MEDIATING EFFECTS OF TEAM TRUST AND TEAM INTERACTIVE BEHAVIOR ON RELATIONSHIP BETWEEN FLEXIBLE LEADERSHIP AND INNOVATION TEAM EFFECTIVENESS IN UNIVERSITIES IN GREATER BAY AREA

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Abstract

The objectives of this research were: (1) to study the components of team trust, team interactive behavior, flexible leadership and innovation team effectiveness. (2) to develop a model of mediating effects of team trust and team interactive behavior on the relationship between flexible leadership and innovation team effectiveness in universities, and (3) to verify the effect of team trust, team interactive behavior and flexible leadership effect on the innovation team effectiveness in Universities in Greater Bay Area. The population of this research were 4,883 teachers working in universities in the Guangdong Hong Kong Macao Greater Bay Area, Republic of China. The sample was determined by G*power, total 539 teachers and were obtained by proportional stratified random sampling method. The statistical for data analysis includes Confirmatory Factor Analysis and Structural Equation Modeling.

The research found that : (1) The flexible leadership was seven components include; Planning ability, Adaptability, guidance ability, control ability, caring ability, resilience ability and growth ability. The Innovation team effectiveness was three components include; innovation task performance, cooperation satisfaction and team growth. The team trust was two components include; cognitive trust and emotional trust, and the team interactive behavior was four components include; team support, team communication, team work and knowledge sharing; (2) The mediating effects of team trust and team interactive behavior on relationship between flexible leadership and innovation team effectiveness in the Greater Bay Area fit well with empirical data. And (3) Flexible leadership, Team trust and team innovative behavior had a positive effect on the innovation team effectiveness. In addition, the Flexible leadership could be positive indirect effect on team innovative effectiveness through team trust and team interactive behavior, which were as mediation effect. So, in organization should be promoting all of them togethers for innovation team effectiveness improvement.

Keywords : Flexible leadership, Team Trust, Team Interactive Behavior, Innovation Team Effectiveness

Background and significance of the problem

The Guangdong-Hong Kong-Macao Greater Bay Area, as one of China's most dynamic and internationally competitive economic regions, was committed to building an international science and technology innovation center. With the development of the Greater Bay Area and the progress of society, the demand for team effectiveness increased, becoming an important constraint on organizational development. As a source of innovation, universities were the most powerful driving force behind conceptual and technological advancements. The construction of university teams was a strategic measure adopted by national and local governments to promote knowledge innovation, interdisciplinary research, and the cultivation of innovative talents, with the deepening of

technological innovation, the organizational form of teaching and research innovation teams increasingly demonstrated its significant role in innovation development. In recent years, the university faculty team gradually expanded, effectively promoting China's technological innovation, scientific development, and talent cultivation, becoming an important component of the country's scientific and technological innovation strategy. It played a crucial role in enhancing university performance by improving the mechanisms for cultivating innovative talents, integrating technological resource allocation, fostering team spirit, uniting outstanding innovative groups, and forming excellent talent team effects. It effectively contributed to the emergence of major scientific research innovations in key fields in China and promoted the nation's technological advancement, scientific development, and talent cultivation. (Berlie and Benard, 2023)

Flexible leadership holds significant importance in modern organizations and team management, particularly in its impact on team performance. This leadership approach emphasizes flexibility, empathy, collaboration, and adaptability, aiming to improve work quality and efficiency by creating a more humane and open environment. This leadership style relies on teamwork, interactive behavior, and team trust, reducing reliance on power command and control management. Leaders support and encourage team members to cultivate better collaborative relationships. Adjust tasks based on the skills, experience, and professional knowledge of team members to improve overall efficiency and result quality. When faced with challenges or failures, flexible leadership helps teams adopt a positive attitude towards difficulties, enhancing their resilience and stress management abilities. It also emphasizes two-way communication and feedback mechanisms, reducing information barriers and misunderstandings to ensure consistency of goals within the team. Flexible leadership enables institutions to adapt more quickly to changes in curriculum design, research directions, and international cooperation strategies, thereby enhancing overall competitiveness. Universities have faculty, staff, and administrative staff from diverse backgrounds, interests, and goals. Flexible leadership has adjusted management methods to meet the diverse needs of teaching, research, and management. Flexible leadership provides resource support and flexible work arrangements, minimizing administrative intervention and stimulating research creativity and enthusiasm. Flexible leadership encourages interdisciplinary collaboration, breaks departmental silos, and creates an environment conducive to interdisciplinary research.

