

Research on the Relationship Between Informational Team Faultline and Team Resilience—Team Leader Member Exchange and Team Member Exchange as Mechanism

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Background: This study aims to investigate how a team can be resilient in the face of crisis and adversity.

Methods: This empirical study adopted a quantitative research method. The data were collected by questionnaire survey, and the stats analysis package in R language and AMOS 23 were used for empirical analysis of 98 teams. Based on complex adaptive system theory and conservation of resources theory, this study was constructed the theoretical framework of “environmental influence — team exchange — team resilience” with informational team faultline (ITF) as independent variable, team leader member exchange (TLMX) and team member exchange (TMX) as mediating and moderating variables, and team resilience as dependent variable in the context of Chinese culture.

Results: We found that the ITF had a significant negative effect on the team resilience. TLMX and TMX played partial mediating role between ITF and team resilience. In addition, TLMX and TMX played moderating role between ITF and team resilience, that is, weakening the negative influence of ITF on team resilience.

Conclusion: This study contributes to clarify the mechanism of the influence of ITF on team resilience, and provide reference for team leaders to improve team resilience in the face of adversity.

Keywords: informational team faultline, team leader member exchange, team member exchange, team resilience, Chinese culture context

Introduction

In contemporary organizations, both internal and external environments are characterized by complexity and volatility. Rapid changes in demand, technological advancements, and high rates of innovation failure all contribute to a constant presence of uncertainty and risk for organizations and teams. Possessing anti-fragility, the ability to recover order from chaotic situations, is critical for success. Thus, improving resilience is a crucial task for both management practitioners and theoretical researchers. Scholars such as Linnenluecke,¹ Desjardine et al² and Stoverink et al³ have explored how organizations, teams, and employees can dynamically adjust, actively adapt, and effectively perform during times of adversity. By virtue of their flexibility, teams are able to effectively respond to changes in their environments. Improving team resilience is therefore advantageous to organizations as they seek to navigate the demands of complex and dynamic environments, and also enhances team innovation and performance.⁴

Although some researchers have explored the influence of team resilience on team creativity. Zhu et al⁵ and Gucciardi et al⁶ found that resilience is associated with meaning construction, positive behavior, leadership, employee

relationships, and psychology. However, there are obvious deficiencies in the current literature. First, the manifestation of team resilience requires specific backgrounds such as challenges, adversity, or crisis, which can trigger team resilience in a negative manner. Existing researches have rarely illuminated the background which needed to trigger the team resilience. As a prevalent condition in many teams, team diversity can create faultlines within the team, which have a detrimental effect on team morale, innovation, commitment, loyalty, and satisfaction.⁷ Despite the growth in literature, the potential influence of team faultlines on team resilience has not been given as much attention. Bezrukova et al⁸ identified two types of team faultlines, namely social categorization faultlines and informational faultlines. Social categorization faultlines occur when team members are divided based on factors such as gender, race and age, while informational faultlines result from differences in educational background, work experience, and functional differences among team members. Informational faultlines impede the exchange of knowledge and information within the team, leading to a reduction in direct and indirect “vicarious experience” between team members, and ultimately, a decrease in the opportunity for positive “verbal persuasion” within the team.⁹ However, there are few researches on the impact and process of informational team faultlines (ITF) on team resilience.

Second, the formation and enhancement of team resilience are to some extent contingent upon the team’s management style and level. For instance, Dimas et al¹⁰ investigated the influence of transformational leadership on team resilience. However, few studies have employed the perspective of exchange among different actors within teams in a Chinese cultural context. Unlike in Western contexts, Chinese society is characterized by a focus on various types of “guanxi”. Building strong vertical and horizontal “guanxi” in the workplace is conducive to obtaining multiple sources of information and support, which can enhance a team’s capacity to adapt to setbacks. In adverse situations, team leaders and members can seek the advice and assistance of their superiors and other team members, creating a resource protection effect that fosters team resilience.

Given this, based on the theories of complex adaptive systems and conservation of resources, the aim of this study was to explore and reveal the influencing factors and intervention mechanisms of team resilience, as shown in Figure 1A. When the ITF in a team are activated, the team resilience will be negatively affected. Different types of exchanges, such as team leader-member exchange (TLMX) and team member exchange (TMX), reflect the quality of the exchange relationship between team leaders and all subordinates and among team members, respectively. This is an important mechanism for teams to absorb shocks, adjust, and recover, and plays a mediating role between ITF and team resilience.¹¹ Last, the variables that play a mediating effect may also have moderating effects. This study suggests that

