

Impact of Organizational Subcultures on Barriers to Total Quality Management Implementation in Nigerian Construction Materials Manufacturing firms

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Abstract

This study examines the impact of organisational subcultures on barriers to Total Quality Management (TQM) implementation in Nigerian construction materials manufacturing firms. Despite the strategic importance of this sector in influencing construction quality and infrastructure performance, persistent challenges such as substandard materials, inconsistent production quality, and weak regulatory compliance continue to undermine outcomes. Drawing on organizational culture theory and the Competing Values Framework (CVF), the research employs a quantitative approach, utilising survey responses gathered from a sample of 150 participants across construction materials manufacturing firms. Organisational subcultures (clan, adhocracy, market, and hierarchical) were analysed alongside six TQM Implementation barrier constructs: top management support, employee, customer Support, planning, process management, and information management. Data collected were analysed using descriptive statistics and Structural Equation Modelling (SmartPLS). The results reveal that organisational subcultures significantly influence TQM barriers, with clan culture emerging as the most supportive orientation, demonstrating significant relationships with multiple TQM dimensions. Adhocracy and hierarchical cultures showed moderate influence, particularly in process and strategic dimensions, while market culture exhibited limited but targeted effects. Quantitatively, the strongest associations were observed for hierarchical culture with customer-focus barriers ($\beta = 0.76, p < 0.01$); clan culture with strategic-planning barriers ($\beta = 0.58, p < 0.01$), top-management barriers ($\beta = 0.42, p < 0.05$) and measurement-and-analysis barriers ($\beta = 0.41, p < 0.05$); market culture with workforce-management barriers ($\beta = 0.52, p < 0.01$) and process-management barriers ($\beta = 0.41, p < 0.01$); and adhocracy culture with workforce-management barriers ($\beta = 0.46, p < 0.01$). The findings confirm that TQM barriers are culturally embedded and that effective implementation requires alignment between subcultural orientations and quality management practices. The study contributes to theory by integrating subculture perspectives into TQM research and provides practical insights for improving quality performance and regulatory compliance in developing-country contexts.

Keywords: Competing Values Framework (CVF); Construction materials manufacturing; Nigeria; Organisational subculture; Total Quality Management (TQM); TQM barriers

1. Introduction

The construction materials manufacturing sector occupies a critical position within the Nigerian construction ecosystem, directly influencing the quality, safety, and sustainability of the built environment. Materials such as cement, blocks, steel, and coatings account for a substantial proportion of construction costs often exceeding 60–70% of total project expenditure and therefore play a decisive role in determining project performance, durability, and lifecycle value (Makhdoomi, 2018; Ofori, 2015). This makes the sector particularly important to study, as defects originating at the production stage often propagate across the entire construction value chain, ultimately affecting project outcomes and public safety. However, the sector continues to face persistent quality deficiencies, including substandard materials, inconsistent production outputs, and non-compliance

with regulatory standards, which have been linked to building collapse and reduced infrastructure lifespan in Nigeria (Egwunatum et al., 2021; Okonta et al., 2024). Despite operating under strict regulatory oversight from the Standards Organisation of Nigeria (SON), enforcement challenges and weak internal quality systems continue to undermine consistent compliance (Oke et al., 2023). These challenges point to systemic weaknesses in quality management practices and justify the need for deeper investigation into the organisational factors underpinning quality performance in this sector.

Total Quality Management (TQM) has been widely advocated as an all-encompassing approach for improving product quality, operational efficiency, and organisational competitiveness through principles such as continuous improvement, process integration, and employee involvement (Deming, 1993; Oakland,

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2003). However, evidence suggests that TQM implementation often falls short of expected outcomes, particularly in developing-country contexts, due largely to organisational and behavioural factors rather than technical limitations (Hilma et al, 2020; Jum'a et al 2023; Sony et al., 2020; Oke et al., 2023). Drawing on organisational culture theory, this study argues that these limitations can be better understood through the lens of organisational subcultures distinct patterns of values and practices that emerge across departments and hierarchical levels and shape how quality initiatives are interpreted and enacted (Schein, 1985; Martin, 2002). Using the Competing Values Framework (Cameron & Quinn, 2005), the study examines how subcultural orientations influence barriers to TQM implementation in Nigerian construction materials manufacturing firms. By linking subculture theory with TQM barrier constructs, the study provides a context-specific and theoretically grounded perspective for improving quality performance, regulatory compliance, and organisational effectiveness in the sector. In the context of Nigerian construction materials manufacturing firms, where operational processes are highly interdependent, such subcultural variations are likely to have significant implications for TQM barriers. However, empirical evidence in this area remains limited, particularly in terms of quantitative analysis linking subculture types to specific barrier constructs. This paper is aimed at examining how organizational subcultures influence barriers to TQM implementation in Nigerian construction materials manufacturing firms. This was achieved by identifying the organizational subcultures (clan, adhocracy, market and hierarchy) present in the sector and to determine which subcultural orientations most strongly shape these barriers.