The team was the main foundation of organizational structure, and interaction can increase communication and negotiation among team members (Beerman, et al., 2009), thereby promoting cooperation between both parties (Mayer, 2009). Strive to achieve work goals in a common direction. The key to enabling team members to collaborate and achieve dual results was continuous interaction and enhanced trust (Hosmer, 2009), Consequently team interactive behaviors and team trust are critical elements that warrant exploration in this study. These factors serve as key variables in understanding team dynamics and performance, while there are numerous factors influencing team effectiveness, this research focuses on the influence of flexible leadership styles, team interactive behaviors, and team trust. More specifically, this study aims to address a notable gap in existing literature by examining how administrators' leadership flexibility impacts team innovation effectiveness within university settings. The research will explore how leadership adaptability, through fostering trust and encouraging team interaction, can directly influence the innovation capabilities of teams in higher education institutions.

Research objectives

1. To study the components of team trust, team interactive behavior, flexible leadership, and innovation team effectiveness.

2. To developing a model of mediating effects of team trust and team interactive behavior on the relationship between flexible leadership and innovation team effectiveness in Universities in Greater Bay Area.

3. To decompose the effect of team trust, team interactive behavior and flexible leadership effect on the innovation team effectiveness.

Conceptual Framework

The Greater Bay Area refers to a specific area that includes Hong Kong, Macau and some cities in Guangdong Province. Many researchers had studied the paths, methods, and influencing factors of improving the effectiveness of university teacher innovation teams from the perspectives of education and management, and had conducted extensive and in-depth discussions. Many outstanding scholars had analyzed and demonstrated various factors that affect teachers' teaching and research innovation teams from different perspectives, laying a theoretical foundation and research paradigm for the effectiveness of team innovation. This study starts from the perspective of flexible leadership and constructs a university teachers' innovation team effectiveness model through the mediating role of team trust and team interactive behavior, as the figure 1.
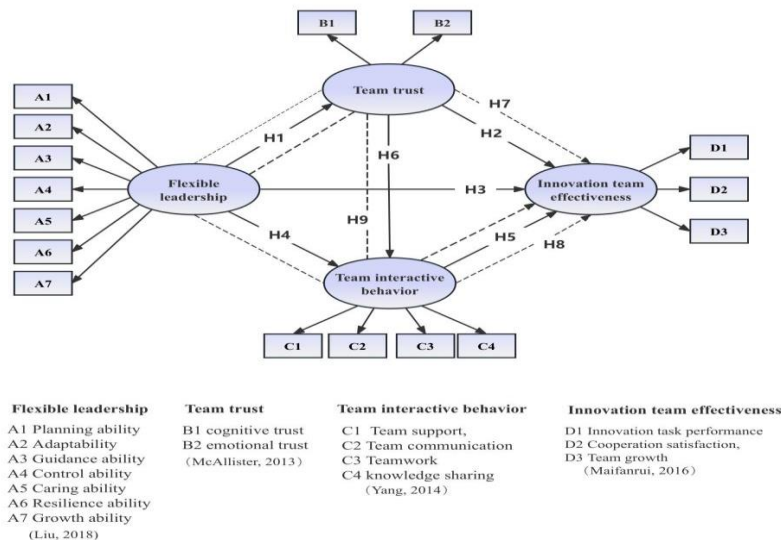

Flexible leadership
A1 Planning ability
A2 Adaptability
A3 Guidance ability
A4 Control ability
A5 Caring ability
A6 Resilience ability
A7 Growth ability
(Liu, 2018)

Team trust
B1 cognitive trust
B2 emotional trust
(McAllister, 2013)

Team interactive behavior
C1 Team support,
C2 Team communication
C3 Teamwork
C4 knowledge sharing
(Yang, 2014)

Innovation team effectiveness
D1 Innovation task performance
D2 Cooperation satisfaction,
D3 Team growth
(Maifanrui, 2016)

Figure 1 Conceptual Framework of this research

Research Hypothesis

H1: Flexible leadership had a positive direct effect on the team trust.

H2: Team trust had a positive effect on the team effectiveness.

H3: Flexible leadership had a positive direct effect on the innovation team effectiveness.

H4: Flexible leadership had a positive direct effect on the team interactive behavior.

H5: Team interactive behavior had a positive direct effect on innovation team effectiveness.

H6: Team trust had a positive direct effect on team interactive behavior.

H7: Flexible leadership had an indirect effect on the innovation team effectiveness through team trust.

H8: Flexible leadership had an indirect effect on the innovation team effectiveness through

team interactive behavior.

H9: Flexible leadership had an indirect effect on the innovation team effectiveness through team trust and interactive behavior.

