Coping with Knowledge Inertia for Improving R&D Team Creativity by Using Structural Equation Modeling and Hierarchical Multiple Regression

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1. Introduction

With the development of China’s e-commerce, the price information of commodities in different regions has become more and more transparent, making China’s market very intense in competition [1]. Visnjic et al. [2] pointed out that innovative products can usually be able to help firms to stand out in fierce market competition. For example, when the disruptive and innovative Xiaomi iPhone coming with artificial intelligence system was launched, it surpassed Apple’s mobile phones and sat on the throne of sales champion in China. Somech and Drach-Zahavy [3] noted that the research and development of innovative products was inseparable from a creative team, and the R&D team creativity determined the sustainability of the innovative new product development. However, just as the Xiaomi iPhone going from the amazing generation to the unremarkable eleventh generation, when the R&D team possess specific knowledge, it will naturally continue to use these knowledge, so that the knowledge system will always maintain in the original state, resulting in inertia problem handling procedures, inertia problem handling experience, and inertia problem thinking mode, thereby falling into a serious state of knowledge inertia trap [4, 5]. Knowledge inertia might severely restrict R&D team creativity, thereby affecting the degree of novelty that can be achieved in the new products developed, which is not conducive to the maintenance of the company’s competitive advantage. Therefore, understanding whether and how knowledge inertia has a destructive effect on R&D team creativity is of unquestionable significance for companies to improve new product development performance and enhance market competitiveness.

However, most research on team creativity conducted by scholars are from the perspective of positive influence, such
as improving team creativity from adopting team leadership [6–8], team diversity characteristics [9–11], team organization learning [12–14], team atmosphere management [15, 16], team member interaction [17, 18], and so on. Related research rarely conducts in-depth analysis from the perspective of negative factors such as knowledge inertia on R&D team creativity and rarely conducts in-depth exploration on the mechanism of the relationship between knowledge inertia and R&D team creativity from theory to empirical research. The research in this area needs to be further expanded.

Conflict management theory believed that conflicts can be divided into cognitive conflicts and emotional conflicts, in which cognitive conflicts allowed multiple views to coexist and can greatly promote team members’ innovative thinking, thus becoming an important factor on affecting creativity [19]. Therefore, based on the theory of conflict management, this study takes team cognitive conflict as a mediating variable to explore the relationship between knowledge inertia and R&D team creativity.

Handy [20] believed that forgetting was an important part of business process reengineering and transformation, which can help companies break the inertial knowledge system. Therefore, R&D team’s intentional unlearning capability is likely to be an important factor that can directly inhibit R&D team’s knowledge inertia. Moreover, a certain ability characteristic of the team usually also affects the process of the main effect [21, 22]. In other words, R&D team’s intentional unlearning capability may be able to weaken the negative effect of knowledge inertia on R&D team creativity by playing a moderating role. Therefore, this study intends to further analyze the direct effect of intentional unlearning capability on R&D team’s knowledge inertia and the moderating effect on the relationship between knowledge inertia and R&D team creativity.

Accordingly, the purpose of this study is to examine the relationship between knowledge inertia and R&D team creativity by focusing on the mediating effect of cognitive conflict with direct and moderating effect of intentional unlearning capability. We propose that the negative effect of knowledge inertia on R&D team creativity is mainly through reducing the level of team cognitive conflict among team members. We also propose that intentional unlearning capability is not only an important variable to reduce R&D team knowledge inertia directly but also an important variable to strengthen or weaken the negative effect of knowledge inertia on R&D team creativity. More specifically, when R&D team’s intentional unlearning capability is low, the negative relationship between knowledge inertia and R&D team creativity will be strengthened, and when intentional unlearning capability is high, it neutralizes the relationship. The theoretical model to be tested is presented in Figure 1.

In developing and testing the above model, we make three main contributions to the literature related to knowledge inertia, intentional unlearning capability, cognitive conflict, and R&D team creativity. First, we extend both the knowledge inertia and R&D team creativity literature by theoretically and empirically testing the inertia model to connect knowledge inertia and R&D team creativity with cognitive conflict in a field setting. Second, we examine the direct and moderating roles of a coping behavior (i.e., intentional unlearning capability), providing a boundary condition for the relationship between knowledge inertia and R&D team creativity. Finally, this paper uses a two-wave design for testing the proposed model among R&D team leaders in China (knowledge inertia and intentional unlearning were measured at time 1, while team cognitive conflict and R&D team creativity were measured at time 2) and using Chinese R&D team samples to offer Asian context insights by testing Western theories.

