

MODERATING AND MEDIATING EFFECTS OF TRANSFORMATIONAL LEADERSHIP ON
JOB SATISFACTION AND INNOVATIONAL LEADERSHIP AND ORGANIZATIONAL
CLIMATE IN LIAONING VOCATIONAL UNIVERSITIES*

Wang Lanjie¹, Sukhum Moonmueang², Sataporn Pruettikul³
Bangkokthonburi University, Thailand.^{1,2,3}
Email : 278829884@qq.com

ABSTRACT

The purpose of this research was to investigate the factors affecting the climate of vocational universities in Liaoning Province and to determine the mediating and moderating roles of transformational and Innovational leaders between job satisfaction and organizational climate in universities. The objectives of this research were: (1) to find out factors affecting university climate in Liaoning province, (2) to determine whether transformational leadership has a mediating effect on the relationship between job satisfaction and university organizational climate, (3) to examine innovation leadership mediates the relationship between job satisfaction and university organizational climate, and (4) to investigate whether transformational leadership has a moderating effect on the relationship between job satisfaction and university organizational climate.

The research used a multi-stage random sampling technique to select 433 teachers from a total of 5222 teachers in 10 vocational colleges and universities in Liaoning Province. Data collection was conducted through a five-point Likert scale questionnaire and then analyzed using descriptive statistics. For more rigorous testing, the research used confirmatory factor analysis to validate the measurement model and then structural equation modeling to test the mediating and moderating hypotheses. The results of the research indicated that job satisfaction, Innovational leadership, and transformational leadership were significant factors influencing university climate. Transformational leadership was found not to mediate the relationship between job satisfaction and university climate. However, Innovational leadership was shown to be a mediator of this relationship. In addition, the research revealed the moderating effect of transformational leadership on the relationship between job satisfaction and university climate, the effect of job satisfaction on university climate in such way that when the transformational leadership was high the relationship between job satisfaction and organizational climate was also high, meanwhile when the transformational leadership was low the relationship between job satisfaction and organizational climate was low.

Keywords : 1. Job Satisfaction 2. University Climate 3. Transformational Leadership
4. Mediating Effect 5. Moderating Effect

1. Background and Problem Statement

In today's dynamic educational environment, leadership is a critical factor for institutional success. This research examines how transformational and innovational leadership styles affect teachers' job satisfaction and organizational climate at Liaoning Vocational University in China.

Transformational leadership inspires and motivates followers through four key dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Riggio, 2006). This leadership style creates a supportive environment that enhances job satisfaction among teachers by instilling a sense of purpose and commitment (Judge & Piccolo, 2004). Innovational leadership emphasizes promoting creativity, risk-taking, and supporting new ideas within the organization (Mumford et al., 2002). This style is particularly relevant in educational settings where innovation can lead to improved teaching methods, curricular reforms, and better educational outcomes (Yukl, 2013).

Despite extensive research on these leadership styles, there remains a notable gap in the literature concerning vocational education institutions in China, especially regarding Liaoning Vocational University. This university plays a pivotal role in equipping the workforce with necessary skills for regional economic development (Liao et al., 2016; Li, 2017).

The research aims to explore how transformational and innovational leadership practices at Liaoning Vocational University influence teachers' job satisfaction and organizational climate. A positive organizational climate, characterized by supportive work environments, effective communication, and robust conflict resolution mechanisms, is essential for professional growth, innovation, and overall organizational effectiveness (Hoy et al., 2008). Addresses the gap in research focused on Chinese vocational education institutions and aims to provide actionable insights for educational leaders and policymakers.

2. Research Questions

2.1 What these factors affected the university climate in Liaoning province?

2.2 How these transformational leadership a mediating effect on the relationship between job satisfaction and organizational climate in university?

2.3 How these innovation leadership a mediating effect on the relationship between job satisfaction and organizational climate in university?

2.4 How these transformation leadership moderating an effect on the relationship between job satisfaction and organizational climate in university?

