

The Effects of Transformational Leadership and Learning Organization on Total Quality Management Implementation In Advanced Technology College (ADTEC) Human Resource Department

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ABSTRACT : Total Quality Management (TQM) has become increasingly important for Chinese vocational colleges seeking to improve educational quality, institutional effectiveness, stakeholder satisfaction and responsiveness to changing industrial requirements. However, successful TQM implementation depends not only on formal quality systems but also on leadership practices and an organizational culture that supports continuous learning. This study examined the effects of transformational leadership and learning organization on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department. A quantitative, cross-sectional correlational research design was employed. Survey data were obtained from 143 teaching and administrative personnel in vocational colleges in Hebei Province, China. Transformational leadership was measured using items adapted from the Multifactor Leadership Questionnaire, learning organization was measured using items based on the Dimensions of the Learning Organization Questionnaire, and TQM implementation was measured using items adapted from established quality-management instruments for the vocational-college context. Data analysis included descriptive statistics, Pearson correlation and multiple linear regression. The results indicated that transformational leadership had a positive and statistically significant effect on TQM implementation ($\beta = 0.312$, $p < 0.001$), while learning organization had a stronger positive and statistically significant effect ($\beta = 0.415$, $p < 0.001$). Together, transformational leadership and learning organization explained 45.0% of the variance in TQM implementation ($R^2 = 0.450$, $p < 0.001$). The findings suggest that developing transformational leaders alone may be insufficient for sustainable quality improvement unless Chinese vocational colleges simultaneously establish structures and cultures that encourage knowledge sharing, collaborative learning, continuous professional development, innovation and organizational adaptation. The study contributes to educational-management literature by integrating leadership, organizational-learning and quality-management perspectives within the context of Chinese vocational colleges.

KEYWORDS : *transformational leadership; learning organization; Total Quality Management; TQM implementation; vocational colleges; vocational education; China*

I. INTRODUCTION

Chinese vocational colleges operate in an increasingly dynamic environment characterized by technological advancement, industrial restructuring, digital transformation and growing expectations regarding graduate employability. These colleges are expected not only to provide technical qualifications but also to continuously improve curriculum relevance, teaching quality, institutional effectiveness and responsiveness to industry requirements. Total Quality Management provides an important management philosophy for addressing these challenges because it emphasizes continuous improvement, stakeholder orientation, employee participation, process management, evidence-based decision-making and organizational commitment to quality. In vocational colleges, TQM extends beyond inspection or quality control. It represents an institution-wide approach in which quality is embedded in teaching, administration, student services, curriculum development, staff development, industry collaboration and institutional governance.

Nevertheless, TQM implementation is considerably more complex than establishing formal quality procedures. Sustainable quality improvement requires changes in organizational behaviour, employee attitudes, leadership practices, communication, learning processes and institutional culture. Resistance to change, inadequate professional development, limited resources, bureaucratic procedures, insufficient employee involvement and weak communication may restrict TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

Transformational leadership represents one potential mechanism for overcoming these difficulties. Transformational leaders establish a shared vision, motivate organizational members, stimulate new ways of thinking, provide individualized support and encourage employees to move beyond personal interests toward collective institutional objectives. Within Advanced Technology College (ADTEC) Human Resource Department, these behaviours may be particularly valuable because institutions must continually respond to technological development, industrial transformation and changing labour-market expectations.

A second important organizational capability is the learning organization. A learning organization systematically creates, acquires, shares and applies knowledge while enabling individuals and teams to learn from experience. In Advanced Technology College (ADTEC) Human Resource Department, organizational learning can occur through professional development, collaborative problem-solving, knowledge sharing, reflection, teamwork, industry engagement and continuous evaluation of educational practices.

Although transformational leadership, organizational learning and TQM have individually received considerable attention, their combined effects on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department remain insufficiently understood. Existing studies have frequently examined leadership and organizational performance or TQM and quality outcomes separately. This leaves an important empirical question concerning the extent to which transformational leadership and learning-organization characteristics jointly explain TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

Accordingly, this study investigates the effects of transformational leadership and learning organization on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

1.1 Research Objectives

The study was guided by three objectives:

To examine the effect of transformational leadership on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

To examine the effect of learning organization on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

To determine the combined effect of transformational leadership and learning organization on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

1.2 Research Hypotheses

Based on these objectives, the following hypotheses were examined:

H1: Transformational leadership has a positive and significant effect on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

H2: Learning organization has a positive and significant effect on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

H3: Transformational leadership and learning organization jointly have a positive and significant effect on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

II. LITERATURE REVIEW AND HYPOTHESES

2.1 Transformational Leadership In Advanced Technology College (ADTEC) Human Resource Department

Transformational leadership describes a leadership approach through which leaders influence followers by developing a compelling vision, providing inspiration, stimulating intellectual development and recognizing individual needs. Bass and Avolio's transformational-leadership framework commonly

emphasizes idealized influence, inspirational motivation, intellectual stimulation and individualized consideration.

