Examining the Impact of Servant Leadership on Team Innovation: The Mediating Role of Organizational Identification in Sports Psychology

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Abstract
Servant leadership, unlike traditional hierarchical models, emphasizes a values-driven approach that fosters positive leadership dynamics. This study investigates the relationship between servant leadership and exploratory innovation within organizations, using organizational identification as a mediating factor. A conceptual model is constructed, hypothesizing that servant leadership positively influences exploratory innovation and that organizational identification plays a critical intermediary role. The study also examines the moderating effects of organizational support for innovation and organizational flexibility. Data were collected from 312 valid questionnaires distributed across high-tech enterprises, including sectors such as Internet software, biomedical technology, electronic information, and new energy industries. The model was validated using SPSS21 and AMOS24 software. The results indicate that servant leadership and organizational identification significantly enhance exploratory innovation. Additionally, organizational identification mediates the relationship between servant leadership and innovation. Organizational support for innovation strengthens the link between servant leadership and organizational identification, while organizational flexibility amplifies the positive relationship between organizational identification and exploratory innovation. In the context of sports organizations, these findings highlight the importance of servant leadership in fostering innovation and team adaptability. By cultivating strong organizational identification and providing robust support structures, sports teams and organizations can enhance their ability to innovate, adapt, and succeed in dynamic environments. These insights underscore the critical role of leadership styles in driving creativity and performance in sports settings.

Keywords: Organizational Flexibility, Exploratory Innovation, Organizational Support for Innovation, Organizational Identification, Servant Leadership

1. Introduction

Technological innovation and industrial upgrading are themes of China's economic development, and how to stimulate innovation and enthusiasm for technology-based enterprises is an important topic in the field of leadership research. The relationship between corporate followers and leaders is an interactive process of mutual influence. Traditional leadership theories are mostly leader-centered, while service-oriented leadership is one of the few leader-centered leadership theories (Zhang et al., 2017). Due to the constraints of innate resources and low embeddedness of cooperative innovation networks, it is difficult for small and medium-sized science and technology enterprises to fully demonstrate their innovative ability (Ritala & Sainio, 2014). Traditional leadership models mostly emphasize top-down control, and in the process of modern science and technology, organization, and management, policymakers need comprehensive strategic development, knowledgeable management, and organizational cohesion. In many fields, decisions are made quickly, and a leader needs to put forward numerous qualifications to meet the rapidly changing business environment. The service-oriented leadership model points out a way to meet this challenge by stimulating the subjective initiative of organization members to improve the innovative ability of enterprises (Hsu & Chen, 2017). exploratory innovation mainly involves searching for, discovering, and creating new technologies and new knowledge—and experimenting with those technologies. It usually takes a loose, independent, flexible, and coordinated organizational structure to develop new products and services, cultivate new customers, and meet the needs of emerging markets to ensure long-term profits (Forés & Camisón, 2016). In essence, there are still some deficiencies in the current research on exploratory innovation. Most of the existing research focuses on the mechanism mining of organizational motivation or

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senior management and rarely involves the level of organizational followers, which limits the completeness, universality, and guidance of the research conclusions. The realization of exploratory innovation requires enterprises to build internal mechanisms in order to effectively relieve competitive tension. This paper focuses on the relationship between the leadership style and exploratory innovation and organizational identity and organizational flexibility; and it attempts to explain the relationship between service-oriented leadership and exploratory innovation as well as the role of organizational flexibility and innovation support atmosphere in the process. Structural equation modeling and multi-level regression analysis are applied in this study in an attempt to clarify the influence mechanism of the servant leadership model on exploratory innovation.

