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How to Improve the Team Innovation Performance by Means of a Double Approach: Innovative Leadership and Innovation-Oriented Human Resource Management Practices*

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Abstract Innovative leadership and innovation-oriented human resource management practices (HRMPs) are soft and hard measures, respectively, that promote team innovation performance (TIP). This study is based on human capital theory, integrating the leadership process model and the content-process-results framework of HRM (HRM-CPO), and using data from 259 teams and 1,278 employees in leader-subordinate pairs. Results show that team human capital (THC) is an important mediator in explaining the impact of introducing innovation-oriented practices on TIP. In addition, innovative leadership can improve THC by increasing the level of implemented innovation-oriented HRMPs, thereby affecting TIP. The study extends the level at which HRMPs and leadership behaviors work together and responds to the call for integration of two major research fields of HRM and leadership behavior.

Keywords innovative leadership, innovation-oriented HRMPs, innovation performance, human capital, leadership process model

1 Question

Today, as market competition increases, organizations must constantly innovate to sustain competitive advantage (Luo et al., 2017). As organizational structures become flatter, most innovation activities within organizations are initiated and implemented by teams, which are becoming the basis of preferred operation for organizations (Du et al., 2020; Klaic et al., 2020). However, the biggest obstacle to improving team innovation performance (TIP) is failure of team leaders to adapt to or meet the leadership requirements of team innovation (Feng, 2018). The issue of transformation of team leadership that can result in stimulation of TIP has become a real problem for organizational managers.

Research on the relationship between leadership and innovation emphasizes the essential role of leadership in promoting TIP (Randel & Jaussi, 2019). Previous research has explored the impacts of

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paradoxical leadership (Luo et al., 2017), transformational leadership (Feng, 2018; Klaic et al., 2020), and empowering leadership (Tang et al., 2020) on TIP. However, it has overlooked the leadership style that most directly affects TIP—innovative leadership, which refers to the process of leadership by which team members achieve innovative results (Mainemelis et al., 2015). It is critical to identify whether innovative leadership is an effective style for improving TIP and for enriching the leadership behavior elements in the influencing factors of TIP.

Most extant research focuses on the relationship between leadership behavior and TIP, but overlooks another management tool for organizational personnel management—human resource management practices (HRMPs). Innovative leadership is a soft approach, while implemented innovation-oriented HRMPs provide a hard measure for promoting TIP (Peng et al., 2020). Isolated exploration of the impact of innovative leadership on TIP is prone to insufficient explanation of the result variables. This is not conducive to systematically and comprehensively explaining the key factors of TIP (Yin et al., 2018). In addition, the existence of three organizational levels determines the characteristics of HRMPs (Yin et al., 2020a): Planned, implemented, and perceived, which correspond to organizational, team, and individual levels, respectively (Boon et al., 2019; Miao et al., 2020). Previous research has mostly explored the impact of planned HRMPs on innovation at the organizational level (Miao et al., 2020), but more and more organizations tend to delegate the management responsibilities of the human resources department to line managers, who promote and implement HRMPs within their departments. Therefore, further research is needed to explore how implemented innovation-oriented HRMPs at the team level work together with team innovative leadership to promote TIP.

According to the leadership process model (Fischer et al., 2017), team leaders can influence team outcomes (such as TIP) by developing team human resources. TIP is closely related to team knowledge resources (Jiang et al., 2013), and knowledge and abilities that are embedded in team human capital (THC) can help teams to identify innovation opportunities and improve innovation capabilities. THC is a significant variable that affects TIP, and is also meaningful in explaining the impact of HRMPs on outcomes (Jiang et al., 2012). This means that innovative leadership and implemented innovation-oriented HRMPs can work together to affect THC, and ultimately impact TIP. In addition, according to the content-process-results framework of HRM (HRM-CPO), team leaders play a vital role in implementing HRMPs, and their leadership behavior affects the level of implemented HRMPs in organizations (Steffensen et al., 2019; Yin et al., 2020a). Therefore, can innovative leaders affect the implemented innovation-oriented HRMPs, and thus affect THC and, ultimately, TIP?

In summary, this paper aims to explore the following questions: Can innovative leaders influence TIP through THC? Can the implemented innovation-oriented HRMPs affect TIP through THC?

Can innovative leaders affect THC and ultimately TIP through the implemented innovation-oriented HRMPs?

The answers to the above questions have the following theoretical significance: Firstly, integrating leadership behavior and HRMPs in the field of team innovation, in response to the call from Leroy et al. (2018) for research on integration of organizational personnel management in the two major fields, is conducive to revealing the most variances of TIP (Yin et al., 2018). Secondly, based on human capital theory, this study reveals the influence mechanism of innovative leadership and innovation-oriented HRMPs on TIP. Previous research has mostly focused on the resource integration path in the leadership process model, such as motivation stimulation and atmosphere shaping, but has neglected the role of team leadership in human resource development. Strategic HRM (SHRM) emphasizes that the current state of human capital is important for explaining the impact of HRMPs (Jiang et al., 2012). Yin et al. (2020a) have also called for the application of human capital theory in explaining the impact of leadership behavior and HRMPs on team outcomes. By leveraging the HRM process framework, this study explores how innovative leadership can enhance THC by improving the level of implemented innovation-oriented HRMPs, deepening our understanding of the factors that impact THC. In addition, the study expands the work on leadership process modelling of Fischer et al. (2017). That is, it explores whether the implemented organizational HRMPs is a productive way for team leadership to develop human resource.

2 Literature Review and Theoretical Hypotheses

2.1 | Innovative Leadership and Innovation-Oriented HRMPs

Stock et al. (2014) define innovative leadership as the process by which leaders encourage subordinates to adopt an innovative approach. Mainemelis and Kark (2015) define innovative leadership as the process by which leading team members achieve innovative results. This paper uses the definition of Mainemelis and Kark (2015) because their definition is broader and directly refers to innovative results.

Innovative leadership requires leadersto adopt communication and motivation strategies to stimulate subordinates' innovative behavior, and to lead by example and implement innovative behavior themselves (Stock et al., 2014). Unlike traditional leadership, such as transactional leadership, transformational leadership, and empowering leadership, innovative leadership emphasizes providing autonomy, as well as guidance, for team members. It allows team members to explore without direct orders, and avoids influence strategies based on power, normative pressure, and organizational commitment. Instead, innovative leadership strives to achieve a balance between organizational goals and innovation efforts (Mumford et al., 2002; Randel & Jaussi, 2019).

