and AMOS 26.0, applying regression and Structural Equation Modeling (SEM) techniques.

The results reveal that Psychological Capital, Knowledge Sharing, Organizational Innovation Climate, and Leader-Member Exchange each have a significant positive impact on employees' innovative behavior. Moreover, Psychological Capital fully mediates the effect of Organizational Innovation Climate, and partially mediates the effects of Leader-Member Exchange and Knowledge Sharing on innovative behavior. These findings underscore the importance of enhancing innovation by simultaneously strengthening individual psychological resources, fostering a supportive organizational climate, promoting open

communication between leaders and employees, and encouraging knowledge sharing.

1. Introduction

At present, the phenomenon of "trade war" and "technology monopoly" is getting worse. The competitive pressure on core technologies among enterprises, regions and countries is increasing, and all parties hope to gain high competitiveness and the right to speak on core technologies. The healthy development of enterprises in China still lacks a large number of "stuck-neck" technologies, and it is urgent to enhance the core innovation ability to meet various challenges. Employee innovation is the foundation and main body of enterprise innovation and the decisive factor of innovation. In order to cultivate and develop innovative employees to the maximum extent, enterprises must take practical measures to stimulate employees' enthusiasm for innovation, so that they can voluntarily participate in enterprise innovation and effectively enhance their core competence.

According to motivation theory, behavior is produced on the basis of certain motivation. In order to trigger employees' innovative behavior, enterprises should first explore the influencing factors of innovative behavior. Personal behavior is influenced by both personality and environment. In previous studies, scholars focused on the influence of single-level factors on employee's innovative behavior, among which the study of individual-level factors dominated, ignoring the complexity of influencing factors of employee's innovative behavior.

In recent years, theorists have realized the limitations of single-level research on innovation behavior, and some scholars have begun to use cross-level methods to study the influencing factors of innovation behavior. Chen Shuling (2006) adopted a cross-level approach to study employee's innovative behavior, taking balanced psychological contract practice at the individual level and organizational innovation climate at the organizational level as independent variables. Zhang Huiqin (2016) explored the mechanism of organizational dynamic ability, team innovation climate and employee knowledge sharing on employee's innovative behavior. But they pay attention to the variables either at the individual and organizational level, or at the individual and leadership level. No scholars have introduced the variables of individual level, organization level and leadership level into the cross-level research of influencing factors of employees' innovative behavior.

On the basis of previous studies, this study constructs a cross-level model of individual, organization and leadership to study the influencing factors of employees' innovative behavior. Through in-depth analysis of cross-level factors affecting employees' innovative behavior.

2. Research Objectives

(1) Analyze the influence of Psychological Capital, Knowledge Sharing, Organizational Innovation Climate, Leader-member Exchange on Employees' Innovative Behavior.

(2) Explore the intermediary role of psychological capital in the influence of Organizational Innovation Climate on Employees' Innovative Behavior.

(3) Explore the intermediary role of psychological capital in the influence of Leader-member Exchange on Employees' Innovative Behavior.

(4) Explore the intermediary role of psychological capital in the influence of Knowledge Sharing on Employees' Innovative Behavior.

According to the research results, the specific countermeasures to improve the innovative behavior of Chinese enterprises' employees are put forward.

3. Literature Review

3.1 Related theory

(1) psychological capital theory. It is one of three emerging modern capital theories. Scholars believe that psychological capital is the core psychological factor beyond human capital and social capital. Luthans and Yusuf (2004) thought that "psychological capital represents individual's specific positive psychological state, which enables individuals and organizations to gain competitive advantages through targeted investment and development. Psychological capital consists of four dimensions: optimism, hope, self-efficacy and tenacity." Psychological capital is regarded as a kind of personal resource that is easy to succeed in every activity in daily life (Baron, 2016) , and it is also a positive psychological resource that people can use and succeed (Digan,2019).