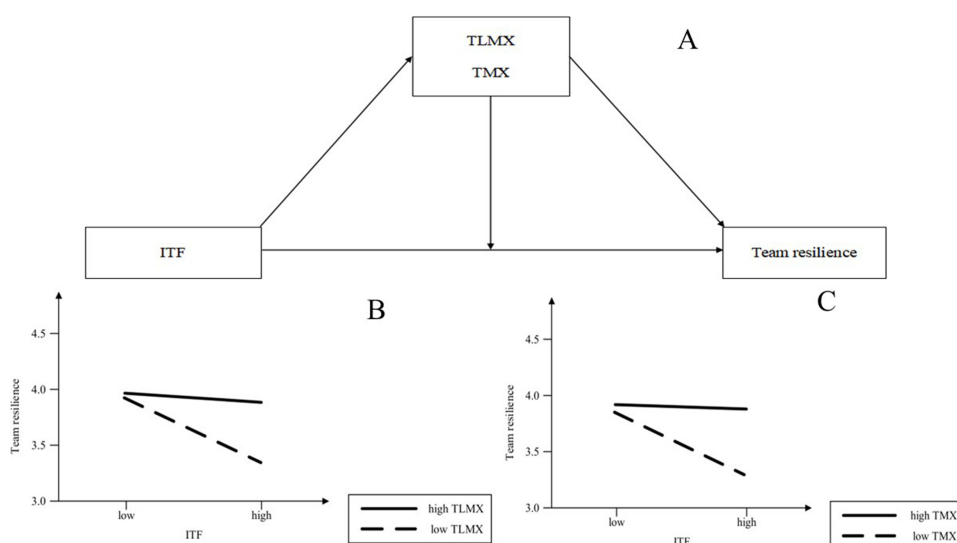


Figure 1 The influencing factors and moderating effect. **(A)** The influencing factors and intervention mechanisms of team resilience. **(B)** The moderating effect of TLMX on the relationship between ITF and team resilience. **(C)** The moderating effect of TMX on the relationship between ITF and team resilience.

by fostering trust and promoting knowledge-sharing between team leader and team members and among different subgroups within the team, TLMX and TMX can potentially mitigate the negative impact of ITF.

Theoretical Basis and Research Hypotheses

Team Resilience

Team resilience refers to a team's ability to adjust its capabilities and resources during adverse circumstances to meet the demands of its environment. Effective knowledge and information exchange and communication are essential components of this process. Existing research on resilience has mainly focused on the process and outcomes, with the former referring to a team's ability to navigate crises before and after the event and the latter referring to its ability to recover from a crisis. However, relatively few studies have explored how the interplay between process and outcome affects the mechanisms underlying team resilience.^{12,13} In the Chinese cultural context, exchange within a team is a critical mechanism for resilience formation through "absorption and adaptation". Effective exchange and integration of knowledge and information enable teams to adjust their cognitive thinking patterns in a timely manner, facilitating the development of a resource protection effect that enables them to overcome difficulties and crises. In specific terms, TLMX is characterized by the overall level of exchange relationship between leaders and their subordinates, which derives from the extension of binary-level exchanges between leaders and members. TLMX has been found to enhance team effectiveness, innovation, emotional commitment, and job satisfaction, and to facilitate team consensus formation while acting as an inhibitory factor on team conflicts.¹⁴ TMX reflects the quality of mutual exchange, high-frequency meetings, and cohesion among team members, with positive promoting effects on knowledge sharing, psychological empowerment, and employee creativity. Thus, as the resilience process, they can to some extent help absorb the negative environmental impact on the team. When team resilience is considered as the outcome variable, TLMX and TMX are potentially related, warranting further investigation.

ITF and Team Resilience

ITF refers to the internal differentiation within a team resulting from heterogeneous perceptions among its members caused by differences in knowledge structure, educational background, work experience, as well as cross-functional and cross-disciplinary factors. This can lead to several negative outcomes. First, ITF can result in the fracturing of the team into multiple subgroups. Individuals tend to give higher evaluations to members within their own subgroup and lower evaluations to those outside their subgroup. Second, ITF can disrupt members' sense of identity within the team. Individuals establish the uniqueness of their belonging to a specific subgroup, which leads to a phenomenon known as subgroup polarization, where the perspectives and interests of subgroups are given greater importance than those of the team as a whole.¹⁵ Third, ITF can result in cognitive homogeneity within subgroups and communication barriers between subgroups. This can lead to a reluctance to communicate and engage in dialogue with other subgroups, which in turn can limit the team's access to diverse information and knowledge and reduce its creativity in problem-solving and dealing with difficulties.¹⁶ Last, ITF can disrupt the normal collaborative efforts of a team, resulting in diminished levels of team cohesiveness, an increased tendency towards distrust and a lack of willingness to cooperate. It becomes difficult for subgroups to reach a consensus, and as a result, communication and collaboration costs within the team rise. This can lead some individuals to feel isolated and unable to focus on shared objectives, which hinders their ability to form effective decision-making strategies and unified action plans. This study suggests that the presence of ITF represents an environmental stimulus factor that has the potential to negatively influence team resilience. Therefore, the following hypothesis is proposed:

H1: ITF have a negative effect on team resilience. That is, the increase of ITF can result in a decrease in team resilience.

