

Article

# Human Resource Practice Management for Knowledge Intensive Team: IMPACT on Team Innovation Performance and Substitution Effect of Empowerment Leadership

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**Abstract:** As an important factor in society development, human resource management is crucial to enhance the effectiveness of an organization. In this paper, the research focuses on the human resource management practice in knowledge-intensive teams, and studies the relationship between knowledge sharing and team innovation performance in combination with the practice of ability improvement, opportunity improvement and motivation improvement, aiming at verifying the various research hypotheses, practical policy suggestions are proposed to improve the enterprises management. A leadership substitution model is used to introduce empowerment leadership as the boundary condition to the analysis framework, and the regulatory effect of the empowerment leadership on human resource management practice and team knowledge sharing are discussed through the method of empirical analysis. The analysis results showed the substitution effect between cross-level empowerment leadership and human resource management practice and proved an alternative role between human resource management practice and empowerment leadership in a knowledge-intensive team, which provides a preliminary research basis for later research. The results fully demonstrate that for knowledge-intensive teams, more targeted human resource management practice is needed as the theoretical support. Based on leadership substitution theory, this study explored the relationship between human resource practice and innovation, trying to extend the reverse effect of leadership substitution theory. A cross-layer model is discussed as the paper distinguished implementation of human resource management practices and perceived human resource management practice.



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## 1. Introduction

With enterprises entering the era of knowledge economy and the wide application of internet technology, knowledge begins to penetrate across all kinds of boundaries and becomes a key for enterprises to gain a competitive advantage in all kinds of scenarios [1,2]. The ability to have innovative knowledge directly determines the success or failure of enterprises. Previous research and management practice have proven teams to be an important form of promoting knowledge innovation. In order to have a better promotion of the knowledge flow within and between teams, it is necessary to strengthen the cooperation ability among team members, and constantly improve the level of cooperation between teams, so as to improve the knowledge stock and added value of them.

Under the background of knowledge economy, enterprises are expected to have unique resources or capabilities in order to obtain a sustainable competitive advantage [3]. Among all kinds of resources and capabilities, knowledge has become a crucial strategic resource. How to deal with knowledge effectively has become a real problem that enterprises have to face. To achieve this goal, managers must constantly strengthen human-oriented

management. To maximize the willingness of team members to acquire and share knowledge, leaders need to improve knowledge management by means of both institution and technology, so as to provide good conditions for knowledge creation.

Due to the great value of knowledge-intensive teams to enterprises' development, the practice of human resource management must take effective measures to store the knowledge database of team members on the basis of distinguishing the characteristics and particularity of the type of team, so that each member can know not only the specific content of knowledge in the database, but also the carrier of different knowledge [4]. As a platform, it can strengthen the communication and interaction between members, connect seemingly isolated knowledge, and form a knowledge map. Targeting this issue, the existing research mainly focus on the investigation of to what extent mindfulness can function as a substitute for transformational leadership [5–7]; the relationship between job-relevant personality traits and performance [8]; and justice enactment [9,10]. They are all conducted with considering of the individual combat. Therefore, in a knowledge-intensive team, the key is to break through the simple thinking of individual combat, take effective measures to continuously stimulate individual knowledge collision, and then form knowledge premium, thus creating new and available knowledge.

This paper uses a leadership substitution model to introduce empowerment leadership as a boundary condition into the analysis framework, and discusses the regulatory effect of empowerment leadership on human resource management practice and team knowledge sharing. Through the method of empirical analysis, various research hypotheses were verified, and practical policy suggestions have been put forward to improve enterprises' management.

The rest of this paper is organized as follows. Section 2 presents a comprehensive literature review on the leadership substitutes theory, research model and research hypothesis. Section 3 describes the details of the proposed methodology and data source. Section 4 presents the experimental results. Section 5 concludes this paper and provides the future work.

## 2. Theoretical Basis and Research Hypothesis

### 2.1. Leadership Substitutes Theory

Contingency leadership theory focuses on the important role of formal leadership in the organization. Inspired by the path goal theory proposed by House, Ref. [11] proposed the concept of leadership substitution, which pointed out that the effectiveness of leadership will vary according to different situations. According to contingency leadership theory, different individuals, tasks and organizations can be used as substitutions of leadership to exert positive or negative influence on employees, so as to replace or offset the effectiveness of leadership to a certain extent. It goes beyond the formal leadership in contingency theory and covers the factors of informal leadership. There are two implications of leadership substitutes theory: (1) "Neutralization", which refers to a weakening agent to leadership in the organization, and (2) "substitution", which refers to a completely replacement of leadership, so that leadership was of no use in the organization.

In addition, Ref. [12] believes that substitutions can not only weaken and replace leadership effectiveness, but also enhance leadership influence. On this basis, Ref. [13] proposed the concept of leadership supplement, that is, the role of leadership is not only to strengthen the relationship with subordinates, but also to improve organizational performance. Ref. [14] pointed out that the alternative variable of leadership plays an important role in the process of leadership. When leaders have problems, the substitutes theory provides a choice for complex organizations, that is, to choose the alternative variable of leadership or leader retraining as a solution to solve a problem. According to [15], leadership can be strengthened by eliminating "Neutralization" and creating "substitution" variables.

From the perspective of statistical test, Ref. [16] refined “substitution” into regulation, inhibition, substitution and combination. Ref. [17] further subdivided “substitution” into four aspects: reinforcement, partial neutralization, complete neutralization or substitution, and reverse influence.

