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EFFECT OF TOTAL QUALITY MANAGEMENT ADOPTION ON PERFORMANCE OF MANUFACTURING FIRMS IN NORTH EASTERN NIGERIA: THE MODERATING ROLE OF ORGANIZATIONAL CULTURE

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Abstract

This study examined the effect of Total Quality Management (TQM) adoption on the performance of manufacturing firms in North-East Nigeria, with organizational culture serving as a moderating variable. The study was motivated by persistent challenges of low productivity, poor product quality, customer dissatisfaction, and weak competitiveness among manufacturing firms despite the growing adoption of quality management practices. The study focused on Adama Beverages Limited, Yola, Adamawa State, and Mambilla Beverages Nigeria Limited, Kakara, Taraba State. Specifically, the study investigated the effects of top management commitment, customer focus, employee involvement, and continuous improvement on organizational performance and assessed the moderating role of organizational culture. A cross-sectional survey research design was adopted. The population comprised 641 employees, from which a sample of 246 respondents was determined using the Taro Yamane formula; however, 239 valid responses were analyzed. Data were analyzed using SmartPLS 4.0. Findings revealed that top management commitment ($\beta = 0.779$, $f^2 = 1.196$), continuous improvement ($\beta = 0.316$, $f^2 = 0.256$), and customer focus ($\beta = 0.251$, $f^2 = 0.052$) positively influenced organizational performance, while employee involvement showed a negligible effect ($\beta = -0.021$, $f^2 = 0.001$). Organizational culture exhibited insignificant moderating effects on all TQM-performance relationships. The study recommends strengthening leadership commitment, institutionalizing continuous improvement practices, and enhancing customer-focused strategies to improve organizational performance.

INTRODUCTION

In today's hypercompetitive global business environment, the sustainability and growth of manufacturing firms are increasingly dependent on their ability to implement effective management systems. Among such systems, Total Quality Management (TQM) has gained prominence as a strategic tool for enhancing organizational performance through continuous improvement and stakeholder satisfaction.

Total Quality Management (TQM) is a holistic management philosophy designed to achieve long-term success through top management commitment, continuous improvement, customer satisfaction, and employee involvement across all organizational processes. Globally, the ISO 9000 series particularly ISO 9001:2015 provides standardized requirements for quality management systems (ISO, 2015; Oakland, 2020).

Total Quality Management (TQM) adoption refers to the comprehensive implementation of quality-focused strategies, processes, and practices across all levels of an organization to continuously improve products, services, and organizational effectiveness by meeting or exceeding customer expectations (Psomas & Jaca, 2023).

Organizational performance, a multidimensional construct, encompasses critical metrics such as customer satisfaction, internal process efficiency, learning and growth, and employee performance (Rahman & Singh, 2022). The successful implementation of TQM can significantly contribute to performance outcomes by aligning operations with customer expectations, minimizing process inefficiencies, fostering organizational learning, and enhancing workforce productivity (Mahmudova & Abdullayeva, 2022).

However, organizations cultural resistance, inconsistent management commitment, and poor alignment with global standards like ISO 9001 remain key barriers to full implementation (Musa, Sulaiman, & Lawal, 2022). Consequently, the interplay between TQM adoption and

organizational culture is vital in determining the effectiveness of quality management efforts within Nigerian firms.

Understanding how organizational culture moderates the relationship between TQM adoption and firm performance is crucial, especially within the context of Adama beverages limited and Mambilla beverages limited in Adamawa and Taraba States. This study aims to provide empirical evidence on how these factors interact to shape the performance of these manufacturing firms in North-East Nigeria.

Statement of the Problem

The manufacturing sector in Nigeria plays a crucial role in fostering industrialization, employment generation, and sustainable economic development. Many firms struggle with inefficiencies in production, inconsistent product quality, low employee productivity, poor customer retention, and minimal innovation. These challenges have been partly linked to the absence of structured Total Quality Management (TQM) frameworks and the limited capacity of organizations to align with internationally recognized quality standards such as the ISO 9000 series and ISO 9001:2015.

Despite the theoretical and practical benefits of TQM, its effective adoption and translation into performance outcomes remain inconsistent across manufacturing firms in Nigeria, especially in Adama and Mambilla beverages. However, Adama and Mambilla beverages in North-East Nigeria, continues to experience low and inconsistent organizational performance, characterized by inefficiencies, poor product quality, low customer satisfaction, and weak competitiveness.