The term innovation-oriented HRMPs refers to a series of practices that support organizational members' innovation by means of motivation, opportunity, and ability. Such practices encourage the submission of novel and

useful ideas by organizational members, and thus promote organizational innovation (Leroy et al., 2018). Based on the Ability-Motivation-Opportunity (AMO) model, Wang (2014) divides innovation-oriented HRMPs into three categories: a) promoting creativity, innovative knowledge and skills, such as focusing on employee diversity in knowledge and skills training; b) incentivizing based on innovation; c) providing more innovation opportunities, such as providing employees with platforms and opportunities to give feedback. Innovation-oriented HRMPs have been found to have a positive impact on employee performance, employee satisfaction, and innovative behavior (Lasisi et al., 2020). Zhang and Sun (2014) find that after controlling high-commitment HRMPs, innovation-oriented HRMPs have additional explanatory power for organizational innovation.

HRMPs have multi-level attributes and can be divided into planned, implemented, and employee-perceived practices (Yin et al., 2018). Planned HRM refers to the HRM system that organizations intend to establish, which is reflected in the formal written HRM policies in the organization and is generally evaluated by the human resource department manager (Boon et al., 2019). Implemented HRM refers to systematic practices implemented by front-line managers through interactions with their subordinates, and are generally evaluated by department managers (Alfes et al., 2013). Perceived HRM refers to employees' subjective evaluations of organizational HRMPs. In the field of SHRM, the focus is on the relationship between planned HRMPs and organizational performance (Jiang et al., 2012), while in the field of organizational behavior, more attention is paid to the impact of employee-perceived HRMPs. In this paper, the implemented innovation-oriented HRM practice belongs to the team-level concept.

Leroy et al. (2018) emphasize that HRMPs and leadership behaviors have the same purpose, which is to effectively manage organizational members, and both have an impact on organizational results. Accordingly, their joint impact on outcome variables should be considered. An increasing number of studies are beginning to explore this joint impact, such as in the context of green transformational leadership and green HRMPs (Peng et al., 2019), and in the sphere of service-oriented leadership and service-oriented HRMPs on service performance (Wang et al., 2018). In addition, according to the HRM-CPO framework, HRM research involves three key areas: HRM policies (i.e., content elements); the implementation of HRM policies (i.e., process factors); and HRM outcomes (such as team performance). The HRM-CPO framework emphasizes that middle-level managers typically participate in the implementation of HRM policies and have a significant impact on HRM processes. Specifically, middle and low-level managers can influence the implementation of HRM policies through budgeting, team atmosphere, communication with team members, empowerment, and attention to HRM issues (Steffensen et al., 2019). Middle-level managers' leadership style is also an important factor influencing whether policies can be effectively

implemented, and different leadership styles will choose different types of practices (Yin et al., 20020). For example, previous research has found that CEO transformational leadership tends to prefer collective-oriented HRMPs (Su et al., 2020). Zhao and Sun (2016) have found that CEO transformational leadership adopts SHRM, which then affects organizational performance. Their research demonstrates the relationship between CEO leadership behavior and HRM content at the organizational level.

2.2 | The Mediating Role of THC between Innovative Leadership and TIP

As the proportion of knowledge-intensive activities in the workplace increases, human capital has been playing an increasingly important role (Unger et al., 2011). Human capital refers to the knowledge, skills, and abilities embedded in individuals, which determine their work capabilities through their experiences in school, in the workplace, and elsewhere (Becker, 1964). Compared to psychological and social capital, human capital has a stronger predictive role in individual career success (Zhou et al., 2015). Human capital applies not only to individuals but also to teams and organizations and can be measured at the group level (Blanco-Mazagatos et al., 2018). Indeed, organizations are more concerned about group (such as team or organizational) human capital than about individual human capital (Subramanuam & Youndt, 2005). Borrowing the definition from individual human capital, this paper defines THC as the knowledge, skills, and abilities embedded in the team. The interdependence between team members, including complicated social relationships, makes THC complicated in causality and more difficult to imitate (Yin et al., 2020a).

The human capital theory is an important mechanism for explaining team leadership behavior and team outcomes (Yin et al., 2020a). According to the leadership process model, at the team level, leaders can influence team outcomes by developing human resources (Fischer et al., 2017). Innovative leadership can improve team resources (such as human capital) by influencing the similarity of team members' mental models, promoting team learning, and providing team guidance (Fischer et al., 2017). Research on team leadership emphasizes that one of the core responsibilities of leaders is to develop subordinates, help team members acquire job-related knowledge and skills, and help team members to form shared mental models (Subramony et al., 2018). Innovative leaders guide team members to innovate through their own actions in daily management and through support for subordinates with innovative ideas; this helps the team to form a collective mental model that emphasizes innovation and stimulates team members' exploration of new knowledge and tolerance of new practices. Moreover, innovative leaders set goals that help team members to innovate. Such leaders encourage subordinates to innovate, and promote the accumulation of individual knowledge and skills. In addition, innovative leaders lead by example, constantly innovating in their work, which helps to transmit new knowledge to the

team. Thus, innovative leadership has a positive impact on THC.

The human capital theory emphasizes that human capital is the core driving factor by which organizations can gain competitive advantages (Blanco-Mazagatos et al., 2018). THC is the foundation for improving TIP. High THC is characterized by evidence of team creativity and possession of various skills, with a high level of professionalism. High THC helps teams to acquire diverse knowledge and skills, enhancing their flexibility in this process (Subramanuam & Youndt, 2005). Furthermore, team members with high human capital are more likely to challenge existing rules and common sense, which improves the team's ability to absorb and transfer knowledge, and is conducive to enhancing team innovation ability (Subramanuam & Youndt, 2005). Therefore, this paper proposes the following hypothesis.

H1: THC plays a mediating role in the relationship between innovative leadership and TIP.