Refs. [18,19] proposed that the same alternative factor could play different roles in different leadership behaviors, while [20] categorised leadership behavior into relationship oriented and task oriented, and further pointed out that the same alternative factor may not have alternative effects on different leadership behaviors. According to their research, the substitutions are divided into 14 types, and different leadership behaviors are corresponding to their respective substitutions.

The leadership substitutes theory has been widely used in organizations’ management. With the development of economy, organizational forms and concepts of employees, self leadership ability of organization members has been improved, the phenomenon of leadership substitution has become common, and the boundary between leaders and LED has become blurred. At the same time, it can also provide an explanation for the change of subordinates’ work performance and the ineffectiveness of leaders in some environments. Ref. [21] studied the phenomenon of leadership substitution, and found that leadership substitution can promote organizational leadership innovation, including leadership style, concept, function and so on. In addition, Ref. [22] found that people’s interest in abuse supervision has increased. In response to this phenomenon, Ref. [23] found that there are still very few organizational factors that can reduce the adverse impact of abuse supervision. On the basis of leadership substitutes theory, working resources adequacy and roles clarity are regarded as substitutes for abuse supervision. At the same time, Ref. [24] examined the impact of time leadership and time-sharing cognition on team performance through time conflict, and tested the alternative role of time-sharing cognition. The results show that team leaders’ behaviors focusing on working hours can help team members reduce time conflicts and achieve high performance. Also, time-sharing cognitive function of team members can be used as a substitution for time leadership to reduce conflicts among team members and improve team performance.

However, leadership substitution model has its own limitations. The model has not been fully supported by previous research and there were some substitution factors showing no significant impact on leadership substitution. In recent years, scholars began to study the main effect of substitutions. Ref. [25] argued a leadership substitutes theory as a framework and there is no systematic substitution factor. To expand approaches of a leadership substitutes theory, it is necessary to introduce new substitution factors and clarify the explanation. Ref. [26] believes that future research should focus on the impact of existing substitutions on new types of leadership. Ref. [27] also pointed out that future research can start from the port of leadership and expand the leadership types. Ref. [28] emphasized that substitutions can directly affect outcome variables, which also enlightens later researchers. Ref. [29] pointed out that the expansion and development of leadership substitutes theory can be realized from different aspects and levels, such as expanding the level of leadership, subdividing the role types of leadership substitutions, building a guiding framework, and exploring the synergy between different substitutions. Other scholars began to pay attention to the reverse effect of leadership substitution, that is, leadership may also have an alternative effect on other organizations, tasks and other factors. For example, Ref. [30] proposed that empowerment leadership may play an alternative role in human resource practice. Based on leadership substitution theory, this study explored the relationship between human resource practice and innovation, trying to extend the reverse effect of leadership substitution theory. Similarly, many research studies have been done focusing on the empowerment leadership from the social relationship perspective and the psychological perspective, respectively, Ref. [31]. To name a few, in the first class, Ref. [32] investigated the mediating role of structural empowerment in the positive relationship between transformational leadership and work engagement based on self-reported questionnaires from 240 employees working in the tourism sector in Galicia (northwest

of Spain). Ref. [33] empirically examined the effect of transformational leadership on followers' inventiveness and organizational innovation, the transformational leadership and innovation are studied at the organizational level and creativity at the individual level. Ref. [34] integrated research on LEB and coworker conflict to help organizations manage coworker conflict effectively. For the methods in the second class, Ref. [35] investigated the antecedents of psychological empowerment among bank managers, aiming at studying the impact of transformational leadership, organization structure and job characteristics on psychological empowerment. Ref. [36] investigated the influence of the empowering leadership and psychological empowerment on employees' creativity. Furthermore, they explored the existence of a moderating effect of psychological empowerment on the relationship between empowering leadership and employees' creativity, and examined the difference between employees of different genders in empowering leadership and psychological empowerment. Ref. [37] studied the relationship between inclusive leadership and innovative work behavior with the mediating role of psychological empowerment. Ref. [38] investigated the relationship between quality of work life and the employee's perception of their contribution to organizational performance, indicating the importance of subjective and behavioral components of quality of work life.

## 2.2. Research Model

Most of the previous studies adopted the universal view that high-performance human resource management practice can solve the problem of team performance. However, few studies explored the relationship between human resource management practice and innovation for knowledge-intensive teams, as well as the internal mechanism. Based on the leadership substitutes theory, this study introduces team empowerment leadership as a moderating variable into the overall analysis framework to explore the boundary conditions of the existence of the main effect. The research model is shown in Figure 1.