2. Literature Review

2.1 Total Quality Management (TQM) in Manufacturing and Construction Materials Firms

Total Quality Management (TQM) remains a foundational managerial philosophy for enhancing operational efficiency, product quality, and organisational competitiveness in manufacturing environments (Ilgrosen & Lagrosen, 2019; Palumbo & Douglas, 2024; Patyal et al, 2020). Contemporary research demonstrates that TQM continues to deliver performance improvements through continuous improvement, process discipline, and customer orientation, although outcomes are highly contingent on organisational context and capability (Carvalho et al., 2021; Sony et al., 2022).

Within the construction materials manufacturing sector, TQM assumes heightened importance due to its strong effect on the quality and safety of the built environment. Materials significantly influence construction performance and durability, often

accounting for a substantial proportion of project costs (Makhdoomi, 2018; Ofori, 2015; Ogunyemi et al., 2022). However, persistent quality failures including non-conforming cement strength and inconsistent material specifications have been linked to weak quality systems and uneven TQM implementation (Sinha & Dhall, 2020; Twaissi et al, 2025; Egwunatum et al., 2021; Okonta et al., 2024). Furthermore, firms operate under strict regulatory oversight from the Standards Organisation of Nigeria (SON), making quality management not only a strategic necessity but also a compliance requirement (Oke et al., 2023). Despite this, evidence suggests that TQM implementation in such contexts is often constrained less by technical limitations than by organisational and behavioural factors (Sony & Naik, 2021). Nevertheless, the TQM–performance relationship remains contested: while some studies report strong positive effects, others find weak or context-dependent outcomes, indicating that TQM's benefits are neither automatic nor universal but depend on organizational and cultural readiness Coelho (2022), Ndlovu (2016), Novena (2012). This unresolved debate justifies a closer, culturally grounded examination of why implementation barriers persist.

2.2 Organisational Culture and Subcultures in TQM Implementation

Organisational culture has been acknowledged as a critical determinant of TQM success or failure. It shapes how employees interpret quality goals, adhere to procedures, and engage in continuous improvement initiatives (Sony & Naik, 2021; Hartnell et al., 2019). Recent literature confirms that alignment between organisational culture and quality management systems is essential for effective TQM implementation, particularly in complex and process-driven environments (Palumbo & Douglas, 2024). However, organisations rarely exhibit a single, unified culture. Instead, subcultures emerge within departments, plants, hierarchical levels, and professional groups, reflecting distinct norms, values, and practices (Palumbo et al, 2024)). In construction materials manufacturing, where operations are highly standardised and inspection-driven, these subcultures play a decisive role in shaping how quality routines are interpreted and enacted at the operational level. Empirical evidence from emerging economies indicates that rigid, hierarchical, or fragmented subcultures tend to intensify TQM barriers such as resistance to change, weak communication, limited skills development, and poor cross-functional coordination (Aquilani et al., 2020; Oke et al., 2023). Conversely, participative and learning-oriented subcultures characterised by trust, teamwork, and openness have been shown to reduce human and managerial barriers to TQM adoption (Sony et al., 2022). These findings imply that understanding subcultural dynamics is vital for explaining variations in TQM implementation outcomes.

2.3 Conceptualising Organisational Subcultures: The Differentiation Perspective

Organisational culture is commonly defined as a system of shared values, beliefs, and assumptions that guide behaviour and interpretation within an organisation (Schein, 1985; Cameron & Quinn, 2005). However, the differentiation perspective of organisational culture emphasises that multiple subcultures coexist within organisations, each shaped by functional roles, hierarchical levels, and operational contexts (Patyal et al., 2020; Twaissi et al., 2025). This view is particularly relevant in manufacturing settings, where different units such as production, quality control, procurement, and management may exhibit distinct cultural orientations. These subcultures may either align with or contradict TQM principles. For example, production units may prioritise output and efficiency, while quality units emphasise compliance and standardisation. Where such subcultures are misaligned, they can create friction, resistance, and inconsistencies in TQM implementation (Juma'a et al., 2023).