(2) Knowledge management theory. There are different views on the development and origin of knowledge management. Wiig(1997) thinks that the foundation of knowledge management was established in 1975, and knowledge management gradually attracted the attention of enterprises and management scholars in the late 1980s. In fact, the concept of "knowledge management" has existed in different forms for more than 30 years, and experts in various fields have applied knowledge management to enterprise management practice and academic practice (Girard,2015). Knowledge management is a "conscious strategy", that is, providing the right knowledge to the right people at the right time, and helping people to share information and put it into practice through efforts to improve organizational performance (O'dell,1998).

(3) Dual Innovation Theory. Dual Innovation is an innovative behavior theory that applies the concept of Dual theory to the research of innovative behavior. Dual innovation includes exploratory innovation and exploitative innovation. Exploratory innovation emphasizes the active pursuit of new possibilities, not only seeking new methods, new markets and new customers to provide new services, but also striving to surpass the existing knowledge base, which is a more radical and positive innovation behavior (Lewin,1999). Utilitarian innovation emphasizes refining and improving existing knowledge, which is a conservative and gradual negative innovation behavior. Dual innovation is regarded as a unique innovation strategy (Enkel,2014).

3.2 Psychological Capital

As a positive psychological state, psychological capital can provide an important driving force for employees to implement innovative behavior. Psychological capital plays an intermediary role in the influence of organizational environment, leadership and personal factors on employees' innovative behavior, which has been confirmed by the research of relevant scholars. The relationship between employees will affect psychological capital and learning effect (Gu Jiajun,2020). Psychological capital has a complete intermediary effect between environmental complexity and employee's ability to solve problems (Avey,2008). Psychological capital plays a completely mediator role between organizational support climate and employees' job performance (Luthans,2008). Organizational innovation climate affects employees' psychological capital, which in turn affects their innovative behavior (Zhen Meirong, 2012). The leader-member exchange can affect employees' psychological capital and promote their innovative behavior (Liang Fu,2016).

3.3 Organizational Innovation Climate

Individual's behavior intention is influenced by organizational climate, and scholars have done a lot of research. The organizational innovation factors perceived by members can affect the innovative behavior of organizational members themselves (Amabile,1996). Organizations with strong innovation climate provide important material, emotional and energy resources for employees' innovation activities, and help employees take innovation risks (Cao Keyan,2015). Employees perceive the possibility of innovation in the organizational environment and the attitude of the organization to innovation, which in turn affects their work attitude, motivation, values and innovative behavior (Wang Yanfei,2006).

3.4 Leader-member Exchange

In recent years, as an important part of interpersonal interaction in organizations, leader-member exchange has been highly valued by scholars, and the relationship between leader-member exchange and employees' innovative behavior has been deeply studied. The results show that leader-member exchange has a significant positive impact on employees' innovative behavior (Peng Zhenglong,2011). The higher the quality of leader-member exchange in an organization, the more employees can perceive the attention and support of their superiors for innovative activities, and promote employees to put forward new ideas or concepts (Liu Yun,2009).

3.5 Knowledge Sharing

Knowledge sharing is knowledge dissemination and knowledge reception (Davenport,1998). Research shows that knowledge sharing can improve organizational innovation ability and performance (Xiang Yang,2012). Individual knowledge sharing behavior is the key foundation of organizational knowledge innovation, and enterprises that encourage knowledge sharing are more likely to succeed in innovation. Among the influences of knowledge sharing on innovation behavior, knowledge sharing willingness and knowledge sharing ability have significant positive effects on employees' innovation behavior (Tang Yuan,2022).

3.6 Employees' Innovative Behavior

Scott et al. (1994) believe that employees' innovative behavior refers to the behavior that employees produce innovative ideas or solutions to related problems in the course of work, and strive to seek support for these ideas or solutions so that they can be applied to practice. Scholars have studied the influencing factors of employee's innovative behavior from different research perspectives, taking individual characteristics, work characteristics, organizational environment, leadership style and other factors. Shared authorized leadership has a significant positive impact on employees' innovative behavior (Su Yi,2018). Organizational innovation climate is the key factor affecting the relationship between organizational members' creativity and innovation performance (Li XinYing,2002). Knowledge sharing can quickly improve the employees' innovation ability and enterprises' competitiveness. Psychological capital is an important factor affecting employees' innovative behavior (Gao Weiming,2017).