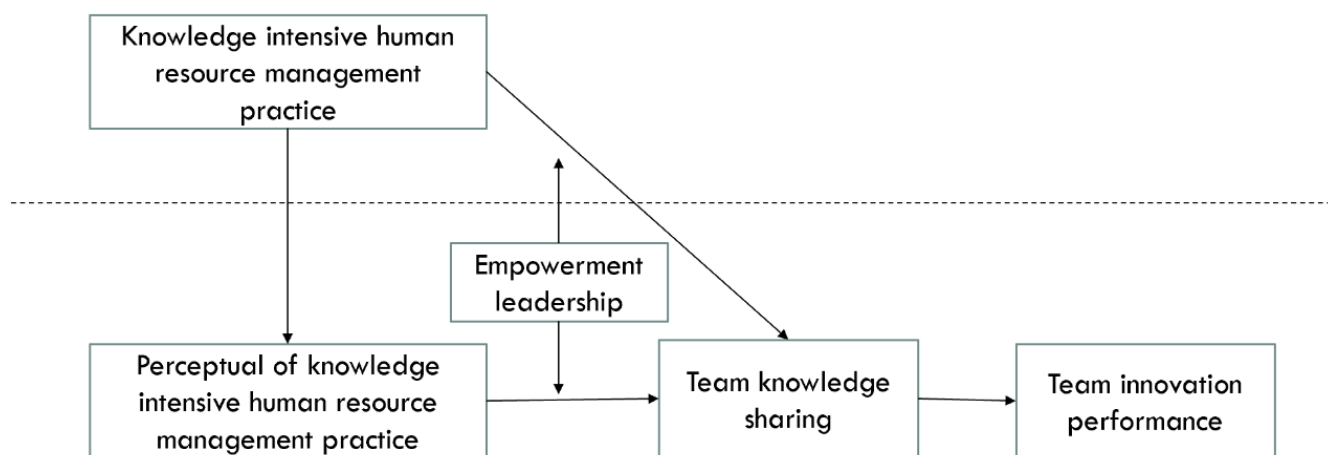


Figure 1. Research model.

## 2.3. Research Hypothesis

### 2.3.1. Relationship between Human Resource Management Practice and Knowledge Sharing of Knowledge-Intensive Teams

This study focused on the impact of human resource management practices of knowledge-intensive teams on team knowledge-related work. According to previous research on empowerment leadership, this study takes empowerment leadership as a situational factor of human resource management practices for knowledge-intensive teams, and analyzes the regulatory role of empowerment leadership. Empowerment leadership refers to the leadership behavior of individuals or the whole team, including authorizing employees, self-management and independent decision-making, guiding and sharing information. However, most of the previous research on empowerment leadership focuses

on individual employees. This study focuses on the regulatory role of empowerment leadership at the team level.

Empowerment leadership refers to a kind of leadership behavior that emphasizes the importance of work, expresses confidence in performance of subordinates, encourages subordinates to participate in work decision-making, and tries to help employees eliminate resource constraints and administrative interventions that affect work performance in order to prevent employees from unnecessary frustration when performing work tasks [39]. For employees, they regard authorization as a positive situational factor and a special incentive factor. Under authorization leadership, employees are more inclined to respond positively. In a knowledge-intensive work environment, the core of empowerment leadership is to cultivate employees' sense of self-efficacy and internal motivation by sharing power with knowledge-based employees [40], and guide employees to lead themselves [41]. Although knowledge-intensive work is full of arduous challenges, under the guidance of authorized leaders, team members' recognition of authorized leaders will turn into confidence in their knowledge behaviors [42]. When team members realize that their suggestions are actually adopted by leaders in decision-making, their motivation for knowledge sharing will be further enhanced. Authorized leaders will guide team members to solve problems autonomously in practical work, and help them find gaps and deficiencies in their knowledge structure, so as to stimulate team members to acquire new information and professional knowledge, and provide basic conditions for knowledge sharing among members [43]. In order to ensure that the core information is obtained, the leader authorizes team members to find solutions inside and outside the team, so as to increase the overall knowledge reserve of the team. Through effective cooperation between teams, it can jointly develop their own scattered knowledge and forming of overall knowledge of the team.

According to previous research, there are mainly two views describing the relationship between human resource management practice and empowerment leadership, strengthening relationship and substitution relationship [44] reviewed the previous literature and pointed out that research on strengthening relationship involves more cognition of process, while the result variable of substitution relationship focuses on results. In terms of the results, leadership behavior and human resource management practice that provide resources for the final behavior or behavior performance can be represented as substitution relationship. In this study, team knowledge sharing and team innovation performance are considered as behavior results or behavior performance. As such, this study believes that human resource management practice of authorized leaders and knowledge-intensive teams can significantly promote team knowledge sharing. However, through the interpretation of social information processing theory and human capital theory, both human resource management practice and leadership behavior belong to the same kind of social information clues, which have similar influence on promotion of human capital. Thus, it can be seen that the positive impact of empowerment leadership and human resource management practice in knowledge-intensive teams involved in this study does not completely overlap with each other, but there is a certain degree of substitution, that is, empowerment leadership will play a certain degree of substitution effect in the impact of human resource management practice on knowledge sharing in knowledge-intensive teams.

Based on the theoretical analysis above, Ref. [45] pointed out that the members of knowledge-intensive teams like R&D teams may be affected by previous work experience and training. In this situation, the system of enterprises may be replaced by these factors, that is to say, in organizational activities of enterprises and the work activities of employees, the substitution effect will always happen randomly all over the place. Of course, the main substituting factors of formal organizational system such as human resource management practice include not only the previous experience, but also the research on the behavior of employees indicates that leadership plays a significant role in influencing the behavior of employees. According to this idea, leadership may also play a significant role in substituting organizational system factors. Empowerment leadership can provide the ability, motivation and opportunity for the effective cooperation in knowledge-intensive teams.