2. Literature and Hypothesis Development

2.1. Knowledge Inertia on Team Creativity. Creativity originated from problem solving, and many problem-solving modes should be considered to include creative thinking [23]. Therefore, team creativity is often an important means for companies to solve complex and difficult problems and an important source of corporate core competitiveness [24, 25], which contains ability, characteristics, and inner psychological process of producing innovative ideas, innovative services, innovative processes, or innovative product for the purpose of socialized output [26]. Leonard and Swap [27] pointed out that team creativity generally went through the following four processes for taking effect: (1) using divergent thinking to think and conceive new ideas; (2) communicating and discussing with others, so as to express novel ideas out; (3) taking convergent thinking by promoting team members to argue so that team members can reach a consensus; and (4) a consensus innovative idea must be practical. Therefore, the level of R&D team creativity is closely related to team members’ creative thinking and abilities.

Knowledge inertia represents the inertia behavior that an organization or team often relies on past experience and knowledge to solve with difficult and complex problems [4]. Liao et al. [28] pointed out that knowledge inertia included two types of learning inertia and experience inertia, and believed that learning inertia would affect organizational members’ refusal to accept new knowledge and new ideas, thus making it difficult to change the old way of thinking, while the experience inertia would make organizational members reject the attempts of new methods, thereby hindering the discovery of creative problem-solving methods, and had a significant negative impact on the improvement of the creative thinking and creative abilities of the organization members. Therefore, the existence of
Knowledge inertia is likely to hinder the improvement of the creative thinking and ability of the R&D team members, thereby negatively affecting R&D team creativity. Thus, we propose Hypothesis 1.

**Hypothesis 1.** Knowledge inertia is negatively associated with R&D team creativity.

### 2.2. The Mediating Role of Team Cognitive Conflict.

Conflict research originated from the discussion of interpersonal relationships by psychologists and believed that conflicts were destructive so that conflicts should be avoided [29]. However, subsequent research found that conflicts can be further divided into emotional conflicts and cognitive conflicts, in which the former mainly referred to the emotional opposition between team members due to incompatibility in interests, ideas, and practices, which was a harmful conflict type, while the latter mainly referred to the behavior of team members arguing about facts in order to complete their work tasks because of their different perspectives, work ideas, and work methods, which was a positive conflict type [19, 30, 31]. The research of Yi et al. [32] also further confirmed that cognitive conflict can stimulate team members to think about the reasons behind the problem and the internal logic that occurs and actively encourage members to question the adequacy of their current thinking and help improve the team’s internal information processing quality, in turn, affected the formation of innovation orientation, and had a positive impact on team members’ innovative behavior. Therefore, it is very necessary for directors of R&D teams to be able to tolerate and even encourage the existence of team cognitive conflict.

However, the research of Liao [4] pointed out that organizations with serious knowledge inertia would rely heavily on past successful experience and problem-solving methods, procedures, which, in turn, are very repulsive to viewpoints that were inconsistent with past problem-solving methods and experiences. In addition, the research of Yuan et al. [5] also found that knowledge subjects with high knowledge inertia had a high degree of recognition for existing knowledge, including past experience and problem-solving methods, and were unwilling to invest relevant human resources and property to verify the correctness and possibility of new knowledge. Therefore, knowledge inertia can often negatively affect the attitudes of team leaders and team members to new knowledge and new thinking patterns. Solutions that do not conform to past practices, procedures, and experience are often ignored, which will reduce cognitive conflicts among team members. Hence, this study believes that the existence of knowledge inertia in R&D teams will greatly reduce the level of cognitive conflict among R&D team members. Thus, we propose Hypothesis 2.

**Hypothesis 2.** Knowledge inertia is negatively associated with R&D team cognitive conflict.

The research of Liao et al. [28] showed that the reason why knowledge inertia can reduce organizational innovation performance was mainly because knowledge inertia hindered the learning and circulation of new knowledge, new experience, and new thinking patterns within the organization, which made organizational members to generate enough innovative thinking collisions and thus to not stimulate organizational members to carry out in-depth thinking and thinking changes. The research of Zhou et al. [33] also proved that the negative impact of knowledge inertia on the innovation performance of R&D team was mainly affected by hindering conflict communication and internal and external knowledge integration. That is to say, when the knowledge inertia level of R&D team is high, it will weaken the absorption, integration, and exchange of new knowledge within the team, showing a low level of team cognitive conflict, which will reduce R&D team creativity. Therefore, combined with the previous discussion and analysis, we propose Hypothesis 3.