2.3 | The Mediating Role of THC between Implemented Innovation-Oriented HRMPs and TIP

Human capital theory is an important theory for explaining the implemented innovation-oriented HRMPs and team outcomes (Wright & Ulrich, 2017). The implemented innovation-oriented HRMPs can promote the accumulation of THC based on opportunities, motivations, and abilities. From the perspective of skills, prioritizing the training of employees with multiple skills, and promoting employees to acquire new knowledge and skills through job rotation can directly improve the human capital of team members. Human capital theory also emphasizes that on-the-job training and experience contribute to improving human capital (Becker, 1964). Additionally, innovation-oriented HRMPs that focus on the proactivity and creativity of job candidates can directly improve THC through recruitment (Lasisi et al., 2020). From a motivational perspective, the implemented innovation-oriented HRMPs emphasizes the evaluation of employee abilities, providing constructive and developmental feedback to employees, which can motivate them to expand their knowledge and skills. Furthermore, innovation-oriented HRMPs do not encourage "individual heroism," but emphasize the combination of individual and team performance evaluations; this approach is conducive to positive interactions between team members, promoting team knowledge sharing as well as knowledge management, and expanding the pool of human capital resources (Li et al., 2018). From an opportunity perspective, teams encourage employees to participate in decision-making and propose innovative ideas; this approach is conducive to team members testing the "quality" of their own knowledge and skills, and promoting the use of their human capital. According to social learning theory, past experience is an important way for individuals to learn. The implemented innovation-oriented HRMPs provides opportunities for individual ability development, allowing employees to gain more experience and training. This is

helpful for consolidating and accumulating knowledge and skills. Relevant studies have also found that innovation-oriented HRMPs can retain employees with similar mindset through similar attraction, thereby strengthening the team's cooperative atmosphere and improving individual absorptive capacity (Lasisi et al., 2020). THC is the foundation of team innovation, and Subramaniam and Youndt (2005) confirm that human capital has a positive impact on innovation capability. Chen and Huang (2009) also have found that by implementing a series of HRMPs, enterprises can improve employees' abilities to acquire, share and apply knowledge, thereby improving TIP. Therefore, the following hypothesis is proposed.

H2: THC plays a mediating role in the relationship between innovation-oriented HRMPs and TIP.

2.4 | The Mediating Role of Implemented Innovation-Oriented HRMPs between Innovative Leadership and THC

The framework of HRM-CPO indicates that at the team level, innovative leadership has a positive impact on the implemented innovation-oriented HRMPs.

Firstly, motivation is an important influencing factor regarding middle-level managers' acceptance of HRM responsibilities (Wang et al., 2017). Innovative leadership pays more attention and is more enthusiastic about promoting innovation-oriented HRMPs because they align with the goals of innovative leadership: enhancing TIP.

Secondly, innovation-oriented HRMPs in the organization are promoted and implemented by team leaders, and their leadership style influences how they communicate specific HRM policies and content with employees (Boon et al., 2019). Innovative leadership actively communicates with team members to explain the purpose and significance of innovation-oriented HRMPs, emphasizes the benefits of these practices to employees, and achieves the unity of individual innovation efforts and organizational goals.

Thirdly, innovation-oriented HRMPs provide effective means for innovative leadership to motivate employees to innovate (Purcell & Hutchinson, 2007). For example, innovative leadership can improve the level of implemented innovation-oriented HRMPs by developing and implementing performance management policies that focus on team innovation, by setting department budgets, by rewarding high-performing team members, and by actively sending department employees to participate in training. Finally, innovative leadership contributes to shaping a team innovation atmosphere, which can increase team members' acceptance of innovation-oriented HRMPs (Yin et al., 2020a), and can promote the implementation of these practices (Bowen & Ostroff, 2004).

Based on *H2*, which states that the implemented innovation-oriented HRMPs has a positive impact on TIP, this paper proposes the following hypothesis.

H3: Implemented innovation-oriented HRMPs mediate the relationship between innovative leadership and THC.

2.5 | The Continuous Mediating Effect of the Implemented Innovation-Oriented HRMPs and THC

Leadership behavior and HRMPs are both important ways of managing organizational personnel. SHRM and leadership process models both emphasize human capital as an important mechanism for explaining the impact of HRMPs and the impact of leadership behavior on individual/team/organizational outcomes (Leroy et al., 2018; Purcell & Hutchinson, 2007; Wang et al., 2017). In the HRM-CPO framework (Steffensen et al., 2019), at the team level, innovative leadership can improve the level of implemented innovation-oriented HRMPs. Therefore, this paper proposes the following hypothesis.

H4: Innovative leadership increases THC and indirectly influences TIP by improving the level of implemented innovation-oriented HRMPs.

Based on the above hypotheses, this paper proposes the research model shown in Figure 1.

3 Research Design

3.1 | Research Subject

The data for this paper come from a large state-owned enterprise in China, which owns more than 60 subsidiary companies and research institutes mainly engaged in automobile manufacturing and services. The group has been advocating innovation in recent years, encouraging its subsidiary companies to explore and implement innovation-oriented HRMPs based on the actual situation of each company, without violating the policies and guidelines of the group headquarters. This paper selects 56 subsidiary companies and research institutes, involving various departments of the subsidiary companies, such as finance, marketing, R&D, technology and sales. With the support of the group's HR department, the research team explains the academic research purpose of this survey, as well as the specific distribution and collection of questionnaires, to the responsible persons of each subsidiary company's HR department during the meeting held by the group. The questionnaire survey is conducted by mail, with the assistance of the human resources departments of the 56 subsidiary companies. Two sets of questionnaires, the employee survey questionnaire and the department manager survey questionnaire, are distributed to each subsidiary company. The questionnaires are placed inside envelopes, and instructions on the purpose and on the operation of this survey are attached. In order not to add too

