



The Effect of Organizational Culture through Total Quality Management: A Moderated Model of Transformational Leadership

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Abstract: This study examines how Total Quality Management (TQM) affects organizational culture in vocational education, using transformational leadership as a moderating variable. The study was motivated by challenges faced by SMK Negeri 4 Klaten in fostering a culture of caring, contribution, and collaboration to improve school performance and graduate readiness. A quantitative cross-sectional design was employed, involving 307 respondents: teachers, staff, and students. Data were collected through a structured questionnaire measuring Total Quality Management, organizational culture, and transformational leadership. Direct and moderating effects were investigated using Structural Equation Modeling (SEM) with AMOS, backed by validity and reliability tests using Average Variance Extracted, Composite Reliability, and Confirmatory Factor Analysis. The findings reveal that both transformational leadership and total quality management have a major positive impact on organizational culture. Additionally, transformational leadership serves as a moderator, strengthening the link between corporate culture and Total Quality Management. By combining transformational leadership with Total Quality Management in vocational schools, this study adds to the body of knowledge on quality management in education. Practically speaking, the results offer guidance to legislators and school administrators on enhancing leadership skills and creating an organizational culture focused on quality.

Keywords: organizational culture; structural equation modelling (SEM); total quality management (TQM); transformational leadership; vocational education

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INTRODUCTION

Rapid industry transformation and rising expectations for global capabilities have made improving the quality of vocational education a strategic goal. Alongside technological advancements and shifting labor market expectations, vocational schools are expected not only to equip students with technical expertise but also to cultivate an organizational culture that promotes caring, contribution, and collaboration. A preliminary study conducted at SMK Negeri 4 Klaten indicates that the collective work culture has not yet been optimally developed, as reflected in the tendency of some teachers, staff, and students to work individually rather than collaboratively. Internal school reports and initial observations also reveal limited cross-functional coordination and low participation in collective quality improvement initiatives, which constrain the development of an adaptive learning environment aligned with industry needs. These conditions highlight the necessity for a systematic management and leadership approach capable of fostering sustainable cultural transformation within vocational education institutions.

Macro-level data and national education reports further underscore the urgency of strengthening organizational culture in vocational education. The [World Bank](#) (2020) highlights persistent challenges in the quality of learning outcomes in Indonesia, while PISA results published by the [OECD](#) (2019) indicate that Indonesian students' collaborative and problem-solving skills remain below the international average. National labor statistics from Statistics Indonesia ([BPS, 2024](#)) also reveal that vocational high school graduates continue to experience the highest unemployment rates, suggesting gaps in job-readiness and a productive work culture. These findings are reinforced by recent empirical studies showing that non-technical competencies, including collaboration, adaptability, and contributive behavior, significantly influence the employability and career success of vocational graduates ([Rahman et al., 2022](#); [Wulandari & Sulistyowati, 2025](#)). Tracer study data from SMK Negeri 4 Klaten further show a growing proportion of graduates entering entrepreneurship, underscoring the need for an organizational culture that supports innovation, teamwork, and cross-disciplinary collaboration.

It is widely acknowledged that Total Quality Management (TQM) provides a useful framework for improving managerial processes, enhancing organizational performance, and developing a continuous quality culture in educational institutions. Recent empirical studies demonstrate that TQM implementation contributes positively to collaborative practices, stakeholder engagement, and instructional effectiveness in schools ([Han & Shim, 2023](#); [Suwarno et al., 2020](#); [Vebriyani et al., 2021](#)). Comparative studies in Asian countries with strong

vocational education systems further indicate that consistent application of quality management principles supports the development of disciplined, cooperative, and performance-oriented school cultures (Han & Shim, 2023; Lee et al., 2019). Nevertheless, recent research also emphasizes that the success of TQM initiatives depends on contextual factors, particularly organizational culture and leadership capacity, which determine how quality values are internalized and sustained (Hilman et al., 2020; Prajogo & McDermott, 2019).

Transformational leadership has gained increasing attention as a critical mechanism for reinforcing quality-oriented organizational change. Contemporary leadership studies suggest that transformational leaders play a central role in articulating shared visions, motivating collective commitment, encouraging innovation, and supporting individual development within educational organizations (Bush, 2018; Northouse, 2021). Empirical research also indicates that transformational leadership strengthens employees' commitment to quality values and continuous improvement, which may directly shape organizational culture and enhance the effectiveness of TQM implementation (García-Morales et al., 2018; Suifan & Al-Janini, 2017). In vocational education, leadership that integrates transformational principles is increasingly viewed as essential for translating quality management systems into daily organizational practices and shared cultural norms.