2.4 Measuring Organisational Culture: The Competing Values Framework (CVF)

The evaluation of organisational culture remains a complex challenge due to its multidimensional nature. Various instruments have been developed, including the Organisational Culture Profile and Organisational Culture Inventory; however, the Competing Values Framework (CVF) has emerged as one of the most widely used and empirically validated models in quality management research. The CVF conceptualises organisational culture along two dimensions: flexibility versus control, and internal versus external focus. These dimensions generate four cultural archetypes: clan, adhocracy, market, and hierarchy. Each archetype reflects distinct organisational priorities, leadership styles, and approaches to coordination and control (Cameron & Quinn, 2005). Recent studies continue to validate the CVF as a robust framework for linking cultural orientations to TQM practices, organisational performance, and change capability (Dimitrantzou et al., 2022; Palumbo & Douglas, 2024). Importantly, the CVF allows for the coexistence of multiple cultural orientations within the same organisation.

2.5 TQM Implementation Barriers: Classical and Contemporary Perspectives

Despite its theoretical appeal, TQM implementation has historically been associated with significant challenges. Foundational studies emphasised that TQM requires deep organisational change and long-term commitment, making it difficult to implement effectively without strong systemic support (Deming, 1993; Oakland, 2003; Dale, 2007). Recent studies confirm that these barriers persist, particularly in developing and emerging economies. In Nigeria, key challenges include weak quality culture, inadequate managerial support, poor communication systems,

limited adoption of formal quality management systems, and insufficient technical resources (Oke et al., 2023; Ibrahim et al., 2024). Additionally, organisational fragmentation and lack of cross-functional integration continue to undermine TQM effectiveness in construction-related industries (Onyia et al., 2024). Importantly, contemporary research suggests that TQM barriers are not uniform across contexts. Their nature and intensity vary depending on organisational structure, industry characteristics, and cultural conditions (Sony et al., 2022).

2.6 Linking Organisational Subcultures to TQM Barriers

A growing body of literature highlights the role of organisational culture as both an enabler and constraint of TQM implementation. However, fewer studies explicitly examine how subcultures influence specific categories of TQM barriers. Emerging evidence suggests that subcultural misalignment can amplify implementation challenges by creating inconsistencies in behaviour, communication, and decision-making across organisational units (Palumbo & Douglas, 2024). For instance, hierarchical subcultures may reinforce control and compliance but limit innovation and learning, while clan-oriented subcultures may promote collaboration and continuous improvement (Dimitrantzou et al., 2022). Similarly, market-oriented subcultures may prioritise performance outcomes at the expense of process discipline, thereby affecting quality consistency. Organisational culture shapes TQM, but subculture effects are contested. Clan cultures reportedly lower behavioural barriers (Eniola et al., 2019; Sony et al., 2022), yet hierarchical/market orientations prove equally effective in controlled settings (Patyal et al., 2020), cultural effects appear weak and context-dependent (Coelho et al., 2022) and often operate indirectly through TQM (Sinha & Dhall, 2020).

2.7 Toward a Typology of TQM Barriers

Given the diversity and fragmentation of TQM barrier literature, there is a need for a structured typology that organises barriers into coherent constructs. Aligning with established quality frameworks such as the Baldrige model, barriers can be categorised into six major constructs: top management, employee, customer, planning, process management, and information management barriers (Dale, 2007; Oakland, 2003). This categorisation enables a more systematic analysis of how organisational subcultures influence different dimensions of TQM implementation (Table 1).