Research Methodology

This research focuses on innovation teams in universities in the Greater Bay Area, aiming to explore the mediating role of team trust and team interactive behavior between flexible leadership and innovation team effectiveness. Using quantitative survey research method, a model was constructed to verify the influence relationship of various variables, providing a basis for the management of innovation teams in universities. Use multiple statistical methods to analyze data. Use descriptive statistics to understand sample characteristics, evaluate the fit of the measurement model using AMOS software, and calculate indicators such as CFI and TLI to determine the fit between the model and the data. Use AVE square root and other methods to test validity, and evaluate reliability using Cronbach's alpha coefficient and CR value. Validate the hypothesis through SEM structural equation analysis and explore the direct and indirect effects between variables.

Research Design

According to the research objectives, this research will be divided into seven steps:

Stage 1: Develop research ideas. What was flexible leadership as a manager of innovation teams in universities in the Greater Bay Area? What were the effective behaviors of flexible leadership? Was the innovation team effectiveness influenced by flexible leadership? What factors indirectly affect the innovation team effectiveness? Attempting to construct an efficiency model for innovation teams in universities in the Greater Bay Area. **Stage 2:** Conceptual research and design. Extensive literature review and content analysis will be conducted. **Stage 3:** Planning sampling and data collection. Determine the research scope, sample size, and sampling method. **Stage 4:** Research proposal and approval. Determine the questionnaire format and scale, use expert predictive evaluation, and conduct validity evaluation of the scale. **Stage 5:** Data Collection and Management. Distribute and return questionnaires, organize and eliminate invalid questionnaires. **Stage 6:** Data processing and interpretation. Analyze and interpret data using software. **Stage 7:** Analysis of Survey Results. Analyze and apply the verification results, propose theoretical contributions and practical applications of the research, and look forward to the future.

Population and Sample

The population were 4,883 teachers from innovation teams of 10 universities in the Guangdong Hong Kong Macao Greater Bay Area. The sample was determined by G*Power program was a total 539 teachers and obtained by proportional stratified random sampling method, covering different regions and levels of universities to ensure representativeness.

Research Instruments

The data was collected through a questionnaire survey, which consists of two parts. The first part collects basic information such as teacher gender and age; The second part was a 5-point rating scale for measure flexible leadership, team trust, team interactive behavior, and innovation team effectiveness, and adjusts them according to research objectives. After had 5 experts evaluate the validity of the questionnaire content, they were the leader of innovative team of university and had experience more 10 years, using the IOC index was value between 0.6 to 1.0, and revise the questionnaire to ensure that it accurately reflects the research objectives. and the reliability value for each factor was between .83 to .95.

Data Collection

The researchers distributed a Likert (5-point) questionnaire to the participants. Select teachers from 10 universities in the Guangdong Hong Kong Macao Greater Bay Area as research samples and collect data through online questionnaires.

Data Analysis

To facilitate the presentation and interpretation of research results, a series of symbols and abbreviations were used in the study. FL represents flexible leadership, TT represents team trust, TIB represents team interactive behavior, TE represents innovation team effectiveness, etc., The data analyzed on descriptive with percent, mean, SD, Skewness and Kurtosis), and inferential statistic with CFA and SEM.

Research Result

1) The data was collecting from the questionnaires, the result on the information of respondents as the table 1.

Table 1. Demographic statistics.

Information		Frequency	Percent	Cumulative Percent
gen	male	243	45.1%	45.10%
	female	296	54.9%	100.00%
age	less than 30 years	126	23.4%	23.40%
	30-40years	178	33.0%	56.40%
	40-50years	163	30.2%	86.60%
	More than 50 years	72	13.4%	100.00%
working experience	5 years or less	158	29.3%	29.30%
	5-10 years	250	46.4%	75.70%
	10-20 years	76	14.1%	89.80%
	20 years or more	55	10.2%	100.00%
Team role	Leader	84	15.6%	15.60%
	Teacher	333	61.8%	77.40%
	Administrator	122	22.6%	100.00%

From table 1, Showed that the sample were female teachers more than male teachers, at 54.9%; The majority were aged 30-40, accounting for 33.0%; The work experience was concentrated in 5-10 years, accounting for 46.4%; Teachers account for 61.8% of the team roles.

2）Data descriptive analysis on mean, standard deviation, Skewness and Kurtosis from the questionnaires, as the table 2.

Table 2. The standard deviation of coefficient of variation, skewness, and kurtosis.