**Hypothesis 3.** Team cognitive conflict mediates the relationship between knowledge inertia and R&D team creativity.

### 2.2. The Direct and Moderating Role of Intentional Unlearning Capability.

Becker [34] believed that intentional unlearning was an important means for an organization to acquire new knowledge continuously and was of great significance to the update of the organization’s existing knowledge. Postan et al. [35] believed that intentional unlearning can be simply defined as the process of the organization’s initiative to give up, replace, and decline knowledge. It is a way and process for the organizational system to adapt to changes in internal and external links by the way of abandoning the original problem solutions or routines to restructure the knowledge structure [36]. Intentional unlearning can be divided into two dimensions including organizational beliefs unlearning and organizational routines unlearning [37, 38]. Among them, organizational beliefs unlearning includes unlearning organizational values, norms, knowledge structures, and thinking patterns, while organizational routines unlearning includes the unlearning of routine procedures in organizational decision-making, standard operating procedures, management practices, and management policies. Becker [38] pointed out that the reason why organizations need to conduct knowledge intentional unlearning was mainly because more and more management practitioners realized that the outdated knowledge system was not conducive to the absorption and acquisition of new knowledge and had a great negative impact on organizational innovation performance; while organizations that regularly conducted intentional unlearning of organizational knowledge achieved good innovation performance. Therefore, the intentional unlearning of organizational knowledge has become an important innovative management tool for organizational managers, and the intentional unlearning capability has also become one of the important indicators for managers to evaluate the creativity of new product development.

Liao [4] pointed out that the existence of knowledge inertia was formed on the basis of the fact that the members...
of the team did not have the motivation or willingness to break the existing knowledge system. Because when more and more knowledge accumulates, the capital cost or trial-and-error costs for the introduction of a new knowledge system to break the original knowledge system will become higher in R&D team, especially when R&D team faces the pressure of product launching, therefore, the motivation or willingness for R&D team to break knowledge inertia is always the obstacle. Hence, when R&D team managers and members realize the danger of knowledge inertia and consciously unlearn the team knowledge intentionally, R&D team’s original knowledge system will be broken strongly [36]. Moreover, the greater the degree of intentional unlearning, the greater the degree of organizational knowledge inertia will be broken and obtain more innovation opportunities [39]. Therefore, combined with the previous discussion and analysis, we propose Hypotheses 4 and 5.

**Hypothesis 4.** Intentional unlearning capability is negatively associated with knowledge inertia of R&D team.

**Hypothesis 5.** Intentional unlearning capability moderates the relationship between knowledge inertia and R&D team creativity, such that the relationship is weaker for high intentional unlearning capability than for low intentional unlearning capability.

### 3. Research Design

#### 3.1. Research Samples

The research data in this study were collected from 135 R&D team leaders within 67 high-tech companies from hardware industries to software industries in Shenzhen, China. A two-wave data collection with an interval of about six months was used to avoid the common method bias issue, which means that each R&D team leader needs to answer the questionnaire twice separately.

In the first-wave survey (T1), we collected the data of R&D team leader’s background information with age, sex, and education, conditions of knowledge inertia, and intentional unlearning in R&D team. It took two months to send out a total of 233 coded questionnaires through on-site surveys and returned 187 with 183 being completed and valid, representing a response rate of 78.5%.

In the second-wave survey (T2) six months later, we collected the data of team cognitive conflict and team creativity in R&D team. It took two months to send out a total of 173 coded questionnaires to leaders who had completed the questionnaire in the first-wave survey, with 11 of them being out of contact. There were 155 questionnaires returned, and 137 questionnaires were completely answered and valid, representing a response rate of 79.7%.

Through the matching of the two-wave survey questionnaires, questionnaires with obvious logical errors were eliminated, and a total of 135 team questionnaires were obtained for hypothesis verification. The characteristics of the R&D team leaders are seen in Table 1. Of these 135 R&D team leaders, 93 were males (accounting for 68.9%) and 42 were females (accounting for 31.1%); the average age was 34.8 years with standard deviation = 5.5, and 13.3% people holding no degree, 31.1% people holding a bachelor’s degree, 43.0% people holding a master’s degree, and 12.6% people holding a doctoral degree. The sample characteristics were basically consistent with the characteristics of high-tech R&D team leaders.

#### 3.2. Research Measurements

Five-point Likert scales of knowledge inertia, intentional unlearning capability, cognitive conflict, and team creativity that was frequently cited in the academic literature were used for ensuring the validity and reliability. Results are seen in Table 2 using SPSS 19.0 for testing reliability with Cronbach’s α and AMOS 17.0 for testing convergent validity with average variance extracted (AVE) and composite reliability (CR).

#### 3.2.1. Knowledge Inertia

A 17-item scale developed by Liao et al. [28] was used to ask team leaders to evaluate team knowledge inertia, which comprised two dimensions of learning inertia (seven items) and experience inertia (seven items) on items such as “My team is rare to have any opportunity to learn new concepts and methods,” and “My team often learn from past experience.” Cronbach’s α was 0.91 for learning inertia, 0.91 for experience inertia, and 0.95 for knowledge inertia, where coefficients were all higher than 0.70, while AVE was 0.67 (> 0.50) and CR was 0.93 (> 0.70) for learning inertia, AVE was 0.69 (> 0.50) and CR was 0.94 (> 0.70) for experience inertia, AVE was 0.68 (> 0.50) and CR was 0.97 (> 0.70) for knowledge inertia, indicating that the constructs of knowledge inertia have good reliability and convergent validity.