Table 1: TQM Barrier Constructs

Barrier Construct	Barrier Indicator
Top Management Barriers	Senior leadership does not visibly support or prioritize quality initiatives. Communication about quality from top management is limited or unclear. Insufficient resources are allocated for employee training and development. Leadership approaches restrict the development of a learning-focused culture. Frequent changes in senior management disrupt organizational stability. Excessive hierarchical layers slow down decision-making processes.
Employee Barriers	Employees are not given enough authority to participate in quality improvement efforts. Staff involvement in improvement initiatives is minimal. There is inadequate training in quality-related skills. Training in communication and teamwork is often neglected. Employee contributions to quality improvements are not properly recognized. Overall employee satisfaction across the organization is low.
Customer Barriers	Employees often resist organizational changes. There is no effective system to evaluate customer satisfaction. Customer needs and expectations are not properly identified. Feedback systems from customers are weak or ineffective. Building strong relationships with key customers is not prioritized.
Planning Barriers	Strategic plans are not aligned with customer requirements. Quality objectives are not included in organizational strategies. There are no clear methods for embedding new tools or practices. Collaboration with suppliers during planning is limited.
Process Management Barriers	There is no comprehensive organization-wide quality programme. Quality is treated as a separate function rather than a shared responsibility. Communication with external stakeholders is ineffective. Resources for implementing TQM are insufficient. Cross-functional teams are not utilized.
Information Management Barriers	Communication across departments and organizations is weak. Employees tend to work in silos without collaboration. Quality and performance data are not widely shared. Quality performance is not regularly or effectively measured. Benchmarking against industry best practices is not carried out. Limited time is available to implement quality initiatives alongside daily operations.

Organisational subculture (Table 2) is examined through six dimensions (Dominant Characteristics, Organisational Leadership, Management of

Employees, Organisational Glue, Strategic Emphasis, and Criteria for Success).

Table 2: Dimensions of Organizational subculture

Dimension	Details
Dominant Characteristics	Does the organization operate in a friendly and supportive environment like a close-knit family, where individuals openly share experiences? Alternatively, is it characterized by a fast-paced and innovative culture where employees are encouraged to take initiative and embrace risk? Does the organization focus primarily on achieving targets, with strong competition and performance-driven attitudes? Or is it more formal and structured, where procedures and rules guide daily activities?
Organizational Leadership	Is leadership within the organization supportive and focused on mentoring, guiding, and developing employees? Or does leadership encourage innovation, creativity, and risk-taking? Does management adopt a highly results-driven and assertive approach? Alternatively, is leadership centered on coordination, organization, and ensuring smooth and efficient operations?
Management of Employees	Does the organization promote collaboration, teamwork, and shared decision-making? Or does it prioritize individuality, creativity, and freedom in how employees work? Is there a strong focus on competition, high performance, and achieving demanding targets? Or does the organization value stability, consistency, and secure working relationships?
Organizational Glue	Are loyalty, trust, and long-term commitment key elements that bind the organization together? Or is the organization driven by innovation and continuous improvement? Does it emphasize achieving goals and maintaining a competitive edge? Alternatively, are formal systems, rules, and procedures the main factors ensuring organizational stability and cohesion?
Strategic Emphasis	Does the organization prioritize employee development, trust, openness, and participation? Or is the focus on growth through acquiring resources and exploring new opportunities? Is success driven by competition, market leadership, and achieving ambitious targets? Or does the organization emphasize efficiency, stability, and well-controlled operations?
Criteria for Success	Is success measured through employee development, teamwork, and strong commitment to people? Or is it defined by innovation and being a leader in developing unique products or services? Does the organization prioritize outperforming competitors and achieving market dominance? Or is success based on efficiency, reliability, cost control, and smooth operational delivery?

Source: (Olaleye, 2019)

3. Research Methodology

This study adopts a quantitative, research design grounded in a positivist philosophy to examine the impact of organisational subcultures on barriers to Total Quality Management (TQM) implementation in Nigerian construction materials manufacturing firms. A minimum of 150 survey respondents was determined using Cochran's formula (95% confidence level, 5% margin of error). A structured questionnaire was developed based on established TQM barrier constructs and organizational subcultures were measured using dimensions adapted from the Competing Values Framework (CVF). The target population comprised construction materials manufacturers registered with relevant bodies; the Standards Organization of Nigeria (SON). A multi-stage sampling technique was employed, involving purposive selection of major industrial hubs (e.g., Lagos, Ogun, Abuja), stratified sampling across firm sizes (large, medium, and small) based on the number of departments in the organization, and purposive sampling of respondents including production managers, quality control

officers, and senior executives. Data was collected using a 5-point Likert scale. The achieved sample of 150 also satisfies the requirements of PLS-SEM: it exceeds the "ten-times" rule (ten cases per the largest number of structural paths directed at any construct here four predictors, giving a minimum of 40) and provides adequate power for the model estimated.