However, limited studies have examined the moderating role of transformational leadership in the relationship between TQM and organizational culture in Indonesian vocational schools. Most studies tend to focus either on the direct effects of TQM on school performance and quality culture or on the independent influence of leadership on organizational outcomes. As a result, empirical evidence remains insufficient regarding whether and how transformational leadership strengthens (or weakens) the impact of TQM practices on building a collaborative, caring, and contributive organizational culture, particularly within the specific context of Indonesian vocational education.

Based on these empirical findings and preliminary analyses, integrating Total Quality Management and transformational leadership emerges as a strategic approach to strengthening a responsive and quality-oriented organizational culture in vocational schools. This study positions transformational leadership as a moderating variable in the proposed causal model to examine how TQM influences organizational culture. Using SEM, the study is expected to provide practical insights for school leaders and policymakers in designing leadership-driven quality improvement strategies for vocational education in Indonesia, while also contributing theoretically to the literature on educational management and quality assurance.

METHODS

This study used a cross-sectional survey and a quantitative explanatory research design to investigate the relationships among organizational culture, transformational leadership, and Total Quality Management (TQM) implementation. Since the main goal of the study was to explain and empirically evaluate causal links among variables within a theoretically grounded framework, an explanatory design was selected. Explanatory research is particularly appropriate for testing hypotheses and identifying patterns of influence among constructs in organizational and educational studies (Creswell & Creswell, 2018). By adopting this design, the study investigated both direct and moderating effects, enabling a comprehensive understanding of how leadership and quality management interact to shape organizational culture in vocational education settings.

A quantitative approach was considered suitable because the study focused on measuring perceptions, attitudes, and behavioral tendencies of school members through numerical indicators that could be statistically analyzed. Quantitative research enables objective hypothesis testing, precise estimation of relationship strength, and generalization of findings within defined populations (Hair et al., 2019). Standardized instruments were used to ensure consistent measurement across respondents, thereby enhancing the reliability and construct validity of the research results. This approach is widely used in management and leadership research, particularly when examining latent variables such as organizational culture and leadership practices (Kline, 2016). To document the current state of TQM implementation, transformational leadership practices, and organizational culture within the vocational school environment, a cross-sectional survey was used to collect data at a single point in time. This method was deemed appropriate given the study's objective to analyze current interactions among variables rather than longitudinal development processes, while also minimizing potential external influences arising from policy or organizational changes during the research period (Sekaran & Bougie, 2020).

SEM was the main analytical method used in this work to examine the suggested causal linkages. SEM was chosen because it enables the simultaneous analysis of relationships among latent constructs while accounting for measurement error (Hair et al., 2019). Specifically, SEM was used to assess: 1) the direct effect of TQM implementation on organizational culture; 2) TQM implementation's impact on transformational leadership; 3) transformational leadership's impact on organizational culture, and; 4) the moderating role of transformational leadership in the relationship between TQM implementation and organizational culture. The use of SEM is consistent with prior leadership and quality management studies that emphasize integrated modeling approaches (Kline, 2016). Prior to SEM estimation, assumption checks were conducted to support the feasibility and accuracy of SEM results. First, data normality was evaluated using skewness and kurtosis statistics

(and, where applicable, multivariate normality indicators available in AMOS), because maximum likelihood estimation in SEM is sensitive to severe non-normal distributions. Second, multicollinearity was assessed by examining inter-construct correlations and collinearity diagnostics (e.g., tolerance and VIF) to ensure that predictors were not excessively correlated, which could distort standard errors and undermine parameter stability. When indicators suggested potential assumption violations, corrective procedures (e.g., item review, model re-specification, or robust estimation/bootstrapping) were considered to maintain the interpretability and robustness of the structural model.

Overall, the study design offers a solid scientific basis for comprehending how leadership philosophies and quality management techniques work together to improve organizational culture in vocational high schools. By combining an explanatory quantitative design, cross-sectional survey methods, and SEM analysis, this study ensures methodological rigor and theoretical relevance. Furthermore, the research design is more credible and compliant with accepted guidelines for educational management research when primary methodological references are included. The academic community of SMK Negeri 4 Klaten comprised the study's population, including teachers, educational staff, and students, totaling approximately 1,315 individuals. This population was selected because it represents the key stakeholders involved in implementing TQM and shaping organizational culture within the vocational school context. Teachers and educational staff play a central role in designing and applying quality management practices, while students are the primary recipients of educational services and active participants in the school culture.