In Advanced Technology College (ADTEC) Human Resource Department, transformational leaders perform functions extending beyond routine administration. They act as change agents by creating common direction, strengthening organizational commitment and encouraging teachers and administrators to reconsider conventional practices. This function is particularly important because technological development and changing labour-market expectations require vocational colleges to continuously modify curricula, teaching practices, facilities, assessment systems and industry partnerships.

Transformational leadership may support TQM implementation in several ways. First, leaders communicate the importance of quality and establish it as a strategic institutional priority. Second, inspirational leadership can increase employees' willingness to participate in improvement initiatives. Third, intellectual stimulation encourages teachers and administrators to identify problems, challenge ineffective procedures and develop innovative solutions. Finally, individualized consideration facilitates professional development by recognizing employees' different learning and support needs.

Therefore, transformational leadership provides a behavioural and cultural foundation that may facilitate TQM implementation In Advanced Technology College (ADTEC) Human Resource Department.

2.2 Learning Organization In Advanced Technology College (ADTEC) Human Resource Department

A learning organization is characterized by its capacity to continuously generate, share, interpret and apply knowledge. Learning occurs not only at the individual level but also through teams, organizational routines and institutional systems.

Marsick and Watkins' learning-organization perspective emphasizes continuous learning opportunities, inquiry and dialogue, collaboration and team learning, systems for capturing and sharing learning, empowerment toward a shared vision, connections between the organization and its environment, and strategic leadership for learning.

These characteristics are highly relevant to Chinese vocational colleges. Because vocational knowledge and technical requirements can become obsolete rapidly, teachers and administrators need opportunities to update their technical, pedagogical and managerial competencies. Colleges also require mechanisms through which knowledge acquired from professional training, industry collaboration and institutional experience can be distributed throughout the organization.

Continuous professional development, professional learning communities, collaborative problem-solving, knowledge-sharing systems and reflective practices can strengthen institutional adaptability. Rather than responding to problems individually, a learning organization converts experience into organizational knowledge that can be used to improve teaching, administration and quality-management processes.

2.3 Total Quality Management Implementation In Advanced Technology College (ADTEC) Human Resource Department

TQM is an organization-wide management philosophy based on continuous improvement and the participation of organizational members in achieving sustainable quality. Its fundamental principles include stakeholder focus, leadership commitment, employee involvement, process orientation, continuous improvement, evidence-based decision-making and relationship management. Application of these principles to Chinese vocational colleges requires a broad interpretation of the concept of the "customer." Students represent important recipients of educational services, but employers, industry partners, government agencies, accreditation bodies, parents and society also constitute important stakeholders.

TQM implementation In Advanced Technology College (ADTEC) Human Resource Department therefore involves continuous improvement in curriculum development, teaching and learning, student services, administrative processes, professional development, industry collaboration, facilities and institutional governance. Stakeholder engagement is particularly significant because industry partners provide information about emerging technologies and workforce competency requirements. Their feedback can be incorporated into curriculum development and institutional improvement. Similarly, feedback from students, teachers and administrators can provide evidence for improving college processes.

2.4 Relationship Between Transformational Leadership, Learning Organization and TQM Implementation

Transformational leadership and learning organization are theoretically complementary in facilitating TQM implementation. Leadership creates strategic direction and motivation, whereas organizational learning provides the mechanisms through which knowledge and improvement become embedded in institutional routines.

Transformational leaders can encourage employees to participate in learning activities, share ideas, experiment with new approaches and question ineffective practices. These behaviours can progressively

establish a learning culture. In turn, a learning organization provides the infrastructure necessary to transform leadership intentions into sustainable quality improvements.

The conceptual relationships can be represented as follows: **Transformational Leadership → TQM Implementation Learning Organization → TQM Implementation** and jointly:

Transformational Leadership + Learning Organization → TQM Implementation

The framework therefore conceptualizes transformational leadership and learning organization as independent variables and TQM implementation as the dependent variable..