Its function can replace the formal human resource management system to some extent, thus weakening or offsetting the impact of human resource management system. Empowering leadership creates an empowering atmosphere in organizations and stimulates an autonomous motivation that means will and choice. When team members experience that autonomous motivation can meet their work autonomy and ability needs, they will be more willing to work hard for team knowledge-sharing activities [46]. Through direct interaction with team members, authorized leaders create conditions to encourage and support knowledge sharing. In this kind of informal interaction, formal institutional arrangements such as human resource management practice activities will appear relatively redundant, and their potential value will be reduced. Therefore, this study puts forward the hypothesis from both specific practical activities and human resource management system:

**Hypothesis 1 (H1).** *Empowerment leadership negatively moderate the relationship between the implementation of human resource management practices and team knowledge sharing in a knowledge-intensive team. That is to say, under the leadership of high authorization, the implementation of human resource management practices in knowledge-intensive teams plays a relatively weak role in promoting team knowledge sharing.*

**Hypothesis 1a (H1a).** *Empowerment leadership negatively moderates the relationship between the implementation of ability improvement-type human resource management practice and team knowledge sharing in knowledge-intensive teams.*

**Hypothesis 1b (H1b).** *Empowerment leadership negatively moderates the relationship between the implementation of motivational promotion-type human resource management practice and team knowledge sharing in knowledge-intensive teams.*

**Hypothesis 1c (H1c).** *Empowerment leadership negatively moderates the relationship between the implementation of opportunity promotion-type human resource management practice and team knowledge sharing in knowledge-intensive teams.*

### 2.3.2. Relationship between Human Resource Management Practice and Knowledge Sharing in Knowledge-Intensive Teams

With the development of human resource management, more and more specific human resource management activities have been undertaken by team leaders or line managers [47]. In a sense, team leaders' perception of human resource management practice represents the level of perception at the team level, which in turn affects team members' behavior response [48]. In research on leadership behavior and substitution effect of human resource management practice, most of them put human resource management practice on a practical level of enterprises [49]. The existing research almost involves team perception level. However, the perception of human resource management practice at the team level has been proven to affect not only individual behavior, but also collaboration and cooperation behavior in teams [50]. That is to say, human resource management practice at the team level will influence team behavior by influencing the mental model shared by team members.

Based on the leadership substitutes theory, perceived human resource management at the team level have the same function with empowerment leadership and it is similar to the actual level of enterprises to a certain extent. Empowerment leadership may also play an alternative role in human resource management practice perception in knowledge-intensive teams. Based on the consideration of research design, further exploration of the relationship between empowerment leadership at the same level and human resource management practice perception for knowledge-intensive teams is required. Based on this, the study considers empowerment leadership as an alternative factor to human resource management practice perception in knowledge-intensive teams at the team level, that is, it negatively moderating the relationship. The regulatory role of team level is also studied from the specific activities and the overall system.

**Hypothesis 2 (H2).** *The relationship between perceived human resource management practices and knowledge sharing of knowledge-intensive teams is negatively regulated by authorized leaders. That is to say, under the leadership of high authorization, the perceived practice of human resource management for knowledge-intensive teams plays a relatively weak role in promoting team knowledge sharing.*

**Hypothesis 2a (H2a).** *The relationship between perceived ability improvement-type human resource management practice and knowledge sharing in knowledge-intensive teams is negatively regulated by empowerment leadership.*

**Hypothesis 2b (H2b).** *The relationship between perceived motivational promotion-type human resource management practice and knowledge sharing in knowledge-intensive teams is negatively regulated by empowerment leadership.*

**Hypothesis 2c (H2c).** *The relationship between perceived opportunity promotion-type human resource management practice and knowledge sharing in knowledge-intensive teams is negatively regulated by empowerment leadership.*

### 3. Research Methods and Data Sources

#### 3.1. Sample Selection

In this study, economic zones in Shanghai and Zhejiang were taken as samples. Forty-one enterprises in Shanghai and 29 enterprises in Zhejiang were selected for questionnaires. First, Shanghai and Zhejiang are the two areas with most active economic development. Hence, we conducted the sampling the two provinces. Second, most of the selected companies are middle and small-size enterprises, which are common and crucial in economic development of China. Third, the companies can provide the data features, as shown in Table 1, which satisfied our investigation requirements. Through communication with the park management committee and enterprises in the park, 8–12 working teams closely related to knowledge work for investigation were selected in each enterprise. The team and the enterprise were coded and matched before sending out questionnaires. All questionnaires were anonymous. Researchers were responsible for the distribution and recovery of the questionnaire for the accuracy of data matching. The questionnaire was distributed three times, one week apart each time. The first time it was filled in by the head of human resource management of the enterprise. In addition to providing basic information related to the enterprise, human resource management practice was evaluated. The second time it was for the team leader to evaluate the level of empowerment leadership and human resource management practice perceived in teams. For the three surveys, the team leader filled in the basic information related to the team and evaluated the level of team innovation and knowledge sharing. Researchers then carried out the corresponding labeling, screening and personnel registration.

**Table 1.** Moderating effect of empowerment leadership on human resource management practice in knowledge-intensive teams.

	Team Knowledge Sharing				
	Model 1	Model 2	Model 3	Model 4	Model 5
gender	−0.07	−0.07	−0.05	−0.06	−0.06
age	−\10.00	−\10.00	0.00	0.00	0.00
education	0.02	0.03	0.04	0.04	0.03
working years	−\10.30 **	−\10.30 **	−\10.28 **	−\10.28 **	−\10.30 **
ability improvement-type human resource management practice	0.37 ***			0.12	

Table 1. Cont.