#### 3.2.2. Intentional Unlearning Capability

A seven-item scale developed by Akgun et al. [37] and Zhu and Zhang [40] was used to ask team leaders to evaluate the intentional unlearning capability of the team, which comprised two dimensions of beliefs unlearning capability (four items) and routines unlearning capability (three items) on items such as

| **Table 1:** The characteristics of research samples. |
|-----------------|-----------------|-----------------|-----------------|
| **Items**       | **Frequency**   | **Percentage**  | **Cumulative**  |
| **Gender**      | **(N = 135)**   |                 |                 |
| Male            | 93              | 68.9            | 68.9            |
| Female          | 42              | 31.1            | 100.0           |
| **Age**         |                 |                 |                 |
| 25–30           | 24              | 17.8            | 17.8            |
| 31–40           | 94              | 69.6            | 87.4            |
| 40–50           | 14              | 10.4            | 97.8            |
| >50             | 3               | 2.2             | 100.0           |
| **Education**   |                 |                 |                 |
| College degree  | 18              | 13.3            | 13.3            |
| degree and below|                 |                 |                 |
| Bachelor’s degree| 42              | 31.1            | 44.4            |
| Master’s degree | 58              | 43.0            | 87.4            |
| Ph.D            | 17              | 12.6            | 100.0           |
“My team will change the advocated values according to its development,” and “My team will often hold seminars to adjust the team management decision-making model.” Cronbach’s α was 0.89 for beliefs unlearning capability, 0.81 for routines unlearning capability, and 0.91 for intentional unlearning capability, where coefficients were all higher than 0.70, while AVE was 0.71 (>0.50) and CR was 0.91 (>0.70) for beliefs unlearning capability, AVE was 0.63 (>0.50) and CR was 0.83 (>0.70) for routines unlearning capability, AVE was 0.67 (>0.50) and CR was 0.94 (>0.70) for intentional unlearning capability, indicating that the constructs of intentional unlearning capability have good reliability and convergent validity.

3.2.3. Team Cognitive Conflict. A three-item scale developed by Amason [19] was used to ask team leaders to evaluate team cognitive conflict on items such as “My team members have many ideas disagreements with each other in recent decision-making discussion.” Cronbach’s α was 0.86 (>0.70), while AVE was 0.74 (>0.50) and CR was 0.90 (>0.70) for team cognitive conflict, indicating that the constructs of team cognitive conflict have good reliability and convergent validity.

3.2.4. Team Creativity. A six-item scale developed by Chen [41] was used to ask team leaders to evaluate team creativity on items such as “My team frequently experiments with alternative ways to carry out their work.” Cronbach’s α was 0.91 (>0.70), while AVE was 0.62 (>0.50) and CR was 0.91 (>0.70) for team creativity, indicating that the constructs of team creativity have good reliability and convergent validity.

### 4. Results

4.1. Confirmatory Factor Analyses (CFAs). Confirmatory factor analyses (CFAs) with AMOS 17.0 were used to examine the discriminant validity of knowledge inertia (KI), intentional unlearning capability (IUC), team cognitive conflict (TCC), team creativity (TC) with χ²/df, RMSEA, TLI, and CFI. The fit indices in Table 3 revealed that the hypothesized four-factor model fitted the data (χ²/df = 641.74/399 = 1.61 between 1 and 3, p < 0.01; RMSEA = 0.07 was less than 0.08, TLI = 0.90 achieved the best value of 0.90, CFI = 0.91 was greater than 0.9) considerably better than any of the alternative models, providing evidence that the measuring scales of knowledge inertia, intentional unlearning capability, team cognitive conflict, and team creativity used in this study have good...
discriminant validity. Given the results, all four constructs were applied for further analyses.

4.2. Common Method Issues. Given that knowledge inertia, intentional unlearning capability, team cognitive conflict, and team creativity came from the same source, common method bias may be caused, which refers to the systematic error caused by the data collected from the same grader, the same measurement environment, and the characteristics of the measurement item itself [42, 43]. Hence, in order to minimize the negative impact of common method bias on the research results, procedures adopted by Podsakoff et al. [44] were used. Firstly, different variables such as knowledge inertia, intentional unlearning capability, team cognitive conflict, and team creativity in this study were scored at different stages with adding some unrelated items to construct the perception of psychological separation between different variables. Secondly, as promised to the respondents that the data would be kept confidential so that they can answer truthfully. Finally, we conducted factor analysis of Harman adopted by Wu et al. [45] with SPSS 19.0 and found that five factors with eigenvalues, which were larger than one, explained 68.8% of the variance, while the largest eigenvalue factor explained 33.7%, which was lower than 50% [46]. Hence, common method bias does not appear to be a serious issue in this study.