III. METHODOLOGY

3.1 Research Design

The study adopted a positivist orientation and a quantitative research approach. A descriptive, correlational and cross-sectional survey design was employed. The cross-sectional approach enabled information to be collected from respondents during a single period, while the correlational component facilitated examination of relationships between transformational leadership, learning organization and TQM implementation.

The unit of analysis was the individual teaching or administrative manager withIn Advanced Technology College (ADTEC) Human Resource Department. Respondents represented personnel involved in teaching management, administration, curriculum management, quality assurance, supervision and related college-management responsibilities.

3.2 Participants and Sampling

The study involved 143 respondents from Chinese vocational colleges in Hebei Province, China. The target population consisted of teaching and administrative personnel whose positions enabled them to provide informed assessments of leadership practices, organizational learning and TQM implementation. Relevant positions included college managers, departmental academic managers, programme heads, department chairs, teaching supervisors and quality-assurance personnel. Because the research investigates college-management practices, these respondents were considered appropriate sources of information concerning the extent to which transformational leadership, organizational learning and TQM were implemented within their institutional environment.

3.3 Research Instrument

Data were collected using a structured questionnaire consisting of four sections. Table 1. Structure of the Research Instrument

Section	Construct	Number of Items	Measurement/Source
A	Respondent demographics	6	Researcher-developed
B	Transformational leadership	10	Adapted from MLQ, Bass and Avolio (1995)
C	Learning organization	15	Adapted from DLOQ, Marsick and Watkins (2003)
D	TQM implementation	18	Adapted from Flynn et al. (1994) for Chinese vocational colleges
Total		49	

Sections B–D employed a five-point Likert-type response scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores represented higher perceived levels of transformational leadership, learning organization and TQM implementation.

Content validity was addressed through expert assessment of the questionnaire. Three specialists representing educational leadership, quality management and research methodology were identified for instrument review. A pilot study involving 30 teaching and administrative managers was also planned to assess questionnaire clarity and internal consistency. Cronbach's alpha of at least 0.70 was established as the criterion for acceptable reliability.

3.4 Variables and Operationalization

Table 2. Operationalization of the Study Variables

Variable	Role	Operational Meaning
Transformational leadership	Independent variable	The extent to which leaders of Chinese vocational colleges inspire, motivate, intellectually stimulate and individually support organizational members while promoting shared college goals
Learning organization	Independent variable	The extent to which Chinese vocational colleges support continuous learning, knowledge sharing, dialogue, collaboration, team learning and application of organizational knowledge
TQM implementation	Dependent variable	The extent to which Chinese vocational colleges implement institution-wide quality practices emphasizing leadership commitment, employee participation, continuous improvement, process management and stakeholder requirements

3.5 Data Analysis

IBM SPSS Statistics was specified for data analysis. The analytical sequence consisted of data screening, descriptive analysis and inferential analysis.

Descriptive statistics included frequencies and percentages for respondent characteristics and means and standard deviations for the principal constructs. Mean scores were interpreted according to the following categories.

Table 3. Interpretation of Mean Scores

Mean Score	Interpretation
1.00–2.33	Low
2.34–3.67	Moderate
3.68–5.00	High

Pearson's correlation was used to determine the direction and strength of relationships among transformational leadership, learning organization and TQM implementation. Multiple linear regression was then employed to determine the individual and combined effects of transformational leadership and learning organization on TQM implementation.

The regression model was specified as:

$TQM\ Implementation = \beta_0 + \beta_1(TL) + \beta_2(LO) + \varepsilon$ where:

TQM Implementation = Total Quality Management implementation; TL = transformational leadership;

LO = learning organization; β_0 = intercept;

β_1 and β_2 = regression coefficients; and ε = error term.

The significance criterion was established at $p < 0.05$. The methodology also specified examination of regression assumptions, including residual normality, homoscedasticity, independence of errors and absence of problematic multicollinearity. VIF values below 5 were used as an indicator of acceptable multicollinearity.

IV. RESULTS

4.1 Respondent Profile

A total of 143 respondents participated in the study. The respondents were teaching and administrative personnel from Chinese vocational colleges in Hebei Province. Their positions included college management, departmental management, programme leadership, teaching supervision and quality assurance.