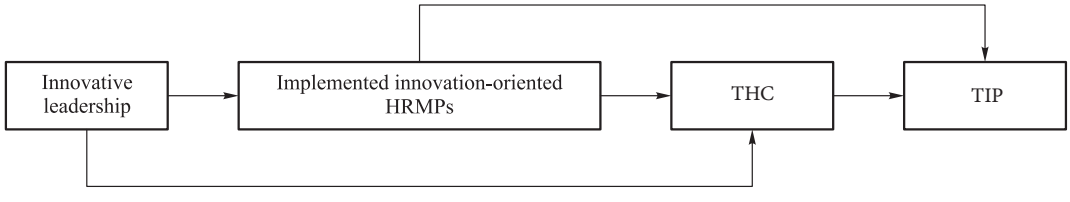

Figure 1 Research Model

much pressure and workload to the HR departments of each subsidiary company, each company is asked to randomly select 5 to 8 departments, with each department selecting at least 5 employees to fill out the employee survey questionnaire. If the number of employees in a department is less than 5, the employee survey questionnaire should be filled out by the actual number of employees. The specific operation process is as follows. Firstly, the relevant employees of each department are invited to evaluate the department's innovative leadership level and fill in personal basic information. After completing the questionnaire, responders are required to tear off the double-sided tape of the envelope and seal it. Secondly, the department manager in each case was invited to evaluate the department's implemented innovation-oriented HRMPs, departmental human capital, and departmental innovation performance, to fill in personal basic information, and to seal the envelope, as above. Finally, the human resources department employees of each subsidiary company are responsible for collection from responders and for putting the collected employee and leadership questionnaires of the same department into a large envelope and mailing them to the research team.

A total of 284 team leader questionnaires and 1,416 employee questionnaires are collected from groups of managers and employees of the same subsidiary companies. First, the responses are carefully reviewed, and data with noticeable quality issues such as repeated selection of the same item or excessive missing data are deleted. Second, box plots are created using SPSS software to reflect the distribution characteristics of each item, and outliers and extreme values beyond the upper boundary (lower quartile – 1.5 times the interquartile range) and lower boundary (lower quartile + 1.5 times the interquartile range) are identified and removed (Desimone et al., 2015). Finally, teams with less than three valid responses from team members are excluded to ensure the accuracy of innovative leadership evaluation. A total of 259 valid leadership questionnaires and 1,278 valid employee questionnaires are thus obtained, with a questionnaire response rate of 90.41%. Although the individual-level sample size does not meet the requirement of at least 20 people for manager group and for employee group, the total number of subjects exceeds 1,000, and the team-level sample size is much larger than the standard of 50 that are required for statistical power. In addition, the sample size of this study reaches the median of the actual sample size used in cross-level studies published in the *Journal of Applied Psychology* from 2000 to 2010 (level 1 sample size of 5 and level 2 sample size of 51). Moreover, since this study focuses on the relationship between team-level variables, the statistical power of the team-level sample is more significant than that of the individual-level sample (Mathieu et al., 2012). Therefore, it is reasonable to believe that this study has strong statistical power. Among the team leader sample, males account for 76.83%, with an average age of 37.69 years (SD = 0.42), and 86.27% have a bachelor's degree or above. The average work experience is 19.94 years (SD = 8.03). Among the team member

sample, males account for 53.05%, with an average age of 36.27 years (SD = 8.39), and 71.91% have a bachelor's degree or above. The average work experience is 13.02 years (SD = 9.73), and the average length of time working with their supervisor is 4.46 years (SD = 4.64). The average team size is 4.94 people. In addition, independent sample *t*-tests are conducted to compare the valid samples and the excluded samples, and the results showed no significant differences in innovative leadership (P = 0.78), implemented innovation-oriented HRMPs (P = 0.09), THC (P = 0.76), TIP (P = 0.27), or demographic variables. This indicates that the valid sample is suitable for subsequent research analysis.

3.2 | Variable Measurement

Except for the implemented innovation-oriented HRMPs, the scales for other variables are derived from existing English-language literature and have been widely validated to ensure their reliability and validity. For English-language materials, the standard translation-back-translation procedure was followed to ensure clarity, accuracy, and readability of the translated questions.

3.2.1 *Innovative Leadership*

A 6-item scale developed by Stock et al. (2014) is used, with measurement statements, inviting levels of agreement or disagreement, such as "He/she particularly supports subordinates with innovative ideas" and "He/she encourages activities that promote innovation." The scores for innovative leadership behavior of the team leader, as evaluated by each subordinate in each team, are added and averaged to obtain the level of innovative leadership behavior of the team leader. The calculated average R_{wg} is 0.93; ICC (1) is 0.19 and ICC (2) is 0.53, both of which are higher than the requirements for data aggregation from low-level variables to high-level variables (Koo & Li, 2016). A Likert 5-point evaluation is used, ranging from "highly unfit = 1" to "highly fit = 5." The composite reliability of this scale at the team level in this study is 0.94. The composite reliability on the basis of the structural equation model (SEM) allows for different factor loadings on the latent construct of the items (Tian et al., 2019), which is more accurate than results based on the consistency coefficient alpha in most cases (Wu & Yuan, 2012).

3.2.2 *Implemented Innovation-Oriented HRMPs*

Using the 11-item scale developed by Wang (2014), team managers evaluate the implemented HRMPs within the team. Typical measurement items include "emphasizing employee diversity training" and "combining individual performance evaluation with team performance evaluation." A Likert 5-point evaluation is used, ranging from "highly unfit = 1" to "highly fit = 5." Compared with "agree or disagree," "fit or unfit" is more objective and descriptive (Boon et al., 2019). The composite reliability of this scale in this study is 0.92.

3.2.3 *Team Human Capital* (*THC*)

Human capital can be measured in two ways: human capital investment and human capital outcomes (Unger et al.,

2011). Human capital investment includes education level, and work experience, while human capital outcomes refer to the knowledge and skills acquired from the above investment. Given that not all human capital investments can be transformed into knowledge and skills, measuring human capital from an outcome-oriented perspective can more directly reflect the results of team learning and have a more direct impact on behavior and performance (Unger et al., 2011). Therefore, this paper uses a 5-item questionnaire developed by Subramaniam and Youndt (2005) to measure human capital, with typical measurement statements, requiring responses giving levels of agreement and disagreement, such as "Our department's employees are smart and creative" and "Our department's employees are experts in their positions." The Likert 5-point scale is used, ranging from "highly unfit = 1" to "highly fit = 5." Blanco-Mazagatos et al. (2018) also measure organizational human capital based on this scale, evaluated by the CEO of each subsidiary company, and confirm that the reliability and validity of the scale are good. In this study, the composite reliability of the scale is 0.83.