4.3. Descriptive Statistics. Table 4 presents the means, standard deviations, and zero-order Pearson correlations of all main variables and controlled variables. Results showed that knowledge inertia was negatively correlated with intentional unlearning capability ($r = -0.27$, $p < 0.01$), team cognitive conflict ($r = -0.23$, $p < 0.01$), and team creativity ($r = -0.40$, $p < 0.01$). Meanwhile, team cognitive conflict was positively correlated with team creativity ($r = 0.32$, $p < 0.01$). In addition, knowledge inertia, intentional unlearning capability, and team creativity were related to team leader’s age but were unrelated to team leader’s gender and education, while team cognitive conflict was unrelated to team leader’s age, gender, and education. These results provide initial support for the further hypotheses test in this study.

4.4. Hypotheses Test of Direct and Mediating Effect

4.4.1. Structural Equation Modeling Proposed. In order to test the direct and mediating hypotheses developed previously relating to the relationship of knowledge inertia, intentional unlearning capability, team cognitive conflict, and team creativity, followed by Heredia-Rojas et al. [47] and Melovi et al. [48], the theoretical structural equation modeling (SEM) is proposed in Figure 2 with exogenous variables (i.e., intentional unlearning capability) represented by ellipse named $\xi$, endogenous variables (i.e., team creativity) represented by an ellipse named $\eta$, observed variables (i.e., items) represented by a rectangle named $X$ and $Y$, while $\delta$, $\epsilon$, $\omega$, and $\zeta$ represented an error value, $\lambda_x$ and $\lambda_y$ represented a factor loading value, and $\gamma$ and $\beta$ represented the path coefficient.

Followed by Chen and Wang [49], the theoretical SEM model can be described as in
\[ \eta = B\eta + \Gamma\xi + \zeta, \]  
\[ X = \Lambda X\xi + \delta, \]  
\[ Y = \Lambda y\eta + \epsilon, \]  

where \( B \) is the matrix of path coefficients indicating the direct effects of endogenous variables including knowledge inertia, team cognitive conflict, and team creativity on each other, \( \Gamma \) is the matrix of path coefficients indicating the direct effects of exogenous variables including intentional unlearning capability on endogenous variables including knowledge inertia, team cognitive conflict, and team creativity, \( \Lambda X \) is the matrix of the factor loading value of item \( X \), and \( \Lambda Y \) is the matrix of the factor loading value of item \( Y \).

Followed by Ma [50] and Zhao et al. [51], combined with the parameter setting SEM model in Figure 2, equations (1) to (3) can be expressed in the vector and matrix forms as

\[
\begin{bmatrix}
\eta_1 \\
\eta_2 \\
\eta_3
\end{bmatrix} =
\begin{bmatrix}
\beta_2 & 0 & 0 \\
\beta_1 & \beta_3 & 0 \\
\beta_1 & \beta_3 & 0
\end{bmatrix}
\begin{bmatrix}
\eta_1 \\
\eta_2 \\
\eta_3
\end{bmatrix} +
\begin{bmatrix}
\gamma_1 \\
0 \\
0
\end{bmatrix}
\begin{bmatrix}
\xi_1 \\
\xi_2 \\
\xi_3
\end{bmatrix} +
\begin{bmatrix}
\zeta_1 \\
\zeta_2 \\
\zeta_3
\end{bmatrix},
\]

\[
\begin{bmatrix}
X_1 \\
X_2 \\
X_3 \\
X_4 \\
X_5 \\
X_6 \\
X_7
\end{bmatrix} =
\begin{bmatrix}
\lambda X_1 & 0 \\
\lambda X_2 & 0 \\
\lambda X_3 & 0 \\
\lambda X_4 & 0 \\
0 & \lambda X_5 \\
0 & \lambda X_6 \\
0 & \lambda X_7
\end{bmatrix}
\begin{bmatrix}
\delta_1 \\
\delta_2 \\
\delta_3 \\
\delta_4 \\
\delta_5 \\
\delta_6 \\
\delta_7
\end{bmatrix} +
\begin{bmatrix}
\xi_{11} \\
\xi_{12}
\end{bmatrix} +
\begin{bmatrix}
\delta_1 \\
\delta_2 \\
\delta_3 \\
\delta_4 \\
\delta_5 \\
\delta_6 \\
\delta_7
\end{bmatrix},
\]

\[
\begin{bmatrix}
\xi_{11} \\
\xi_{12}
\end{bmatrix} =
\begin{bmatrix}
\eta_{11} \\
\eta_{12}
\end{bmatrix}
\begin{bmatrix}
\omega_1 \\
\omega_2
\end{bmatrix},
\]

\[
\begin{bmatrix}
\eta_{11} \\
\eta_{12}
\end{bmatrix} =
\begin{bmatrix}
\beta_{11} & \beta_{12} \\
\beta_{12} & \beta_{12}
\end{bmatrix}
\begin{bmatrix}
\eta_{11} \\
\eta_{12}
\end{bmatrix} +
\begin{bmatrix}
\zeta_{11} \\
\zeta_{12}
\end{bmatrix}.
\]