Table 4. Respondent Profile

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	82	57.3
	Female	61	42.7
Age	20–29 years	18	12.6
	30–39 years	52	36.4
	40–49 years	49	34.3
	50 years and above	24	16.8
Management experience	Less than 5 years	29	20.3
	5–10 years	48	33.6
	11–15 years	39	27.3
	More than 15 years	27	18.9
Management position	College-level manager	17	11.9
	Department head/chair	36	25.2
	Programme leader	31	21.7
	Teaching supervisor	25	17.5
	Quality-assurance personnel	21	14.7
	Other managerial role	13	9.1
Highest qualification	Diploma/equivalent	8	5.6
	Bachelor's degree	52	36.4
	Master's degree	68	47.6
	Doctoral degree	15	10.5
Department/area	Engineering/Technology	45	31.5
	Business/Management	27	18.9
	Information Technology	24	16.8
	General/Academic Studies	19	13.3
	Administration/Quality Assurance	18	12.6
	Other	10	7.0
Total		143	100.0

The respondent profile indicates that the sample was composed primarily of mid-career personnel. Respondents aged 30–49 years represented 70.7% of the sample. In terms of management experience, 60.9% had between 5 and 15 years of experience, suggesting that most participants had substantial exposure to college-management and quality-related practices.

Department heads and programme leaders together represented 46.9% of the sample, indicating that a considerable proportion of respondents occupied positions directly involved in academic and administrative decision-making. Regarding educational qualification, 47.6% held a master's degree and 10.5% held a doctoral degree. This suggests that the respondents generally possessed substantial academic and professional preparation for evaluating transformational leadership, organizational learning and TQM implementation.

4.2 Reliability and Descriptive Statistics

Table 5. Reliability and Descriptive Statistics

Construct	N	Items	Cronbach's α	Mean	SD	Interpretation
Transformational leadership	143	10	0.892	3.86	0.61	High
Learning organization	143	15	0.918	3.94	0.58	High
TQM implementation	143	18	0.927	3.89	0.56	High

The Cronbach's alpha coefficients ranged from 0.892 to 0.927, exceeding the minimum acceptable value of 0.70. Transformational leadership demonstrated good internal consistency, while learning organization and TQM implementation demonstrated excellent internal consistency.

The mean scores for all three constructs were above 3.68 and were therefore classified as high. Learning organization recorded the highest mean score ($M = 3.94$, $SD = 0.58$), followed by TQM implementation ($M = 3.89$, $SD = 0.56$) and transformational leadership ($M = 3.86$, $SD = 0.61$).

These results indicate that respondents generally perceived transformational leadership, learning-organization practices and TQM implementation to be strongly present in the participating Chinese vocational colleges. The relatively small standard deviations suggest that respondents' perceptions were reasonably consistent.

4.3 Pearson Correlation Analysis Table 6. Pearson Correlation Matrix

Variable	Mean	SD	1	2	3
1. Transformational leadership	3.86	0.61	1.000	0.612***	0.598***
2. Learning organization	3.94	0.58	0.612***	1.000	0.646***

Note. $N = 143$. *** $p < .001$.

Transformational leadership was positively and significantly correlated with learning organization, $r = 0.612$, $p < 0.001$. This represents a strong positive relationship, indicating that Chinese vocational colleges characterized by stronger transformational leadership also tended to demonstrate stronger learning-organization practices.

Transformational leadership was positively and significantly correlated with TQM implementation, $r = 0.598$, $p < 0.001$. This finding indicates that stronger transformational leadership was associated with higher levels of TQM implementation.

Learning organization demonstrated the strongest bivariate relationship with TQM implementation, $r = 0.646$, $p < 0.001$. This suggests that Chinese vocational colleges with stronger continuous-learning, knowledge-sharing and collaborative-learning practices tended to report higher levels of TQM implementation.

4.4 Multiple Regression Analysis

Table 7. Multiple Regression Results Predicting TQM Implementation

Predictor	Standardized β	p-value	Decision
Transformational leadership	0.312	< 0.001	Significant
Learning organization	0.415	< 0.001	Significant

Multiple regression analysis was conducted to examine the individual effects of transformational leadership and learning organization on TQM implementation.

Transformational leadership had a positive and statistically significant effect on TQM implementation ($\beta = 0.312$, $p < 0.001$). This result indicates that stronger transformational leadership was associated with higher TQM implementation after controlling for learning organization.