	$\bar{x}$	S.D.	Skewness	Kurtosis
A1	3.624	1.082	-0.930	-0.589
A2	3.619	1.107	-0.911	-0.636
A3	3.648	1.112	-0.939	-0.537
A4	3.625	1.117	-0.810	-0.707
A5	3.647	1.093	-0.954	-0.494
A6	3.666	1.095	-0.944	-0.526
A7	3.616	1.125	-0.903	-0.656
(A1-A7) FL	3.635	0.882	-1.012	-0.412
B1	3.637	1.075	-0.938	-0.588
B2	3.668	1.151	-0.948	-0.472
(B1-B2) TT	3.653	0.991	-1.019	-0.258

C1	3.645	1.129	-0.932	-0.558
C2	3.631	1.074	-0.988	-0.516
C3	3.610	1.153	-0.911	-0.544
C4	3.647	1.116	-0.910	-0.582
(C1-C4) TIB	3.634	0.911	-0.914	-0.468
D1	3.638	1.100	-0.911	-0.620
D2	3.602	1.093	-0.806	-0.657
D3	3.663	1.100	-0.908	-0.583
(D1-D3) TE	3.634	0.911	-0.998	-0.285

From the table 2, It can be seen the mean value of each variable was between 3.486-4.093, and the distribution was relatively balanced, and the standard deviation of each variable is between 0.982-1.082, which indicates that the sample data dispersion was small. when the absolute value of skewness of data was less than 3 and the absolute value of kurtosis was less than 10, the observed variables basically conform to the normal distribution, it can be considered that the shape of large sample data basically conforms to the normal distribution, which meets the basic requirements of the research hypothesis in this paper.

3) The Intercorrelation Between Latent Variables, as the table 3.

**Table 3. The Square Matrix of Intercorrelation Between Latent Variables.**

	FL	TT	TIB	TE
FL	1			
TT	.375**	1		
TIB	.387**	.425**	1	
TE	.497**	.542**	.435**	1

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation coefficients between all variables are positive, indicating a positive relationship between them. The correlation coefficient ranges from 0.375 to 0.542, indicating a moderate to strong correlation. and correlation coefficients were significant ($p<0.01$), indicating that the relationships between these variables can be considered statistically reliable.

Confirmatory factor analysis model. The research identified four factors and 16 observed variables, namely flexible leadership, team trust, team interactive behavior, and innovation team effectiveness, and constructed a measurement model using AMOS software. On figure 2

4) Measurement model (Confirmation factors Analysis model)
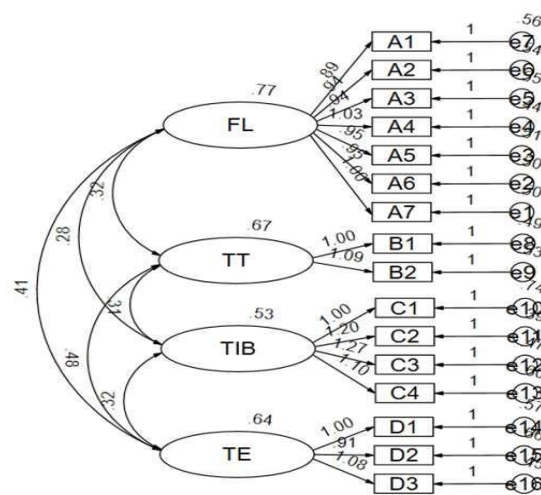
TLI=.985 ̗GFI=.964 ̗CFI=.985 ̗RMSEA=.034

Figure 2 The Measurement Model of Four Latent Variables in standardized estimates

Table 4. Measurement model fit valuation after modifying.

Parameters	Threshold	Model Value	Interpretation
CMIN		159.853	Excellent
CMIN/DF	<3 Excellent, 3-5 Acceptable	1.631	Excellent
GFI	>0.95 Excellent, >0.9 Acceptable	0.964	Excellent
IFI	≥0.90 Excellent, >0.8 Acceptable	0.961	Excellent
TLI	>0.95 Excellent, >0.9 Acceptable	0.985	Excellent
CFI	>0.95 Excellent, >0.9 Acceptable	0.981	Excellent
RMSEA	<0.05 Excellent, <0.08 Acceptable	0.034	Excellent

Based on Table 4, the Measurement Model fit-well with a CMIN/DF value of 1.631 less than 3, a GFI value of 0.964, an AGFI value of 0.950, an IFI value of 0.961, a TLI value of 0.985, a CFI value of 0.981, and an RMSEA value of 0.034. This indicates that the model can effectively explain the variance and covariance of observed data and fits well with the empirical data. As the Table 5.

Table 5. Results of convergence validity analysis.