To obtain a representative sample, this study employed proportional stratified random sampling because the population comprised groups of unequal sizes. This sampling technique ensured that each subgroup (teachers, educational staff, and students) was proportionally represented, thereby minimizing sampling bias and enhancing the generalizability of the findings. Slovin's formula with a 5% margin of error was used to determine the sample size, yielding a total sample of 307 respondents. The proportional allocation of samples across strata allowed the study to capture diverse perspectives on TQM implementation, leadership practices, and organizational culture within the school.

This study involved three main variables: Total Quality Management (TQM) as the independent variable, organizational culture as the dependent variable, and transformational leadership as the moderating variable. Each variable was conceptualized as a latent construct and operationalized through multiple dimensions to ensure comprehensive measurement. Total Quality Management (TQM) was defined as an integrated management approach focused on continuous improvement, stakeholder involvement, and customer satisfaction in educational services. In this study, TQM was operationalized through five dimensions: leadership commitment, staff involvement, continuous improvement, training and development, and customer orientation. These dimensions represent the degree to which quality management principles are embedded in school management practices.

Organizational culture was defined as a set of shared values, norms, and behaviors that guide the actions of school members. Organizational culture was measured through three core dimensions relevant to vocational education: care, contribution, and collaboration. These dimensions capture the extent to which school members demonstrate mutual concern, active participation, and cooperative behavior in achieving organizational goals. Transformational leadership inspires and encourages organizational members to prioritize collective goals over individual interests. It was operationalized using four dimensions: idealized influence, intellectual stimulation, inspirational motivation, and individualized consideration. These dimensions reflect the leader's ability to inspire creativity, provide vision, and foster personal growth, all of which are critical to strengthening TQM's influence on organizational culture.



Figure 1. Causal Model of Total Quality Management Implementation on Strengthening Organizational Culture with Transformational Leadership as a Moderator

Data were collected using a structured questionnaire designed to assess respondents' perceptions of TQM implementation, transformational leadership, and organizational culture. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used to measure the closed-ended statements in the questionnaire. This scale was picked to capture variations in respondents' behavior and visions in a quantifiable form. The questionnaire items were adapted from established instruments in the aspects of quality management, educational leadership, and organizational culture, and were modified to suit the vocational school context. Prior to the main data collection, the instrument was reviewed by experts in educational management to ensure content validity and clarity. A pilot test was also constructed to appraise the readability and relevance of the items. The use of standardized and validated indicators enhanced the reliability and accuracy of the measurement process.

The AMOS software suite was used for data analysis using Structural Equation Modeling (SEM). SEM was selected because it controls for measurement error, enables simultaneous examination of relationships among latent variables, and supports testing models with moderating effects. The analysis process began with descriptive statistics to provide an overview of respondents' characteristics and variable distributions. Next, the measurement model was examined using confirmatory factor analysis (CFA) to test construct validity and internal consistency reliability. Factor loadings, AVE, and CR were used to evaluate convergent validity, while inter-construct correlations were examined to assess discriminant validity. After confirming the measurement model, the structural model was tested to evaluate relationships among variables. The moderating role of transformational leadership was tested by analyzing interaction effects within the SEM framework. Model fit was assessed using goodness-of-fit indices, including Chi-square/df, RMSEA, GFI, AGFI, CFI, and TLI. Statistical significance was defined as $p < 0.05$. Through this analytical approach, the study provided empirical evidence of the causal relationships among TQM, transformational leadership, and organizational culture.

RESULT AND DISCUSSION

A total of 307 respondents in this study, consisting of teachers, educational staff, and students of SMK Negeri 4 Klaten. The respondents represent key stakeholders involved in the application of TQM and the growth of organizational culture in the vocational school context. The distribution of respondents ensured proportional representation across groups, supporting the robustness of the analysis. In Figure 2, the model shown in the path diagram in the preceding phase is stated as a structural equation.

