How Is Paradoxical Leadership Linked to Exploratory Innovation?  
The Mediating Role of Knowledge Sharing and the Moderating Role of Environmental Dynamism

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ABSTRACT

The promotion of innovation is a crucial leadership function. However, empirical evidence on the role of paradoxical leadership in innovation is scarce. Based on paradox theory, this study presents an effective model to investigate the relationship between paradoxical leadership and employee exploratory innovation. Based on a survey of 358 employees in China, it was observed that paradoxical leadership promotes knowledge sharing among employees, consequently stimulating exploratory innovation. The study results showed that environmental dynamism plays a negative moderating role in the relationship between employee knowledge sharing and exploratory innovation. This study contributes to theoretical and empirical studies on paradoxical leadership and provides new perspectives for promoting exploratory innovation.

KEYWORDS

Environmental Dynamism, Exploratory Innovation, Knowledge Sharing, Paradoxical Leadership, Paradox Theory

INTRODUCTION

Employee innovation is a source of enterprise innovation (Li, Zhou, & Ding, 2013). Therefore, stimulating employee innovation is currently a crucial function of leadership (Antonio, Indrianto, & Padmawidjaja, 2022). Several scholars have explored the relationship between leadership and innovation (Cunha et al., 2019; Lee, Willis, & Tian, 2018; Dijk et al., 2021; Toseef et al., 2022). An increasing number of researchers have emphasized that the innovation process is contradictory and complex, and it can impede the management of employees and teams within organizations (Rosing, Frese, & Bausch, 2011). Traditional leadership approach can only address one end of the paradox and cannot surmount the challenges posed by a complex environment. This has prompted the increasing need for paradoxical leadership, especially in China (Sparr, van Knippenberg, & Kearney, 2022). However, the influence mechanism of paradoxical leadership on individual and
exploratory innovation remains largely unexplored (Li, She, & Yang, 2018). To this end, this study aims to investigate the relationship between paradoxical leadership and employee exploratory innovation using the paradox theory.

Exploratory innovation processes have contradictory and interrelated elements of continuous coexistence. Sheremata (2000) described this process as a rally between the centripetal and centrifugal forces. Innovation emphasizes both employee autonomy and overall team traction, which is the paradox of an innovation power source (Gebert, Boerner, & Kearney, 2010). Milosevic, Bass, and Combs (2018) revealed that innovation requires the continuous acquisition of frontier knowledge and the continuous integration of mature knowledge, which is a paradox of innovation knowledge sources. An, Song, and Carr (2016) indicated that innovation is concerned with divergent thinking and emphasizes consistency, which is the paradox of an innovative idea source. The question of how to balance these contradictions to ensure that innovations are novel and actionable remains to be addressed. Yao and Ji (2021) suggested that accepting the polarities of things through complex interactions and adopting paradoxical thinking that integrates complexity can be effective in resolving innovation conflicts.

Paradoxical leadership rejects the traditional “black and white” management mindset and views challenges from a paradoxical perspective (Li et al., 2020). Paradoxical leadership uses the logic of “both” to integrate and divide the contradictions in the innovation process and to meet the competing needs of multiple parties. Paradoxical leaders allow autonomy, while maintaining control over their decisions. They can give employees space to innovate independently, thereby encouraging them to explore cutting-edge knowledge and think outside the box. Simultaneously, they focus on their leadership positions, control the implementation of decisions, and excel at integration and unification. This indicates that paradoxical leadership plays an irreplaceable role in exploratory innovation.

Knowledge resources are essential for innovation. Knowledge-sharing among employees is a key process for organizations to create value and gain a competitive edge (Obrenovic et al., 2020). However, contradictions and conflicts occur during the knowledge-sharing process. Researchers have found that individuals usually face the “social dilemma” of whether to share or hide knowledge. In most cases, they instinctively tend to hide and store knowledge (Liu & de Frank, 2013). This demonstrates the necessity to deal with knowledge-sharing paradox. Based on the paradox theory, proper handling of tensions can balance the size of the gap between expectations and reality. Paradoxical leadership is effective at balancing opposing elements and dealing with tensions. It combines self-centeredness and other-centeredness, treating all people equally and allowing individuality. This study proposes a mediating mechanism for knowledge-sharing, while constructing a model to examine the relationship between paradoxical leadership and exploratory innovation.