3. Research Objectives

- 3.1 To find out factors affecting university climate in Liaoning province.
- 3.2 To determine whether transformational leadership has a mediating effect on the relationship between job satisfaction and organizational climate in university.
- 3.3 To examine innovation leadership mediates the relationship between job satisfaction and organizational climate in university.
- 3.4 To investigate whether transformational leadership has a moderating effect on the relationship between job satisfaction and organizational climate in university.

4. Research Benefits

Transformational and Innovational leadership styles significantly enhance teacher job satisfaction by fostering supportive and motivating environments, reducing burnout and turnover. These leadership approaches also improve organizational climate by promoting trust, collaboration, and open communication, while encouraging creativity and adaptability. Higher job satisfaction and a positive climate lead to greater teacher commitment and performance, benefiting students and institutions. Additionally, these leadership styles indirectly improve student outcomes by supporting teacher well-being and professional growth. Innovational leadership drives organizational adaptability and innovation, ensuring competitiveness and relevance in a changing educational landscape. The findings of this research contribute to academic literature by focusing on vocational education institutions in China, offering insights applicable globally. By aligning individual and organizational goals, transformational and Innovational leadership holistically advance educational institutions, ensuring excellence in education through improved satisfaction, climate, and innovation. These insights can inform policies and leadership practices, leading to better resource allocation and leadership development programs.

5. Research Methodology

This research employed a quantitative cross-sectional survey design to investigate factors influencing the organizational climate of vocational universities in Liaoning Province. The research specifically examined the mediating and moderating roles of transformational and innovation leadership in the relationship between job satisfaction and organizational climate. The methodology encompassed the following components:

5.1 Research Design and Objectives

A quantitative approach was adopted to address four objectives: (1) identifying factors affecting university climate; (2) assessing transformational leadership's mediating

effect between job satisfaction and climate; (3) evaluating innovation leadership's mediating role; and (4) testing transformational leadership's moderating effect. The target population comprised teachers from 10 vocational universities in Liaoning Province. Data were analyzed using Structural Equation Modeling to incorporate latent mediation and moderation analyses.

5.2 Population and Sampling

The population included 5,222 teachers across 10 universities. Multi-stage random sampling was applied, with universities serving as strata. The sample size was determined via G*Power, accounting for an effect size of 0.3, $\alpha = 0.05$, and power = 0.80, yielding a minimum sample of 433 participants.

5.3 Instrument Development

Used 5-point Likert-scale questionnaires:

Transformational Leadership Questionnaire (TLQ): Measured idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration.

Innovational Leadership Questionnaire (ILQ): Assessed creative abrasion, agility, resolution, and shared purpose.

Job Satisfaction Questionnaire (JSQ): Covered work itself, pay, promotion opportunities, and supervision.

Organizational Climate Questionnaire (OCQ): Evaluated leadership, communication, support, and recognition/reward.

Instrument development followed a seven-step process: (1) defining constructs, (2) literature review, (3) item generation, (4) response format selection, (5) content validation via expert review (IOC ≥ 0.6), (6) pilot testing ($n = 30$) confirming reliability (Cronbach's $\alpha \geq 0.7$), and (7) final reliability testing.

5.4 Data Collection

Data were collected online using Questionnaire Star software. A formal request for data collection approval was obtained from BTU Faculty of Education. Participants from the 10 universities were given one week to complete the survey. Post-collection, data underwent rigorous verification to ensure accuracy and completeness.

5.5 Data Analysis

Analyses included:

Descriptive Statistics: Frequencies, percentages, means, standard deviations, skewness, and kurtosis.

Inferential Statistics: Inter-correlation matrices to support Confirmatory Factor Analysis (CFA) and identify multicollinearity.

CFA to validate the factor structure of latent variables (transformational leadership, innovation leadership, job satisfaction, organizational climate) and their indicators. Model fit was assessed using χ^2/df (<5), CFI (>0.90), TLI (>0.90), and RMSEA (<0.08).

SEM to test direct, mediating, and moderating effects. Mediation was analyzed via indirect effects (z-test), while moderation employed the product indicator approach and Latent Moderated Structural Equations to model interactions within SEM.