Data were analysed in two stages. Descriptive statistics (means and standard deviations) were computed in SPSS to assess the prevalence and severity of the TQM barriers. The measurement and structural models were then estimated using partial least squares structural equation modelling (PLS-SEM) in SmartPLS, which is appropriate for predictive, theory-building research and for models with several latent constructs and non-normal data (Figure 1). The measurement model was assessed for internal consistency using Cronbach's alpha and composite reliability (≥ 0.70) and for convergent validity using average variance extracted ($AVE \geq 0.50$); the structural model was evaluated through path coefficients (Table 3), with significance established by bootstrapping to obtain t-statistics and p-

Table 3: Path Coefficients

	Customer Focus	Measurement Analysis	Process Management	Strategic Planning	Top Management	Workforce Management
Adhocracy	0.072	0.317	0.086	0.011	0.316	0.445
Clan	-0.210	0.392	0.183	0.563	0.410	0.165
Hierarchical	0.751	0.080	0.348	0.410	0.089	-0.146
Marketing	0.030	0.102	0.416	0.014	0.038	0.523

Source: Field Survey 2025

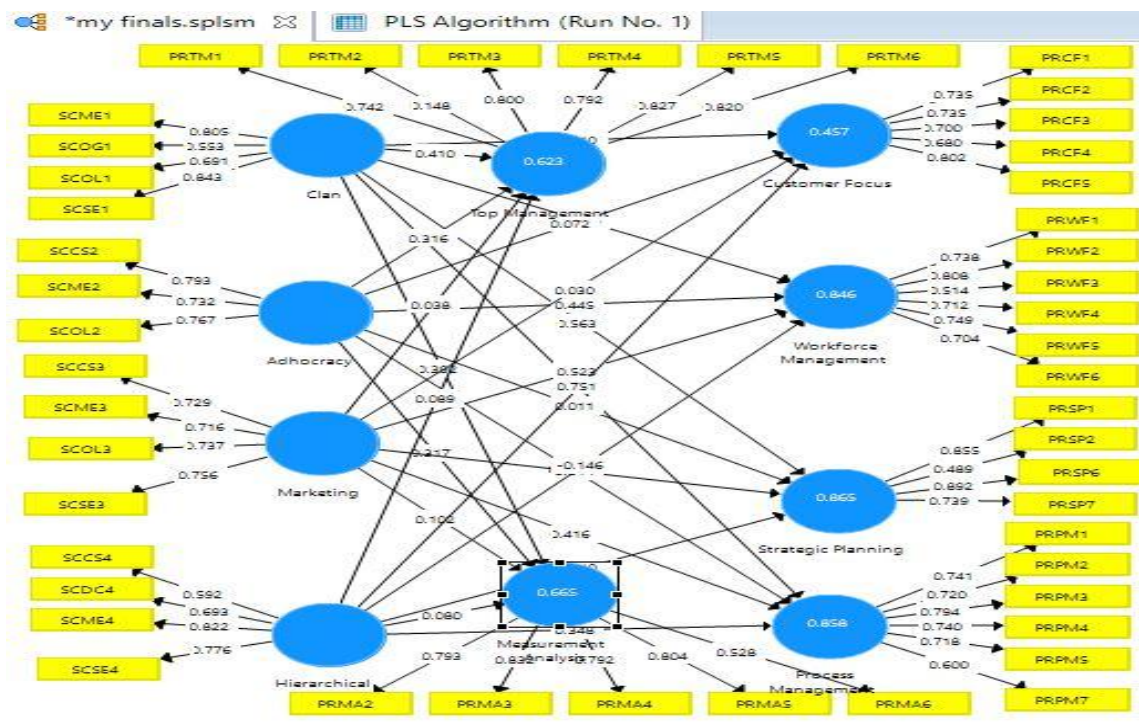


Figure 1: SEM showing Factor Loadings

values. Instrument validity was further supported through expert review and pilot testing. Ethical considerations were strictly observed, including informed consent, confidentiality, and secure data handling. Although the study provides valuable insights into the role of subcultures in shaping TQM implementation, limitations such as potential response bias and constraints associated with non-probability sampling are acknowledged.