Variables			Factor loadings		C.R.	p	S.E.	R^2
			Estimate	beta				
A1	<---	FL	0.89	0.721	17.411	***	0.051	0.520
A2	<---	FL	0.945	0.748	18.19	***	0.052	0.560
A3	<---	FL	0.943	0.743	18.042	***	0.052	0.552
A4	<---	FL	1.025	0.805	19.853	***	0.052	0.648
A5	<---	FL	0.946	0.758	18.482	***	0.051	0.575
A6	<---	FL	0.954	0.764	18.641	***	0.051	0.584
A7	<---	FL	1	0.779				0.607
B1	<---	TT	1	0.760				0.578
B2	<---	TT	1.086	0.772	13.414	***	0.081	0.596
C1	<---	TIB	1	0.645				0.416
C2	<---	TIB	1.199	0.814	14.85	***	0.081	0.663
C3	<---	TIB	1.271	0.803	14.743	***	0.086	0.645
C4	<---	TIB	1.102	0.720	13.674	***	0.081	0.518
D1	<---	TE	1	0.730				0.533
D2	<---	TE	0.909	0.668	13.72	***	0.066	0.446
D3	<---	TE	1.083	0.790	15.589	***	0.069	0.624

Significance Indicators: ***$p<0.001$

From the table 5, FL (Flexible Leadership) all factor loadings>0.89, R^2 > 0.52. The measurement variables (A1-A7) of FL had high convergence validity. A4 has the highest load (1.025), indicating that A4 contributes the most in measuring FL.

The factor loadings of TT (Team trust) B1-B2 were 1 and 1.086, respectively, R^2 > 0.57. The measurement variables of TT were reliable.

The TIB (Team Interactive Behavior) has the lowest C1 load (0.645, R^2 = 0.416), but it was still acceptable (>0.40). The C2-C4 load was relatively high (>1.1), and R^2>0.50, indicating good overall convergence validity.

The TE (Innovation Team Effectiveness) D1-D3 load ranges from 0.909-1.083, and the R^2 ranges from 0.446-0.624, which meets the standards.

The measurement model quality with the Composite Reliability (CR), The Average Variance Extracted (AVE), The Maximum Shared Variance (MSV), The Maximum Reliability (MaxR(H)), and The Latent Variables Intercorrelation with Square Root of AVE, As the diagonal on the table 6.

Table 6. Show CR, AVE and discriminant of model.

|	CR	AVE	MSV	MaxR (H)	Flexible leadership	Team trust	Team effectiveness	interactive behavior
FL	0.905	0.578	0.335	0.907	**0.760**			
TT	0.739	0.587	0.531	0.74	0.454***	**0.766**		
TE	0.774	0.534	0.531	0.783	0.579***	0.728***	**0.731**	
TIB	0.835	0.56	0.299	0.848	0.434***	0.525***	0.546***	**0.749**

Significance Indicators: ***p<0.001

Form the table 6, the CR was a measure of internal consistency of latent variables, requiring a value of ≥ 0.7. All latent variables had a CR higher than 0.7, indicating good internal consistency and meeting the reliability requirements.

AVE measures the explanatory power of latent variables on their observed variables, with a requirement value of ≥ 0.5. The AVE of all latent variables was higher than 0.5, indicating that latent variables can explain most of the variance of their observed variables and had good convergent validity. MSV measures the maximum shared variance between latent variables and was used to evaluate discriminant validity, requiring MSV ≤ AVE.

The MSV values of FL, TT, TE, and TIB were all smaller than their corresponding AVE, indicating good discriminant validity among latent variables.

The correlation matrix of latent variables and discriminant validity, the square of the correlation coefficient between latent variables should be less than the square root of their respective AVEs to verify discriminant validity. The diagonal value of FL is 0.760. The diagonal value of TT was 0.766. The diagonal value of TE was 0.731. The diagonal value of TIB was 0.749. The correlation of all latent variables was smaller than their respective diagonal values. (Fornell and Larcker, 1981).

5) Hypothesis Testing
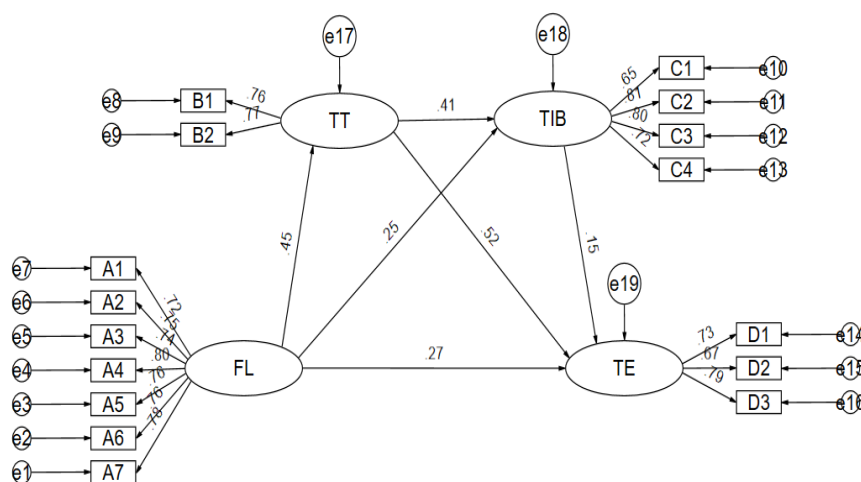
CMIN=159.853, df=98, CMIN/df=1.631, p=.000
GFI=.964,CFI=.985,RMSEA=.034

Figure 3 Structural Equation Models

From the figure 3, the result for analyzed on the effects of factors on the innovation team effectiveness as the table 7.