6. Research Results

The research investigated the interplay between transformational leadership, innovational leadership, job satisfaction, and organizational climate among vocational university teachers in Liaoning Province, China. Key findings are summarized as follows:

6.1 Descriptive Statistics:

Table 1 General information of the respondents (n=433)

List of information		Frequencies	Percentage
Gender			
	Male	221	51.04
	Female	212	48.96
Age range			
	Lower than 25 years	0	0
	26-35 years	130	30.02
	36-45 years	112	25.87
	46-50 years	102	23.56
	More than 50 years	89	20.55
Educational level			
	Master's degree	368	84.99
	Doctoral degree	63	14.55
	Post-doctoral degree	2	0.46
Working Experience			
	1-5 years	42	9.70
	6-10 years	184	42.49
	11-15 years	163	37.64
	More than 15 years	44	10.16

List of information		Frequencies	Percentage
Rank with teacher administrator			
	1-5 years	293	67.67
	6-10 years	73	16.86
	More than 10 years	67	15.47

The survey included 433 respondents, with a slight majority of males (51.04%) and the rest females (48.96%). Most respondents (55.89%) were under 45, with 23.56% aged 46-50 and 20.55% over 50. The majority (84.99%) held master's degrees, 14.55% had PhDs, and 0.46% were postdocs. Among respondents familiar with Liaoning Vocational University's administrators, 67.67% had 1-5 years of familiarity, 16.86% had 6-10 years, and 15.47% over 10 years.

Table 2 Mean score, Standard Deviations, Skewness, Kurtosis, and the Test of Normality for Transformational leadership, Innovational leadership, Job satisfaction and Organizational climate

Observed variable	\bar{X}	S.D.	%CV	Skewness	Std. error skewness	Kurtosis	Std. error kurtosis
Idealized Influence (II)	3.84	0.565	14.714	-0.261	0.117	-1.1	0.234
Inspiration Motivation (IM)	3.82	0.636	16.649	0.329	0.117	-0.665	0.234
Intellectual Stimulation (IS)	3.93	0.645	16.412	0.102	0.117	-1.04	0.234
Individualized Consideration (IC)	3.78	0.57	15.079	-0.062	0.117	-1.37	0.234
Creative Abrasion (CAb)	3.87	0.584	15.090	0.292	0.117	-0.176	0.234
Creative Agility (CAg)	3.97	0.576	14.509	-0.378	0.117	-1.13	0.234
Creative Resolution (CR)	3.88	0.735	18.943	0.146	0.117	-1.4	0.234
Shared Purpose (SP)	4.15	0.689	16.602	-0.274	0.117	-1.11	0.234

Observed variable	\bar{X}	S.D.	%CV	Skewness	Std. error skewness	Kurtosis	Std. error kurtosis
Work Itself (WI)	4.06	0.675	16.626	-0.196	0.117	-1.1	0.234
Pay (Pa)	4.06	0.686	16.897	0.0669	0.117	-1.1	0.234
Promotion Opportunities (OP)	4	0.534	13.350	0.521	0.117	0.0192	0.234
Supervision (SV)	4.17	0.572	13.717	0.0709	0.117	-0.136	0.234
Leadership (LS)	4.18	0.595	14.234	0.147	0.117	-0.991	0.234
Communication (CC)	4.2	0.544	12.952	0.406	0.117	-1.06	0.234
Support (Sp)	4.08	0.684	16.765	-0.1	0.117	-0.933	0.234
Recognition Reward (RR)	3.87	0.533	13.773	0.115	0.117	-0.521	0.234

Organizational climate variables demonstrated favorable perceptions, with communication (CC) scoring the highest mean (4.2) and recognition and rewards (RR) the lowest (3.87).

Job satisfaction was positively perceived, particularly regarding supervision (SV: 4.17) and promotion opportunities (OP: 4.00).

Transformational leadership dimensions and innovational leadership components were rated highly, though variability existed in creative resolution (CR).

6.2 Intercorrelations:

The correlation matrix reveals clear relationship patterns.

Strong correlations indicate some variables are interchangeable or reflect the same underlying constructs, particularly leadership-related ones.

Moderate correlations exist between variables like WI and OP, OP and SV, and LS and CC.

Weak but significant correlations are observed between IS and IC, IS and IM, as well as WI and Pa. Leadership and communication are central to organizational performance and satisfaction.