	Team Knowledge Sharing				
	Model 1	Model 2	Model 3	Model 4	Model 5
motivational promotion-type human resource management practice		0.54 ***		0.44 ***	
opportunity promotion-type human resource management practice			−\10.19	−\10.05	
human resource management practice in knowledge-intensive team					0.68 ***
empowerment leadership	0.43 ***	0.43 ***	0.42 ***	0.45 ***	0.40 ***
ability improvement-type human resource management	−\10.17 *			−\10.09	
practice×empowerment leadership					
motivational promotion-type human resource management		0.15		0.10	
practice×empowerment leadership					
opportunity promotion-type human resource management			−\10.21 **	−\10.20 **	
practice×empowerment leadership					
human resource management					−\10.18 *
system×empowerment leadership					
Level 1σ2	0.83	0.83	0.82	0.81	0.83
Deviance	1387.25	1370.52	1399.48	1370.41	1388.71

Note. \*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.001$ .

In the first survey, 593 questionnaires were issued, and 551 valid questionnaires were recovered; in the second survey, 551 questionnaires were issued, and 521 valid questionnaires were recovered. After pairing, 501 valid questionnaires were obtained. Under the condition of ensuring that each enterprise has at least three valid team data, 67 survey enterprises were finally determined; in the third survey, 67 enterprise questionnaires were issued and 66 valid questionnaires were collected, 65 enterprises and 485 teams' valid questionnaire data were obtained after matching.

### 3.2. Measurement

A theoretical analysis model of empowerment leadership was created by [51], a five-dimensional analysis model was proposed through multi-sample comparative analysis. In this study, a n10 item scale developed by [52] was selected. The scale consists of four dimensions: emphasizing the significance of work, promoting participation in decision-making, transmitting confidence in performance and providing autonomy. Likert 7-point scale was taken for measurement, in which "1" means totally disagree and "7" means totally agree.

A exploratory factor analysis was conducted using SPSS 19.0, KMO sample measurement and Bartlett sphere test was carried out, and the results are shown in Table 2, where KMO value is 0.93, and items meet the basic conditions of exploratory factor analysis. Shown in Table 3, principal component analysis method was used for factor analysis, it is found that there are four factors whose characteristic root is greater than 1, and the factor loading of all items is greater than 0.5, which implies the consistency of items and data.

Table 2. KMO sample measure and Bartlett sphere test of empowerment leadership.

KMO Sample Measure		0.93
Bartlett sphere test	Chi square	3548.230
	df	45
	Sig.	0.000



**Table 3.** Exploratory factor analysis of empowerment leadership.

	Item	Factor Loading
Significance of work	I will help subordinates understand the relevance between my goals and the company's goals.	0.80
	I will help my subordinates realize the importance of their work to the overall situation.	0.82
	I will help my subordinates understand how to integrate their work into the overall situation.	0.79
Promoting participation in	I will help subordinates to participate in team decision-making.	0.78
Decision-making	I often discuss strategic decisions with my subordinates.	0.81
Deliver performance	I believe that my subordinates can handle complicated work.	0.78
Confidence	I believe that my subordinates can accomplish their tasks well.	0.84
Provide autonomy	I allow my subordinates to do things in their own way.	0.85
	I will keep the rules and regulations as simple as possible, so as to make the work of subordinates more efficient.	0.83
	I allow my subordinates to make decisions quickly in order to meet customer needs	0.71

#### 4. Results

Table 2 shows the results of the moderating effect of empowerment leadership on human resource management practice for knowledge-intensive teams. In model 1, the interaction of ability improvement-type human resource management practice and empowerment leadership has a negative influence on team knowledge sharing ( $\beta = -0.17$ ,  $P < 0.01$ ), thus H1a was supported. In model 2, the interaction of motivational promotion-type human resource management practice and empowerment leadership had no significant effect on team knowledge sharing ( $\beta = 0.15$ , NS), which failed supported H1b. In model 3, the interaction of opportunity promotion-type human resource management practice and empowerment leadership has a negative impact on team knowledge sharing ( $\beta = -0.21$ ,  $P < 0.01$ ), which shows that empowerment leadership plays a negative role in regulating the relationship between opportunity promotion practice and team knowledge sharing, and H1c is supported. In model 4, the empowerment leadership, ability improvement-type human resource management practice, motivation improvement and opportunity improvement are included. The interaction of opportunity improvement practice and empowerment leadership still has a significant impact on team knowledge sharing ( $\beta = -0.20$ ,  $P < 0.01$ ). Model 5 integrates three types of human resource management practices into human resource management system. Considering the impact of interaction between human resource management system and empowerment leadership on team knowledge sharing, the results are significant ( $\beta = -0.18$ ,  $P < 0.01$ ), thus H1 is verified. In order to better describe the regulatory role of authorized leaders on human resource management practice and team knowledge sharing, we take a plus and minus standard deviation as a benchmark to represent the level of empowerment leadership, and describe the differences of team knowledge sharing level under different levels of empowerment leadership, so as to build the regulatory effect of Figures 2–4. As shown in Figure 2, under a high authorization leadership, the team knowledge sharing level is higher than, which shows that the authorization leadership has a significant role in promoting team knowledge sharing. However, in the context of high authorization leadership, the promotion effect of ability improvement-type human resource management practice on team knowledge sharing slows down, which shows that the authorization leadership has a certain substitution for the ability improvement-type human resource management practice effect. In Figure 3, empowerment leadership has a directional regulating effect on opportunity improvement-type human resource management practice and team knowledge sharing level, that is, under high empowerment leadership, there is a negative relationship between opportunity improvement-type human resource management practice and team knowledge sharing. That is to say, under high empowerment leadership, opportunity improvement-type human resource management practice as a formal management mode

is completely in a state of failure and even the application of opportunity practice may inhibit knowledge sharing of employees to some extent. Figure 4 describes the modulate effect of empowerment leadership on human resource management practice and team knowledge sharing in knowledge-intensive teams. High empowerment leadership will play an alternative role in actual human resource management practice.