Based on the analysis and induction of previous related literature, this paper finds the factors that influence employees' innovative behavior include organizational factors, leaders' factors and employees' own factors. Employees' innovative behavior is not only an individual's behavior, but also the result of the interaction between organization, leadership and individuals. Therefore, this study analyzes the influencing mechanism of employees' innovative behavior from the perspectives of leaders, organizations and individuals.

4. Conceptual Framework and Research Hypotheses

According to the relevant theories and research results, this study has designed five variables: Psychological Capital (PC), Knowledge Sharing (KS), Organizational Innovation Climate (OIC), Leader-member Exchange (LMX) and Employees' Innovative Behavior (EIB). Among them, OIC, LMX and KS are independent variables; PC is the mediator variable; EIB is the dependent variable. OIC, LMX and KS have positive influence on EIB. At the same time, they positively influence EIB through the mediator effects of PC (as shown in Figure1).

The following assumptions are put forward:

H1: Organizational innovation climate has a positive impact on psychological capital.

H2: Organizational Innovation Climate has a positive influence on Employees' Innovative Behavior.

H3: Leader-member exchange has a positive impact on psychological capital.

H4: Leader-member Exchange has a positive influence on Employees' Innovative Behavior.

H5: Knowledge sharing has a positive impact on psychological capital.

H6: Knowledge Sharing has a positive influence on Employees' Innovative Behavior.

H7: Psychological capital has a positive impact on employees' innovative behavior.

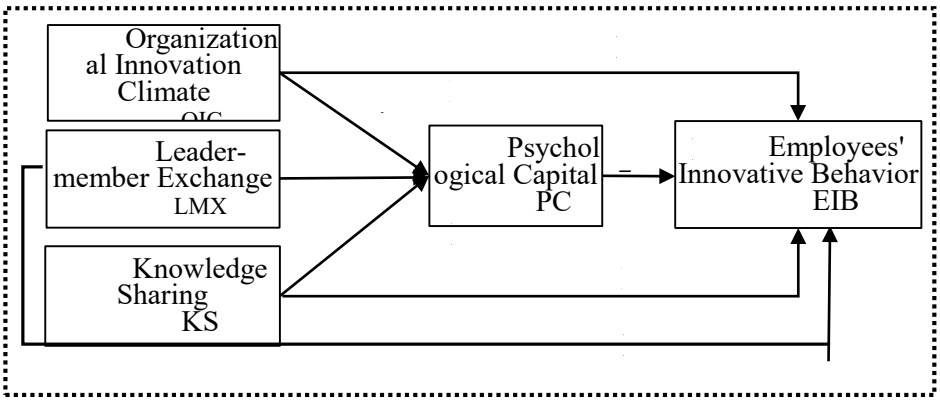

Figure1. Research model

5. Research Methodology

This study adopts a quantitative research approach supported by qualitative insights to analyze the influence of Psychological Capital, Knowledge Sharing, Organizational Innovation Climate, and Leader-Member Exchange on employees' innovative behavior in Chinese enterprises. The methodology integrates literature review, questionnaire survey, in-depth interviews, and statistical modeling.

5.1 Research Type

This is an applied, empirical study employing both descriptive and inferential statistical methods. A mixed-methods design was used, incorporating qualitative inputs to refine measurement tools and quantitative methods to test hypotheses using regression and Structural Equation Modeling (SEM).

5.2 Study Population and Sample Group

The study population consists of employees working in various enterprises across China. According to the Ninth National Employee Survey, there are approximately 402 million employees in China, with diverse demographic and professional profiles. This research specifically targeted employees aged 20–39 as the core sample group due to their higher

engagement in innovative activities, while still including respondents from other age groups for broader representation.