Most relationships are highly significant, reinforcing the robustness of the findings.

Table 3 Correlation Matrix

	WI	Pa	OP	SV	LS	CC	Sp	RR	II	I_S	IC	IM	CAb	CAG	CR	Sp
WI	1															
Pa	0.42***	1														
OP	0.51***	0.48***	1													
SV	0.49***	0.44***	0.50***	1												
LS	0.39***	0.38***	0.39***	0.43***	1											
CC	0.41***	0.37***	0.35***	0.45***	0.65***	1										
Sp	0.37***	0.36***	0.39***	0.36***	0.70***	0.66***	1									
RR	0.41***	0.37***	0.40***	0.41***	0.65***	0.70***	0.65***	1								
II	0.30***	0.29***	0.34***	0.31***	0.34***	0.29***	0.35***	0.30***	1							
I_S	0.37***	0.22***	0.27***	0.36***	0.25***	0.27***	0.28***	0.27***	0.22***	1						
IC	0.30***	0.33***	0.26***	0.37***	0.29***	0.28***	0.28***	0.27***	0.20***	0.16***	1					
IM	0.31***	0.35***	0.34***	0.35***	0.26***	0.26***	0.27***	0.24***	0.24***	0.21***	0.25***	1				
CAb	0.29***	0.22***	0.29***	0.30***	0.35***	0.33***	0.38***	0.34***	0.25***	0.17***	0.22***	0.13**	1			
CAG	0.22***	0.16***	0.26***	0.21***	0.34***	0.34***	0.37***	0.33***	0.18***	0.14**	0.11*	0.19***	0.56***	1		
CR	0.23***	0.19***	0.28***	0.26***	0.38***	0.31***	0.37***	0.37***	0.24***	0.18***	0.18***	0.16***	0.60***	0.56***	1	
SP	0.27***	0.23***	0.22***	0.21***	0.31***	0.31***	0.32***	0.30***	0.20***	0.12*	0.14**	0.17***	0.56***	0.54***	0.57***	1

Note. * p < .05, ** p < .01, *** p < .001

6.3 Confirmatory factor analysis (CFA):

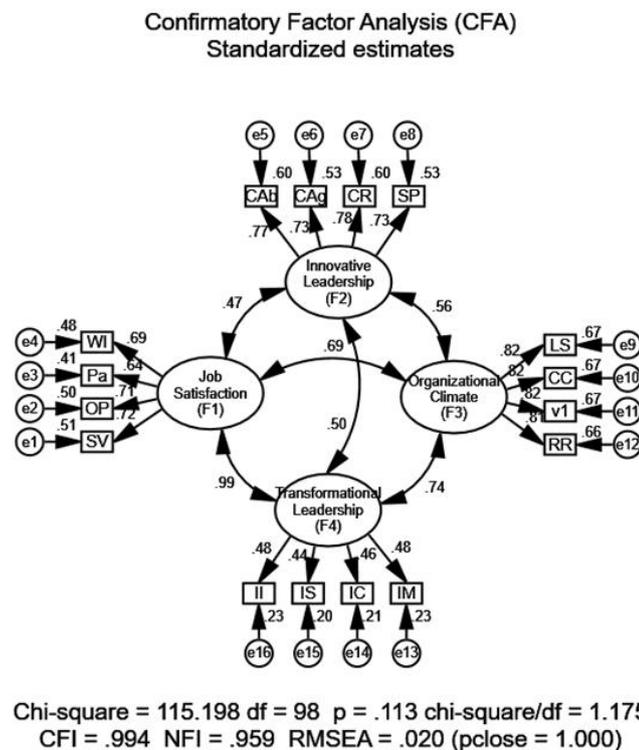


Figure 1 The Confirmatory Factor Analysis Model (CFA)

6.3.1 Confirmatory Factor Analysis Model

The Confirmatory Factor Analysis Model (CFA) model examines the relationship between the four latent factors and their observed variables in the context of Transformational Leadership, Innovational Leadership, Job Satisfaction, and Organizational Climate. Transformational leadership (F4) significantly influences job satisfaction (F1), Innovational leadership (F2), and organizational climate (F3). All latent factors were supported by observable variables, confirming their theoretical validity.