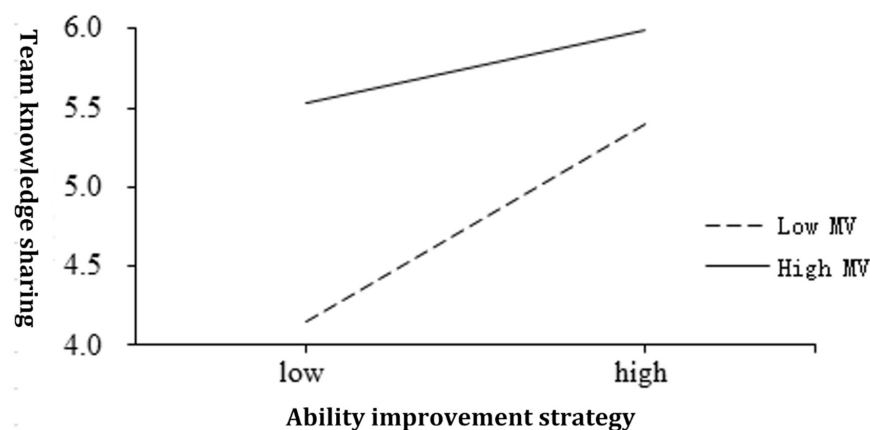


Figure 2. Adjustment of empowerment leadership on ability improvement-type human resource management practice.

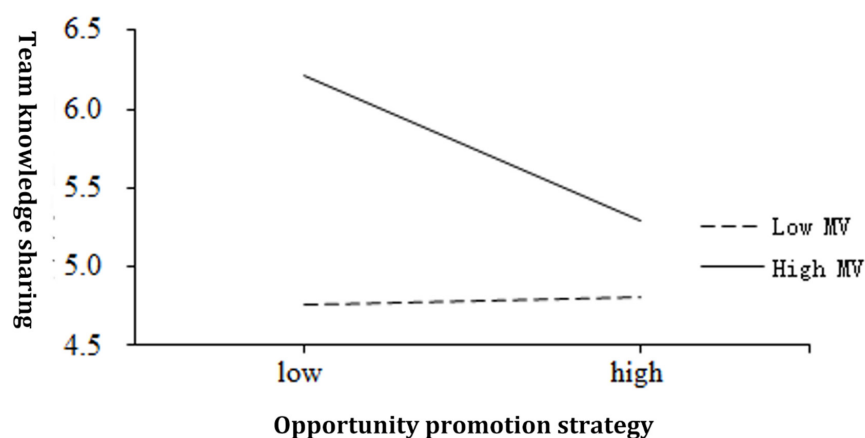


Figure 3. Adjustment of empowerment leadership on opportunity promotion-type human resource management practice.