5.3 Sampling Technique

A purposive sampling method was used to ensure demographic diversity (age, gender, tenure, and job level) and enterprise type (private, public, state-owned, and foreign-invested). Given the COVID-19 restrictions in 2022, data collection was conducted online to ensure accessibility and safety.

5.4 Research Tools

The main research instrument was a structured questionnaire. Measurement items were derived from validated domestic and international scales, refined through expert interviews and a pilot study. The initial questionnaire included 47 items rated on a 5-point Likert scale. After item analysis and expert validation, 41 items were retained in the final instrument, which consisted of three sections: introduction, demographic information, and measurement of core variables.

5.5 Research Procedure

A comprehensive literature review was conducted to identify key constructs and theoretical frameworks. Expert interviews were used to adapt and contextualize measurement items. A pilot test evaluated the validity and reliability of the questionnaire; items with low item-total correlations or redundancy were removed. The revised questionnaire was finalized and distributed online through a professional survey platform. Respondents were recruited and contacted via WeChat, QQ, and email.

5.6 Data Collection

A total of 460 participants were invited to complete the online survey. After data cleaning, 445 valid responses were obtained, yielding a high response validity rate.

5.7 Data Analysis Methods

Quantitative data were analyzed using SPSS 23.0 and AMOS 26.0. Analytical techniques included descriptive statistics, regression analysis, and Structural Equation Modeling (SEM) to test the hypothesized relationships and mediating effects of Psychological Capital. Validity and reliability tests (e.g., Cronbach's alpha, Confirmatory Factor Analysis) ensured measurement accuracy.

6. Results

6.1 Reliability and Validity Test

The reliability and validity of the scale were tested by SPSS.23.0 and AMOS 26.0. Firstly, Cronbach's α value was used to test the reliability of the scale. The Cronbach's α values of five variables were 0.939, 0.915, 0.943, 0.951, 0.951 respectively, which were all higher than 0.7, indicating the reliability of the scale was good. Secondly, KMO value and Bartlett's sphere test were used to test the validity of the scale. The KMO values were all higher than 0.8, the statistical significance probability of Bartlett's sphere test is 0.0000, less than 0.01, indicating the validity of the scale was good (as shown in Table 1).

Table 1. KMO test and Bartlett's sphere test for total variables

variable	KMO	Bartlett's Sig		
		Approx. Chi-Square	df	Sig.
Independent Variables	0.958	10136.115	210	0.000
Mediator Variable	0.915	1757.0969	15	0.000
Dependent Variable	0.910	2898.459	28	0.000

Note. Adapted from SPSS Software Result.

6.2 Confirmatory Factor Analysis

The first-order models of independent variables, intermediate variables and dependent variables were established by Amos 26.0, and confirmatory factor analysis was carried out with fixed loading method and maximum likelihood method (ML). Tested the convergence validity by composite reliability (CR) and average of variance extracted (AVE). The CR is usually > 0.7, AVE > 0.5 is the standard. The specific results are shown in Table 2. All observed variables had significant levels of standardized estimated parameters for potential variables, indicating that these observed variables can effectively reflect their corresponding potential variables. As can be seen from the table 3, the square root of AVE is greater than the correlation coefficient between dimensions, indicating that the scale has good discriminant validity.