Table 7. The hypotheses testing of direct effects.

			UnStd. Esti.	S.E.	C.R.	p	Std. Esti.	Hypothesis
TT	<---	FL	0.423	0.051	8.36	***	0.454	H1
TE	<---	TT	0.515	0.067	7.713	***	0.524	H2
TE	<---	FL	0.252	0.046	5.459	***	0.275	H3
TIB	<---	FL	0.206	0.045	4.588	***	0.247	H4
TE	<---	TIB	0.168	0.061	2.766	0.006	0.152	H5
TIB	<---	TT	0.368	0.057	6.477	***	0.413	H6

Significance Indicators: ***$p<0.001$

The hypothesis testing results of structural equation modeling show that all direct effects hypotheses (H1-H6) are supported. Flexible leadership has a significant impact on team trust, team interactive behavior, and innovation team effectiveness; Team trust has a significant impact on team interactive behavior and innovation team effectiveness; Team interactive behavior has a significant impact on the effectiveness of innovation teams. Among them, team trust has the strongest direct impact on innovation team effectiveness was coefficient 0.524, while team interactive behavior has the weakest direct impact on innovation team effectiveness was coefficient 0.152, as the table 8.

Table 8. Show the indirect effects analysis.

Path	Estimate	SE	95%CI		p	Hypothesis
			Lower	Upper		
FL-->TT -->TE	0.238	0.047	0.163	0.352	***	H7
FL- ->TIB-->TE	0.038	0.020	0.006	0.084	1.90	H8
FL-->TT-->TIB-->TE	0.028	0.013	0.008	0.061	**	H9

From the table 8. Result for hypothesis testing of indirect effects as follow;

H7: FL ⟶ TT ⟶ TE Flexible leadership (FL) has a significant indirect effect on team effectiveness (TE) through team trust (TT), with a path coefficient of 0.238 and both upper and lower confidence intervals not including 0, verifying H7. Team trust was an important mediating variable for the impact of flexible leadership on team effectiveness. This indicates that flexible leadership can further improve the overall effectiveness of the team by enhancing trust among team members.

H8: FL ⟶ TIB ⟶ TE Flexible leadership (FL) has a weak indirect effect on team effectiveness (TE) through team interactive behavior (TIB), with a path coefficient of 0.038. SE of 0.02. The z-value of 1.9 is less than 1.96, therefore the z-value is not significant, H8 assumes that the indirect effect of the FL ->TIB ->TE pathway does not hold, indicating that H8 was not supported.

H9: FL ⟶ TT ⟶ TIB ⟶ TE Flexible leadership (FL) has a significant indirect effect on team effectiveness (TE) through the joint mediation of team trust (TT) and team interactive behavior (TIB), with a path coefficient of 0.028. that was supporting on H9.

From the Table 7 and 8, shown the decompose for the direct effects of Flexible leadership (FL) has effect on team effectiveness (TE) was 0.252, and had indirect effect through the mediation of team trust (TT) and team interactive behavior (TIB) was .304, The total effect was .556, with a significant.

Discussions

On the research results, researchers could be discussion on the main research results according to the hypothesis as follows:

1) The flexible leadership construct is composed of seven components: planning ability, adaptability, guidance ability, control ability, caring ability, resilience ability, and growth ability. These factors contribute to a leader's capacity to steer a team through challenges and foster an environment conducive to both individual and collective growth. Studies have shown that flexibility in leadership can significantly enhance a team's performance, particularly in dynamic and uncertain environments (Hoch and Dulebohn, 2013). Additionally, innovation team effectiveness was found to consist of three core components: innovation task performance, cooperation satisfaction, and team growth. These elements highlight the importance of both individual and group performance in driving innovative outcomes, as well as the significance of fostering a collaborative and supportive team environment (West, 2002).

2) The mediating effects model of team trust and team interactive behavior on relationship between flexible leadership and innovation team effectiveness in the Greater Bay Area fit well with empirical data (CMIN/DF = 1.631, GFI = 0.964, IFI = 0.961, TLI = 0.985, CFI = 0.981, and RMSEA = 0.034). which are all within the acceptable range for structural equation modeling (Hu and Bentler, 1999). These results provide empirical support for the proposed relationships, indicating that team trust and team interactive behavior play crucial mediating roles in translating flexible leadership into improved innovation team effectiveness.