Moreover, these TQM initiatives often fail to yield uniform results, raising concerns about contextual factors that may influence their success. One such critical but underexplored factor is organizational culture. The manufacturing sector, particularly Adama and Mambilla beverages in North-East Nigeria, continues to experience low and inconsistent organizational performance, characterized by inefficiencies, poor product quality, low customer satisfaction, and weak competitiveness.

Furthermore, even where TQMA dimensions such as top management commitment, customer focus, employee involvement, and continuous improvement are applied, their impact on organizational performance remains unclear and inconsistent due to differences in organizational structures and internal environments. One critical factor that has not been sufficiently examined is organizational culture, which may influence how effectively TQM adoption translate into performance outcomes.

Additionally, most prior studies on TQM in Nigeria such as Ofoegbu & Eromosele. (2024). Total Quality Management and Product Innovation of Manufacturing Firms in Rivers State and Sule, Ogbadu, & Nafiu. (2023). Factor Analysis of Total Quality Management Adoption by SMEs in Nigeria have focused on Southern or urban industrial regions, often neglecting the peculiar challenges and dynamics faced by firms in the North-East, such as limited access to skilled labor, weak institutional support, and volatile socio-economic conditions. This geographical bias has created a significant knowledge gap regarding the strategic role of TQM adoption in enhancing firm performance in the North-East.

However, the problem of this study will be to address the limited understanding of how the adoption of total quality management dimensions specifically top management commitment, customer focus, employee involvement, and continuous improvement affects the performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria, and how organizational culture moderates this effect. Closing this knowledge gap is critical for informing policy, improving managerial practices, and fostering a culture of quality that is aligned with the socio-cultural realities of the region.

Research Questions

The following research questions were formulated based on the objectives of the study.

i. To what extent does top management commitment affect performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?
ii. To what extent does customer focus affect performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?
iii. To what extent does employee involvement affect performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?
iv. To what extent does continuous improvement affect performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?
v. To what extent does organizational culture moderate the relationship between top management commitment and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?
vi. To what extent does organizational culture moderate the relationship between customer focus and performance of Adama beverages yola

and Mambilla beverages kaka in North-East Nigeria?

vii. To what extent does organizational culture moderate the relationship between employee improvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?

viii. To what extent does organizational culture moderate the relationship between continuous improvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria?

Research Objectives

The main objective of this study is to examine Total Quality Management Adoption on Performance of Manufacturing Firms in Northeastern Nigeria and the Moderating Role of Organizational Culture., while the specific objectives are to:

i. Assess the effect of top management commitment on the performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
ii. Evaluate the effect of customer focus on the performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
iii. Determine the effect of employee involvement on the performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
iv. Examine the effect of continuous improvement on the performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
v. Evaluate the moderating role of organizational culture in the relationship between top management commitment and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
vi. Determine the moderating role of organizational culture in the relationship between customer focus and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
vii. Ascertain the moderating role of organizational culture in the relationship between employee involvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.
viii. Examine the moderating role of organizational culture in the relationship between continuous improvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

Research Hypotheses

The following null hypotheses are developed in other to guide the study.

H_o1: Top management commitment has no significant effect on performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

Ho2: Customer focus has no significant effect on performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

Ho3: Employee involvement has no significant effect on performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

Ho4: Continuous improvement has no significant effect on performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

H_o5: Organizational culture plays no moderate role in the relationship between top management commitment and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

H_o6: Organizational culture plays no moderate role in the relationship between customer focus and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

H_o7: Organizational culture plays no moderate role in the relationship between employee involvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

H_o8: Organizational culture plays no moderate role in the relationship between tcontinuous improvement and performance of Adama beverages yola and Mambilla beverages kaka in North-East Nigeria.

Conceptual Review

Total Quality Management

Total Quality Management as one of the modern approaches to managing business organizations, based primarily on quality, through the participation of all employees at their various levels for achieving success and excellence in the long term by achieving customer and employee satisfaction at the same time (Khader, 2020). As it was defined by (Alfatlawy, et al., 2021). Total quality management emerged as one of the utmost evident essential alternatives and has since been widely implemented worldwide (Shafiq et al., 2019).

Total Quality Management Adoption

Total Quality Management (TQM) adoption refers to the process through which an organization formally integrates quality management principles, practices, and culture into its strategic and operational systems. Unlike the general concept of TQM, adoption focuses on the extent, depth, and institutionalization of quality practices within an organization. Shafiq et al. (2021) conclude that

sustainable TQM adoption requires continuous evaluation, feedback systems, and reinforcement mechanisms to prevent regression into traditional management practices.