4. Findings and Discussion

The findings (Table 4 in Appendix 1) of this study demonstrate that organisational subcultures significantly shape the nature and intensity of barriers to TQM implementation in Nigerian construction materials manufacturing firms. Clan culture emerged as the most supportive orientation, reducing barriers through enhanced teamwork, communication, and employee involvement, consistent with recent studies highlighting the importance of participatory cultures in quality management (Sony et al., 2022; Bogale & Debela, 2024). Adhocracy culture also contributed positively by fostering innovation, learning, and workforce engagement, although its influence on structured planning and customer focus was limited (Eniola et al, 2019). In contrast, hierarchical culture strengthened process control and regulatory compliance but tended to reinforce workforce-related barriers due to rigidity and limited flexibility, while market culture improved efficiency and performance but showed weaker alignment with strategic quality systems in agreement with Dimirantzou et al, 2022. Overall, the results confirm that TQM barriers are culturally embedded and multidimensional, and that effective implementation requires a balanced integration of collaborative, innovative, and control-oriented cultural attributes rather than reliance on a single dominant culture. Interpreted through the Competing Values Framework, these patterns suggest distinct mechanisms: the strong clan–strategic-planning association ($\beta = 0.58$) reflects the role of shared vision and participation in collective goal-setting, whereas the dominant hierarchical–customer-focus association ($\beta = 0.76$) indicates that formalised procedures and standardisation are what translate customer requirements into consistent specifications in this regulated sector. The prominence of market and adhocracy cultures in workforce-management barriers ($\beta = 0.52$ and 0.46) further implies that performance- and innovation-oriented cultures act mainly on human-resource and engagement dimensions rather than on strategic or measurement systems. The practical implication is that firms cannot rely on a single cultural lever; managers should diagnose their dominant subculture and deliberately build complementary orientations to address the specific barriers to which each is most strongly linked.

5. Conclusion and Further research

This study demonstrates that organisational subcultures play a fundamental role in shaping barriers to TQM implementation in Nigerian construction materials manufacturing firms. By integrating the Competing Values Framework with TQM barrier constructs, the research shows that clan and adhocracy cultures tend to mitigate behavioural and managerial barriers through collaboration and innovation, while hierarchical and market cultures enhance process discipline and performance but may reinforce structural and human-related constraints. The study contributes to theory by advancing a culture-based explanation of TQM barriers and to practice by highlighting that successful quality management requires not only technical systems but also deliberate alignment of organisational subcultures with TQM principles. In the context of Nigeria's construction materials sector, improving quality outcomes and regulatory compliance depends significantly on transforming internal cultural dynamics. Theoretically, the study extends TQM research by reconceptualising implementation barriers as culturally embedded phenomena and by demonstrating, through the Competing Values Framework, that different subcultures are associated with distinct and measurable barrier constructs rather than a single, undifferentiated cultural effect.

Future research should assume longitudinal and mixed method approaches to examine how organisational subcultures evolve over time and influence the sustainability of TQM outcomes in dynamic environments. Additionally, comparative studies across industries and developing economies would provide deeper insights into how contextual and institutional factors shape the relationship between organisational subculture and TQM barriers.

6. Recommendations

Firm leadership and senior management should institutionalise participatory management practices by promoting teamwork, employee empowerment, and open communication systems to reduce resistance to change and strengthen TQM implementation.

Regulatory bodies (e.g., SON) and organisational managers should encourage hybrid cultural models that combine hierarchical control with innovation-oriented practices to ensure both compliance and continuous upgrade in quality management systems.