4.4.2. Model Fit Test. AMOS17.0 with maximum likelihood estimation (MLE) method was employed to calculate equations (4) to (8) to examine the hypothesized model presented in Figure 2. Results of structural equation mod-
ning (Table 5) indicated that the hypothesized model fits the data very well: $\chi^2 (397) = 587.57$, $\chi^2/df = 1.48$ between 1 and 3, $p = 0.001 < 0.01$; GFI = 0.78, IFI = 0.93, NFI = 0.81, CFI = 0.93, TLI = 0.92; RMSE = 0.05, RMSEA = 0.06; PNFI = 0.74, PGFI = 0.67 and AIC = 723.57. Except for some indicators, such as GFI, which is slightly lower than 0.8, other indicators are bigger than acceptable values. Therefore, the proposed structural equation modeling for testing the hypothesized direct and mediating effect in this study is valid, and the results of the hypotheses should be analyzed.

4.4.3. Hypothesis Test. According to the structural equation model path analysis results shown in Figure 3, combined with the path coefficient and significance ($p$ value), the results of the hypothesis verification can be summarized as follows.

Hypothesis 1 proposed that knowledge inertia was negatively associated with R&D team creativity. As shown in Figure 3, the finding suggests that knowledge inertia has a negative and significant effect on R&D team creativity ($\beta_1 = -0.35$, $p < 0.01$). Thus, Hypothesis 1 was supported.

Hypothesis 2 proposed that knowledge inertia was negatively associated with R&D team cognitive conflict. As shown in Figure 3, the finding suggests that knowledge inertia has a negative and significant effect on R&D cognitive conflict ($\beta_2 = -0.27$, $p < 0.01$). Thus, Hypothesis 2 was supported.

Hypothesis 3 proposed that team cognitive conflict mediated the relationship between knowledge inertia and R&D team creativity. As shown in Figure 3, the finding suggests that team cognitive conflict has a positive and significant effect on R&D team creativity ($\beta_3 = 0.27$, $p < 0.01$). Thus, combined with the support of Hypothesis 1 and Hypothesis 2, it initially confirms that there may be a mediating effect [52]. To test for mediation (Hypothesis 3), bootstrapping methods recommended by Hayes [53] are widely used. Hayes [53] pointed out that once the 95% confidence interval of the mediating effect did not contain zero, the mediating effect would exist and be significant.

Through the calculation analysis of the bootstrapping method of 5000 times repeated sampling, it was found that the mediating effect of team cognitive conflict on the relationship between knowledge inertia and R&D team creativity is $-0.074$, and its 95% confidence interval is $[-0.189, -0.022]$. The confidence interval for the mediating effect of team cognitive conflict did not include zero. Therefore, the mediating effect of team cognitive conflict between knowledge inertia and R&D team creativity was significant. Thus, Hypothesis 3 was initially supported.

Moreover, in order to understand whether the mediating effect is full mediation or partial mediation, we utilized the change in chi-square test [54] to compare partially mediated model with a full-mediation model, which fixed the direct path coefficient of knowledge inertia and R&D team creativity to be zero in Figure 2. The change in chi-square tests as shown in Table 6 revealed that the full-mediation model ($\Delta \chi^2 = 14.75; \Delta df = 1; p > 0.05$) was not significantly better than the partially mediated model and were less parsimonious, as after fixing the direct path coefficient of knowledge inertia and R&D team creativity to be zero, the chi-square value increased significantly and was greater than the value of 3.84 (0.05, 1). Hence, the partially mediated model is the good-fitting and most parsimonious model, indicating that team cognitive conflict partially mediates the relationship between knowledge inertia and R&D team creativity, thus lending a strong support to Hypothesis 3.

Hypothesis 4 proposed that intentional unlearning capability was negatively associated with knowledge inertia of R&D team. As shown in Figure 3, the finding suggests that intentional unlearning capability has a negative and significant effect on knowledge inertia of R&D team ($\gamma_1 = -0.31$, $p < 0.01$). Thus, H4 was supported.

4.5. Hypothesis Test of Moderating Effect. Hierarchical multiple regression analysis was used to test the moderating hypothesis by entering in control variables (i.e., team leader’s age, gender, and education), independent variable (i.e., knowledge inertia), and moderator variable (i.e., intentional unlearning capability, knowledge inertia × intentional unlearning capability) on separate steps to construct equations (9) to (11) as model 1 to model 3.