2. Theoretical Basis and Research Hypothesis

2.1 Enterprise Servant Leadership and Exploratory Innovation

Servant leadership emphasizes that the leader serves the members of the organization, puts the needs of the members of the organization above the needs of the leader, and enables the members of the organization to enter the management level, giving full play to the subjective initiative of the members of the organization. When leaders positively influence the self-efficacy and intrinsic motivation of the members of an organization, they can improve their adaptability and innovation ability, thereby improving the innovation ability of individuals and the organization as a whole (Yoshida et al., 2014). Based on the relational identity theory, Yoshida and other scholars discussed the influence of organizational service leadership on members' creativity and team innovation and believe that servant leadership can promote individual relationship identity, improve the efficiency of cooperation among members, and stimulate the release of team members' creativity (Hartnell et al., 2020). Some scholars believe that the management mode in which service-oriented leaders put the needs of others first can guide team members to imitate this behavior, thus establishing a service culture among teams that directly affects the team's identity, work performance, and creativity (Lei, Jiang, & Junna, 2013). Based on the theory of demand psychology, Chiniara and other scholars have studied the potential psychological process of improving the innovation performance of organizational members, believing that servant leadership leaders pay attention to the development of employees and meet the three basic psychological needs of organizational members: autonomy, competence, and relevance. Each of the three needs can generate an incentive for the members of an organization and contribute to improving the performance of organizational innovation (Bao, Xu, & Zhang, 2016). Additionally, servant leadership managers put the needs of other team members above the influence of leaders, which can result in few perceived differences among members, improve the quality of relationships among members, enhance team cohesion, and have a positive impact on team task performance and servant leadership organizational relations (Sims, Hewitt, & Harris, 2015). Through cross-level research, Bande and other scholars discussed the two-way influence mechanism of service-oriented leadership on individual and team work prosperity and believe that there is a two-way positive interacting relationship between service-oriented leadership and work prosperity (Bande et al., 2016). Most existing innovation studies are based on the Schumpeterian concept of innovation through information, experience, and knowledge reorganization (Holland, 1986). The ultimate goal of exploratory innovation is to obtain future markets and customers. The process involves searching for, experimenting with, discovering, and creating new technologies and new knowledge based on a loose, independent, flexible, and coordinated organizational structure (Iammarino & McCann, 2006). In the process of exploratory innovation, information interaction within the enterprise helps to increase the amount of combinable knowledge and the acquisition of heterogeneous knowledge. Therefore, shared knowledge is one of the key elements, and the implementation of shared-knowledge behavior depends on an organization that can construct the corresponding active internal context (Hsiao, Chang, & Chen, 2014). In the traditional hierarchical model, the leadership is at the top, and if the top gives an order, it can more effectively cause knowledge and resources to be shared; communication between leadership and members can also be faster, promoting the pace of enterprise innovation. This model, however, is not a proposal for enterprise development but an instruction, a necessary policy for the development of the company (Broekaert, Andries, & Debackere, 2016). The attitude of leaders can greatly affect the attitude of employees and determine the direction of enterprise development and the speed of action. Compared with the traditional hierarchical leadership, servant leadership can give greater rights to ordinary employees, motivate them to participate in the decision-making of enterprise development discussions, and inspire them provide their own thoughts and ideas on the target and development path for the enterprise. Servant leadership can inspire employees to tie their own interests with the business interests of stakeholders and promote organization members' active learning. It helps employees to change the way they view themselves within the company. This kind of identity transformation achieves source integration and promotes knowledge sharing and information exchanges (Williams & Anderson, 1991). Therefore, hypothesis H1 is proposed in this study.

H1: Servant leadership in enterprise organizations positively influences enterprise exploratory innovation.

2.2 The Mediator Effect of Organizational Identity

The improvement of exploratory innovation depends on the stimulation of employees' innovation potential, so employees' recognition of the organization is one of the key factors. An important element of employees' sense of organizational identity is the leadership philosophy, attitude, and model. Organizational identity depends on the enterprise to build a well-designed system and a relatively active situation that can stimulate innovation and integrate performance management. In such a situation, members of the organization can explore and utilize knowledge more independently, thus promoting the realization of exploratory innovation (Kamasak, Yozgat, & Yavuz, 2017). Some scholars have studied the relationship between sense of organizational support, organizational identity, and organizational performance, believing that organizational identity has a significant positive impact on the work performance of organizational members (Mokhber, Khairuzzaman, & Vakilbashi, 2018). Based on the perspective of knowledge sharing, Bao and other scholars believe that the trust of members in an organization is a multi-dimensional structure that includes their trust in the organization at the same level, their trust in the superior organization, and their trust in colleagues. The ability of organizational members to influence knowledge sharing and knowledge integration is realized through organizational identity and self-esteem (Chiniara & Bentein, 2016). Some scholars have conducted empirical research on the relationship between transformational leadership and innovation perception, believing that transformational leadership plays an indirect and positive role in innovation perception through organizational identification (Shanker et al., 2017). Based on the perspective of knowledge management, some scholars have verified the differences of knowledge sharing in organizations. The research points out that team members are more willing to share knowledge in the context of high organizational identity, whereas in the context of low organizational identity, organizational members are less willing to share knowledge. Lythreatis studied enterprises in the Middle East and North Africa and discussed the relationship between participatory leadership and organizational identity as well as the pride of internal members (Lythreatis, Mostafa, & Wang, 2019). Organizational identity refers to members' sense of identity for the values and concepts of an organization as well as their conscious spiritual and moral identity. The construction of individuals or the improvement of abilities in an organization must be based on the overall characteristics of the members (Sulaiman, Ragheb, & Wahba, 2019). The members of an organization can further promote exploratory innovation through internal structure or under the inspiration of certain situations and leaders. The optimization of this internal structure and the charisma of leaders can affect the collective cognition among members and recognition of the organization, which plays a positive role in promoting exploratory innovation (Kaplan & Vakili, 2015). Organizational identification is the basis and premise of promoting team unity, and the enterprise's centripetal force also belongs to the category of organizational identification results. Positive organizational identification can move the organization toward a common goal and smooth communication and promote the innovation of outburst to further promote the production of new technology and formats and improve the enterprise's innovation ability. In the context of high organizational identity, it can raise the level of knowledge exploration and organization utilization at the same time, promoting exploratory innovation within the organization. On the one hand, through knowledge sharing among members, enterprises and members together can make more convenient and efficient use of existing knowledge and capabilities and accelerate the diffusion of existing knowledge and capabilities within the enterprise. On the other hand, the rapid exchange of ideas among members of an organization improves the coordination level of the organization's internal work and enhances the consistency of members' behaviors, thus effectively reducing the additional work of knowledge search and improving the efficiency of knowledge utilization (Damanpour, 1992). The higher the degree of organizational recognition, the richer the shared resources the enterprise obtains; and the technical cooperation and approval between multiple teams and departments will further promote the innovative development of the enterprise. The level of exploratory innovation will also be enhanced with continuous recognition of enterprise members and organizations. Therefore, the following hypotheses are proposed in this study:

H2: Servant leadership positively affects organizational identity.

H3: Enterprise's organizational identity positively affects the exploratory innovation of enterprises.

H4: Organizational identity plays an intermediary role between servant leadership and exploratory innovation.

2.3 The Moderating Effect of Innovation Support Atmosphere

An atmosphere of innovation support mainly refers to the degree of encouragement and support for innovation behavior given in the enterprise environment based on the common cognition of innovation practice and working style in the organization. At present, there is no lack of outstanding achievements in the relationship between innovation support atmosphere and innovation, which can be roughly divided into two schools: First, based on resource-based theory and knowledge-based theory, it explores the impact of knowledge creation within enterprises on innovation performance (Russell & Stone, 2002); and second, based on the relationship

theory, social network theory, social capital theory, and transaction cost economics theory, it explores the influence of external knowledge acquisition, social network location characteristics, and alliance mode on innovation (Chiniara & Bentein, 2018). There are four basic elements of innovative behavior: organizational atmosphere, leadership model, organizational size, and willingness to innovate (Kauppila et al., 2022). Some studies believe that time pressure will hinder innovation performance in an environment with superior innovation support atmosphere. In an environment with weak innovation support atmosphere, time pressure will improve innovation performance (Eva et al., 2019). Shanker believes that innovation support atmosphere can influence innovation performance through the mediating effect of individual innovation behavior (Parris & Peachey, 2013). Other studies have suggested that both the innovation support atmosphere and the spiritual capital of employees have a significant impact on the innovation performance of employees, and that the positive psychological capital of employees has a greater impact on the innovation performance of employees than the innovation support atmosphere (Zhu, 2016). A circumstance of high innovation support atmosphere can promote the level of organizational exploration and utilization of knowledge at the same time, and promote technology sharing, capital financing, and access to more shared resources among cooperative enterprises to improve competitiveness of enterprises. The stronger the atmosphere of innovation support, the richer the shared resources obtained by the enterprise. Technical cooperation and collusion among multiple enterprises will further promote the innovative development of the enterprise, and, with continuous improvement of strategic leaders, exploratory innovation will break through (Xenikou, 2017). In view of the differences of knowledge acquisition, the enterprise's exploitative innovation will help promote innovation in technical ability and competitive advantage, and in the field of small research and developmental costs, risks can bring more economic benefits for the enterprise. Although enterprise innovation breakthroughs face higher costs and risks, they can be involved in more areas of technology, and technical development may usher in a new breakthrough. Therefore, the following hypotheses are proposed:

H5a: The innovation support atmosphere has a significant moderating effect on the relationship between enterprise service leadership and exploratory innovation. When the innovation support atmosphere is high, the positive relationship between enterprise service leadership and exploratory innovation will be enhanced.

H5b: The innovation support atmosphere has a significant moderating effect on the degree of enterprise service leadership and organizational identity. When the innovation support atmosphere is high, the positive relationship between enterprise service leadership and organizational identity will be enhanced.

H5c: The interaction between service-oriented leadership and innovation support atmosphere in enterprises influences exploratory innovation through the intermediary role of organizational identity.

2.4 The Regulating Effect of Organizational Flexibility

Organizational flexibility mainly refers to an enterprise's ability to adjust its organizational structure, personnel allocation, production process, research and innovation, fixed assets, corporate culture, and other aspects in the face of a complex and changeable internal and external operating environment. When the organizational flexibility of an enterprise is relatively high, it will be more favorable for the decision-making level of the enterprise to make strategic adjustments to the complex business environment and external relations quickly, in order to seize the opportunity. Based on the perspective of intra-organizational collaboration, some scholars have studied joint ventures in the field of high-tech and found that the higher the organizational flexibility, the higher the ability of enterprises to absorb internal knowledge and the higher the utilization of loosely coupled resources between departments. Based on the perspective of organizational network, Lise and other scholars discussed the causes, factors, and processes of organizational flexibility and believe that a decentralization and flattening structure could significantly improve its impact on enterprise innovation performance. Some scholars have studied the innovation process of family enterprises and found that, although family enterprises are conservative in innovation investment, their innovation performance is often better than that of non-family enterprises with the same research investment level due to their relatively high organizational flexibility. Some studies have tested the positive effects of resource structure and organizational flexibility on exploratory innovation and found that high resource consumption and high risk are two key challenges faced by exploratory innovation. High organizational flexibility can flexibly manage organizational resources, thus effectively promoting the exploratory innovation performance of enterprises. Specifically, in terms of research and innovation, when the organizational flexibility of enterprises is low, the efficiency of cooperative research and development within the cooperative network will be reduced; moreover, the enterprise's ability to search for knowledge cannot be effectively transformed into an efficient absorption capacity of explicit or implicit knowledge, which greatly reduces the promotion of innovation. In the process of implementing exploratory innovation, high organizational flexibility can stimulate leaders' innovation strategy implementation efficiency to cope with the complex changes in the external market