3.2.4 *Team Innovation Performance (TIP)*

The 4-item scale developed by Farh et al. (2010) is adopted to measure TIP, with typical measurement items such as "The work results of our team are innovative" and "Our team has proposed many creative solutions to problems." The Likert 5-point scale is used, ranging from "highly unfit = 1" to "highly fit = 5." In this study, the composite reliability of the scale is 0.81.

3.2.5 *Control Variable*

Based on previous research (Ali et al., 2020; Chen et al., 2020; Li et al., 2019), the study controls for team type, average work tenure, average age, leader age, and leader gender. Additionally, the study also controls for gender ratio, average time spent with superiors/subordinates, average education level of the team, leader education level, and leader work tenure. Team type ("business team = 1" and "non-business team = 0") and gender ("male = 1" and "female = 0") are treated as dummy variables. Age and work tenure are measured in actual number of years, while education level is categorized as follows: 1 = technical secondary school, high school or below, 2 = junior college, 3 = bachelor, 4 = master, 5 = doctorate or above.

3.3 | Statistical Analysis Methods

First, innovative leadership is evaluated by department employees at the individual level, while other variables are evaluated by team leaders at the team level. Multilevel confirmatory factor analysis (MCFA) is used to determine the construct validity of the research model. Second, the average variance extracted (AVE) of each variable is calculated and the square root of AVE is compared with the correlation coefficient of the variable's row/column to further validate the discriminant validity between variables. Next, correlation analysis was performed on the sample data. Finally, software Mplus 8.1 is used to conduct path analysis on the research model, and bootstrap method (repeated sampling 20,000 times) is used to

estimate the 95% confidence interval of the mediating effect for more robust estimation. In addition, since team data have been nested within the level of subsidiary companies, Mplus is used for cross-organizational team-level confirmatory factor analysis to distinguish the variances between intra-group and inter-group.

4 Research Results

4.1 | Reliability and Validity Analysis

First, exploratory factor analysis is conducted using the Harman single-factor test to examine the common method bias. The first factor extracted without rotation accounts for 29.70% of the total variance, indicating that there is no serious common method bias. Second, a cross-level confirmatory factor analysis is conducted to determine the discriminant validity between different variables. Both inter-group and intra-group analyses included innovative leadership, as that exhibited significant variation at both the individual and team levels. Factor analysis is conducted at the team level for the innovative orientation of leadership evaluation, THC, and TIP, using two-factor, three-factor, and four-factor competitive models. The fit results of various confirmatory factor analysis models are shown in Table 1. The five-factor model had the best fit, and the four-factor, three-factor, and two-factor structures after merging the team-level factors are not acceptable, indicating that the constructs themselves had good discriminant validity.

Table 2 shows the results of the five-factor MCFA at both levels. The individual and team levels are found to be mutually independent after being processed by the cross-level model, so level-specific reliability is used. Since this study focuses on the team level analysis, particular attention is paid to the team-level results, including the composite reliability (CR) and average variance extracted (AVE) for assessing convergent validity. From the team-level MCFA perspective, the standardized factor loadings are all above 0.6, the composite reliability is above 0.8, and the AVE is greater than or close to 0.5, indicating good structural validity of the scale. In addition, the square roots of the AVEs for the four variables are all greater than the correlation coefficients between the constructs, further verifying the independence of the four constructs.

4.2 | Correlation Analysis

Table 3 presents the means, standard deviations, and correlation coefficients of the variables. The results show that innovative leadership is significantly positively correlated with the implemented innovation-oriented HRMPs (r = 0.25, P < 0.01), THC (r = 0.14, P < 0.05), and TIP (r = 0.25, P < 0.01). The implemented innovation-oriented HRMPs is significantly positively correlated with THC (r = 0.34, P < 0.01) and TIP (r=0.46, P < 0.01). Team THC is significantly positively correlated with TIP (r=0.38, P < 0.01).

4.3 | Path Analysis and Hypothesis Testing

Based on controlling for variables such as team type, team average work years, team average age, leader age, and leader gender, this

Table 1 Goodness of Fit Indices for the Original Model and Competing Models

Model	χ^2	df	χ^2/df	CFI	TLI	SRMR	
5-Factor Model (*CLw*, *CLb*, *CHRM*, *HC*, *CP*)	857.46	302	2.84	0.90	0.89	Intra-group	0.06
						Inter-group	0.07
4-Factor Model(*CLw*, *CLb+CHRM*, *HC*, *CP*)	919.58	305	3.02	0.89	0.88	Intra-group	0.08
						Inter-group	0.15
4-Factor Model(*CLw*, *CLb+HC*, *CHRM*, *CP*)	935.84	305	3.07	0.89	0.87	Intra-group	0.09
						Inter-group	0.17
4-Factor Model(*CLw*, *CLb+CP*, *CHRM*, *HC*)	909.92	305	2.98	0.89	0.88	Intra-group	0.08
						Inter-group	0.13
4-Factor Model(*CLw*, *CHRM+HC*, *CLb*, *CP*)	1207.50	305	3.96	0.84	0.82	Intra-group	0.06
						Inter-group	0.09
4-Factor Model(*CLw*, *CHRM+CP*, *CLb*, *HC*)	1096.61	305	3.60	0.86	0.84	Intra-group	0.06
						Inter-group	0.09
4-Factor Model(*CLw*, *HC+CP*, *CLb*, *CHRM*)	1087.63	305	3.57	0.86	0.84	Intra-group	0.06
						Inter-group	0.08
3-Factor Model(*CLw*, *CLb+CHRM+HC*, *CP*)	1268.40	307	4.13	0.83	0.81	Intra-group	0.08
						Inter-group	0.17
3-Factor Model(*CLw*, *CLb+CHRM+CP*, *HC*)	1151.12	307	3.75	0.85	0.83	Intra-group	0.08
						Inter-group	0.16
3-Factor Model(*CLw*, *CLb+HC+CP*, *CHRM*)	1144.40	307	3.73	0.85	0.83	Intra-group	0.08
						Inter-group	0.15
3-Factor Model(*CLw*, *CHRM+HC+CP*, *CLb*)	1419.64	304	4.67	0.80	0.78	Intra-group	0.06
						Inter-group	0.10
2-Factor Model (*CLw*, *CLb+CHRM+HC+CP*)	1473.68	308	4.78	0.80	0.77	Intra-group	0.08
						Inter-group	0.17

Note. *N*=1,278; *CLw*=Intra-group innovative leadership, *CLb*=Inter-group innovative leadership, *CHRM*=Inter-group implemented innovation-oriented HRMPs, *HC*=Inter-group THC, *CP*=Inter-group TIP; "+" denotes combination.