Table 2 The results of confirmatory factor analysis

Variable	Item	Parameter significance estimation				Factor load	Topic reliability	Convergence reliability	
		Unstd.	S.E.	C.R.	P	Std.	SMC	CR	AVE
OIC	OIC2	1.000				0.836	0.699	0.934	0.740
	OIC3	1.192	0.054	22.245	***	0.848	0.719		
	OIC4	1.077	0.047	23.024	***	0.865	0.748		
	OIC5	1.061	0.045	23.596	***	0.878	0.771		
	OIC7	1.131	0.048	23.408	***	0.874	0.764		
LMX	LMX1	1.000				0.922	0.850	0.932	0.733
	LMX2	1.022	0.030	34.502	***	0.932	0.869		
	LMX4	0.972	0.034	28.254	***	0.866	0.750		
	LMX5	0.890	0.043	20.575	***	0.744	0.554		
	LMX8	0.870	0.037	23.632	***	0.800	0.640		
PC	PC1	1.000				0.864	0.746	0.918	0.692
	PC2	0.961	0.041	23.190	***	0.854	0.729		
	PC3	0.984	0.044	22.524	***	0.840	0.706		
	PC4	1.026	0.047	21.788	***	0.823	0.677		
	PC6	0.868	0.044	19.745	***	0.775	0.601		
KS	KS1	1.000				0.891	0.794	0.925	0.756
	KS2	0.990	0.036	27.464	***	0.898	0.806		
	KS3	0.979	0.036	27.168	***	0.893	0.797		
	KS6	0.903	0.042	21.594	***	0.792	0.627		
EIB	EIB1	1.000				0.685	0.569	0.884	0.657
	EIB6	1.193	0.075	15.877	***	0.846	0.716		
	EIB7	1.337	0.081	16.539	***	0.903	0.815		
	EIB8	1.122	0.075	15.046	***	0.793	0.629		

Note. Adapted from Amos Software

*p<0.05, **p<0.01, ***p<0.001, C.R. of fixed-parameter items is empty

Table 3 The test of discriminant validity

	AVE	EIB	KS	PC	LMX	OIC	WE
EIB	0.657**	**0.811**					
KS	0.756**	0.740**	**0.869**				
PC	0.692**	0.806**	0.783**	**0.832**			
LMX	0.733**	0.621**	0.593**	0.629**	**0.856**		
OIC	0.740**	0.739**	0.729**	0.706**	0.768**	**0.860**	
WE	0.777**	0.637**	0.513**	0.625**	0.654**	0.563**	**0.881**

Note. Adapted from Amos Software

** was significantly correlated at 0.01 level (bilateral). The value in bold on the upper right corner is the square root of AVE