6.3.2 Model evaluation

Table 4 Model evaluation

Measure	Estimate	Threshold	Interpretation
CMIN	115.198	--	--
DF	98	--	--
CMIN/DF	1.175	Between 1 and 3	Excellent
CFI	0.994	>0.95	Excellent
SRMR	0.028	<0.08	Excellent
RMSEA	0.02	<0.06	Excellent
PClose	1	>0.05	Excellent

The CFA model demonstrates excellent fit with all indices meeting or exceeding thresholds: CMIN/DF=1.175, CFI=0.994, SRMR=0.028, RMSEA=0.02, and PClose=1.000. These results confirm the model's robustness and confirmatory factor analysis.

6.3.3 Measurement quality

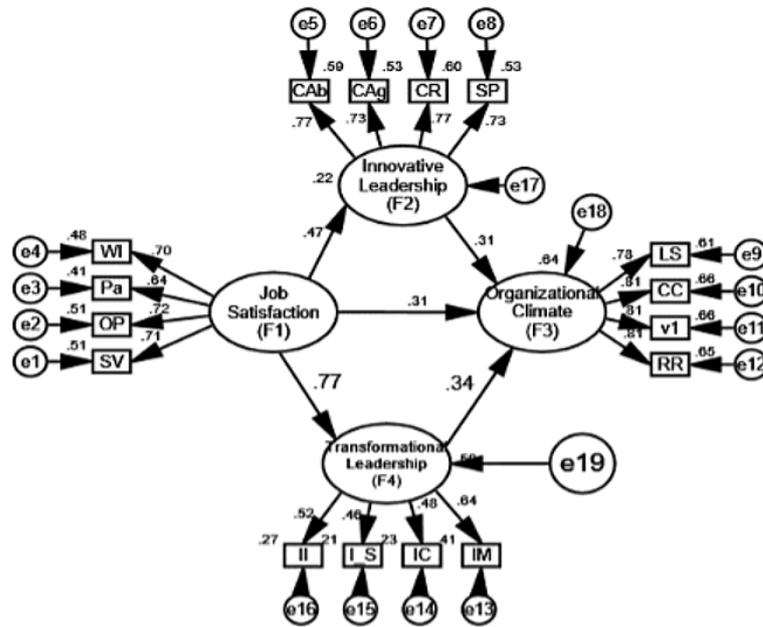
Table 5 Measurement quality

	CR	AVE	MSV	MaxR(H)	F1	F2	F3	F4
F1	0.783	0.475	0.978	0.786	0.69			
F2	0.839	0.566	0.309	0.84	0.468***	0.752		
F3	0.889	0.667	0.55	0.889	0.691***	0.556***	0.817	
F4	0.525	0.217	0.978	0.526	0.989***	0.498***	0.742***	0.466

The fit of the measurement model was very high (CFI = 0.994, RMSEA = 0.02). The reliability (CR = 0.525) and validity (AVE = 0.217) of the transformational leadership (F4) were slightly weaker, but the intercorrelations were high and the effects were among the significant ones.

6.4 Hypothesis Testing

6.4.1 Mediation model



Chi-square = 160.276 df = 101 p = .000 chi-square/df = 1.587
 CFI = .978 NFI = .943 RMSEA = .037 (pclose. = .982) BIC = 372.752

Figure 2 Mediation model hypothesis

Table 6 Hypothesis Testing for Direct Paths in Mediation Model

Effects		Estimate	S.E.	C.R.	P	Label
F3 <---	F1	0.409	0.13	3.141	0.002	H1
F3 <---	F2	0.349	0.058	6.005	***	H2
F3 <---	F4	0.519	0.151	3.428	***	H3
F4 <---	F1	0.666	0.07	9.526	***	H4
F2 <---	F1	0.544	0.071	7.679	***	H5

Table 8 The results of the assessment of the hypothesis testing of the moderated

			Estimate	S.E.	C.R.	P	Label
F3	<---	F1	1.45	0.286	5.078	***	H1
F3	<---	F2	0.391	0.053	7.318	***	H2
F3	<---	F4	-0.655	0.173	-3.781	***	H3
F4	<---	F1	1.942	0.111	17.537	***	H4
F2	<---	F1	0.071	0.023	3.067	0.002	H5
F3	<---	F1xF4	0.107	0.013	8.356	***	H6

The results indicate that transformational leadership moderates the relationship between job satisfaction and organizational climate, highlighting the importance of interaction effects in leadership research.