The dynamism and complexity of the environment have a continuous substantial effect on employees, teams, and organizations (Yamin, 2022). Higher environmental dynamism increases the difficulty for employees to obtain external information and aggravate management challenges (Li et al., 2021). Taghizadeh and his colleagues (2020) referred to environmental dynamism as the rate and unpredictability of change that impacts innovation. Based on the information overload theory, excessive external updated knowledge reduces the speed and efficiency of information processing. Therefore, this study introduces environmental dynamism as a moderating variable. We explored the changing patterns in the relationship between knowledge-sharing and exploratory innovation based on the current level of environmental dynamism.

In this study, a theoretical model was constructed to investigate the relationship between paradoxical leadership and exploratory innovation. The theoretical framework is illustrated in Fig. 1. By linking the paradox theory and information overload theory, we gain a more comprehensive understanding of the role of paradoxical leadership in exploratory innovation. Several studies, focusing on the West, have been conducted on the relationship between leadership behavior and innovation. However, fewer studies have focused on paradoxical leadership and innovation in Asia. This study considered the effect of Chinese philosophy, such as the principle of yin and yang, on paradoxical leadership. And we introduce the mediating role of knowledge-sharing in the paradoxical problem of
innovation, which extends the scope and research perspective of knowledge-sharing. In addition, we consider the dynamism and complexity of the external environment to provide new perspectives and directions and tap into the critical conditions for the role of knowledge-sharing in innovation. This study has guiding and practical significance for innovation reforms and performance improvements.

THEORETICAL BACKGROUND AND HYPOTHESES

Paradoxical Leadership and Exploratory Innovation

Innovation management is broadly categorized as exploratory or incremental (Wang, Lin, & Sheng, 2022). Exploratory innovation involves novel ideas and possibilities (Sheng & Chien, 2016; Wasono & Furinto, 2018). Compared to incremental innovation, exploratory innovation involves higher risks. However, it presents several advantages that can benefit organization, if exploited. Employee exploratory innovation is critical for the survival and growth of organizations (Lumpkin & Dess, 2001). Exploratory innovation process is characterized by tensions and contradictions (Miron-Spektor, Erez, & Naveh, 2011; Carnabuci & Diószegi, 2015). Li, She, and Yang (2018) asserted that idea generation and implementation are mutually reinforcing and mutually impeding processes. Luo and her colleagues (2021) provided a more detailed explanation. They used the rooting theory to classify innovation paradoxes into three types: (1) The innovation powerhouse paradox, which states that innovation requires employee autonomy to exercise creativity and team discipline and facilitation; (2) The innovation knowledge-source paradox, which suggests the need for employees to absorb cutting-edge knowledge and integrate it with past knowledge; and (3) The creative innovation source paradox, which requires teams to be focused on the divergence and diversity of employees’ thinking while emphasizing the consistency of creativity.

This imbalance in the innovation paradox has a detrimental effect on the development of individuals, teams, and organizations. Aubert, Kishore, and Iriyama (2015) revealed that an inability to correctly identify and deal with paradoxes may lead to a downward spiral. Therefore, the question of how to balance the contradictions and effectively deal with tensions to promote corporate innovation need to be addressed. Smith and Lewis (2011) revealed that paradoxical thinking is key to resolving paradoxes. The paradox theory also suggests that it is crucial to focus on the simultaneity and effectiveness of practices when dealing with events (Quinn & Cameron, 1988). To this end, we introduce the concept of paradoxical leadership.