environment. At the same time, select servant leadership can reduce a complex business environment and influence the enterprise's organization flexibility to integrate knowledge and resources needed for the exploratory innovation. Through servant leadership and flexibility, interaction and coordination work together, implementing exploratory innovation in the decision-making process to make the right strategic choice. The efficiency of information transfer between enterprises and external organizations will also be promoted, which will improve the positive effect of service-oriented leadership on exploratory innovation. Therefore, the following hypotheses are proposed in this paper:

H6a: Organizational flexibility plays a significant role in regulating the relationship between service-oriented leadership and exploratory innovation. When organizational flexibility is high, the positive relationship between service-oriented leadership and exploratory innovation will be enhanced.

H6b: Organizational flexibility plays a significant role in regulating the relationship between service-oriented leadership and organizational identity. When organizational flexibility is high, the positive relationship between service-oriented leadership and organizational identity is enhanced.

H6c: The interaction between service-oriented leadership and organizational flexibility influences exploratory innovation through the intermediary role of organizational identity. Summing up, the research model of this paper is shown in Figure 1.

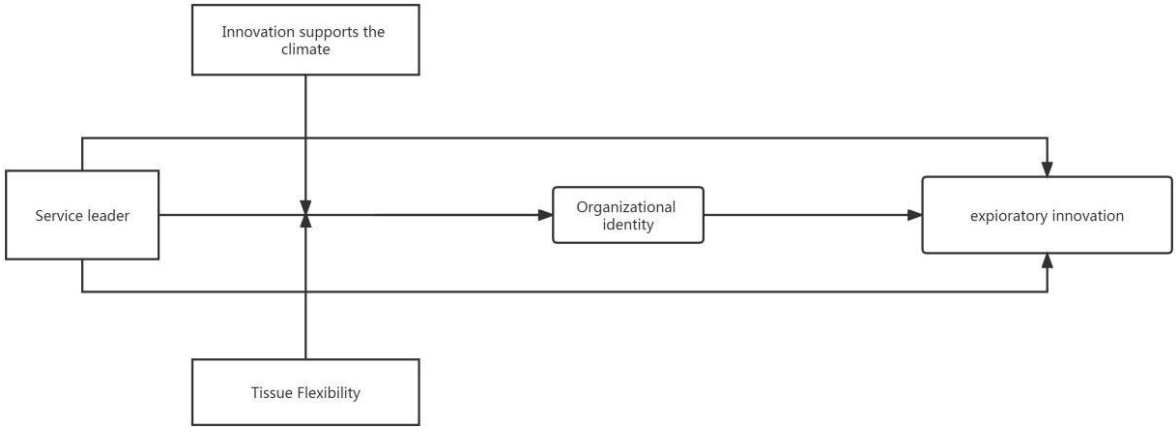

Figure 1: Conceptual model

3. Research Methods

3.1 Research Objects

The research enterprises in this paper belong to electronic equipment manufacturing, medical and health, new materials, and other fields. The research work lasted for four months, starting in January 2019. The main research method consisted of survey questionnaires that were retrieved in the following two ways: (1) contacting the target enterprise by phone and instructing the respondents to fill in the questionnaire and collect it; and (2) contacting the target enterprise via e-mail and filling in an e-questionnaire online. A total of 420 questionnaires were distributed. Among them, 108 unqualified and invalid questionnaires were eliminated due to an abundance of default values. All the sample data passed the T test. The effective recovery was 69.3%. The sample companies included enterprises of different sizes and had good representativeness, which ensures the accuracy and validity of the survey results (Table 1).