Reference

- Aquilani, B., Silvestri, C., Ruggieri, A., & Gatti, C. (2020). A systematic literature review on total quality management critical success factors and the identification of new avenues of research. *The TQM Journal*, 32(4), 821–850.
- Bogale, A. T., & Debela, K. L. (2024). Organizational culture: A systematic review. *Cogent Business & Management*, 11(1), Article 2340129. <https://doi.org/10.1080/23311975.2024.2340129>
- Cameron, K. S., & Quinn, R. E. (2005). *Diagnosing and changing organizational culture: Based on the competing values framework* (Rev. ed.). Jossey-Bass.
- Carvalho, F., Sampaio, P., Rebentisch, E., Saraiva, P., & Mendes, G. (2021). Operational excellence, organisational culture and agility: The missing link? *Total Quality Management & Business Excellence*, 32(13–14), 1493–1514.
- Coelho, C., Mojtahedi, M., Kabirifar, K., & Yazdani, M. (2022). Influence of organisational culture on total quality management implementation in the Australian construction industry. *Buildings*, 12(4), 496. <https://doi.org/10.3390/buildings12040496>
- Dale, B. G., van der Wiele, T., & van Iwaarden, J. (2007). *Managing quality* (5th ed.). Blackwell Publishing.
- Deming, W. E. (1993). *The new economics for industry, government, education*. MIT Press.
- Dimitrantzou, C., Psomas, E., Bouranta, N., & Kafetzopoulos, D. (2022). The role of organisational culture in total quality management adoption and cost of quality. *Total Quality Management & Business Excellence*, 33(15–16), 1718–1736. <https://doi.org/10.1080/14783363.2021.1997143>
- Egwunatum, S. I., Anumudu, C., & Aje, I. O. (2021). Total quality management implementation in the Nigerian construction industry. *Engineering, Construction and Architectural Management*, 29(1), 354–382. <https://doi.org/10.1108/ECAM-08-2020-0639>
- Eniola, A. A., Olorunleke, G. K., Akintimehin, O. O., Ojeka, J. D., & Oyetunji, B. (2019). The impact of organizational culture on total quality management in SMEs in Nigeria. *Heliyon*, 5(8), e02293. <https://doi.org/10.1016/j.heliyon.2019.e02293>
- Hartnell, C. A., Kinicki, A. J., Lambert, L. S., Fugate, M., & Doyle Corner, P. (2019). Do similarities or differences between CEO leadership and organizational culture have a more positive effect on firm performance? *Journal of Applied Psychology*, 104(3), 371–395.
- Hilman, H., Ali, G. A., & Gorondutse, A. H. (2020). The relationship between total quality management and SMEs' performance: The mediating role of organizational culture. *International Journal of Productivity and Performance Management*, 69(1), 61–84. <https://doi.org/10.1108/IJPPM-02-2019-0059>
- Jum'a, L., Alkalha, Z., Al Mandil, K., & Alaraj, M. (2023). Exploring the influence of lean manufacturing and total quality management practices on environmental sustainability: The moderating role of quality culture. *International Journal of Lean Six Sigma*, 14(7), 1626–1654. <https://doi.org/10.1108/IJLSS-11-2021-0203>
- Lagrosen, Y., & Lagrosen, S. (2019). Creating a culture for sustainability and quality: A lean-inspired way of working. *Total Quality Management & Business Excellence*. <https://doi.org/10.1080/14783363.2019.1575199>
- Martin, J. (2002). *Organizational culture: Mapping the terrain*. Sage Publications.
- Ndlovu, S., Ngirande, H., Setati, S. T., Zaiman, P., & Rachidi, M. F. (2016). The role of organisational subcultures in organisational effectiveness. *Problems and Perspectives in Management*, 14(2), 339–346.
- Novena, M., & Ogunlana, S. O. (2012). How organizational culture impacts project performance in developing countries. *Engineering, Construction and Architectural Management*, 19(4), 405–421.
- Ogunyemi, K., Adefolaju, T., & Adegbuyi, O. (2022). Organisational culture and quality management practices in emerging economies: A review of implementation challenges. *International Journal of Quality & Reliability Management*, 39(8), 1821–1843.
- Oakland, J. S. (2003). *Total quality management: Text with cases* (3rd ed.). Butterworth-Heinemann.
- Ofori, G. (2015). Nature of the construction industry, its needs and its development: A review of four decades of research. *Journal of Construction in Developing Countries*, 20(2), 115–135.