Top Management Commitment

The concept of Top Management is represented by individuals who are at the highest administrative levels in the organization and who are primarily responsible for drawing up the general policy of the organization. It is responsible for forming work teams to implement quality plans and empowering these teams (quality circles) with broad powers in the field of achieving goals and their tools used in implementation (Samida, 2019). Decisions related to quality are considered strategic decisions; therefore, the commitment of Top Management in supporting and developing it, and activating the movement of those responsible for that are among the basic tasks which undoubtedly lead to the success of the targeted system.

Customer focus

Customer focus refers to the extent to which an organization prioritizes the identification, understanding, and satisfaction of customer needs in its strategic and operational activities. According to Antony, Sony, and McDermott (2021), customer focus involves systematic processes for gathering customer feedback, analyzing expectations, and translating these insights into product and service improvements. They emphasize that organizations that embed customer orientation into their culture achieve higher levels of competitiveness and long-term sustainability.

Employee Involvement

Employee involvement refers to the degree to which employees at all levels of an organization actively participate in decision-making, problem-solving, and continuous improvement activities. According to Antony, Sony, and McDermott (2021), employee involvement entails empowering workers with the authority, skills, and motivation required to contribute meaningfully to organizational objectives. They emphasize that sustainable quality performance can only be achieved when employees are fully engaged in improvement initiatives.

Continuous Improvement

Continuous improvement refers to the ongoing, systematic effort by an organization to enhance its products, services, and processes in order to achieve higher efficiency, quality, and customer satisfaction. According to Antony, Sony, and McDermott (2021), continuous improvement involves structured problem-solving approaches, performance measurement systems, and employee participation mechanisms that collectively drive gradual but consistent organizational advancement.

Organizational Performance

Organizational performance refers to the extent to which an organization achieves its predetermined goals efficiently and effectively. It is a multidimensional construct that reflects both financial and non-financial outcomes, including productivity, profitability, market share, customer satisfaction, operational efficiency, and employee performance. According to Antony, Sony, and McDermott (2021), organizational performance represents the measurable results of managerial practices and quality initiatives implemented within an organization. They argue that performance improvement is the primary justification for adopting Total Quality Management (TQM) practices.

Organizational Culture

Organizational Culture (OC) refers to the shared values, beliefs, norms, and practices that shape behaviors, decision-making, and overall functioning within an organization. It provides a framework for how employees interact, execute tasks, and respond to internal and external challenges. Schein (2020) defines OC as a pattern of shared basic assumptions learned by a group as it solves problems, which has proven effective enough to be considered valid and therefore taught to new members. Organizational culture influences how quality practices are implemented and sustained. Cultures that encourage adaptability, collaboration (team orientation), innovation, and performance orientation are more likely to support successful TQM implementation (Osakwe & Boateng, 2024).

Theoretical Framework

Stakeholder Theory (1983)

Stakeholder theory was propounded by Ian Mitroff (1983), an organizational theorist, in his book Stakeholders of the Organizational Mind, as cited by (Miles, 2017) that stakeholder theory is a managerial and ethical framework proposing that organizations should take into accounts the concerns and welfare of all stakeholders, rather than solely focusing on shareholders, when making decisions. Stakeholders are individuals or groups with a vested interest in the operations and results of an organization (McGrath & Whitty, 2017). The theory underscores the importance of organizations maintaining equilibrium between the wants and expectations of different stakeholders in order to attain long-term sustainability and success (Crane, 2020).

In the context of this study, Stakeholder Theory provides a foundational framework for understanding how the adoption of TQM in manufacturing firms such as Mambilla Beverages and Adama Beverages can enhance organizational performance. By aligning TQM adoption with stakeholder expectations, firms are better

positioned to improve efficiency, customer satisfaction, employee morale, and overall competitiveness.

Furthermore, the theory supports the inclusion of organizational culture as a moderating variable, as the values, beliefs, and practices within an organization influence how effectively stakeholder needs are addressed through TQM. A culture that promotes adaptability, collaboration, and learning enhances the ability of firms to respond to stakeholder demands, thereby strengthening the relationship between TQM adoption and firm performance.

Thus, Stakeholder Theory directly relates to this study by explaining why firms adopt TQM, how organizational culture influences its implementation, and why stakeholder satisfaction is essential for achieving improved performance outcomes, particularly within the socio-economic and cultural realities of North-East Nigeria.

Empirical Literature

Top Management Commitment and Organizational performance

Abdulameer and Mohammed (2024) examined the effect of top management commitment on operational performance among manufacturing firms in Iraq, with particular attention to the mediating role of green production practices. The study focused on manufacturing companies across Iraq, from which data were obtained from 219 firms using a structured questionnaire. A quantitative research design was adopted, and the data were analyzed using structural equation modeling. The findings revealed that top management commitment had a significant positive effect on operational performance, both directly and indirectly through green production. The authors recommended that manufacturing firms should strengthen leadership involvement and integrate quality and environmental initiatives into their strategic objectives to enhance performance.