Mediating Role of TLMX and TMX

This study also posits that TLMX plays a mediating role in the relationship between ITF and team resilience. Improving team resilience requires continuous communication and interaction among team leaders and members, which seeks to provide clarity and predictability of issues through constructive behavior, thereby fostering a common understanding and

unified action within the team. Such an approach sets the foundation for the team's ability to recover from unfavorable conditions and challenges. With TLMX, two-way exchange of information between team leaders and all members is made possible, triggering reflections on and adjustments to existing workflows and methods, and allowing for brainstorming of effective ways of working in novel situations. This aids leaders in making informed and timely decisions, facilitating the team's disentanglement from problematic situations. The emergence of informational faultlines within teams poses a threat to information sharing and flow. Increased awareness of faultlines leads team members to focus more on subgroup differences rather than on shared goals, resulting in behavior such as silence, knowledge hiding, and opposition.¹¹ Therefore, TLMX is likely to be negatively affected by ITF, which may lead to a polarization phenomenon, causing team leaders to face difficulties fully utilizing diversified knowledge and skills available to them. As leaders receive incomplete and inadequate information, it becomes challenging to make sound decisions. Such an environment can hinder the team's ability to overcome obstacles and improve resilience. Consequently, the following hypotheses are put forth:

H2: ITF have a negative effect on TLMX. That is, the increase of ITF can result in a decrease in TLMX.

H3: TLMX plays a mediating role in the effect of ITF on team resilience. That is, ITF negatively affect team resilience by reducing TLMX.

TMX, as a horizontal exchange, plays a catalytic role in the relationship between ITF and team resilience. TMX is characterized by reciprocal interactions among team members, which facilitates dynamic coordination across teams facing adversity. For instance, team members can navigate new environmental changes effectively by breaking the original management structure or making necessary adjustments. Sudden events can require team members to work jointly and spontaneously, leading to enhanced management capabilities. Work-task changes can also cause team members to adjust their roles and adapt to new circumstances. Similarly, role conflicts occurring within teams necessitate high-level information exchange and collaboration among members. However, when informational faultlines occur within teams, the quality of interactions among team members may suffer. Members tend to prefer communicating and collaborating with teammates who share similar backgrounds and cognition. Such tendencies can foster biases and reduce the willingness to interact and exchange ideas with other members outside of their subgroup.¹⁷ Therefore, TMX is a crucial factor in enhancing team resilience while also mitigating the negative impacts of informational faultlines. Understanding the dynamic interplay between these factors can provide managers with critical insights that can inform their ability to cultivate more effective and resilient teams. As such, the exchange between subgroups may be negatively affected by ITF. When TMX is weakened by ITF, it can have a negative impact on team dynamics, information sharing, mutual support, flexibility, and coordination, ultimately hindering the ability of the team to form an effective joint force and reducing its resilience to withstand impacts and recover. On this basis, the following hypotheses are posited:

H4: ITF have a negative effect on TMX. That is, the increase of ITF can result in a decrease in TMX.

H5: TMX plays a mediating role in the effect of ITF on team resilience. That is, ITF negatively affect team resilience by reducing TMX.

Moderating Effects of TLMX and TMX

Based on the theories of complex adaptive system and resources conservation, this study proposes that TLMX not only mediates the negative impact of ITF on team resilience, but also acts as a moderating variable to weaken the negative relationship between the two. Studies have shown that TLMX can act as a moderating variable. For example, Stewart and Johnson found that TLMX plays a positive moderating role in the relationship between team diversity and team performance.¹⁸ Le Blanc and Gonzalez-Roma found that TLMX can weaken the negative relationship between differentiation in leader-member exchange (DLMX) and team output.¹⁹ First, a high level TLMX can improve team members' emotional commitment to the team through reciprocal interactions between leaders and members, thereby reducing the negative emotional impact of ITF and increasing the team's resilience. Second, high TLMX can enable employees to

receive support from leaders under pressure, enhance their self-efficacy, and develop a positive mindset for completing tasks in adversity. Last, high TLMX can encourage team members to generate more constructive behaviors, and improve the team's resilience in the face of difficulties and obstacles by providing ideas for problem-solving. Based on this, the following hypothesis is proposed:

H6: TLMX moderates the negative effect of ITF on team resilience. That is, the higher the level of TLMX, the weaker the negative relationship between ITF and team resilience.