5.4 Fitting test of structural equation model

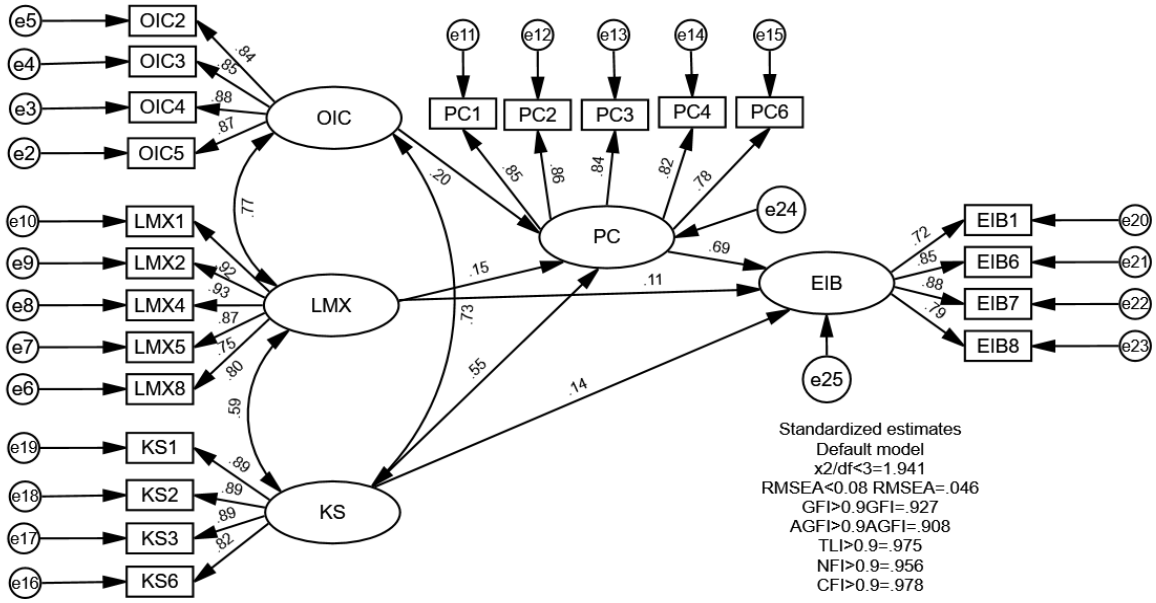

Figure 2 Running results of structural equation model graph

The running results of structural equation model graph is shown in Figure 2. $x^2/df=1.941$, GFI=0.927, AGFI=0.908, TLI=0.975, NFI=0.956, CFI=0.978, RMSEA=0.046. The fitting standard of the comparison table and the fitting index of the model all meet the requirements, so the path of the model is analyzed.

6.3 Path analysis of structural equation model

The path coefficient values of structural equation model and C.R. Value and path coefficient reflect the influence relationship and degree between variables. The Critical Ratio (C.R.) can judge whether the regression coefficient is significant or not. It is generally considered that C.R. value greater than or equal to 1.96, P value is less than 0.05 indicates a significant difference at the level of 0.05. The standardized regression coefficients and variance parameter estimates of the structural equation model in this study are shown in Table 4:

Table 4. Path coefficient test of structural equation model

Path			Path coefficient	S.E.	C.R.	P
PC	<---	LMX	0.139	0.053	2.649	0.008
PC	<---	KS	0.583	0.061	9.597	***
PC	<---	OIC	0.200	0.069	2.921	0.003
EIB	<---	PC	0.650	0.065	10.028	***
EIB	<---	LMX	0.095	0.037	2.589	0.010
EIB	<---	KS	0.136	0.056	2.427	0.015

Note. *** indicates P< 0.001
The relationship hypothesis is tested in terms of path coefficients.

6.4 Mediating effect hypothesis testing

The results of mediating effect test are shown in Table 5. It can be seen from the results that the lower and upper bounds of the confidence interval both of percentile and bias corrected do not include 0. Z value is greater than 2, significant P<0.05, indicates that there are three mediating effects in the model, and they are all significant.

Table 5. Mediating effect test results

Relationships	Point Estimate	Product of Coefficients		Bootstrapping				
				Percentile 95% CI		BC 95% CI		
		SE	Z	Lower	Upper	Lower	Upper	P
Indirect effect								
KS - PC - EIB	0.379	0.066	5.742	0.259	0.516	0.268	0.526	0.000
LMX-PC- EIB	0.091	0.045	2.022	0.007	0.183	0.008	0.184	0.032
OIC - PC -EIB	0.130	0.066	1.970	0.008	0.268	0.004	0.261	0.036
Direct effect								
KS - EIB	0.136	0.056	2.429	0.012	0.282	0.006	0.288	0.015
LMX - EIB	0.095	0.037	2.111	0.008	0.188	0.013	0.192	0.010
OIC - EIB	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Effect								
KS - EIB	0.515	0.069	7.464	0.383	0.650	0.392	0.661	0.000
LMX - EIB	0.186	0.057	3.263	0.077	0.306	0.082	0.312	0.001
OIC - EIB	0.130	0.066	1.970	0.008	0.268	0.004	0.261	0.036

Note. Adapted from Bootstrap method analysis results

The hypothesis testing results are shown in Table 6.

As can be seen from the results:

(1) Psychological Capital, Knowledge Sharing, Leader-member Exchange all have direct positive effects on Employees' Innovative Behavior.H4, H6, H7 passed the tests. Organizational Innovation Climate hasn’t directed effect on Employees' Innovative Behavior. H2 didn’t pass the test.

(2) Organizational Innovation Climate, Leader-member Exchange, Knowledge Sharing, all have direct positive effects on Psychological Capital.H1, H3, H5 passed the tests. Psychological Capital has mediating effects between Organizational Innovation Climate, Leader-member Exchange, Knowledge Sharing and Employees' Innovative Behavior.