Table 2 Reliability, Convergent Validity, and Discriminant Validity of MCFA

	Discriminant validity							
	Individual level				Team level			
	1	2	3	4	1	2	3	4
1. Innovative leadership	0.67				0.86			
2. Innovation-oriented HRM					0.36*	0.72		
3. THC					0.16*	0.39*	0.70	
4. TIP					0.37*	0.53*	0.47	0.72
Standardized factor loading					0.60–0.96	0.63–0.77	0.63–0.76	0.68–0.76
Composition reliability (CR)					0.94	0.92	0.83	0.81
Convergent validity (AVE)					0.73	0.51	0.49	0.52

Note. $N = 1,278$; * represents $P < 0.05$; the data below the diagonal are correlation coefficients, and the data on the diagonal are the square root of the average variance extracted (AVE).

Table 3 The Means, Standard Deviations, and Correlation Coefficients of Each Variable

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Team type														
2. Team gender ratio	−0.24**													
3. Team average age	0.13*	−0.06												
4. Team average education	−0.05	0.08	−0.539**											
5. Team average work years	0.08	−0.05	0.84**	−0.52**										
6. Team average time spent between superiors and subordinates	0.17**	−0.02	0.31**	−0.17**	0.25**									
7. Leader gender	−0.06	0.14*	−0.09	0.01	−0.06	−0.05								
8. Leader age	0.03	−0.09	0.13*	−0.06	0.11	0.13*	−0.12*							
9. Leader education level	0.03	0.02	−0.07	0.26**	−0.09	−0.03	0.02	−0.18**						
10. Leader work years	0.05	−0.09	0.22**	−0.10	0.26**	0.12	−0.07	0.77**	−0.16*					
11. Innovative leadership	0.14*	−0.07	−0.14*	0.03	−0.08	−0.05	−0.01	−0.03	0.11	−0.09	0.94			
12. Innovation-oriented HRM	0.10	0.04	−0.08	0.15*	−0.08	−0.15*	0.02	−0.03	0.03	−0.10	0.25**	0.92		
13. THC	0.04	0.02	−0.05	0.15*	−0.07	−0.05	0.00	−0.13*	0.12	−0.09	0.14*	0.34**	0.83	
14. TIP	0.06	−0.10	−0.04	0.05	−0.07	−0.04	−0.04	−0.10	0.17**	−0.08	0.25**	0.46**	0.38**	0.81
Mean	0.14	1.46	36.37	2.78	13.09	4.49	1.23	43.01	3.05	19.94	3.50	3.82	3.56	3.95
Standard deviation	0.35	0.30	5.18	0.42	6.72	2.99	0.42	6.44	0.53	8.03	0.34	0.49	0.52	0.52

Note. $N = 259$; * represents $P<0.05$,** represents $P<0.01$.

paper analyzes mediating effect and tested bootstrap (with 20,000 resamples) mediating effect to estimate the 95% confidence interval of the mediating effect for testing the overall hypothesis model (Preacher et al., 2010). Furthermore, to test whether this model could also apply at the organizational level, this study calculates the ICC of all team-level variables. The results for the following do not meet the requirements for low-level variables to aggregate to high-level data: for innovative leadership, ICC (1) = 0.132, ICC (2) = 0.407: for implemented innovation -oriented HRMPs, ICC (1) = 0.085, ICC (2) = 0.274); for THC, ICC (1) = 0.047, ICC (2) = 0.181; and for TIP, ICC (1) = 0.001, ICC (2) = 0.007. In addition, the design effect (*deff*= 1+ (group average size–1) ×ICC) of the four team-level variables did not meet the requirements for cross-level analysis (*eff* > 2) (Sun et al., 2018). The confirmatory factor analysis model for cross-team-organizational level fails to fit, indicating that the research variables are not suitable for aggregation to the organizational level for study. Possible reasons include small ICC values, small inter-group covariance matrix elements, and small organizational-level sample sizes (Wang & Bi, 2018). Therefore, as far as the analysis results of this sample are concerned, the research model is not applicable to the organizational level; this should be explored in the future by expanding the sample. The path coefficients of the team-level model are shown in Table 4.

Table 4 shows that the impact of innovative leadership on THC is not significant ($\beta = -0.02$, $P > 0.05$), thus negating *H1*. In addition, innovative leadership has a significant positive impact on the implemented innovation-oriented HRMPs ($\beta = 0.22$, $P<0.001$). The implemented innovation-oriented HRMPs has a positive impact on THC ($\beta = 0.37$, $P<0.001$). Therefore, the implemented innovation-oriented HRMPs plays a fully mediating role between innovative leadership and THC, and *H3* is supported. Furthermore, the implemented innovation-oriented HRMPs ($\beta = 0.41$, $P < 0.001$) and THC ($\beta = 0.21$, $P < 0.01$) positively predict TIP, indicating that THC partially mediates the relationship between the implemented innovation-oriented HRMPs and TIP. Therefore, *H2* is verified. Combining the verifications of *H2* and *H3*, the continuous mediating effect of implemented innovation-oriented HRMPs and THC on innovative leadership and TIP is also confirmed, and *H4* is supported. The model pathway relationship is shown in Figure 2.

In addition, bootstrapping is currently the best method for testing mediating effects (Hayes, 2009). The bootstrapping (with 20,000 resamples) mediating effect testing results are shown in Table 5.