<table>
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<td>Tucker-Lewis index (TLI)</td>
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<td>≥0.80</td>
<td>0.92</td>
</tr>
<tr>
<td>Parsimony normed fit index (PNFI)</td>
<td>≥0.50</td>
<td>≥0.50</td>
<td>0.74</td>
</tr>
<tr>
<td>Parsimony goodness of fit index (PGFI)</td>
<td>≥0.50</td>
<td>≥0.50</td>
<td>0.67</td>
</tr>
<tr>
<td>(AIC)</td>
<td>&lt;Sat. AIC</td>
<td>&lt;Indp. AIC</td>
<td>723.57</td>
</tr>
</tbody>
</table>

Table 5: Goodness of model fit ($N = 135$).
(R&D team creativity increased from 22% to 25%
positively related to R&D team creativity (Model 3,
knowledge inertia

Results found that (1) knowledge inertia was negatively related to R&D team creativity, and
Our study contributes to knowledge inertia in several important ways. First of all, this study confirmed that knowledge inertia was a significant and negative predictive variable that affected R&D team innovation in the era of knowledge economy, which would significantly reduce R&D team creativity. This result was consistent with the research of Sharifirad [57] and Hana [58] based on Western organizational contexts, indicating that knowledge inertia was a cross-cultural and universal phenomenon in preventing employee creativity in knowledge-intensive organizations. That is to say, no matter in the East or West, when the R&D team develops one after another successful products and accumulates a lot of successful experience and successful problem solutions in the fierce market competition, it will fall into the bottleneck of knowledge inertia. R&D team will indulge in past successful experiences and learning paths, which will result in too slow knowledge update or even rejection of the learning and application of new knowledge, which, in turn, causes R&D team creativity to decline continuously.

Secondly, Li and Zeng [59] pointed out in their research limitations and prospects that future research on knowledge inertia should pay more attention to the mediating mechanism of knowledge inertia influencing innovation performance. In response to this initiative, this paper explored the mediating mechanism on knowledge inertia affecting R&D team creativity from the perspective of conflict management theory. The empirical results showed that knowledge inertia can not only decrease R&D team creativity directly but also decrease it by reducing the level of cognitive conflict among R&D team members, causing serious damage to R&D team creativity. That is to say, team cognitive conflict partially mediated the relationship between knowledge inertia and R&D team creativity. These results uncover the “black box” of knowledge inertia, taking impact on R&D team creativity, and are of great significance to people’s deep understanding of the negative affecting process of knowledge inertia. At the same time, from the results of team cognitive conflict was positively related to R&D team creativity, we can see that improving team cognitive conflict can help enhance R&D team creativity, thereby indirectly reducing the negative impact of knowledge inertia on R&D team creativity. Moreover, in previous studies, we found that team knowledge flow, knowledge creation, differences in team member values, differences in knowledge structure, differences in thinking styles, differences in technical preferences, etc., can all trigger team cognitive conflict [60–62]. Therefore, in summary, this study concludes that as long as it is a way to strengthen the knowledge flow of the R&D team, it can often help improve the level of cognitive conflict in R&D team, thereby helping to reduce the adverse consequences of knowledge inertia on R&D team creativity.

Finally, the empirical results of this study also showed that intentional unlearning capability was one of the key abilities to overcome the negative influence of knowledge inertia on R&D team creativity. Intentional unlearning capability will not only directly reduce the level of knowledge inertia that existed in R&D team but also significantly weaken the negative effect of knowledge inertia on R&D team creativity. This shows that R&D teams with high intentional unlearning capability are less susceptible to the negative influence of knowledge inertia and can weaken the negative effect of knowledge inertia. This research conclusion is an important expansion of knowledge inertia in the field of knowledge management research and innovation management. It is the first time to explore the boundaries of the effect of knowledge inertia on R&D team creativity from the perspective of R&D team’s ability characteristics of intentional unlearning, providing theoretical support for

### Table 7: Hierarchical regression hypothesis test results.

<table>
<thead>
<tr>
<th></th>
<th>Team creativity</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td></td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>−0.24*</td>
<td>−0.24*</td>
<td>−0.21*</td>
<td></td>
</tr>
<tr>
<td>Gender (GEN)</td>
<td>0.15</td>
<td>0.15</td>
<td>0.15*</td>
<td></td>
</tr>
<tr>
<td>Education (EDU)</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Independent variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge inertia (KI)</td>
<td>−0.24*</td>
<td>−0.23*</td>
<td>−0.26*</td>
<td></td>
</tr>
<tr>
<td>Moderator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentional unlearning capability (IUC)</td>
<td>0.04</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge inertia × intentional unlearning capability (KI × IUC)</td>
<td>0.16*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.22</td>
<td>0.22</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>0.22</td>
<td>0.00</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>9.29**</td>
<td>7.43**</td>
<td>7.10**</td>
<td></td>
</tr>
<tr>
<td>$\Delta F$</td>
<td>9.29**</td>
<td>0.19</td>
<td>4.46*</td>
<td></td>
</tr>
</tbody>
</table>

Note: $N = 135$. ** $p < 0.01$; * $p < 0.05$.