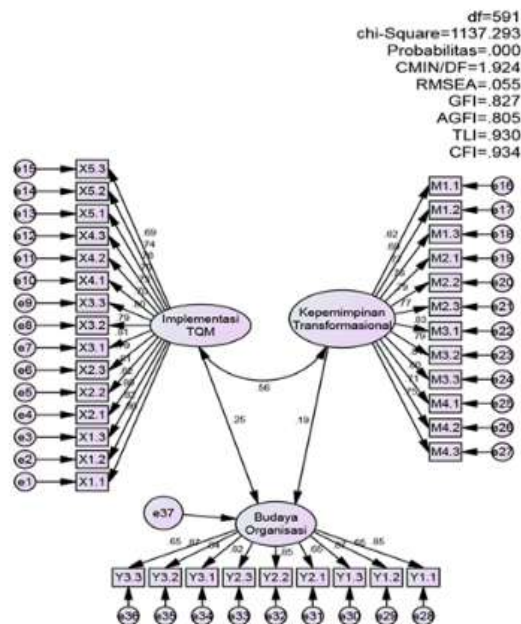


Figure 2. Conversion of Path Diagram to Structural Equation

The descriptive analysis indicates that TQM implementation and transformational leadership are perceived as high, while organizational culture is moderately to strongly developed, particularly in the dimensions of care and contribution. Collaboration, although present, still requires strengthening, especially across departments.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Standard Deviation	Category
Total Quality Management (TQM)	307	1	5	3.46	0.87	High
Transformational Leadership	307	1	5	3.57	0.83	High
Organizational Culture	307	1	5	3.02	0.93	Moderate-High

The results indicate that Total Quality Management (TQM) practices and transformational leadership are perceived positively by respondents, while school culture remains moderate, suggesting room for improvement in the values of caring, contribution, and collaboration among stakeholders. To ensure that all constructs met the required validity and reliability requirements, the measurement model was evaluated. CFA results confirmed that all factor loadings exceeded 0.50, indicating adequate convergent validity. CR and AVE also met the recommended thresholds ($CR \geq 0.70$, $AVE \geq 0.50$). A summary is exhibited in Table 2.

Table 2. Evaluation of Measurement Model

Variables	CR	VE	Information
Implementation of Total Quality Management (TQM)	0.958	0.602	Reliable
Transformational Leadership	0.943	0.580	Reliable
Organizational culture	0.936	0.623	Reliable

All constructs demonstrated high internal consistency and convergent validity. The fit indices obtained from SEM-AMOS indicate that the structural model fits the data well. Table 3 displays the main indicators of model fit.

Table 3. Summary of Model Fit

Goodness of fit index	Cut-off value	Research Model	Model
RMSEA	≤ 0.08	0.055	Fit
CMIN/DF	≤ 2.00	1,924	Fit
CFI	≥ 0.90	0.934	Fit
TLI	≥ 0.90	0.930	Fit
GFI	≥ 0.90	0.827	Marginal Fit
AGFI	≥ 0.90	0.805	Marginal Fit

Most indices meet the required thresholds, indicating that the model has an acceptable level of fit and can be used to test structural relationships. SEM analysis produced standardized regression weights, critical ratios (CR), and significance levels (p-values), as displayed in Table 4.

Table 4. Hypothesis Testing Results

Hypothesis	Estimate	CR	p-value	Results
H1: Total Quality Management (TQM) → Organizational Culture	0.240	3,431	0.000	Significant
H2: Transformational Leadership → Organizational Culture	0.272	2,623	0.009	Significant
H3: Total Quality Management (TQM) x Transformational Leadership → Organizational Culture	0.000	2,575	0.010	Significant