6.5 Decomposition effects

Table 9 Results of decomposition effects

Parameter	Estimate	Lower	Upper	P
Correlation	0.69	0.69	0.69	0.000
DE	0.409	-0.049	1.012	0.144
IE	0.19	0.127	0.272	0.001
TE	0.598	0.174	1.203	0.012
Spurious	0.092	-0.513	0.516	0.752

Decomposing the effects of the mediation model showed that IE had a significant indirect effect on DE through mediation, with an estimate of 0.19 and a p-value of 0.001. The direct effect (0.409) was statistically insignificant ($p=0.144$), whereas the total effect (0.598) was significant ($p=0.012$), suggesting that mediation effects are important in the relationship between IE and DE.

6.6 Probing analysis

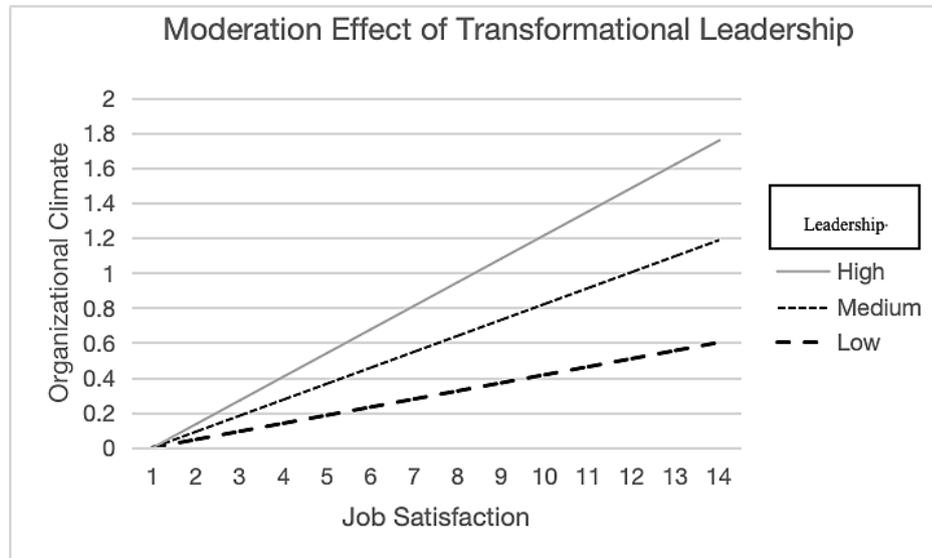


Figure 4 Exploring and explaining interactions in models

The results illustrate the moderating effect of transformational leadership on the relationship between job satisfaction and organizational climate, showing that higher levels of transformational leadership enhanced the positive impact of job satisfaction on organizational climate, while lower levels of transformational leadership weakened this impact. This highlights the importance of transformational leaders influencing organizational climate through their impact on job satisfaction, suggesting that the development of transformational leadership traits can improve the overall work environment.

Table 10 Relationship between leadership levels and transformational leadership

Parameter	Estimate	Lower	Upper	P
Low Transformational leadership	0.926	0.506	1.34	0.008
Medium Transformational leadership	0.902	0.488	1.311	0.007
High Transformational leadership	0.878	0.472	1.282	0.006

The results indicate that transformational leadership is an effective style across all leadership levels, as the estimates for transformational leadership remain significant even as leadership levels increase.

Conclusion: The research highlights the complex dynamics among leadership styles, job satisfaction, and organizational climate. While transformational leadership shows paradoxical effects, innovational leadership and job satisfaction emerge as pivotal drivers of a positive climate. Future research should address measurement limitations and explore contextual factors influencing leadership outcomes.