3) For decomposed on direct effects and indirect effects, To investigate found the flexible leadership, team trust and team interactive behavior had positive direct effect on the innovation team effectiveness (p<.001), accepted on hypothesis H3, H2 and H5, this may be due to the flexible leadership were ability of leaders to flexibly adjust their behavior and strategies based on changes in the environment and team needs, in order to promote the achievement of team goals, according previous studies had shown that flexible leadership has a significant direct impact on innovation team effectiveness: (Yukl and Mahsud. 2010). proposed that flexible leadership can effectively respond to complex team needs and promote the improvement of team innovation capabilities. The flexibility of leaders can improve the quality of decision-making and the efficiency of resource allocation, thereby enhancing the overall performance of the team. (Lin and Yi Lingfeng, 2020) points out that flexible leadership was particularly important for innovative teams in dynamic environments. Through adaptive management, leaders can stimulate the creativity and collaboration abilities of team members, and drive the generation of innovative results. Hannah, et al. (2009) believes that flexible leadership can enhance a team's psychological security and encourage members to try new ideas, which is crucial for high-performance innovative teams. Team trust was the shared sense of trust among team members, which was an important foundation for efficient collaboration and performance. A large amount of literature emphasizes the crucial role of team trust in team effectiveness: Mayer (1995) pointed out in their trust theory that team trust can reduce conflicts, improve team collaboration efficiency, and directly affect team performance. Costa, et al. (2001) emphasized the importance of team trust in interdisciplinary teams, stating that trust can accelerate information sharing and decision implementation, and enhance team innovation capabilities. Research by Dirks (1999) has shown that high levels of team trust can enhance members' psychological contracts, increase their motivation and participation, and were particularly important for innovative tasks. Zand (1972) mentioned that trust can not only reduce communication costs

within a team, but also improve coordination among members, thereby significantly enhancing the efficiency of innovation teams.

To verify the indirect effect of flexible leadership on innovation team effectiveness via team trust and team interactive behavior by systematically testing each hypothesis, convincing evidence was found to support the mediating effects of different variables. The research results confirm that flexible leadership (FL) has a significant indirect impact on innovation team effectiveness (TE) through team trust (TT), and team trust was an important mediating variable for the impact of flexible leadership on the innovation team effectiveness This indicates that flexible leadership can further improve the overall efficiency of the team by enhancing trust among team members.

However, the indirect impact of flexible leadership (FL) on innovation team effectiveness (TE) through team interactive behavior (TIB) was not significant, indicating that interactive behavior does not has a positive mediating effect on the impact of flexible leadership on innovation team effectiveness, and its impact was relatively small. Flexible leadership (FL) has a significant indirect impact on innovation team effectiveness (TE) through the joint mediation of team trust (TT) and team interactive behavior (TIB). There were multiple indirect pathways indicate that flexible leadership can further promote team interactive behavior through team trust, ultimately improving the innovation team effectiveness. Although the overall effect of the path was weak, its complexity reflects the multi-level relationships between variables.

The impact of flexible leadership (FL) on innovation team effectiveness (TE) was not only achieved through direct effects, but also through various indirect pathways. Team trust was the core mediating variable of the impact of flexible leadership on innovation team effectiveness. The influence of team interactive behavior as a single medium is relatively weak. But this indicates that they had a certain significance in complex relationships.

In addition, valuable insights were obtained by linking these findings with the theoretical foundations presented in the literature review. This research contributes to the field by elucidating how flexible leadership influences the effectiveness of teacher innovation teams through specific pathways. These findings had significant implications for both academic research and practical applications. This research also emphasizes the interrelationship between team trust and team interactive behavior. The mediating role of these factors reveals a complex network of influences, enriching our understanding of the broader education ecosystem.

Recommendations

1. Recommendation for Policies Formulation

(1) Promote the development of flexible leadership and enhance the innovation team effectiveness. Flexible leadership training: Universities should provide flexible leadership training for leaders, focusing on cultivating their adaptability, flexibility, and emotional management abilities in different contexts. Promote universities to develop systematic leadership enhancement plans and introduce flexible leadership practice projects in conjunction with innovative goals.

(2) Enhance team trust and build an efficient collaborative culture: Transparent communication mechanism: Establish transparent communication channels within the team to enhance trust and understanding among team members. Building a culture of trust: Introduce policies to encourage universities to create a culture centered on trust, such as enhancing trust through public recognition, team building activities, and other means.

(3) Optimize team interactive behavior and enhance team innovation effectiveness promote knowledge sharing: Encourage team members to actively share knowledge and experience through brainstorming, interdisciplinar seminars, and other forms. Encourage collaborative innovation: Design a team reward mechanism that links innovative achievements with team collaboration behavior, motivating members to achieve common goals through cooperation.