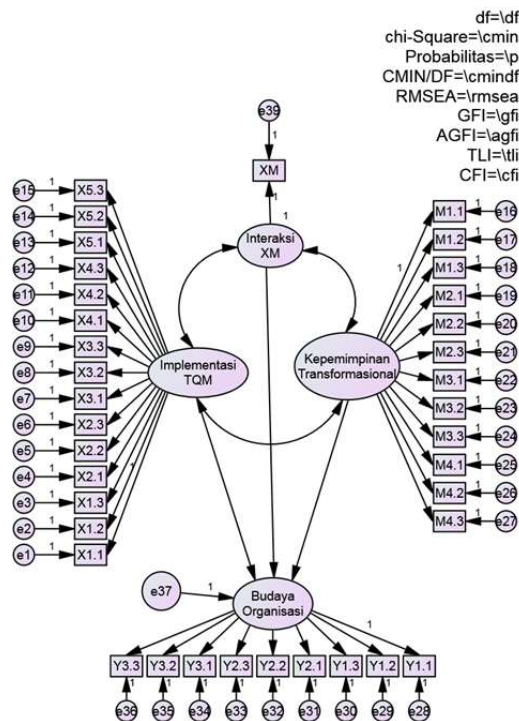


Figure 3. Structural Equation Model (SEM) Results

The empirical results show that improving organizational culture is significantly and favorably impacted by the application of Total Quality Management (TQM). The statistical results (estimate = 0.240, CR = 3.431, $p < 0.001$) indicate that consistent application of TQM principles—such as continuous improvement, customer orientation, employee empowerment, and systematic problem-solving—contributes meaningfully to the development of shared values, norms, and collaborative behaviors within the organization. These results suggest that TQM functions not merely as an operational management system but also as a cultural driver that shapes organizational identity and cohesion.

This finding is consistent with recent studies that emphasize the cultural dimension of TQM implementation in educational and organizational contexts. Contemporary research indicates that TQM strengthens teamwork, accountability, and learning orientation when implemented holistically (Al-Dhaafri et al., 2020; Harsono & Mujiwati, 2022; Hidayat & Wulan, 2021). Unlike earlier studies that focused primarily on efficiency outcomes, this study highlights how TQM contributes to cultural internalization in vocational education settings, particularly by fostering collaborative, value-driven work practices. The novelty of this finding lies in its contextual focus on vocational schools, where empirical evidence on the cultural impact of TQM remains limited, especially in developing countries.

From a practical perspective, the descriptive analysis indicates that respondents believe TQM procedures are moderately well applied, as evidenced by a mean TQM score of 3.46. At SMK Negeri 4 Klaten, TQM adoption has resulted in more structured work processes, improved service quality, and stronger collaboration among school members. This reinforces recent empirical findings suggesting that effective quality management systems enhance organizational adaptability and cultural alignment (Yusuf et al., 2020; Zu et al., 2021). Scientifically, this study contributes to the literature by reaffirming TQM as a cultural mechanism rather than solely a technical tool, thereby extending its theoretical relevance in educational management research. The findings further support the notion that organizational culture is significantly improved by transformational leadership (estimate = 0.272, CR = 2.623, $p = 0.009$). This suggests that executives who demonstrate intellectual stimulation, idealized influence, personalized attention, and inspirational motivation are essential in creating and maintaining a positive corporate culture. By connecting personal beliefs to corporate objectives, transformational leadership promotes cultural coherence and shared commitment. Recent empirical studies support these findings, demonstrating that transformational leadership enhances organizational learning, innovation, and cultural adaptability in educational institutions (Bush, 2018; Northouse, 2021; Sunarto & Fitriyani, 2022). This study adds to the body of knowledge by providing empirical evidence of the effectiveness of transformational leadership in vocational school environments, where operational and bureaucratic restrictions frequently limit leadership responsibilities. The novelty lies in treating leadership behavior as a direct cultural driver rather than a contextual background factor within a quality-oriented educational framework.

The mean transformational leadership score of 3.57 suggests that leadership practices in the observed institutions are perceived as moderately effective. This aligns with the significant statistical relationship identified and underscores leadership's strategic role in managing cultural transformation. From a scientific standpoint, this finding reinforces contemporary leadership theory that positions transformational leaders as cultural architects capable of embedding values into daily organizational routines. Practically, it emphasizes the importance of leadership development programs focused on vision-building, empowerment, and innovation in vocational education systems. The moderation analysis reveals that transformational leadership significantly strengthens the influence of TQM on organizational culture (estimate = 0.000, CR = 2.575, $p = 0.010$). Although the interaction coefficient is numerically small, as is typical in moderation models, the statistical significance confirms that leadership amplifies the cultural impact of TQM implementation. This indicates that TQM initiatives are more effective in shaping organizational culture when supported by transformational leadership.

These findings extend recent research emphasizing leadership as a critical contextual factor in quality management effectiveness (Al-Dhaafri et al., 2020; Kaynak, 2020). The novelty of this study lies in empirically validating transformational leadership as a moderating variable in vocational education, a relationship that has received limited attention in prior studies. This integrated model demonstrates that TQM alone may remain procedural unless leaders actively translate quality principles into shared values and behaviors. From a practical perspective, the results imply that school leaders must act as catalysts for cultural change by modeling quality-oriented behaviors, encouraging innovation, and reinforcing continuous improvement. Scientifically, by proposing and validating a leadership-driven quality culture model, this study adds to the body of literature on organizational and educational management. The robust model fit indices (RMSEA = 0.055, CFI = 0.934, TLI = 0.930) further support the theoretical validity of this integrated framework.