- Olaleye, Y.O (2019) Assessing the Influence of Organisational Subcultures on TQM practices in Nigerian construction Firms. Unpublished PHD thesis, Ahmadu Bello University Zaria
- Oke, A. E., Aghimien, D. O., Aigbavboa, C., & Musenga, C. (2023). Barriers to quality improvement implementation in developing-country construction and manufacturing contexts. *Journal of Engineering, Design and Technology*, 21(6), 1648–1667.
- Okonta, E. D., Okeke, F. O., Ojelabi, E. T.,(2024). Exploring the role of quality management practices in mitigating construction failures and building collapse. *Discover Civil Engineering*, 1, Article 111. <https://doi.org/10.1007/s44290-024-00115-6>
- Palumbo, R., & Douglas, A. (2024). The secret ingredient? Uncovering the effect of organizational culture on quality management: A literature review. *International Journal of Quality & Reliability Management*, 41(1), 195–268. <https://doi.org/10.1108/IJQRM-03-2023-0077>
- Patyal, V. S., Ambekar, S., & Prakash, A. (2020). Organizational culture and total quality management practices in the Indian construction industry. *International Journal of Productivity and Performance Management*, 69(5), 895–913. <https://doi.org/10.1108/IJPPM-10-2018-0368>
- Schein, E. H. (1985). *Organizational culture and leadership*. Jossey-Bass.
- Sinha, N., & Dhall, N. (2020). Mediating effect of total quality management on the relationship between organisational culture and performance: Evidence from Indian SMEs. *Total Quality Management & Business Excellence*, 31(15–16), 1841–1865. <https://doi.org/10.1080/14783363.2018.1511372>
- Sony, M., & Naik, S. (2021). Key ingredients for evaluating industry 4.0 readiness for organizations: A literature review. *Benchmarking: An International Journal*, 28(5), 1702–1733.
- Sony, M., Antony, J., & Douglas, J. (2022). Essential ingredients for the implementation of quality 4.0: A narrative review of literature and future directions for research. *The TQM Journal*, 34(6), 159–186.
- Sony, M., Antony, J., & McDermott, O. (2020). The relationship between organizational culture and quality management: A systematic literature review. *International Journal of Quality & Reliability Management*, 37(1), 29–61.
- Twaissi, N. M., Al-Zoubi, M. O., Masa'deh, R., Al Zoubi, J. Z., & Alhelalat, J. A. (2025). The mediating role of total quality management interventions and benchmarking in the impact of organizational culture on organizational performance. *Journal of Industrial Engineering and Management*, 18(1), 10–32. <https://doi.org/10.3926/jiem.7899>

Appendix 1

Table 4: Size and significance of path estimates

	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Remarks
Adhocracy -> Customer Focus barrier	0.091	0.205	0.349	0.727	NS
Adhocracy -> Measurement Analysis barrier	0.317	0.135	2.347	0.019	**
Adhocracy -> Process Management barrier	0.083	0.088	0.971	0.332	NS
Adhocracy -> Strategic Planning barrier	0.006	0.075	0.151	0.880	NS
Adhocracy -> Top Management barrier	0.310	0.135	2.335	0.020	**
Adhocracy -> Workforce Management barrier	0.457	0.081	5.471	0.000	***
Clan -> Customer Focus barrier	-0.198	0.213	0.985	0.325	NS
Clan -> Measurement Analysis barrier	0.406	0.160	2.442	0.015	**
Clan -> Process Management barrier	0.183	0.111	1.655	0.099	*
Clan -> Strategic Planning barrier	0.580	0.090	6.232	0.000	***
Clan -> Top Management barrier	0.424	0.161	2.536	0.012	**
Clan -> Workforce Management	0.152	0.112	1.472	0.142	NS

	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Remarks
Hierarchical -> Customer Focus barrier	0.763	0.185	4.051	0.000	***
Hierarchical -> Measurement Analysis barrier	0.085	0.135	0.589	0.556	NS
Hierarchical -> Process Management barrier	0.353	0.100	3.493	0.001	***
Hierarchical -> Strategic Planning barrier	0.397	0.082	5.001	0.000	***
Hierarchical -> Top Management barrier	0.097	0.149	0.595	0.552	NS
Hierarchical -> Workforce Management barrier	-0.149	0.099	1.477	0.140	NS
Marketing -> Customer Focus barrier	-0.002	0.163	0.182	0.856	NS
Marketing -> Measurement Analysis barrier	0.087	0.114	0.897	0.370	NS
Marketing -> Process Management barrier	0.411	0.086	4.863	0.000	***
Marketing -> Strategic Planning barrier	0.012	0.075	0.189	0.851	NS
Marketing -> Top Management barrier	0.027	0.125	0.301	0.764	NS
Marketing -> Workforce Management barrier	0.524	0.070	7.500	0.000	***

Source: Field Study (2025) Note: NS = not significant. a. Bootstrap confidence intervals for 10% probability of error ($\alpha = 0.10$). * $p < .10$. ** $p < .05$. *** $p < .01$