Zhang and his colleagues (2015) define paradoxical leadership as a behavior that meets the needs and requirements of employees and teams, respectively through interconnected and contradictory activities. Paradoxical leaders are skilled at using the “both” strategies rather than “either” to make decisions and weigh conflicts. In this process, leaders seek a reasonable middle ground and regard conflict as persistent and natural (Zhang et al., 2021). Paradoxical leaders allow subordinate autonomy, whilst maintaining decision control. They stimulate creativity through autonomy and concurrently...
establish a tight monitoring and feedback mechanism to play the role of team traction. This effectively balances the innovation powerhouse paradox. Paradoxical leaders have an inclusive mindset and perceive knowledge progress in a rational and integrated manner. They do not entirely abandon traditional knowledge, but continuously optimize and adjust it to integrate with new cutting-edge knowledge technologies. This balances the paradox of sources of innovative knowledge. Paradoxical leaders are flexible and rigorous. They focus on the inspiration of their employees and allow them to maximize their motivation. Concurrently, they refine and integrate ideas to make them more actionable. Thus, they balance the paradox of innovative and creative sources effectively.

Generally, paradoxical leadership thinking and practice can balance the paradoxes of the innovation process and coordinate the idiosyncratic requirements of the team and employees. This facilitates exploratory innovation. Therefore, this study proposes the following hypotheses:

**Hypothesis 1:** Paradoxical leadership is positively related to exploratory innovation.

### The Mediating Role of Knowledge-Sharing

Knowledge-sharing refers to “the act of providing and sharing knowledge with others in an organization” (Ipe, 2003). Knowledge-sharing behavior significantly influences creativity, performance, and breakthrough innovation (Wang et al., 2021; Mesmer-Magnus & DeChurch, 2009; Fan et al., 2022). Actually, the process of knowledge-sharing is fraught with paradoxes (Stoltzfus, Stohl, & Seibold, 2011). On the one hand, when a team applies shared knowledge, employees can obtain satisfaction and recognition. Some employees prefer to contribute to the organization through knowledge-sharing behaviors (Obrenovic et al., 2020). On the other hand, knowledge is often linked to income, promotion, and performance appraisal and is also considered a reflection of personal values (Liu & de Frank, 2013). As the cost of acquiring knowledge increases, employees hope to maintain a competitive advantage through knowledge hiding (Cabrera, Collins, & Salgado, 2006).

Paradoxical leadership can balance the paradox of employee knowledge-sharing. First, they treat subordinates fairly, while allowing for individuality. Paradoxical leaders need to establish sound performance appraisal mechanisms and create an open and accessible knowledge-sharing atmosphere. In such situations, the confidence and self-worth of employees are guaranteed and their contributions to the knowledge-sharing process are assessed fairly. Paradoxical leaders allow personalization to give full play to the flexibility and personal values of employees, which leads to a greater willingness to initiate knowledge-sharing activities. Second, paradoxical leaders are both self-centered and employee-centered. They actively participate in corporate decision-making and encourage employees to offer opinions, which are often adopted in the decision-making process. This not only ensures their dominant position in the decision-making process, but also highlights the central position of employees, thus promoting knowledge-sharing. In addition, paradoxical leaders can transfer their knowledge to employees to enhance knowledge exchange and management between the upper and lower levels. This encourages employees to contribute and accept new knowledge, thereby promoting knowledge-sharing. To this end, we propose the second hypothesis:

**Hypothesis 2:** Paradoxical leadership is positively related to knowledge-sharing.

A high degree of knowledge-sharing indicates that dispersed knowledge skills, competencies, and values can be effectively connected. When personal knowledge is combined and codified to create shared knowledge experiences, a team can innovate by practicalizing these knowledge experiences. Expanding the team’s knowledge base can aid in overcoming the obstacles in the process of individual innovation construction (Wang et al., 2022). Moreover, new knowledge from colleagues or leaders can improve individual horizons and provide a more comprehensive understanding. This allows employees to explore issues daringly. Generally, knowledge-sharing can facilitate employees to sprout
new ideas, break through technological barriers, and effectively explore new possibilities (Bart & Ridder, 2004). Therefore, we propose the following hypothesis:

**Hypothesis 3:** Knowledge-sharing is positively related to exploratory innovation.

Based on the above analysis, paradoxical leaders are good at using personal traits to resolve employee conflicts in knowledge-sharing. Knowledge-sharing reduces the cost of acquiring knowledge resources, which increases the knowledge base and probability of innovation. Knowledge-sharing provides diverse perspectives and ideas for productive activities, which can stimulate employee exploratory innovation. To this end, the fourth hypothesis was proposed:

**Hypothesis 4:** Knowledge-sharing mediates the relationship between paradoxical leadership and exploratory innovation.

**The Moderating Role of Environmental Dynamism**

Environmental dynamism refers to the instability and unpredictability of environmental changes. This reflects the magnitude of the stationary or relative changes in the external environment (Duncan, 1972). Environmental dynamism can also refer to the external environmental conditions of an organization, including changes in national policies, level of economic development, science and technology, and team size (Azadegan et al., 2013).

Several scholars believe that both knowledge-sharing and innovation are affected by changes in the external environment (Visser & Scheepers, 2021; Taghizadeh et al., 2020). The turbulence of the external environment increases the difficulty for employees and teams to acquire external knowledge. External knowledge and technology are updated and iterated as the level of external environment uncertainty increases. Based on information overload theory, constantly updated information far exceeds an individual’s ability to process and use information (Jackson & Farzaneh, 2012). This adversely impacts the ability of employees to pinpoint, select, and use adequate information. Consequently, the speed and efficiency of information processing is negatively impacted, reducing employee enthusiasm for exploratory innovation.

In conclusion, while knowledge-sharing can be a valuable tool for supporting exploratory innovation, its effectiveness may be reduced in highly dynamic environments where flexibility and experimentation are prioritized. Therefore, we propose the following hypothesis:

**Hypothesis 5:** Environmental dynamism negatively moderates the relationship between paradoxical leadership and exploratory innovation such that the relationship between paradoxical leadership and exploratory innovation becomes stronger as environmental dynamism decreases.

**METHODS**

**Procedures and Sampling**

In order to ensure the accuracy of the survey response data and the validity of the conclusions, the survey respondents are from Beijing, Wuhan, and Hefei, and the grassroots employees to the middle and senior managers. The questionnaires were distributed mainly online. We distributed 440 questionnaires in total, and 386 questionnaires were collected, which constituted an 87.76% recovery rate. After excluding the questionnaires that did not meet the screening criteria, the 358 usable survey responses received constituted a 92.75% response rate. Among them, 50.84% were female, and 49.16% were male, which was a reasonable ratio between men and women. 54.75% were between 30 and 50
years old. In terms of education level, 43.82% were undergraduates, 22.35% were masters, 5.03% were doctors, and the rest were in high school or below.

**Measures**

The four scales, paradoxical leadership, knowledge-sharing, environmental dynamism, and exploratory innovation are all well-established scales that have been used frequently in previous research, where their reliability and validity have been verified. All the variables were measured by participant responses to questions on a five-point Likert-type scale ranging from “strongly disagree” to “strongly agree.”

**Paradoxical Leadership**

We measured paradoxical leadership using a 22-item scale developed by Zhang et al. (2015). A sample item is “The leader likes to be the center of attention but allows others to be in the limelight.” Cronbach’s alpha for this scale was 0.95.

**Knowledge-Sharing**

We measure knowledge-sharing using four items based on the scale from Davenport & Prusak (1998). The typical item is “When discussing complex issues with colleagues, I usually continue to participate in subsequent communication activities.” Cronbach’s alpha for this scale was 0.86.

**Environmental Dynamism**

We assessed environmental dynamism using a four items scale developed by Kohli & Jaworski (1990). The typical item is “Customers are constantly making new demands on our products and services.” Cronbach’s alpha for this scale was 0.84.

**Exploratory Innovation**

Exploratory innovation is based on the scale by Jansen et al. (2009), with four items. The typical item is “I am willing to meet the needs beyond the existing products and services.” Cronbach’s alpha for this scale was 0.86.

**Control Variable**

Demographic variables, such as employees’ gender, age, education, and overall job experience, had significant effects on exploratory innovation. Thus, these variables were controlled in this study.