Table 1

Descriptive Statistics of Sample Enterprises

		Sample Size (A)	Proportion (%)
Industrial Distribution	Electronic equipment manufacturing	88	28.21%
	Advanced Materials	52	16.67%
	Healthcare	62	19.87%
	Software	87	27.88%
	Others	23	7.37%
Enterprise Nature	State-holding	23	7.37%
	Private	192	61.54%
	Foreign capital	24	7.69%
	Sino-foreign joint venture	41	13.14%
	Collective ownership	32	10.26%
Organizational Scale	< 100 people	24	7.69%
	100-500 people	92	29.49%
	500-2000 people	151	48.40%
	> 2000 people	45	14.42%

3.2 Variables Measured

The scales used in this paper are from published material at home and abroad, and on the basis of preliminary research, the items of measurement are revised to form a formal measurement scale. The translator-echo program was adopted to avoid the influence of semantic differences in foreign study scales on the survey results. The five-level, Likert-type scale was adopted in the questionnaires, with a scale from 1 to 5 representing strongly disagree to strongly agree. A brief description of the measured variables follows. Servant leadership: Refers to the scale proposed by Liden and measures specific items such as "the company gives priority to the career development of employees; the company emphasizes the importance of giving back to the society." There is a total of 7 measurement items. Cronbach's α coefficient of internal consistency of variables was 0.886, indicating a good level of reliability. Organizational identification: Refers to the scale proposed by Koopman. We measured if "company members are very interested in the ideas of others in the organization, and if the success of a company is considered the success of its members." Cronbach's α coefficient of internal consistency of variables was 0.866, indicating a good level of reliability. Organizational flexibility: Refers to the scale proposed by Jiang Luan and other scholars.[39] The paper measured if "the working environment of the organization is full of challenges; the working environment of the organization is rich in changes; and the working environment of the organization provides a lot of opportunities for change." Cronbach's α coefficient of internal consistency of variables was 0.803, indicating a good level of reliability. Innovation support atmosphere: Refers to the scale proposed by Farmer and other scholars, which consists of six items. Specific measurement items include "new ideas and new ideas in the organization can be effectively promoted, and the top management of the enterprise gives sufficient value to the innovation work."

Cronbach's α coefficient of internal consistency of variables was 0.836, indicating a good level of reliability. Exploratory innovation: This scale is from Subramaniam and is composed of three items: "the innovation of the company strengthens the existing technical ability and competitiveness; the innovation of the company makes the original skills; and knowledge becomes outdated;" Cronbach's α coefficient was 0.869, indicating a good level of reliability. Control variables: Based on the organizational level, this study focuses on the impact of service-oriented leadership on organizational exploratory innovation. Organizational characteristics such as enterprise size, age of management, and nature of the enterprise are related to the innovation ability of the enterprise to some extent, which may have a relevant impact. Therefore, the above variables are selected as control variables in this paper.

4. Empirical Analysis and Inspection

In this study, SPSS21.0 and AMOS24.0 software were used for data processing by means of statistical analysis. SPSS21.0 and AMOS24.0 were also used for reliability and validity analysis, including correlation analysis, multiple regression analysis, and hierarchical structure model verification. Five variables were involved in the questionnaire. There were 312 valid questionnaires in the survey, which met the basic requirements of analysis.

4.1 Deviation Analysis of Common Methods

In order to study the common method deviation, the study designed a clear questionnaire description and revised the questionnaire with reference to the opinions of relevant experts. Then, single-factor testing was conducted on the questionnaire, and principal component analysis was conducted by referring to the method of Podsakoff and other scholars. Through the "no deflection factor analysis" of SPSS software, 5 factors with eigenvalue greater than 1 were finally separated out, accounting for a total of 81.5% of the variables. The explained variables were relatively average, and the coverage rate of one factor was not excessively high.

4.2 Reliability and Validity

The convergent validity of variables is tested before hypothesis testing. It can be seen from Table 2 that the KMO values of such variables as service-oriented leadership, organizational identity, and exploratory innovation are all greater than 0.75, and the significance probability of the Bartlett-ball test is 0.001, indicating that the content validity of the quantity is acceptable. Confirmatory factor analysis to distinguish the validity of the variables can be used to test, In this study, AMOS24.0 confirmatory factor analysis was carried out on the five variables, comparing in turn the single factor model and multi-factor model. As shown in Table 2, in the five-factor model, each fitting index (chi square/df = 1.983; CFI = 0.917; IFI = 0.918; TLI = 0.905; RMSEA = 0.042; RMR = 0.038; PGFI = 0.702) was significantly higher than that of the single factor model and many other factors. The five variables involved in this study have good validity.

Table 2

Confirmatory Factor Analysis of Model Discriminant Validity

Model	Factor	X2/df	CFI	IFI	TLI	RMSEA	RMR	PGFI
Five-Factor Model	SL;OI;BI;IP;OF	1.983	0.917	0.918	0.905	0.042	0.038	0.702
Four-Factor Model	SL;OI;BI;IP+OF	2.921	0.882	0.850	0.822	0.062	0.049	0.688

Three-Factor Model 1	SL+OI;BI;IP+OF	4.322	0.766	0.754	0.727	0.089	0.066	0.568
Three-Factor Model 2	SL+OI+BI;IP;OF	4.441	0.715	0.722	0.699	0.091	0.062	0.561
Two-Factor Model	SL+OI;BI+IP+OF	4.655	0.704	0.714	0.688	0.094	0.077	0.602
One-Factor Model	SL+OI+BI+IP+OF	5.214	0.652	0.646	0.623	0.099	0.072	0.485