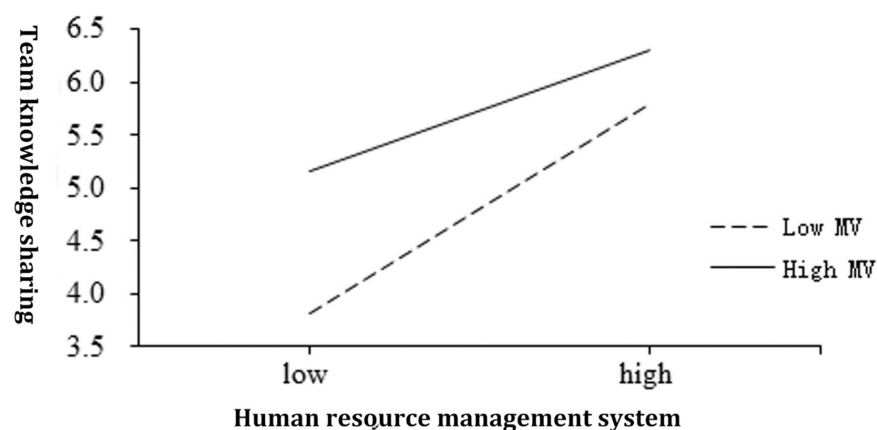


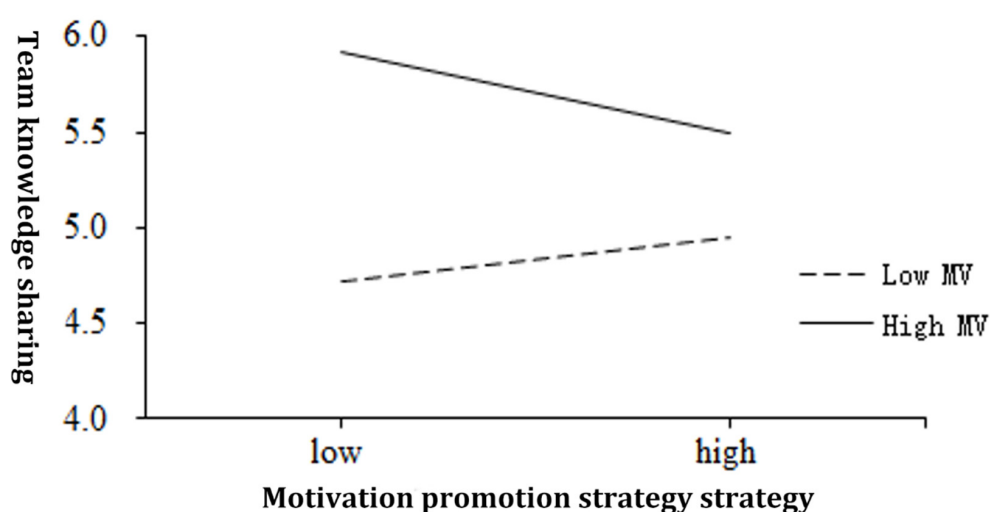
Figure 4. Adjustment of empowerment leadership on human resource management practice.

Table 4 shows the results of the moderating effect of empowerment leadership on perceived human resource management practices for knowledge-intensive teams. In model 6, the Interaction item of practical perception and empowerment leadership has no significant effect on team knowledge sharing ( $\beta = 0.03$ , NS), which indicates that empowerment leadership has no moderating effect between practical perception and team knowledge sharing, thus H2a is not verified. In model 7, the interaction of opportunity promotion-type human resource management practice perception and empowerment leadership has a negative impact on team knowledge sharing ( $\beta = -0.14$ ,  $P < 0.01$ ), which shows that empowerment leadership plays a negative role in regulating the relationship between opportunity promotion-type human resource management practice perception and team knowledge sharing, thus H2b is supported. In model 8, the interaction of opportunity promotion-type human resource management practice perception and empowerment leadership had no significant effect on team knowledge sharing ( $\beta = 0.15$ , NS), and H2C was not verified. In model 9, empowerment leadership and team perception on ability improvement-type human resource management practice, motivational promotion-type human resource management practice, opportunity improvement-type human resource management practice, and interaction items of empowerment leadership with these three terms are included in the model. The interaction items of motivational promotion-type human resource management practice and empowerment leadership has shown a significant impact on team knowledge sharing ( $\beta = -0.11$ ,  $P < 0.01$ ), which supported H2b. Model 10 integrates the perception of team to three types of human resource management practices into the overall perception of a human resource management system. Considering the impact of the interaction between perception of human resource management system and empowerment leadership on team knowledge sharing, the result is significant ( $\beta = -0.12$ ,  $P < 0.01$ ) and H2 is verified. In order to better describe the regulatory role of empowerment leadership on human resource management practice perception and team knowledge sharing, respectively, based on a standard deviation of plus and minus, describe the differences impact of human resource management practice perception on team knowledge sharing level under different levels of empowerment leadership. According to model 7 and model 10 of Table 4, the regulatory effect diagrams of Figures 5 and 6 are constructed, respectively. Both Figures 5 and 6 show that team knowledge sharing level is higher under high empowerment leadership, which further illustrates the positive effect of empowerment leadership on team knowledge sharing. Figure 5 shows that under a leadership of high authorization, the influence of motivational promotion-type human resource management practice perception on team knowledge sharing is negative, while under the leadership of low authorization, the influence of motivational promotion-type human resource management practice perception on team knowledge sharing is positive. However, further research is needed to verify and explore the detailed constraints about highly empowerment leadership inhibiting the influence of opportunity promotion-type human resource management practice perception, or even making it have a negative effect. In Figure 6, the influence of human resource management practice perception under high empowerment leadership on team knowledge sharing is lower than that under low empowerment leadership, which shows that empowerment leadership plays a negative regulatory role in this relationship, that is, empowerment leadership can partially replace the effect of human resource management practice perception.

In this paper, the analysis above is from the view of knowledge data, which is an important factor in human resources management. However, in the practice, besides knowledge data, many other aspects are supposed to be considered. Hence, the contribution of this paper provides a key view to the LS model. We will also explore other views in our future work.

**Table 4.** Moderating effect of empowerment leadership on human resource management practice perception in knowledge-intensive teams.

	Team Knowledge Sharing				
	Model 6	Model 7	Model 8	Model 9	Model 10
gender	−0.07	−0.04	−0.08	−0.07	−0.07
age	0.00	0.00	0.00	0.00	0.00
education	0.05	0.05	0.07	0.07	0.05
working years	−0.24 *	−0.28 **	−0.29 **	−0.24 **	−0.27 **
ability improvement-type human resource management practice perception	0.33 ***			0.23 ***	
motivational promotion-type human resource management practice perception		−0.04		−0.03	
opportunity promotion-type human resource management practice perception			0.26 ***	0.14 *	
human resource management practice perception in knowledge-intensive team					0.37 ***
empowerment leadership	0.30 ***	0.38 ***	0.27 ***	0.26 **	0.29 ***
ability improvement-type human resource management practice perception × empowerment leadership	0.03			0.07	
motivational promotion-type human resource management practice perception × empowerment leadership		−0.14 **		−0.11 *	
opportunity promotion-type human resource management practice perception × empowerment leadership			−0.03	−0.05	
Human resource management system perception × empowerment leadership					−0.12 *
Level 1σ2	0.75	0.82	0.79	0.73	0.79
Deviance	1364.83	1403.57	1388.29	1368.70	1390.14

Note. \*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.001$ .**Figure 5.** Adjustment of empowerment leadership in motivational promotion-type human resource management practice perception.