7. Research Discussion

The findings indicate that job satisfaction exerts the strongest positive influence on organizational climate ($\beta = 0.5$), supporting Herzberg's Two-Factor Theory (Herzberg, 1959) and Schneider's Attraction-Selection-Attrition (ASA) Framework (Schneider, 1987), which emphasize that satisfied employees help shape and maintain a positive organizational atmosphere. Innovative leadership shows a modest positive effect ($\beta = 0.1$), aligning with Amabile's Componential Theory of Creativity (Amabile, 1996) and Schein's organizational culture framework (Schein, 2010), highlighting leaders' role in fostering climates of openness and innovation. Although transformational leadership exhibits a weak direct effect on organizational climate ($\beta = 0.05$), its significant indirect contribution through job satisfaction supports the Full Range Leadership Theory (Bass & Avolio, 1994) and Leader-Member Exchange (LMX) Theory (Graen & Uhl-Bien, 1995), emphasizing individualized consideration and intellectual stimulation. Additionally, the moderating effect ($F1 \times F4 \rightarrow F3$, $\beta = 0.1$) reinforces Fiedler's Contingency Theory (Fiedler, 1967), suggesting that transformational leadership enhances the positive impact of job satisfaction on organizational climate depending on contextual variables. These results underscore the critical interplay between employee satisfaction and adaptive leadership in cultivating a supportive and effective organizational environment.

8. New Knowledge Gained

While existing literature acknowledges a relationship between job satisfaction and organizational climate, the precise nature of this interaction has remained less understood. This study addresses this gap by revealing that the relationship between job satisfaction and organizational climate is contingent upon leadership style. Specifically, the findings, as illustrated in Figure 4, demonstrate that a high level of leadership strengthens this relationship, whereas a low level of leadership attenuates it.

9. Research Recommendation

9.1 Policy Recommendations

9.1.1 The study elucidated that factors such as job satisfaction, innovative leadership, and transformational leadership have a substantial impact on the university climate within Liaoning Province. In order to improve this climate, it is imperative that policymakers prioritize the establishment of leadership development programs that emphasize transformational and innovative competencies. The incorporation of job satisfaction metrics into the evaluative processes of universities is also recommended. Furthermore, the promotion of an innovative culture through the provision of dedicated grants, incentives for interdisciplinary collaboration, and the establishment of innovation hubs can serve to institutionalize creativity. Collaborative governance frameworks, including shared decision-making committees and mentorship initiatives, ought to be implemented to enhance inclusivity.

9.2 Implementation Suggestions

9.2.1 To effectively implement research findings, higher education institutions must augment employee job satisfaction through the establishment of career development trajectories, the introduction of work-life balance initiatives, and the provision of competitive compensation packages. Simultaneously, programs centered on transformational leadership must prioritize the cultivation of visionary communication, the provision of personalized support, and the promotion of intellectual engagement. The establishment of open communication channels and collaborative frameworks is essential for the enhancement of trust and the stimulation of innovation. Regular assessments of the institutional climate and the employment of key performance indicators (KPIs) should be utilized to evaluate ongoing progress.

9.3 Suggestions for Further Research

Three research directions emerge: 1) Transformational leadership and educator well-being: Investigating its impact on burnout and mental health in vocational settings; 2) Innovational leadership and curriculum outcomes: Assessing how such leadership drives program development and student achievement; 3) Organizational climate and collaborative learning: Exploring climate's role in knowledge-sharing within vocational institutions.

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11. Acknowledgement

The researcher is overwhelmed with gratitude to my parents for their tireless efforts in my upbringing and for their unrelenting encouragement and unwavering support throughout my educational journey. It is with their guidance and help that I have overcome many difficulties and obstacles to succeed in my studies and career.

I would like to take this opportunity to express my sincere gratitude to my esteemed supervisors, Dr.Sukhum Moonmuang and Dr.Sataporn Pruettikul, who have provided invaluable expertise and insightful academic advice throughout the course of my research, which has greatly enriched my understanding and benefited my academic work.

In addition, I would like to express my sincere gratitude to all the individuals who contributed to the comprehensive data collection process, especially the faculty members who generously gave their time to fill out the questionnaires during the survey phase, as your invaluable support played a crucial role in the progress of my research.