(4) Promote regional coordinated development and enhance the innovation capabilities of universities in the Greater Bay Area. School enterprise cooperation support: Establish a flexible cooperation mechanism between universities and enterprises to promote the application of leadership, trust, and interactive behavior in innovative practices.

2. Recommendations for the application of research findings

(1) Promote flexible leadership practices to enhance team adaptability and innovation capabilities Through practical case analysis and scenario simulation training, help university leaders learn to flexibly adjust strategies in complex and changing environments, and adapt to the needs of different teams. Encourage leaders to flexibly apply different leadership styles such as directive, supportive, and empowering based on the characteristics of team tasks and member abilities.

(2) Strengthen team trust building and optimize team collaboration. Conduct team building activities: Regularly organize team building activities such as psychological safety training, role recognition workshops, and team goal co creation meetings to enhance trust among members. Transparent and open decision-making mechanism: Introduce open discussion sessions in team decision-making to ensure that members' opinions are fully heard, thereby establishing trust and a sense of belonging

(3) Optimize team interactive behavior and enhance innovation effectiveness. Knowledge sharing and collaboration platform construction: By establishing online collaboration platforms (such as academic cloud disks and knowledge management systems), team members can efficiently share information and discuss issues. Assessment mechanism for motivating collaboration: incorporating team interaction behavior into performance evaluation indicators, such as rewarding outstanding team members or groups with outstanding innovative achievements, to motivate members to actively participate in collaboration.

(4) Promote regional university linkage and enhance overall innovation capability. Establish a university resource sharing platform: Through regional research resource sharing platforms, promote communication and interaction between different universities, and provide more resource support for innovation teams. Promote cross school joint projects: Encourage universities, enterprises, and research institutions in the region to jointly form cross school innovation teams and achieve major breakthroughs through collaborative research and development.

3. Recommendations for the next research

Future research should further explore the complex relationship between team trust, team interactive behavior, and flexible leadership in innovation teams of universities in the Greater Bay Area, especially how to enhance innovation team effectiveness through multidimensional leadership, team trust, and team interactive behavior. In addition, considering factors such as external environment and team diversity will help to comprehensively understand this relationship and provide more practical theoretical support and policy recommendations for the construction of university innovation teams and regional scientific and technological innovation.

References

Beerman, et al. (2009). Superior performance of liquid-based versus conventional cytology in a population-based cervical cancer screening program. 112 (3), **Gynecologic Oncology,** 572–576.

Berlie, A. J. and Benard, M. (2023). Greater Bay Area Importance of Hongkong and Guangzhou. **Open Access Library Journal,** 10 (3), 1-18.

Costa, C, et al. (2001). Trust within teams : The relation with performance effectiveness. **European Journal of Work and Organizational Psychology,** 10 (3), 225–244.

Dirks, T. K. (1999). The effects of interpersonal trust on work group performance. **Journal of Applied Psychology,** 84 (3), 445–455.

Fornell, C. and Larcker, D. F. (1981) Evaluating structural equation models with unobservable variables and measurement error. **Journal of Marketing Research**. 18 (1), 39-50.

Hannah, T, et al., (2009). A framework for examining leadership in extreme contexts. **The Leadership Quarterly,** 20 (6), 897–919.

Hoch, J. E. and Dulebohn, J. H. (2013). Shared Leadership in enterprise and Human resource management system implementation. **Human Resource Management Review**, 23 (1), 114-125.

Hosmer, T. L. (2009). **The ethics of management**. 7th ed. McGraw-Hill/Irwin.

Hu, L. T., and Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. **Structural Equation Modeling : A Multidisciplinary Journal**, 6 (1), 1-55.

Lin and Yi Lingfeng. (2020). The Cross-level Effect of Entrepreneurial Leadership on Team Creativity. **Foreign Economics & Management,** 42 (9), 107–120.

Mayer, C., et al. (1995). An integrative model of organizational trust. **The Academy of Management Review**, 20 (3), 709–734.

Mayer, E. R. (2009). **Multimedia learning.** 2nd ed. Cambridge University Press.

West, M. A. (2002). Sparkling Fountains or Stagnant Ponds : An Integrative Model of Creativity and Innovation Implementation in Work Groups. **Applied psychology**, 51 (3), 355-387.

Yukl and Mahsud, R. G. (2010). Why flexible and adaptive leadership is essential. **Consulting Psychology Journal : Practice and Research**, 62 (2), 81–93.

Zand, E. D. (1972). Trust and managerial problem solving. **Administrative Science Quarterly,** 17 (2), 229–239.