The mediating effect of THC on the relationship between innovative leadership and TIP is not significant (indirect effect = –0.01, $P > 0.05$), and the confidence interval contains 0 (95% CI = (–0.054, 0.039)), so *H1* is still unsupported. In addition, the implemented innovation-oriented HRMPs has a significant indirect effect on TIP through THC (indirect effect = 0.08, $P <$ 0.01), and the confidence interval does not include 0 (95% CI = (0.023, 0.140)). The mediating effect of innovation-oriented HRMPs between innovative leadership and

Table 4 The Impact of Innovative Leadership on TIP: The Mediating Role of Innovation-Oriented HRMPs and THC

	Innovation-oriented HRMPs (mediation)	THC (mediation)	TIP (dependent variable)
Control variables			
Team type	0.12	−0.01	0.02
Team gender ratio	0.03	−0.02	−0.12
Team average age	0.00	0.09	−0.05*
Team average education	0.18*	0.09	−0.10
Team average work years	0.05	−0.04	0.00
Team average time spent between superiors and subordinates	−0.11	−0.02	0.04
Leader gender	0.06	−0.05	−0.04
Leader age	−0.02	−0.17	−0.05
Leader education	−0.08	0.08	0.16
Leader work years	−0.04	0.10	0.01
Independent variable			
Innovative leadership	0.22***	−0.02	−0.02
Mediation variables			
Innovation-oriented HRMPs		0.37***	0.41***
THC			0.21**
Intercept	4.86***	4.00*	4.77***
R^2	0.12**	0.17***	0.31***

Note. $N = 259$; * represents $P<0.05$,** represents $P<0.01$, *** represents $P<0.001$.

THC is significant (indirect effect = 0.13, $P < 0.01$, 95% CI = (0.039, 0.228)), thus verifying *H2* and *H3*. Finally, the test for continuous mediating effect found that the mediating effect of innovation-oriented HRMPs on THC is not significant (indirect effect = 0.03, $P > 0.05$), but the confidence interval obtained from the bootstrap test does not include 0 (95% CI = (0.004, 0.055)), so the mediating effect coefficient is still significant (Wen & Ye, 2014). Innovative leadership is found to influence THC through the implemented innovation-oriented HRMPs, thereby further affecting TIP, supporting *H4*.

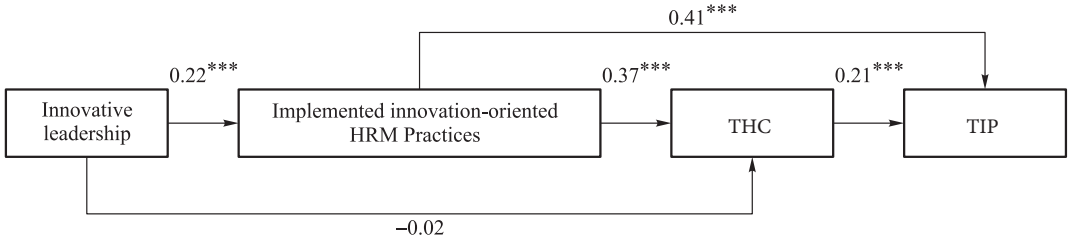

Figure 2 Path Analysis Results

Note. N=259; * represents $P<0.05$,** represents $P<0.01$,*** represents $P<0.01$.

Table 5 Mediating Effect of Innovation-Oriented HRMPs and THC

Bootstrapping	Indirect effect	95% CI
H1: IL → THC → TIP	–0.01(0.76)	(–0.054, 0.039)
H2: Innovation-oriented HRMPs → THC → TIP	0.08*(0.01)	(0.023, 0.140)
H3: IL → Innovation-oriented HRMPs → THC	0.13**(0.01)	(0.039, 0.228)
H4: IL → Innovation-oriented HRMPs → THC → TIP	0.03(0.06)	(0.004, 0.055)

Note. *N*=259; * represents *P*<0.05, ** represents *P*<0.01.

5 Research Results and Analyses

5.1 | Results Analyses

Based on the research data from a large state-owned enterprise, this study shows that THC is an important mechanism for explaining the impact of innovation-oriented HRMPs on TIP. However, THC does not mediate the effect of innovative leadership on TIP. Instead, innovative leadership can enhance THC by improving the level of implemented innovation-oriented HRMPs, which in turn affects TIP.

Firstly, the conclusion that THC does not mediate the relationship between innovative leadership and TIP is similar to the findings of Wang et al. (2018) at the individual level. Wang et al. (2018) have found that leadership behavior has a strong influence on service innovation through motivating and providing opportunities for employees, while HRMPs have strong impact on employee performance through skill development. Although the leadership process model emphasizes that leadership behavior can affect team outcomes through developing human resources (Fischer et al., 2017), this study does not confirm this assertion. One possible reason is that THC, as interpreted in this study, is still a relatively broad concept, and it is necessary to choose team resources that are more closely related to innovation to further validate the leadership process model. In addition, the Leadership Substitutes Theory also emphasizes that leadership behavior can directly or indirectly affect organizational outcomes (Yin et al., 2017), and innovative leadership may be more inclined to have a direct impact on TIP and an indirect impact on THC.

Secondly, THC plays a mediating role in the relationship between implemented innovation-oriented HRMPs and TIP. Human capital is the core capability by which organizations can innovate (Rasool et al., 2019), and its formation is influenced by organizational management processes (Tong et al., 2019). This study confirms that implemented innovation-oriented HRMPs as an important means of organizational management can enhance THC and have a positive impact on TIP. This is consistent with previous research findings, such as the study by Jiang et al. (2012), which finds that organizational human capital is an important mediating mechanism for the impact of HRMPs on organizational performance. In addition, the review of SHRM by Wright and Ulrich (2017), emphasizes that HRMPs are an important means of shaping human capital.

Finally, innovative leadership can indirectly affect TIP by promoting the implemented innovation-oriented HRMPs to enhance THC. This study validates the hypothesis that innovative leadership is an important influencing factor for

implementing innovation-oriented HRMPs at the team level. Previous research has also emphasized that managers at different levels have different degrees of influence on the HRM process, suggesting (Nishll et al., 2008), for example, that middle-level managers should take on more HRM responsibilities, and their leadership styles will affect the effectiveness of HRMPs (Perry & Kulik, 2008). The HRM-CPO framework also emphasizes that middle-level managers are important influencing factors for the implemented team-level HRMPs (Steffensen et al., 2019). The conclusion of this study is consistent with the above logic and further emphasizes the importance of leadership styles in influencing the HRM process and the importance of implemented HRMPs as a mechanism for leadership behavior to affect team outcomes.