Furthermore, a high level TMX can facilitate communication and mutual assistance among team members who may differ in their backgrounds and cognitive frameworks, thereby breaking down barriers between different subgroups within a team, overcoming obstacles to the flow of knowledge, information and resources within the team, and making the distribution of team knowledge and resources more equitable, thus migrating the negative influence of ITF on team resilience. First, high TMX can promote cognitive integration among team members. The activation of ITF is, to some extent, due to the perceived differences among members that impede integration. Second, high TMX can benefit teams in carrying out detailed information processing and developing comprehensive and feasible action plans.²⁰ Third, uneven resource allocation exacerbates the perception of differences among members. A high level TMX can help teams distribute internal resources more equitably through effective communication and mutual assistance, reducing uneven resource allocation and internal comparisons and conflicts. Last, high TMX can enhance trust among team members, improve non-formal communication, and increase team cooperation flexibility, thereby reducing the negative impact of ITF on team resilience. This study thus proposes the following hypothesis:

H7: TMX moderates the negative effect of ITF on team resilience. That is, the higher the level of TMX, the weaker the negative relationship between ITF and team resilience.

Research Methods

Procedures and Samples

This study utilized convenience sampling method (a time-and-cost effective means of data collection often used for social and business research),²¹ questionnaire survey and empirical research to test the hypotheses. Regarding data acquisition, five different organizational teams, including those in the medical, pharmaceutical, IT, sales, and manufacturing industries, were randomly selected to undergo quantitative analysis. This selection was based on their work being predominantly centered around knowledge and information, where effective communication plays a crucial role in team task achievement. Moreover, these teams possess higher demands for resilience, such as the arduous labor intensity and frequently faced unexpected changes within medical teams, rapidly changing knowledge updates and risks for IT teams, and market development restraints for sales teams. These characteristics of these teams to some extent align with the theme of this study, namely, the relationship between informational team fault lines and team resilience. To avoid common method biases and achieve relatively rigorous statistical results, this study employed a multi-source and temporal research design. The Likert 5-point scale was utilized as an evaluation tool for ITF, TLMX, TMX, and team resilience, whereas actual number of people and years of service were used to evaluate team size, years of working together, and leaders' tenure. Considering that this study is primarily focused on the team level, individual-level data had to be aggregated to the team level by calculating the average. To authenticate the questionnaire's validity, confirmatory factor analysis was conducted using AMOS23. To test the hypotheses, this study employed the stats analysis package in R language for correlation and regression analysis.

Specifically, the questionnaire survey was conducted between May and September 2022, encompassing a total of 98 teams from over ten healthcare, pharmaceuticals, IT, sales, and manufacturing organizations situated in Jiangsu, Anhui, Hubei, Hunan, and other provinces. Two sets of questionnaires, A and B, were designed by researchers to delineate the study variables. These questionnaires were distributed and collected from participating teams in two stages, utilizing both on-site and online surveys. At time point 1, the B questionnaire was distributed to gather demographic information such as team size and leaders' tenure, which were completed by team leaders. Team members completed the A questionnaire

by providing demographic information pertaining to the years of working together, ITF, TLMX, and TMX. One month later, at time point 2, team leaders received the B questionnaire to measure team resilience. To ensure that responses can be matched, the questionnaire contained markers such as “organization and team affiliation”. After the collection of questionnaires and the removal of those that cannot be matched, filled incorrectly, or missed, the final sample includes 98 team leaders and 457 team members, with effective response rates of 86.726% and 81.172%, respectively. In terms of sample distribution, among team leaders’ tenures, those with 2 years or less accounted for 9.184%, 3–5 years accounted for 19.388%, 6–10 years accounted for 66.326%, and those with more than 10 years accounted for 5.102%. Among team leaders’ ages, those aged 20–30 accounted for 25.510%, those aged 31–40 accounted for 42.857%, and those aged 41 and above accounted for 31.633%. Among team members’ tenures, those with 2 years or less accounted for 29.322%, 3–5 years accounted for 35.230%, 6–10 years accounted for 31.947%, and those with more than 10 years accounted for 3.501%. Among team members’ ages, those aged 20–30 accounted for 30.416%, those aged 31–40 accounted for 42.888%, and those aged 41 and above accounted for 26.696%. In terms of team size, the average was 5 people, distributed among 3–8 people.

Measurement of Variables

ITF. The measurement of this variable referred to the studies of Earley and Mosakowski²² and Jehn and Bezrukova,¹¹ including three items, ie “My team broke into two groups based on information-based attributes, such as educational level, work experience or functional background”, “My team split into subgroups based on information-based attributes, such as educational level, work experience or functional background”, and “My team divided into subsets of people based on information-based attributes, such as educational level, work experience or functional background”. Team members rated these items using the Likert 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). (*Cronbach’s* $\alpha=0.863$).