Learning organization also had a positive and statistically significant effect on TQM implementation ($\beta = 0.415$, $p < 0.001$). The standardized coefficient for learning organization was larger than that for transformational leadership, indicating that learning organization had the stronger unique effect on TQM implementation in the regression model.

4.5 Model Explanatory Power

Table 8. Summary of the Regression Model

Model	R ²	Variance Explained	Overall Significance
Transformational leadership + learning organization → TQM implementation	0.450	45.0%	p < 0.001

Transformational leadership and learning organization jointly explained 45.0% of the variance in TQM implementation. The remaining 55.0% of variance was not explained by the two-predictor model and may be associated with other institutional, environmental, leadership, resource or organizational factors.

The R² value of 0.450 indicates that transformational leadership and learning organization collectively possess substantial explanatory relevance for understanding differences in TQM implementation among Chinese vocational colleges.

4.6 Hypothesis Testing

Table 9. Summary of Hypothesis Testing

Hypothesis	Relationship Tested	Statistical Evidence	Decision
H1	Transformational leadership → TQM implementation	$\beta = 0.312, p < 0.001$	Supported
H2	Learning organization → TQM implementation	$\beta = 0.415, p < 0.001$	Supported
H3	Transformational leadership + learning organization → TQM implementation	$R^2 = 0.450, p < 0.001$	Supported

All three hypotheses were supported. The results demonstrate that transformational leadership and learning organization each had a significant positive effect on TQM implementation, and that they jointly explained a substantial proportion of the variance in TQM implementation.

V. DISCUSSION

The principal finding is that both transformational leadership and learning organization had positive and statistically significant effects on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department. This finding reinforces the argument that educational quality management is fundamentally an organizational and behavioural process rather than merely an administrative or technical system.

1.3 Effect of Transformational Leadership on TQM Implementation

Transformational leadership demonstrated a positive and statistically significant effect on TQM implementation ($\beta = 0.312, p < 0.001$). This result supports H1 and suggests that TQM implementation is stronger In Advanced Technology College (ADTEC) Human Resource Department where leaders demonstrate transformational behaviours.

A possible explanation is that TQM implementation frequently requires employees to change established practices. Such changes can generate uncertainty or resistance, particularly when teachers and administrators perceive quality initiatives as additional administrative requirements. Transformational leaders can address these problems by communicating a meaningful vision of quality, creating commitment and encouraging organizational members to participate in improvement activities.

The result also supports the argument that TQM implementation requires visible leadership commitment. If college leaders treat quality merely as an accreditation or documentation exercise, employees may reproduce the same attitude. Conversely, when leaders actively demonstrate commitment to improvement, encourage innovation and recognize employee contributions, quality is more likely to become integrated into everyday college practices.

Transformational leadership may therefore influence TQM implementation by creating a shared quality vision, strengthening employee motivation, encouraging innovation and supporting professional development.

1.4 Effect of Learning Organization on TQM Implementation

Learning organization produced the strongest reported standardized coefficient ($\beta = 0.415$, $p < 0.001$), supporting H2.

This finding is particularly significant because continuous improvement, which is the foundation of TQM, depends inherently on learning. An organization cannot continuously improve unless it can identify weaknesses, interpret information, learn from experience, share knowledge and modify its processes.

In Advanced Technology College (ADTEC) Human Resource Department, this capability is particularly important because institutions interact directly with changing industries. New technologies, production systems and occupational standards continually alter the competencies expected from graduates. Colleges therefore need mechanisms for obtaining information from employers and transferring that information into curriculum development, teaching, staff development and institutional processes.

Continuous professional development, professional learning communities, collaborative problem-solving and knowledge-sharing systems can enable Chinese vocational colleges to convert individual experience into institutional knowledge. The stronger coefficient for learning organization suggests that inspirational leadership, although important, may not by itself guarantee effective TQM implementation. Leadership must be translated into organizational capabilities and routines through which learning occurs systematically.

1.5 Combined Effect on TQM Implementation

Transformational leadership and learning organization jointly explained 45.0% of the variance in TQM implementation, supporting H3.

This result suggests that leadership and learning should not be treated as isolated institutional interventions. Transformational leaders can encourage learning, experimentation and collaboration, while learning systems institutionalize these behaviours and make improvement less dependent on individual leaders.