Empirical findings indicate that, although TQM implementation is perceived to be moderate-to-high (mean TQM = 3.46) and the SEM results confirm a significant positive effect of TQM on organizational culture (estimate = 0.240, $p < 0.001$), the cultural dimension of collaboration is not yet optimally strong, as reflected in the overall perception of organizational culture that remains at a moderate level in practice. This suggests that improved management systems do not automatically translate into big cultural change. Therefore, several local context factors may explain why collaborative culture remains suboptimal despite relatively strong TQM adoption. First, TQM in schools can be implemented more as a formal administrative routine (documentation, compliance, and standard operating procedures) than as a shared learning culture, leading to collaboration only when required rather than becoming habitual. Second, vocational schools often operate within bureaucratic structures and hierarchical decision-making, which can limit cross-functional coordination and reduce teachers' and staff members' initiative to collaborate beyond their assigned roles. Third, workload distribution, time constraints, and siloed departmental practices may restrict opportunities for sustained teamwork, even when quality improvement programs are formally in place. Finally, in the specific local context of SMK Negeri 4 Klaten, collaboration may be influenced by existing norms of individual task completion, uneven engagement in collective initiatives, and limited incentives for cross-unit innovation. Therefore, strengthening collaborative culture likely requires not only maintaining TQM procedures but also intensifying leadership-driven cultural interventions, such as structured cross-departmental teams, shared improvement projects, and recognition systems that reward collective contributions, so that TQM becomes internalized as daily collaborative practice rather than remaining procedural.

Collectively, the findings confirm a comprehensive causal model in which Total Quality Management serves as a foundational mechanism for cultural strengthening, transformational leadership directly enhances organizational culture, and leadership further amplifies TQM's cultural impact. This study contributes to science by integrating quality management and leadership theories into a unified empirical model within the context of vocational education. The results provide new insights into how leadership behavior and management systems interact to foster sustainable organizational culture, offering both theoretical advancement and practical guidance for policymakers and educational leaders. Despite these contributions, several limitations should be considered when interpreting the findings. First, the study employed a cross-sectional design, which captures relationships at a single point in time and limits conclusions about long-term cultural change processes. Second, the study was conducted in a single vocational school, which may reduce the generalizability of the findings to other schools with different organizational structures, leadership practices, or regional characteristics. Third, the study relied on self-reported questionnaire data, which may be subject to bias from perception and social desirability. Future research could strengthen validity by using additional data sources such as classroom and organizational observations, interviews, and document analysis.

CONCLUSION

This study concludes that Total Quality Management (TQM) and transformational leadership play significant roles in shaping organizational culture in vocational education settings. The findings indicate that TQM has a positive and significant influence on organizational culture, suggesting that continuous improvement, staff engagement, leadership commitment, and customer orientation contribute to strengthening the values of

caring, contribution, and collaboration in schools. Transformational leadership also shows a significant effect on organizational culture. Leaders who inspire and motivate members, stimulate innovation, and provide individualized support help build a stronger cultural foundation that encourages collective engagement and shared ownership. Furthermore, this study confirms that transformational leadership moderates the relationship between TQM and organizational culture. This suggests that TQM practices alone may not be sufficient to drive cultural change; rather, their effectiveness depends on how leaders translate TQM principles into everyday actions, interactions, and routines within the school. Overall, these results highlight that strengthening school culture requires a combination of systematic quality management practices and transformational leadership behaviors. Schools that integrate these two components are more likely to develop a sustainable and collaborative culture that supports continuous improvement and student success. Future studies are encouraged to adopt longitudinal designs to examine how TQM, leadership practices, and organizational culture develop over time and to capture causal and sustainability mechanisms better. In addition, multi-school studies across different regions and vocational specializations would enhance external validity and allow meaningful comparisons across institutional contexts. Further research may also incorporate additional contextual variables such as workload, organizational climate, governance arrangements, and the intensity of industry partnerships to explain why collaborative culture may remain moderate even when TQM implementation is perceived as relatively strong.

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