TLMX. The measurement of this variable drew on the research of Graen and Uhlbien,²³ including seven items, such as “How well does your leader understand your job problems and needs?”, and “How well does your leader recognize your potential?”. Team members rated these items using the Likert 5-point scale, ranging from 1 (not at all) to 5 (to a great extent). The team-level score was obtained through the mean value. (*Cronbach’s* $\alpha=0.834$).

TMX. The measurement of this variable referred to Seers²⁴ research, including 10 items, such as “Meetings good for expressing my ideas”, “Team has strong sense of togetherness”, “I am flexible in switching jobs with others of our team”, and “I am willing to finish work assigned to others”. Team members rated these items using the Likert 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree) (*Cronbach’s* $\alpha=0.889$).

Team resilience. The measurement of this variable drew on Talat and Riaz’s²⁵ research, including four items, ie “We look for creative ways to alter difficult situations”, “Regardless of what happens to us, we can control our reaction to it”, “We can grow in positive ways by dealing with difficult situations”, and “We actively look for ways to overcome the challenges we encounter”. Team leaders rated these items using the Likert 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree) (*Cronbach’s* $\alpha=0.821$).

Control variables. Team size, years of working together, and leaders’ tenure were selected as control variables. Team size is related to internal communication in the team. Larger team size increases the difficulty of communication and coordination and dilutes the intensity of relationships within the team. Years of working together and leaders’ tenure may affect the degree to which team leaders and subordinates understand each other. All these variables may have an impact on team resilience.

Reliability and Validity Analysis

Reliability analysis, as shown in Table 1, suggests that the *Cronbach’s* α values for all variables were above the critical value of 0.700, indicating good reliability for each variable. The *CR* values for each variable were also above the critical value of 0.700, and the *AVE* values were all above the critical value of 0.500, indicating good convergent validity. To assess discriminant validity, confirmatory factor analysis was conducted on the individual-level measurements of ITF, TLMX, and TMX using AMOS 23. Results of the analysis are presented in Table 1, and indicate that the three-factor model had the best fit. Table 2

Table 1 Reliability and Validity Analysis

Reliability, CR, and AVE Values of Variables						
Variable		Cronbach's α		CR		AVE
ITF		0.863		0.852		0.713
TLMX		0.834		0.893		0.542
TMX		0.889		0.927		0.619
Team resilience		0.821		0.877		0.654
Results of Confirmatory Factor Analysis						
Model	Factor	χ^2/df	CFI	TLI	RMSEA	RMR
Three-factor model	ITF, TLMX, TMX	2.149	0.945	0.938	0.078	0.052
Two-factor model	ITF+TMX, TLMX	7.694	0.828	0.806	0.137	0.102
Two-factor model	ITF+TLMX, TMX	7.714	0.827	0.806	0.137	0.106
Two-factor model	ITF, TLMX+TMX	18.955	0.538	0.481	0.225	0.192
Single-factor model	ITF+TLMX+TMX	23.275	0.421	0.353	0.251	0.210

Abbreviations: CR, composite reliability; AVE, average variance extracted; χ^2/df , degree of freedom in Chi-Squared test; CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root-mean-square error of approximation; RMR, root mean square residual; ITF, informational team faultlines; TLMX, team leader-member exchange; TMX, team member exchange.

Table 2 Mean, Standard Deviation, Correlation Coefficient, and AVE Square Root of Variables

	1	2	3	4	5	6	7
1. Team size	—						
2. YOWT	−0.044	—					
3. Leadership tenure	−0.151	0.078	—				
4. ITF	0.044	−0.104	−0.077	0.844			
5. TLMX	−0.205	0.072	0.210	−0.380**	0.736		
6. TMX	−0.142	0.287**	0.043	−0.391**	0.215*	0.786	
7. Team resilience	−0.232*	0.356**	0.079	−0.457**	0.438**	0.530**	0.808
Mean	5.062	2.889	3.061	3.782	3.880	3.479	3.760
SD	1.334	1.072	1.049	0.604	0.537	0.655	0.552

Notes: **Indicates $p < 0.010$, *indicates $p < 0.050$, and the diagonal blackened data is the AVE square root.

Abbreviations: ITF, informational team faultlines; TLMX, team leader-member exchange; TMX, team member exchange; YOWT, years of working together.

shows that the square root of AVE for each variable was greater than its correlation coefficient, indicating good discriminant validity.

Empirical Analysis

Aggregation Analysis

Aggregation analysis was performed to determine whether the data of ITF, TLMX, and TMX could be aggregated at the team level. As shown in Table 3, the r^*_{wg} values of ITF, TLMX, and TMX were all greater than 0.700.²⁶ The $ICC(1)$ values were all greater than 0.050, TLMX's $ICC(2)$ was close to 0.500, and the rest of the variables were all greater than 0.500. This suggests that the variables had overall good aggregation analysis results, and could be aggregated at the team level.