Note: *SL stands for service-oriented leadership, OI stands for organizational identity, BI stands for exploratory innovation, IP stands for innovation support atmosphere, and OF stands for organizational flexibility. The "+" represents the combination of two factors.*

According to SPSS21.0 results, different items were focused on the scale of the same factor. The index factors of load were greater than 0.5, which can explain variance percentage of not less than 50%, showing good convergent validity. Cronbach's coefficients were all above 0.75, indicating that the internal consistency also met the requirements. Therefore, this model has passed the test of reliability and validity. Moreover, the factor analysis confirmed that each item aligned well with its respective dimension, contributing positively to the overall model structure. The high factor loadings suggest strong item correlations within each factor, further supporting the model's structural validity. Additionally, the satisfactory Cronbach's alpha values across all factors reinforce the robustness and dependability of this model's internal consistency.

4.3 Descriptive Statistical Analysis

Table 3 lists the correlation coefficients, means, and standard deviations of each variable. There was a significant positive correlation between service-oriented leadership and exploratory innovation (r=0.406, p<0.01).

There was a significant positive correlation between servant leadership and organizational identity (r=0.553, p<0.01) and a significant positive correlation between organizational identity and exploratory innovation (r=0.401, p<0.01).

Table 3

Mean Value, Standard Deviation, and Correlation Coefficient of Each Variable

Variable	1	2	3	4	5	6	7	8	9
1. Gender	*NA*								
2. Age	-0.029	*NA*							
3. Education	0.005	0.103	*NA*						
4. Organizational Scale	0.007	0.155*	0.146*	*NA*					
5. Servant Leadership	-0.076	-0.054	0.034	-0.026	0.886				
6. Innovation Support Atmosphere	-0.070	0.004	-0.067	-0.013	0.387**	0.836			
7. Organizational Flexibility	-0.073	0.003	-0.028	0.054	0.434**	0.275**	0.803		
8. Organizational Identification	-0.052	-0.056	0.019	-0.003	0.553**	0.259**	0.385**	0.866	
9. Exploratory Innovation	-0.055	-0.050	-0.066	-0.029	0.406**	0.386**	0.313**	0.401**	0.869
Average	1.47	2.30	2.82	2.78	3.302	3.728	3.602	3.330	3.606
Standard Deviation	0.500	1.189	1.157	1.251	0.809	0.847	0.891	0.815	0.831

Note: *** is p<0.01; * is p<0.05; and the bold numbers on the diagonal are the internal consistency coefficients (reliability) of the variables in this study. NA means not applicable.*

4.4 Mediating Effect Test

Regression analysis is a common method to test direct effect, mediating effect, and regulating effect. SPSS24.0 software is used to test the hypotheses mentioned above. As can be seen from Table 4, since servant leadership has a significant positive impact on enterprise exploratory innovation (model 6, =0.405, p<0.01), hypothesis H1 is verified. From model 1 to model 2, shown in Table 4, after controlling control variables such as enterprise type and enterprise size, it can be seen that enterprise organizational service leadership has a significant positive impact on enterprise organizational identity (model 2, =0.551, p<0.01). In addition, according to model 7, it can be seen that organizational identity has positive effects on enterprise exploratory innovation (=0.400, p<0.01), verifying H3.

Finally, on the basis of model 6 into the organizational identification of model 8, servant leadership regression coefficients decrease (beta: from 0.405 to 0.265, p < 0.01); the influence of organizational identity for exploratory innovation is significant (beta = 0.254, p < 0.01); organizational identification in servant leadership style and innovation, the relationship between the partial intermediary role, which verifies hypothesis H4.

Table 4(a)

Results of Hierarchical Regression Analysis

	Organizational Identification					Exploratory Innovation				
	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model

	1	2	3	4	5	6	7	8	9	10	11
Control Variables											
Gender	-0.054	-0.011	-0.003	0.003	-0.056	-0.024	-0.034	-0.021	-0.009	0.007	0.007
Age	-0.061	-0.030	-0.034	-0.037	-0.044	-0.020	-0.019	-0.013	-0.031	-0.047	-0.040
Education	0.025	0.001	0.013	0.012	-0.059	-0.077	-0.069	-0.077	-0.049	-0.034	-0.036
Organizational Scale	0.004	0.016	0.004	0.004	-0.013	-0.004	-0.014	-0.008	-0.014	-0.010	-0.011

Table 4(b)