**Analyses**

This study applied Mplus and SPSS 26.0 to analyze the relevant data collected from the questionnaire survey. First, we verified the reliability of variables (Cronbach’s alpha) and discriminant validity between variables (CFA). Second, we performed descriptive statistics and correlation analyses to test the association between the four variables. Finally, we performed hypothesis testing using multiple linear regression analyses to determine whether the proposed hypotheses were supported. We also used the Bootstrapping method in the SPSS-PROCESS program to test for mediating effects.

**RESULTS**

**Confirmatory Factor Analysis**

We conduct a confirmatory factor analysis using Mplus 7.4, and the results of this analysis are shown in Table 1. This study fits a five-factor model ($\chi^2 = 374.73$, df = 293, $\chi^2$/df $=1.28$, RMSEA = 0.03, CFI = 0.99, TLI = 0.99, SRMR = 0.03). This model successfully fits the data based on the parameter criteria. The five-factor model’s parameter indicators outperform the four-factor model and other models, and the five-factor model’s chi-square value is significant. This indicates that the
The five-factor model has a superior fitting effect compared to other models, and the five variables used in this study demonstrate satisfactory discriminant validity.

**Descriptive Analysis**

Table 2 summarizes the mean, standard deviation, and correlation coefficient for each variable in this study. Paradoxical leadership has a positive correlation with knowledge-sharing ($\beta = 0.62$, $p < 0.01$), while the latter is positively correlated with exploratory innovation ($\beta = 0.62$, $p < 0.01$). Paradoxical leadership has a positive correlation with exploratory innovation ($\beta = 0.56$, $p < 0.01$). These findings preliminarily support some of the hypotheses posed in the above theoretical model.

**Hypothesis Test**

We standardize the data before regression. As standardization contains centrality, standardization reduces multicollinearity among variables.

### Table 1. Results of validated factor analysis of the discriminant validity of variables

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Four-factor Model</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Paradoxical Leadership, Knowledge Sharing, Environmental Dynamism, Exploratory Innovation)</td>
<td>374.73</td>
<td>293</td>
<td>1.28***</td>
<td>0.03</td>
<td>0.99</td>
<td>0.99</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Three-factor Model</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Paradoxical Leadership, Knowledge Sharing+Environmental Dynamism, Exploratory Innovation)</td>
<td>1543.81</td>
<td>296</td>
<td>5.22***</td>
<td>0.11</td>
<td>0.80</td>
<td>0.78</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Two-factor Model</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(Paradoxical Leadership+Knowledge Sharing, Environmental Dynamism+Exploratory Innovation)</td>
<td>1485.78</td>
<td>298</td>
<td>4.99***</td>
<td>0.11</td>
<td>0.81</td>
<td>0.79</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>One-factor Model</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Paradoxical Leadership, Knowledge Sharing+Environmental Dynamism+Exploratory Innovation)</td>
<td>1747.37</td>
<td>298</td>
<td>5.86***</td>
<td>0.12</td>
<td>0.76</td>
<td>0.74</td>
<td>0.10</td>
</tr>
</tbody>
</table>

N=358.*** p< 0.001

### Table 2. Means, standard deviations, and correlations among study variables

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Gender</td>
<td>1.51</td>
<td>0.50</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Age</td>
<td>3.14</td>
<td>1.11</td>
<td>-0.09</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Education</td>
<td>2.08</td>
<td>0.81</td>
<td>0.01</td>
<td>0.07</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Overall Job Experience</td>
<td>2.03</td>
<td>0.73</td>
<td>-0.02</td>
<td>0.57**</td>
<td>0.19**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Paradoxical Leadership</td>
<td>4.13</td>
<td>0.75</td>
<td>0.09</td>
<td>0.13*</td>
<td>0.11*</td>
<td>0.15**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Knowledge-Sharing</td>
<td>4.19</td>
<td>0.81</td>
<td>-0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.62**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Environmental Dynamism</td>
<td>3.76</td>
<td>1.22</td>
<td>0.00</td>
<td>-0.07</td>
<td>-0.03</td>
<td>-0.04</td>
<td>0.17**</td>
<td>0.18**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8 Exploratory Innovation</td>
<td>4.22</td>
<td>0.80</td>
<td>0.02</td>
<td>-0.06</td>
<td>0.08</td>
<td>0.02</td>
<td>0.56**</td>
<td>0.62**</td>
<td>0.17**</td>
<td>1</td>
</tr>
</tbody>
</table>