Descriptive Statistical Analysis

As shown in Table 2, ITF is negatively correlated with TLMX, TMX and team resilience, while TLMX and TMX are positively correlated with team resilience, providing initial support for subsequent analysis.

Table 3 Aggregation Analysis and Hypothesis Testing

Aggregation Analysis					
Variable	r^*_{wg}	$ICC(1)$	$ICC(2)$	MSW	MSB
ITF	0.754	0.291	0.673	0.492	1.504
TLMX	0.729	0.148	0.464	0.545	1.017
TMX	0.716	0.307	0.689	0.568	1.828
Regression Analysis Results of Main Effect and Mediating Effect					
Variable	TLMX	TMX	Team Resilience		
	Model 1	Model 2	Model 3	Model 4	Model 5
Team size	−0.165	−0.119	−0.202*	−0.157	−0.163
YOWT	0.015	0.246*	0.304**	0.300**	0.224*
Leadership tenure	0.156	−0.022	0.007	−0.050	0.001
ITF	−0.359**	−0.362**	−0.417**	−0.292**	−0.284**
TLMX				0.304**	
TMX					0.325**
R^2	0.204	0.228	0.345	0.405	0.427
F	5.259**	6.054**	10.809**	11.023**	12.064**

Notes: r^*_{wg} represents within-group agreement; $ICC(1)$ represents reliability of score within group; $ICC(2)$ represents reliability of internal group score. **Indicates $p < 0.010$, * indicates $p < 0.050$.

Abbreviations: MSW, mean squares within groups; MSB, mean squares between groups; ITF, informational team faultlines; TLMX, team leader-member exchange; TMX, team member exchange; YOWT, years of working together.

Hypothesis Testing

Main Effect Analysis

The study's hypotheses were tested using the stats analysis package in R language. Team size, years of working together, and leaders' tenure were set as control variables, ITF was set as the independent variable, and TLMX, TMX, and team resilience were set as dependent variables for regression analysis. The results of the tests are shown in Table 3. Model 3 revealed that ITF had a negative effect on team resilience ($\beta = -0.417$, $p < 0.010$), indicating that ITF weakened team resilience. H1 was supported. Model 1 revealed that ITF had a negative effect on TLMX ($\beta = -0.359$, $p < 0.010$), indicating that ITF weakened TLMX. H2 was supported. Model 2 revealed that ITF had a negative effect on TMX ($\beta = -0.362$, $p < 0.010$), indicating that ITF weakened TMX. H4 was supported.

Mediating Effect Analysis

Based on the main effect analysis, the study conducted mediating effect analysis. Team size, years of working together, and leaders' tenure were set as control variables, ITF was set as the independent variable, TLMX and TMX were set as mediating variables, and team resilience was set as the dependent variable for analysis. The results of the tests are shown in Table 3.

Through Model 1, it was found that ITF had a negative effect on TLMX ($\beta = -0.359$, $p < 0.010$). Through Model 4, after adding TLMX as a mediating variable, it was found to have a significant effect on team resilience ($\beta = 0.304$, $p < 0.010$), and the independent variable ITF also had a significant effect on team resilience ($\beta = -0.292$, $p < 0.010$). Comparing Model 3 and Model 4, it was found that the negative effect of ITF on team resilience was reduced ($\beta = -0.417$, $p < 0.010 \rightarrow \beta = -0.292$, $p < 0.010$). This indicates that TLMX partially explained the impact of ITF on team resilience and played a partially mediating role in the relationship between the two. H3 was supported.

Through Model 2, it was found that ITF had a negative effect on TMX ($\beta = -0.362$, $p < 0.010$). Through Model 5, after adding TMX as a mediating variable, it was found to have a significant effect on team resilience ($\beta = 0.325$, $p < 0.010$), and the independent variable ITF also had a significant effect on team resilience ($\beta = -0.284$, $p < 0.010$). Comparing Model 3

and Model 5, it was found that the negative effect of ITF on team resilience was reduced ($\beta=-0.417$, $p<0.010 \rightarrow \beta=-0.284$, $p<0.010$). This indicates that TMX partially explained the impact of ITF on team resilience and played a partially mediating role in the relationship between the two. H5 was supported.

Moderating Effect Analysis

To test the moderating effect, after controlling for team size, years of working together, and leaders' tenure, analysis was conducted using ITF as the independent variable, TLMX and TMX as moderating variables, and team resilience as the dependent variable, as shown in Table 4. The moderating effects of TLMX and TMX were analyzed using group tests and interaction tests, respectively. In the group test, the samples were divided into high and low groups with similar sample sizes based on the mean values of the moderating variables for analysis, while in the interaction test, the whole sample was analyzed.