Results of Hierarchical Regression Analysis

	Organizational Identification				Exploratory Innovation						
Independent Variable											
Servant Leadership		0.551**	0.461**	0.485**		0.405**		0.265**	0.250**	0.323**	0.226**
Regulated Variable											
Innovation Support Atmosphere			0.034	0.074					0.248**	0.322**	0.308**
Organizational Flexibility			0.176**	0.185**					0.135**	0.206**	0.169**
Interaction Effect											
Servant Leadership× Innovation Support Atmosphere				0.099						0.156**	0.137**
Servant Leadership× Organizational Flexibility				0.015						0.178**	0.175**
Intervening Variable											
Organizational Identification							0.400**	0.254**			0.199**
R2	0.007	0.307	0.334	0.341	0.009	0.172	0.168	0.217	0.245	0.289	0.315
F Value	0.602	31.320**	25.187**	20.137**	0.848	14.695**	14.323**	16.283**	16.326**	15.772**	16.020**
R2 Values Change	0.007	0.300	0.027	0.007	0.009	0.162	0.159	0.045	0.073	0.043	0.026
F Value Change	0.602	153.157**	7.14**	1.972**	0.496	69.427**	67.586**	20.235**	17.070**	10.686**	13.270**

Note: *** p < 0.01, * p < 0.05*

4.5 Adjustment Effect Test of Organizational Flexibility and Innovation Support Atmosphere

To test organization regulating effects of flexible support and innovation atmosphere, this study constructed a breakthrough-type multilevel regression model of innovation as the dependent variable, as shown in Table 4. In reference to the inspection regulation variables causal steps method, we used a layered test for the relationship between the variables. In order to avoid multicollinearity, caused by an excessive correlation between independent variables and dependent variables when calculating interaction terms, the independent variables were first centralized. On the basis of the model based on 9, to join the organization flexible interaction with the enterprise after the servant leadership centralized (10) model, the results showed a significant interaction term (beta = 0.178, p < 0.01), which indicates that organizational flexibility in the enterprise servant leadership and organization innovation breakthrough type has a positive adjustment, between hypothesis H5a verified. Similarly, based on model 9, model 10 is obtained by adding the innovation support atmosphere and the interaction term after the centralization of servant leadership, and the interaction term coefficient is significant (=0.156, p<0.01), indicating that the innovation support atmosphere plays a positive regulating role between servant leadership and exploratory innovation in enterprises. At the same time, on the basis of model 3, the interaction terms after the centralization of organizational flexibility and innovation support atmosphere with service-oriented leadership were added, and model 4 was obtained. It can be seen that the interaction terms after the centralization of organizational flexibility and organizational identification were not significant (=0.015, p=n.s.), and the H5b hypothesis verification was assumed to fail. The interaction term between the innovation support atmosphere and service-oriented leadership centralization is not significant (major =0.099, p=n.s.), and it is assumed that H6b also fails to pass the verification. Finally, according to model 10 and

model 11, the influence coefficient of organizational identity is 0.199 ($p<0.01$), and the interaction coefficient between organizational flexibility and innovation support atmosphere and service-oriented leadership is reduced, so hypotheses H5c and H6c are verified. To more intuitively present the moderating effect of organizational flexibility and innovation support atmosphere on service-oriented leadership and organizational exploratory innovation, this study carried out a slope test. Based on previous research methods,[49] the average values of service-oriented leadership, organizational flexibility, and innovation support atmosphere were added or subtracted by one standard deviation into the regression model, and a schematic diagram of the moderating effect was drawn by SPSS24.0 software. As shown in Figure 2, in the case of higher organizational flexibility, there is a significant positive relationship between service-oriented leadership and exploratory innovation ($p<0.01$), while in the case of lower organizational flexibility, there is a positive relationship between strategic flexibility and exploratory innovation, but the slope is smaller, reaching a significant level ($p<0.001$). As shown in Figure 3, the positive relationship between service-oriented leadership and exploratory innovation is strong ($p<0.001$) in the context of high innovation support atmosphere, while in the context of low innovation support atmosphere, the positive relationship between strategic flexibility and exploratory innovation is weak but reaches a significant level ($p<0.01$).

Figure 2: Regulation effect of organizational flexibility on the relationship between servant leadership and exploratory innovation

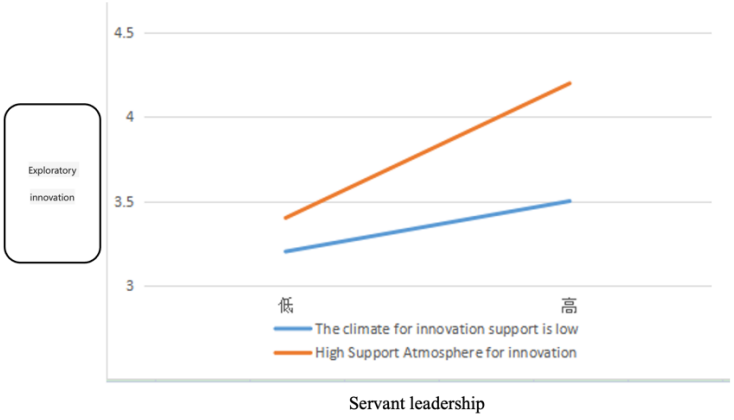

Figure 3: Regulation effect of innovation support atmosphere on the relationship between servant leadership and exploratory innovation