*p< 0.05. **p< 0.01. ***p< 0.001
Tests for the Main and Mediating Effects

As shown in model 2 in Table 3, paradoxical leadership is positively related to exploratory innovation ($B = 0.57$, $SE = 0.05$, $p < 0.001$), supporting H1. In models 1 and 3, paradoxical leadership is positively related to knowledge-sharing ($B = 0.64$, $SE = 0.04$, $p < 0.001$), which is in turn positively related to exploratory innovation ($B = 0.44$, $SE = 0.05$, $p < 0.001$). H2 and H3 are supported. In Model 3, the coefficient of the effect of paradoxical leadership on exploratory innovation becomes smaller and it is still significant ($B = 0.29$, $SE = 0.05$, $p < 0.001$) after putting paradoxical leadership and knowledge-sharing into the regression equation. Thus, H4 is supported.

Robustness Test of the Mediation Effect

Meanwhile, this study uses the Bootstrap method to further verify the mediating role of knowledge-sharing to improve the robustness of the results. Table 4 shows the results of the Bootstrap analysis of the mediating effect with 95% confidence intervals using the PROCESS plug-in program. The mediating effect value of paradoxical leadership influencing exploratory innovation through knowledge-sharing is 0.296 ($CI = [0.166, 0.452]$), without containing zero. H4 is again confirmed.

Moderating Effect of Exploratory Dynamism

In Model 4 of Table 3, the interaction term between knowledge-sharing and environmental dynamism has a significant negative effect on exploratory innovation ($B = 0.44$, $SE = 0.02$, $p < 0.001$).

Table 3. Results of the hierarchical regression model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Knowledge-Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
</tr>
<tr>
<td></td>
<td>$B$</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.06</td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
</tr>
<tr>
<td>Education</td>
<td>-0.01</td>
</tr>
<tr>
<td>Overall Job Experience</td>
<td>-0.01</td>
</tr>
<tr>
<td>Paradoxical Leadership</td>
<td>0.64***</td>
</tr>
<tr>
<td>Knowledge-Sharing</td>
<td></td>
</tr>
<tr>
<td>Environmental Dynamism</td>
<td></td>
</tr>
<tr>
<td>KS x ED</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Note: N=358, Regression coefficient results after standardization
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 4. Results of mediation effect

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Effect type</th>
<th>Effect value</th>
<th>Standard error</th>
<th>95% CI</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper</td>
</tr>
<tr>
<td>Exploratory innovation</td>
<td>Indirect</td>
<td>0.296</td>
<td>0.073</td>
<td>0.452</td>
</tr>
<tr>
<td></td>
<td>Direct</td>
<td>0.303</td>
<td>0.055</td>
<td>0.411</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.600</td>
<td>0.046</td>
<td>0.690</td>
</tr>
</tbody>
</table>
This result indicates that environmental dynamism negatively moderates the impact of knowledge-sharing on exploratory innovation. H5 is supported. Figure 2 shows the moderating effect of environmental dynamism.

**DISCUSSION**

This study emphasizes the influence of paradoxical leadership on employee exploratory innovation. We observed that paradoxical leadership is positively associated with exploratory innovation (Hypothesis 1). The mechanism under study is that paradoxical leadership promotes knowledge-sharing (Hypothesis 2) and knowledge-sharing drives exploratory innovation (Hypothesis 3). Thus, knowledge-sharing is the mediator in the model (Hypothesis 4). We argue that the relationship between knowledge-sharing and exploratory innovation is moderated by environmental dynamism (Hypothesis 5), in which the higher the degree of environmental dynamism, the weaker the positive relationship between knowledge-sharing and exploratory innovation.