### Figure 4: The moderating effect of intentional unlearning capability on the relationship between knowledge inertia and team creativity.
R&D team to take measures to weaken the negative impact of knowledge inertia and enhance R&D team creativity.

5.2. Managerial Implications. The results of our study provide some managerial implications. First of all, we found that knowledge inertia can significantly reduce R&D team creativity, which posed a huge threat to enterprises' continuous and rapid development of creative products to seize the market. Therefore, the R&D team should implement various measures to prevent the R&D team from generating serious knowledge inertia. Effective measures and suggestions are as follows: (1) we should build a learning organization. By increasing the organizational learning construction for R&D team members and cultivating the concept of lifelong learning for R&D team members, it can promote R&D team members to learn new knowledge continuously, thereby reducing the generation of knowledge inertia in the R&D team; (2) we should regularly hold cutting-edge technology and cutting-edge knowledge application training seminars. Knowledge inertia arises because both people and organizations are inert, and they are accustomed to using past knowledge and experience to deal with problems. If there is an exchange platform for new knowledge and new technology, it can promote the flow and integration of new knowledge and technology within the R&D team, thereby greatly reducing the harm of knowledge inertia; (3) we should establish an effective reward system for knowledge learning. Vigorously reward and support employees to participate in academic training and certification training courses and give priority to promotion and monetary rewards for industry-certified certificate holders and holders of higher-level academic degree certificates to break the old R&D team members’ knowledge inertia system; and (4) for those R&D teams that fall into the bottleneck of knowledge inertia, the organization should actively provide intellectual assistance to help introduce technical experts to guide the team to get rid of the inertial dilemma.

Secondly, it can be seen from the impacting process that knowledge inertia will decrease the level of team cognitive conflict and then decrease R&D team creativity. Therefore, increasing the level of team cognitive conflict will help break the linkage between knowledge inertia on R&D team creativity partially, thereby indirectly reducing the negative impact of knowledge inertia on R&D team creativity. Therefore, we should make up rules and regulations or incentive measures to encourage team members to participate in discussions with divergent thinking, including encouraging members to propose new problem-solving ideas, exchange new industry knowledge and theories, and provide new innovative thinking and concepts to promote cognition among team members. In the constant exchange and debate of new thinking and new concepts, the R&D team can achieve the purpose of breaking the original knowledge inertial system and enhance R&D team creativity.

5.3. Limitations and Further Research. There are several limitations that need to be noticed in this study. Firstly, although this research explored the mediating role of team cognitive conflict between knowledge inertia on R&D team creativity based on the theory of organizational conflict, there may be multiple ways in which knowledge inertia affected R&D team creativity. Future research could try different theoretical perspectives to explore the mediating mechanism of knowledge inertia affecting R&D team creativity. For example, in recent years, the role of knowledge circulation theory in explaining team creativity and team new product development has gradually received more and more attention from academe [63–66]. Will knowledge inertia negatively affect the inflow and outflow of knowledge between the R&D team and the outside world, thereby affecting R&D team’s creativity and new product development? Future follow-up research can be used for in-depth discussion of this aspect.

Secondly, this article only discussed the moderating role of R&D team’s intentional unlearning capability on knowledge inertia affecting R&D team creativity. However, the moderating factors that affect knowledge inertia in the R&D team are very diverse, including not only the characteristics of the team itself but also the characteristics of leadership level and the individual level of employees. For example, in an R&D team that has been established for a long time and has a deep accumulation of knowledge, knowledge inertia may be more harmful to the R&D team. Therefore, future follow-up research can explore on the moderating role of diverse variables such as team knowledge stock on studying knowledge inertia in R&D teams.

Thirdly, because this research focused on exploring the relationship and mechanism of knowledge inertia and R&D team creativity from the perspective of intentional unlearning capability and team cognitive conflict, the differential impact of background variables of team managers and the characteristics of the industry in which the R&D team was located had not been discussed in depth and can be further improved in the future.

Finally, the samples for this study were mainly taken from the high-tech R&D team. Although this sampling helps to improve the internal validity by controlling the industry and other influencing factors, the research results will be branded with specific domain characteristics, which weaken the external validity of the research. Future research can further collect samples from different kinds of teams and senior management teams for extensive sampling to make the research results more universal.

Data Availability

Data used in this study can be provided upon request from the corresponding author Jianming Zhou.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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References