5 Conclusions and Implications

5.1 Discussion of Research Results

Enterprise innovation is a comprehensive systematic process, and the innovation result is the outcome of a series of internal factors interacting with external factors. This paper constructs an analytical framework of "servant leadership–organizational identification–exploratory innovation" and studies the promoting effect of service-oriented leadership on the exploratory innovation of science and technology enterprises, as well as the mediating effect of organizational identity between the two. Based on the analysis of the questionnaire, the following conclusions were drawn:

(1) Servant leadership and organizational identity can promote the exploratory innovation of enterprises. Enterprise innovation integrates a variety of complex elements. Within the cooperative innovation network, each department needs to cooperate with other departments. The traditional hierarchical leadership

model emphasizes control and predictability, which is essentially contradictory to the unpredictability of innovation activities.

(2) Organizational identity plays an intermediary role in the positive impact of servant leadership on exploratory innovation. Individual enterprises exist in a complex industrial chain. Although there is competition among enterprise departments, under the premise of vision integration, there is more inter-department cooperation. Any knowledge, research, and development networks, as well as social networks, are key nodes of the network structure. Organizational identification key nodes in the knowledge network between enterprises is one of the core elements of knowledge dissemination. Highly heterogeneous knowledge by key nodes in a network is passed to the rest of the nodes, and the continuous stability of organizational identification ensures the delivery process and improves exploratory innovation throughout the network.

(3) Organizational flexibility has a positive regulating effect on the process of service-oriented leadership's influence on exploratory innovation. In the process of implementing innovation, enterprises must cooperate with enterprises in the upstream and downstream of the industrial chain, such as universities scientific research institutions. In the case of low organizational flexibility, enterprises themselves will spend a lot of time identifying highly heterogeneous information, unable to effectively transform their learning ability into an efficient absorption capacity of explicit or implicit knowledge, thus reducing the promoting effect of service-oriented leaders on exploratory innovation.

(4) Innovation support atmosphere has a positive regulating effect on the process of exploratory innovation influenced by service-oriented leaders. exploratory innovation puts more emphasis on integrity, which is the supporting atmosphere of innovation. Good innovation support atmosphere does not focus on the combination of members, but puts more emphasis on the interdependence and cooperation between the parts and more focus on dynamic cooperation. In the case of possible local conflicts in the cooperative network, the parts are not in a state of confrontation, and more emphasis is placed on active cooperation and the coordination of interests in order to take maximum advantage of the cooperative network as a whole.

5.2 Theoretical Price

Previous research on exploratory innovation mostly focused on the internal research and development factors of enterprises, and there is a lack of in-depth research on the environmental factors and influencing mechanism of enterprise exploratory innovation. In this paper, the concept of organizational identity is introduced into the analytical framework of enterprise exploratory innovation, which breaks through the shackles of predecessors who often only focus on single factor research; construct a theoretical model of "service-oriented leader-organizational, identification-exploratory innovation"; or expand the research scope of enterprise servant leadership and organizational structure innovation. It is helpful to clarify the realistic mechanism of enterprises to promote exploratory innovation in the context of an innovation cooperation network from the two aspects of enterprise leadership model and organizational structure. There are certain constraint conditions needed for service-oriented leadership to influence exploratory innovation. Organizational flexibility and innovation support atmosphere are two important constraint factors. In this study, the positive effects of organizational flexibility and innovation support atmosphere were incorporated into the research model to enrich the situational factors of the servant leadership model.

5.3 Management Enlightenment

The efficient transfer of knowledge is the premise of exploratory innovation. Under the circumstances of large information flow and high exchange frequency, new working forms can be stimulated. The servant leadership mode can promote the sharing of knowledge and the integration of resources, thus promoting the exploratory innovation of enterprises. Service-oriented leaders can break the shackles of the traditional board-centered management and traditional top-down mechanism; they can break the boundary of rigid management and create an ideal environment for the transfer of knowledge. We can draw an analogy between an innovative system and a quantum system in the physical world. The quantum system is composed of complex particles and other structures. Each particle in the quantum organization is bottom up to give full play to its subjective initiative and achieve the optimal overall performance. Enterprise innovation is also a complex system process. If the internal enterprise can be like the particles in the complex quantum environment, various production factors, including information, ideas, and other intelligence factors, can be combined and flow freely. If enterprise's manpower, financial resources, and a combination of elements such as free access to intelligence are combined, each department can free up restructuring, arrangement, and the whole innovation system to achieve optimal overall efficiency. Compared with the board of directors, which is still the center of business management, a management structure based on service-oriented leadership will break through the defects of authority, hierarchy, and the board of director's structure management to bring the whole and individual potential into full play.

5.4 Research Limitations and Prospects

The research data in this paper are cross-sectional data. Although the process mechanism and boundary effect of the model in this study can be effectively measured, the dynamic evolution effect between model variables cannot be directly obtained. Therefore, it is worthwhile to design the measurement method for multiple time

points in the future and to discuss the differences of variable data at different time points.

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