Table 6. hypothesis testing results

Hypotheses	Results
H1: Organizational Innovation Climate has a positive influence on Psychological Capital.	Support
H2: Organizational Innovation Climate has a positive influence on Employees' Innovative Behavior.	No
H3: Leader-member Exchange has a positive influence on Psychological Capital.	Support
H4: Leader-member Exchange has a positive influence on Employees' Innovative Behavior.	Support
H5: Knowledge Sharing has a positive influence on Psychological Capital.	Support
H6: Knowledge Sharing has a positive influence on Employees' Innovative Behavior.	Support
H7: Psychological Capital has a positive influence on Employees' Innovative Behavior.	Support

Note. Adapted from Amos Software and Bootstrap method analysis results

7. Discussion

(1) PC, OIC, LMX and KS all have positive effects on EIB. That indicates the influencing factors of EIB include organizational level, leadership level and employees' individual level. EIB is the comprehensive results of the interaction between organization, leadership and individual. This is different from previous studies, that scholars mainly focus on the influence of single-level factors on employees' innovative behavior, which provides a new perspective for the study of influencing factors of employees' innovative behavior and innovates related theories.

(2) PC has a complete mediating effect between OIC and EIB. This conclusion verifies the research results proposed by previous scholars. Organizational innovative climate can affect employees' psychological capital, and then affect employees' innovative behavior. The individual's behavior intention is influenced by the organizational climate. If employees are in a fair, friendly organizational climate, which accepts and encourages innovation, employees are willing to innovate actively. The conclusion of this study further expands the research results of the above scholars. It is proved that the influence of organizational innovation climate on employees' innovative behavior is indirect, and it affects employees' innovative behavior by affecting their psychological capital. In order to make employees constantly produce innovative behaviors, we must attach importance to the promotion of employees' psychological capital.

(3) PC has a partial mediating effect between LMX and EIB. This conclusion verifies the research results proposed by previous scholars. That means, when a close exchange relationship is formed between leaders and subordinate employees, employees can feel that leaders attach importance to and support innovation activities, and thus actively participate in organizational innovation. At the same time, the conclusion of this study further expands the

research results of the above scholars. The important intermediary role of Psychological Capital between Leader-member Exchange and Employee's Innovative Behavior is clarified. Enterprises should not only build a good relationship between leaders and employees, but also pay attention to the shaping and cultivation of psychological capital of subordinates, so that they have a strong subjective willingness and ability to innovate.

(4) PC has a partial mediating effect between KS and EIB. This conclusion verifies the research results proposed by previous scholars. Knowledge Sharing stimulates new ideas and values, and exchanges knowledge and resources through interaction and communication between individuals, thus promoting organizations to create new products or services. At the same time, the conclusion of this study further expands the research results of the above scholars. The important intermediary role of Psychological Capital between Knowledge Sharing and Employee's Innovative Behavior is clarified. Enterprises should not only cultivate employees' willingness and ability to share knowledge, but also enhance their psychological capital.

8. Conclusion

As a result of this research, it is evident that employees' innovative behavior is significantly and positively influenced by psychological capital, knowledge sharing, organizational innovation climate, and leader-member exchange. Notably, psychological capital plays a pivotal mediating role—fully mediating the effect of organizational innovation climate and partially mediating the effects of leader-member exchange and knowledge sharing on innovative behavior. These findings highlight the dynamic interplay between individual psychological resources and organizational factors in fostering innovation among employees. Therefore, to effectively enhance innovative behavior within enterprises, interventions must be multi-dimensional. At the individual level, organizations should invest in developing employees' psychological capital—boosting their confidence, resilience, optimism, and hope. At the organizational level, it is essential to cultivate a supportive innovation climate that encourages experimentation and learning. At the leadership level, fostering strong leader-member relationships and facilitating open, trust-based communication channels are key. Simultaneously, nurturing a culture of knowledge sharing will not only distribute expertise more widely but also empower employees to act creatively and collaboratively. By addressing these interconnected factors holistically, enterprises can create an environment where innovation is continuously generated and sustained, ultimately strengthening their competitive edge in an increasingly complex and volatile market landscape.

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