First, regarding the moderating effect of TLMX on the relationship between ITF and team resilience, the comparison of Models 6 and 7 in Table 4 shows that: ① Under low TLMX, ITF had a significant negative effect on team resilience ($\beta=-0.468$, $p<0.010$); ② Under high TLMX, the effect of ITF on team resilience was not significant ($\beta=-0.139$, $p>0.050$), so there was no need for a significance test of difference between two regression coefficients. In the interaction test, as shown in Model 8, after adding control variables, independent variables, moderating variables, and interaction terms, it was found that the interaction coefficient between ITF and TLMX was positively significant ($\beta=0.216$, $p<0.010$). The moderating effect is shown in Figure 1B. With the increase of TLMX level, the negative effect of ITF on team resilience decreased. H6 was supported.

Second, regarding the moderating effect of TMX on the relationship between ITF and team resilience, shows the comparison of Models 9 and 10 in Table 4 shows that: ① Under low TMX, ITF had a significant negative effect on team resilience ($\beta=-0.489$, $p<0.010$); ② Under high TMX, the effect of ITF on team resilience was not significant ($\beta=-0.147$, $p>0.050$), so there was no need for a significance test of difference between two regression coefficients. In the interaction test, as shown in Model 11, after adding control variables, independent variables, moderating variables, and interaction terms, it was found that the interaction coefficient between ITF and TMX was positively significant ($\beta=0.229$, $p<0.010$). The moderation effect is shown in Figure 1C. With the increase of TMX level, the negative effect of ITF on team resilience decreased. H7 was supported.

Table 4 Analysis Results of Moderating Effect

Variable	Team Resilience					
	Low TLMX	High TLMX	Whole Sample	Low TMX	High TMX	Whole Sample
	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Team size	-0.243	-0.075	-0.162	-0.145	-0.219	-0.126
YOWT	0.293*	0.231	0.254**	0.156	0.393**	0.252**
Leadership tenure	-0.036	-0.283	-0.052	0.080	0.063	0.018
ITF	-0.468**	-0.139	-0.289**	-0.489**	-0.147	-0.278**
TLMX			0.262**			
TMX						0.294**
ITF*TLMX			0.216**			
ITF*TMX						0.229**
R ²	0.428	0.192	0.406	0.351	0.307	0.453
F	9.588**	2.073	9.102**	4.182**	5.090**	11.034**

Notes: **Indicates $p<0.010$, *Indicates $p<0.050$.

Abbreviations: ITF, informational team faultlines; TLMX, team leader-member exchange; TMX, team member exchange; YOWT, years of working together.

Discussion

Findings of This Study

Based on the theories of complex adaptive system and conservation of resources, using ITF as the independent variable, TLMX and TMX as the mediating and moderating variables, and team resilience as the dependent variable, this study constructed a theoretical analysis framework of “environmental background-team exchange-team resilience”, and conducted an empirical study to find that: (1) ITF has a significant negative effect on team resilience; (2) ITF has a significant negative effect on TLMX; (3) ITF has a significant negative effect on TMX; (4) TLMX partially mediates the negative effect of ITF on team resilience; (5) TMX partially mediates the negative effect of ITF on team resilience; (6) TLMX weakens the negative effect of ITF on team resilience; (7) TMX weakens the negative effect of ITF on team resilience.

Theoretical Contribution

First, this study explores the impact of ITF on TLMX, TMX, and team resilience. For teams that rely on knowledge-based work, diversity among team members can be a double-edged sword. When team diversity is stimulated and ITF are activated, it can have a negative impact on team creativity.¹⁶ However, in the Chinese cultural context, research on the influence of ITF on team exchange and resilience needs further expansion. Focusing on teams in localized organizations, it was found through theoretical analysis and empirical research that ITF has a significant negative effect on TLMX, TMX and team resilience. Therefore, this study supplements the theoretical framework of the influence of ITF.

Second, based on the principle of “absorption and adaptation” of resilience, this study investigates the impact mechanism of ITF on team resilience using TLMX and TMX as mediating variables. TLMX and TMX are closely related to the mobilization of physical, social, individual, and energy resources in the team, as well as team collaboration capabilities. Through empirical analysis, it was found that TLMX and TMX play a partial mediating role between ITF and team resilience. This suggests that the negative impact of ITF on team resilience is achieved to some extent by weakening the vertical exchange quality between leaders and the overall team members, as well as the horizontal exchange quality among team members. Thus, this study complements theories of the relationship between ITF and team resilience.