This study demonstrates that combining different research approaches can enhance the understanding of the relationship between leadership, knowledge-sharing, and innovation. This study makes several contributions to the literature. First, compared to Western literature, only a few studies have been conducted on the relationship between leadership behavior and innovation in Asia. This study therefore integrates Chinese culture to investigate the relationship between paradoxical leadership and exploratory innovation. Hence, this study contributes to the literature on paradoxical leadership and innovation. Second, various existing studies on paradoxical leadership focused on the team level and less on outcome variables. This study tests the effectiveness of paradoxical leadership through exploratory innovation processes, which is an extension of the research dimension. Additionally, this study introduces the mediating role of knowledge-sharing, which provides a new explanatory path to the model. Finally, this study considers the external dynamic and complex environment, and taps into the critical conditions for knowledge-sharing in innovation. Thus, it enriches the research related to

Figure 2. Moderating effect
environmental dynamism. The study also provides new perspectives and directions for research on paradoxical leadership, knowledge-sharing, and exploratory innovation.

Managerial Implications

First, leaders need to pay significant attention to paradoxical integration and conflict management. Paradoxical thinking facilitates the development of leaders’ insight into situational factors. This enhances organizational innovation and growth. To resolve disagreements and foster organizational growth, leaders should apply paradoxical integrated thinking to provide holistic leadership and improve resource management.

Second, enterprises should establish sound incentives and assessment mechanisms to encourage employee knowledge-sharing behaviors. Managers should regularly hold knowledge and technology experience exchange meetings to encourage knowledge-sharing among employees to stimulate individual innovation. In addition, enterprises can provide autonomy to employees to stimulate and promote innovation.

Finally, companies should pay critical attention to environmental changes and promptly adjust their business and innovation strategies. Managers should regularly assess the external environment and develop strategies to surmount arising challenges. Combined with the need for strategic development, appropriate adjustments to resource allocation can propel employees to achieve innovation breakthroughs in a complex environment. By combining internal and external knowledge-sharing, leaders can reduce the adverse effects of internal and external knowledge asymmetry and effectively reduce risks.

Limitations

This study has relatively complete sample data and analysis results. However, it has some limitations owing to various subjective and objective factors. First, it focused primarily on Beijing, Wuhan City in Hubei Province, and Hefei City in Anhui Province, and few participants from other areas. Therefore, its universality might be low. A questionnaire survey should involve different industries and regions to ensure the generalizability of the study results. Besides, this study is mainly cross-sectional. The questionnaire results could only verify the range of temporal changes before and after data collection without considering the longitudinal time evolution factor.

In future studies, researchers could explore the following aspects: First, more representative participants could be included in the survey. Second, the measurement of paradoxical leadership could be more integrated with the current situation of Chinese business management, incorporating the doctrine of yin and yang and the idea of the middle ground, while considering the general context of 21st century China. Third, this study can benefit from new mediating factors. Although knowledge-sharing was employed as the mediating variable, other possibilities for investigation, such as knowledge acquisition and transfer, can be adopted.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this study will be made available to any qualified researcher, without undue reservation.

ETHICS STATEMENT

According to our research design, the study did not violate any legal regulations or common ethical guidelines. In order to ensure that this study has followed ethical principles, the research purpose of the study is introduced, and consent was obtained before completing the hard copy questionnaires.
Additionally, we emphasized that all the participants could reject any questions or withdraw from the study at any time. Lastly, their anonymity and confidentiality were assured.

**AUTHOR CONTRIBUTIONS**

JL conceived the theoretical framework, organized the data collection, analyzed the statistics, and wrote the manuscript. YH contributed to the research ideas, data analysis, and formatting, and participated in writing the manuscript. XD provided key research ideas and guidance and was responsible for revising and improving the manuscript. All authors contributed to the article and approved the submitted version.

**COMPETING INTERESTS**

The authors of this publication declare there are no competing interests.

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