5.2 | Theoretical Significance

By revealing the common mechanism of innovative leadership and implemented innovation-oriented HRMPs on TIP, this study offers several theoretical contributions.

Firstly, it reveals the common influence of innovative leadership and implemented innovation-oriented HRMPs on TIP. For a long time, scholars have either focused on the impact of leadership behavior on team innovation, or have explored the impact of implemented innovation-oriented HRMPs on team innovation, but have ignored the joint effect of the two contextual factors (Stock et al., 2014). Such approaches are not conducive to the theoretical understanding of "how to effectively improve TIP," because a team is not only influenced by leadership behavior or HRMPs, but also by various other factors in the workplace. This study integrates innovative leadership and implemented innovation-oriented HRMPs, and enriches the theoretical understanding of the factors influencing TIP by revealing the two major tools for team innovation management.

Secondly, based on human capital theory, this study integrates the leadership process model and SHRM research. The leadership process model emphasizes that team leadership can affect team outcomes not only through resource integration but also through resource development, and human capital is an important resource for teams (Fischer et al., 2017). SHRM emphasizes that human capital provides an important mechanism for explaining the impact of HRMPs on outcomes, and Wright and Ulrich (2017) have called for more application of human capital theory to explain the impact of HRMPs on organizational outcomes. This study takes THC as the common mediator between innovative leadership, on one hand, and the implemented innovation-oriented HRMPs, on the other hand, on TIP. The results show that the role of innovative leadership is limited, and the implemented innovation-oriented HRMPs has more impact on TIP through THC. The research conclusion does not support the leadership process model, suggesting that future research could usefully consider the boundary conditions of the relationship between innovative leadership and THC factors such as team learning orientation.

Thirdly, this study validates the

HRM-CPO framework and extends the research level of the joint effect of HRMPs and leadership behavior. The HRM-CPO framework emphasizes that team-level leadership behavior is an important influencing factor for the HRM process in organizations (Steffensen et al., 2019), and this study supports this argument, finding that innovative leadership is conducive to the implemented innovation-oriented HRMPs. In addition, this study extends the research level of the joint effect of HRMPs and leadership behavior. Previous research on the joint effect of the two has either been at the organizational level or at the individual employee level, and there has been no research on the joint effect at the team level. For example, Peng et al. (2020) explore the impact of green transformational leadership and green HRMPs on employee green behavior at the individual level. Su et al. (2020) explore the impact of CEO transformational leadership on collectivism-oriented HRM content at the organizational level. Zhao and Sun (2016) confirm the influence of CEO transformational leadership on SHRM content, but both leadership behavior and HRMPs are multi-level constructs (Yin et al., 2018; Yin et al., 2020a). This study fills the gap in previous research that has lacked integration at the team level and responds to the call by Leroy et al. (2018) for integration of the two major research domains of HRMPs and leadership behavior.

5.3 | Practice Implications

TIP is the key to connecting individual employee innovation with organizational innovation. The implications of this study are as follows.

Firstly, to further reform state-owned enterprises and enhance organizational vitality, organizations should promote TIP through both focusing on building innovative leadership and on implementing "hard" systems in order to maximize the TIP. The innovation-oriented HRMPs can be introduced and implemented from the perspective of ability, opportunity, and motivation. They can include emphasizing diversified employee knowledge and skill training, providing incentives based on innovation, and providing more innovative opportunities and platforms for employees to express their opinions. In terms of innovative leadership, organizations can identify the shortcomings of team innovation leaders through talent inventories and through provision of targeted training and development.

Secondly, innovative leadership and innovation-oriented HRMPs play different roles in promoting TIP. Innovative leadership has a more direct impact, while innovation-oriented HRM system has a more indirect impact. Innovative leadership can directly influence team innovation through its own creativity, rewards and punishments based on employee innovation performance, while implemented innovation-oriented HRM system can indirectly promote team innovation by enhancing THC through diversified training, combining team and individual assessments, and designing compensation. This suggests that organizational managers can improve THC through the implemented HRM systems, which is an important way to reduce the

team's dependence on team leaders for innovation performance.

Finally, team innovative leadership is an important influencing factor in introducing and implementing organizational innovation-oriented HRM policies. When recruiting or promoting team leaders, attention should be paid to examining their leadership style, and leaders who encourage team innovation and lead by example should be given priority under otherwise equal conditions. In the daily management of the organization, it is also important to emphasize that team leaders are the first responsible person for implementing team HRMPs, that is, to strengthen the HRM responsibilities of team leaders.

5.4 | Limitations and Future Directions

Firstly, this study used cross-sectional data, which cannot infer causality between variables. Fischer et al. (2017) emphasize in the leadership process model that cross-sectional data are appropriate for relatively stable variables at the team level, such as team leadership style, team ability, team performance.

Secondly, based on the human capital theory, integrating the leadership process model (Fischer et al., 2017) and the HRM-CPO model (Steffensen et al., 2019), this study verifies the mediating role of THC in the influence of leadership behavior on the implemented innovation-oriented HRMPs, but does not control for other possible mediating mechanisms, such as turnover intention (Jiang et al., 2015). Future research can further compare whether innovative leadership can affect TIP through human resource development (THC) and resource integration (such as team behavior integration and team cohesion).

Thirdly, regarding the measurement of innovation-oriented HRMPs, this study refers to previous research and used a simple average of different practices by stacking them, without reflecting the synergistic effect within different practices (Boon et al., 2019). Future research can use emerging techniques, such as latent profile analysis, to analyze the antecedents and results of different practice combinations of innovation-oriented HRMPs. Such an approach can be an important supplement to the traditional variable-centered research path (Yin et al., 2020b).

Fourthly, from the perspective of research subjects, to limit the variation of different HRMPs in different types of enterprises, this study only selects a large state-owned enterprise. Although the sample size is large and data are collected from multiple sources and levels (Miao et al., 2020), the generalizability of the research conclusions needs further verification. Future research can compare the moderating effect of ownership types on different paths in this study, such as whether the influence of innovative leadership on the implemented innovation-oriented HRMPs is the same in enterprises with different ownership types.

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