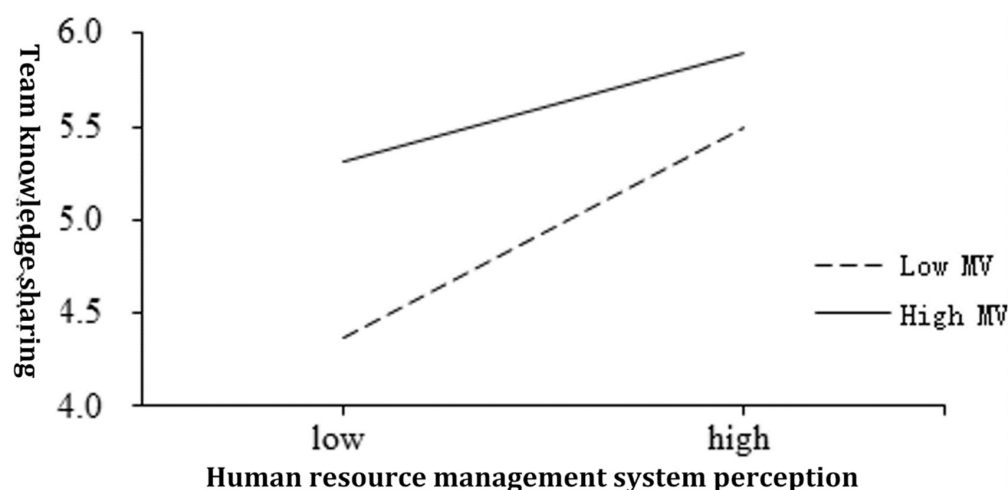


Figure 6. Adjustment of empowerment leadership in human resource management practice perception.

## 5. Conclusions

The results showed that empowerment leadership will still have a substitution effect with human resource management at the team level. In this study, empowerment leadership is used as a situational factor to explore how it affects the relationship between human resource management practice and team knowledge sharing in knowledge-intensive teams. At the individual level, the relevant literature of strategic human resource management points out that human resource management systems will have a certain impact on employees' knowledge work [53]. At the same time, the literature of leadership research also points out that leaders' positive behaviors can promote employees' knowledge to related work [54]. However, these two kinds of research were not yet unified. In a sense, there is a certain degree of overlap between the impact of human resource management practice and leadership behavior on employee performance; that is to say, a certain similarity might exist in the effect of influencing employee performance, and there may be a substitution relationship between them. In previous literature, the substitution of human resource management practice on leadership behavior and leadership behavior has been confirmed by relevant research. This study further extends the substitution effect of leadership behavior on human resource management practice to the team level and locks the research object into knowledge-intensive teams. It showed the substitution effect between cross-level empowerment leadership and human resource management practice and proved an alternative role between human resource management practice and empowerment leadership in knowledge-intensive teams, which provides a preliminary research basis for later research.

There are certain boundary conditions for the effect of knowledge-intensive team-oriented human resource management practice. It is undeniable that both human resource management practice and empowerment leadership have a certain degree of positive effect. This study confirms the substitution effect of human resource management practice and empowerment leadership in knowledge-intensive teams. Based on this, although both of them help to improve the knowledge sharing and innovation performance of knowledge-intensive teams, from the perspective of input–output benefits, there is no need for enterprises to invest in both at the same time. That is to say, the degree of investment and development of human resource management practices in knowledge-intensive teams should be determined by the specific situation of the enterprise itself. Decision-making basis for development of human resource practices or empowerment leadership mainly depends on the comparative analysis of their input and output. If empowerment leadership fully mobilizes the enthusiasm of knowledge search, experience learning, skill development, knowledge sharing and other work related to the knowledge competitiveness of the enterprise by increasing the employees' autonomy and sense of responsibility, then



empowerment leadership is completely effective for the enterprise. In this case, if the enterprise continues to invest in the human resource management practice, it will form the redundancy of enterprise resources, thus reducing the investment benefit to human capital. On the contrary, if the positive effect of empowerment leadership is not significant, enterprises will achieve the purpose of promoting knowledge work performance of teams and employees through formal system arrangement and management means. At this time, it is necessary for enterprises to invest in human resource management and develop corresponding human resource management practices for knowledge-intensive teams.

To further explore the relationship between human resource management practice and empowerment leadership for knowledge-intensive teams, there are four types of research on the relationship between human resource management and leadership behavior: causal, joint, substitution and reinforcement. Although this study confirmed the substitution effect of human resource management practice and empowerment leadership on team knowledge sharing and team innovation performance, according to the literature foundation of human resource management practice research, when the level, social culture, organizational situation and outcome variables are different, the relationship between human resource management practice and leadership behavior may be completely different. The corresponding research lays the foundation for the research on the relationship between human resource management practice and leadership behavior of knowledge-intensive teams, and also puts forward the requirements for further discussion on the relationship between them and following research should focus on specific analysis on it.

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