Last, based on the theories of complex adaptive system and conservation of resources, using TLMX and TMX as moderating variables, it was found that TLMX and TMX can weaken the negative influence of ITF on team resilience. Relevant crisis response studies have also shown that in order to overcome crisis, teams need to possess flexibility and consistency, meaning that while fostering diverse creativity, the entire team should possess cohesion, manifested as a learning state.²⁷ This study explores how teams can reduce resource losses and maintain resilience through different types of exchange when facing information faultlines, enriching ITF intervention theories.

Management Enlightenment

Chinese culture has a long history and far-reaching influence, which is fundamentally different from the culture of other countries, so the team building under the background of Chinese culture is unique. However, it is undeniable that Chinese culture emphasizes stability and does not recommend reform under the influence of Chinese pan-family culture, which to a certain extent inhibits the work enthusiasm and innovation of team individuals,²⁸ which is not conducive to reform and innovation. This study combines the obtained research data with China’s national conditions, and puts forward the following suggestions for the construction of innovative teams in the future:

First, it is necessary for organizational and team managers to recognize the value of resilience at the team level. The increasing complexity and dynamism of the external environment in which organizations and teams operate, coupled with the inherent fluidity of teams, suggest that simply enhancing the psychological resilience of individual, such as leaders or employees, is insufficient. It is also essential to raise the level of resilience across the entire team. Therefore, team leaders should take notice of the value of building a resilient team and shape a culture that promotes it at the team level. This involves enhancing the team’s cohesion and confidence in a cognitive and mental way, cultivating the ability

to learn quickly as a team, which can help enhance the team's adaptability in times of sudden change and high uncertainty.

Second, in terms of the process mechanism of team resilience, when facing adverse environments, leaders should manage vulnerability through high-quality feedback and iteration. In the formation of team resilience, the influence of team leaders and members on team resilience is not isolated, but can have a positive effect through exchange. Team leaders should not only pay attention to the roles played by different team members' personalities, knowledge, skills, and resources, but also integrate the knowledge and information that different team members possess. The formation of resilience depends not only on the knowledge, skills, and resources of different subjects, but also on the synergy of team knowledge and information integration.

Last, in addition to social classification factors such as gender and age, team leaders and members should be aware of various factors that activate team faultlines in their work. For example, employees' educational backgrounds/levels, work experience, and functional specialization can all naturally form small groups within a team, and the division of labor and sense of responsibility in work may also trigger team faultlines. Team leaders and members can consciously strengthen mutual understanding and shared experiences in work and life, such as establishing a matrix-style work team, to expand the intersection between members and horizontal communication between different functions, in order to avoid negative impacts brought by the activation of informational faultlines.

Research Innovations, Limitations and Future Prospects

This study has made several innovations. First, based on the Chinese cultural background, it explores the relationship between ITF, TLMX, TMX and team resilience at the team level, supplementing the theoretical framework of the influence of ITF and the front-end factors of team resilience. Second, through exploration of the mediating role of TLMX and TMX in the relationship between ITF and team resilience, it identifies the front-end negative impact mechanism of team resilience from a process perspective. Third, based on the theories of complex adaptive system and conservation of resources, it investigates the moderating role of TLMX and TMX in the relationship between ITF and team resilience, providing theoretical inspiration and practical support for teams to respond to diverse and complex management environments and promote further integration.

This study also has some limitations. First, while this study obtained quantitative data from both team leaders and members, the sample size is limited. Future studies can collect larger samples for data analysis to yield more reliable results. Second, despite the identification of partial mediating effects of TLMX and TMX on the relationship between ITF and team resilience, their effect sizes remained relatively small. Therefore, subsequent research may explore other variables that can potentially mediate the relationship between ITF and team resilience. Last, this study investigated the moderating effect of TLMX and TMX on the relationship between ITF and team resilience. Yet, the specific moderating effects of other forms of exchange, such as differentiation in leader-member exchange (DLMX) and relative leader-member exchange (RLMX), remain an interesting direction for future research.

Conclusions

In summary, ITF has a negative impact not only on team resilience but also on TLMX and TMX. Consequently, when recruiting new members and managing teams, team leaders should take measures to prevent ITF activation to maintain the quality of exchange among diverse entities within the team and foster team resilience. Additionally, apart from conveying the impact of ITF on team resilience, TLMX and TMX can generate resource conservation and adaptability by improving their level in the team, thereby reducing the negative impact of informational faultlines on team resilience. These findings provide insight into the underlying mechanisms through which ITF affects team resilience, equipping team leaders with the knowledge to enhance team resilience during challenging circumstances.

Data Sharing Statement

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki and informed consent was obtained from all participants. All methods were carried out in accordance with relevant guidelines and regulations.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

Youth Fund of the National Natural Science Foundation of China (71701004). The General Program of National Natural Science Foundation of China (71971003).

Disclosure

The authors report no conflicts of interest in this work.

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