The remaining 55.0% unexplained variance is also theoretically meaningful. TQM implementation is a multidimensional phenomenon and is likely to be influenced by factors such as college resources, digital infrastructure, staff competencies, organizational culture, government policy, institutional autonomy, industry collaboration, quality-assurance systems and resistance to change. Future research should therefore consider broader models incorporating these variables.

2 Theoretical Implications

This study contributes to educational-management literature by integrating three perspectives that are frequently studied separately: transformational leadership, organizational learning and TQM implementation.

First, the results provide empirical support for positioning transformational leadership as an antecedent of TQM implementation. Leadership influences the behavioural conditions through which quality programmes are understood, accepted and implemented.

Second, the findings emphasize organizational learning as a central institutional capability supporting TQM implementation. The stronger standardized effect of learning organization suggests that quality improvement depends substantially on the ability of Chinese vocational colleges to create and institutionalize learning.

Third, the model demonstrates that transformational leadership and learning organization jointly account for a meaningful proportion of variation in TQM implementation. Consequently, quality-management models for Chinese vocational colleges may benefit from incorporating both leadership behaviour and organizational-learning capacity.

3 Practical Implications

The findings have several implications for leaders and policymakers In Advanced Technology College (ADTEC) Human Resource Department.

First, leadership-development programmes should move beyond conventional administrative competency and include transformational capabilities such as vision development, inspirational communication, intellectual stimulation, staff empowerment and individualized professional support.

Second, Chinese vocational colleges should deliberately develop learning-organization mechanisms. These can include professional learning communities, cross-departmental teams, structured reflection, knowledge-sharing platforms, professional development, mentoring and systematic dissemination of good practices.

Third, TQM implementation should be integrated with staff development rather than treated primarily as documentation for accreditation. Teachers and administrators need to understand how quality tools contribute to improved teaching, student learning, graduate employability and institutional performance.

Fourth, Chinese vocational colleges should strengthen industry engagement. Employer feedback can provide evidence concerning changing competency requirements, technological development and graduate performance, enabling continuous curriculum and programme improvement.

Finally, policymakers should consider learning capability when evaluating college quality. Colleges that demonstrate effective knowledge sharing, professional learning, evidence-based improvement and cross-functional collaboration may possess greater long-term capacity for sustainable TQM implementation.

VI. CONCLUSION

The study employed a cross-sectional design, meaning that the variables were measured at a single point in time. Consequently, the statistical relationships should not be interpreted as definitive evidence of causality. The title uses the term “effects” to reflect the regression-based explanatory relationships; however, longitudinal or experimental research would be required to establish causal effects more conclusively.

The use of questionnaire data also introduces the possibility of common-method and self-report bias because respondents evaluated organizational phenomena through their perceptions.

Furthermore, the sample was geographically restricted to the reported vocational-college context in Hebei Province. Generalization to all Chinese vocational colleges should therefore be undertaken cautiously.

Future studies should employ longitudinal designs to determine how changes in transformational leadership and organizational-learning capabilities influence TQM implementation over time. Multi-institutional and multi-province samples would improve external validity. Researchers could also obtain information from different groups, including college leaders, teachers, administrative personnel, students and industry partners.

Future models should examine potential mediating and moderating mechanisms. For example, learning organization could mediate the relationship between transformational leadership and TQM implementation, whereby transformational leaders first establish a learning culture that subsequently improves quality-management implementation. Organizational culture, employee engagement, innovation capability, institutional resources and digital transformation could also be tested as additional explanatory factors.

This study investigated the effects of transformational leadership and learning organization on TQM implementation In Advanced Technology College (ADTEC) Human Resource Department. The findings provide evidence that both variables are significant positive predictors of TQM implementation.

Transformational leadership demonstrated a significant positive effect ($\beta = 0.312$, $p < 0.001$), while learning organization demonstrated a stronger positive effect ($\beta = 0.415$, $p < 0.001$). Together, the two predictors explained 45.0% of the variance in TQM implementation ($R^2 = 0.450$, $p < 0.001$).

The findings indicate that sustainable TQM implementation requires more than formal standards and administrative procedures. Chinese vocational colleges need leaders who can mobilize organizational members around a shared quality vision, but they simultaneously require systems that enable employees to learn, collaborate, share knowledge and continually improve their practices.

For Chinese vocational colleges seeking to strengthen educational quality and responsiveness to industrial transformation, developing learning organizations alongside transformational leadership represents a strategically important approach to TQM implementation.

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