In the Nigerian context, Olabimtan and Olopete (2024) assessed the relationship between Total Quality Management practices and organizational performance among construction contractors in Abuja. The study involved a population of registered construction firms, with a sample of 275 contractors selected for the survey. A quantitative research approach was employed, and data were analyzed using SmartPLS. The findings showed that top management commitment emerged as one of the most significant predictors of organizational performance among the TQM dimensions studied. Based on these findings, the authors recommended that organizations should prioritize leadership commitment in quality management implementation to sustain long-term performance improvement.

Customer Focus and Organizational Performance

Maswadeh and Al-Zumot (2020) examined the effect of Total Quality Management practices, with particular emphasis on customer focus, on organizational performance among transport companies in Jordan. The study was conducted in Jordan and targeted employees and managers of registered transport firms. Using a survey research design, data were collected from a sample of 210 respondents through structured questionnaires and analyzed using multiple regression analysis. The findings revealed that customer focus had a positive and statistically significant effect on organizational performance, particularly in terms of service quality and customer satisfaction. The study recommended that organizations should institutionalize customer-oriented policies and continuously gather customer feedback to enhance performance outcomes.

In another empirical study, Korang (2024) assessed the moderating role of organizational culture on the relationship between TQM practices, including customer focus, and project outcomes in the Electricity Company of Ghana. The study focused on employees involved in project execution within the organization. Using a descriptive and explanatory research design, data were collected from 265 respondents through questionnaires and analyzed using regression analysis. The findings showed that customer focus significantly enhanced project and organizational performance, particularly when supported by a strong organizational culture. The study recommended that public utility organizations should strengthen customer-oriented values and align internal processes with customer expectations to improve performance and service delivery.

Employee Involvement and Organizational Performance

Ibrahim and Mahmood (2023) examined "Employee Involvement and Performance Outcomes in Manufacturing Firms: A TQM Approach" in Malaysia. The study focused on manufacturing firms operating in major industrial zones, with employees forming the population of the study. A structured questionnaire was administered to a sample of 312 employees selected through stratified sampling. Using a quantitative research design, the data were analyzed through multiple regression analysis. The findings revealed that employee involvement measured through participation in decision-making, teamwork, and problem-solving had a significant and positive effect on organizational performance in terms of productivity, quality improvement, and operational efficiency. The authors recommended that manufacturing firms should institutionalize employee involvement practices as part

of their total quality management strategy to sustain long-term performance.

Psomas and Jaca (2023) conducted a study titled "Employee Involvement and Quality Improvement: Evidence from European Organizations." The research was carried out across selected European countries and targeted organizations that had adopted quality management practices. The population comprised employees and managers of these organizations, from which a sample of 287 respondents was drawn using random sampling techniques. The study employed a survey research design, and data were analyzed using structural equation modeling (SEM). The findings demonstrated that employee involvement significantly influenced organizational performance both directly and indirectly through quality improvement initiatives. The study recommended that managers should strengthen participative structures and empower employees to enhance performance outcomes.

Continuous Improvement and Organizational Performance

Oke and Adeleke (2024) conducted a study titled "Continuous Improvement Practices and Organizational Competitiveness in Nigerian Manufacturing Firms." The study was carried out in the manufacturing sector in Nigeria, focusing on established manufacturing companies operating in key industrial regions. The population comprised production supervisors, quality managers, and operations personnel, from which a sample of 280 respondents was selected using stratified random sampling. A quantitative research design was employed, and data were collected through structured questionnaires. The data were analyzed using regression analysis to determine the effect of continuous improvement practices on organizational performance indicators such as efficiency, cost reduction, and product quality. The findings revealed that continuous improvement practices had a positive and significant impact on performance outcomes, particularly in operational efficiency and competitive advantage. The authors recommended that manufacturing firms institutionalize continuous improvement programs, including employee training and systematic feedback mechanisms, to sustain performance gains.

Korang (2024) explored the effect of TQM practices, including continuous improvement, on project outcomes and firm performance in "Organizational Culture as a Moderator between TQM Practices and Project Outcomes." The study was carried out in the electricity sector of Ghana, focusing on employees involved in project management and operational activities. The population included project managers, engineers, and administrative staff, with a sample of 265 respondents obtained via simple random sampling. A descriptive and explanatory research design was adopted, and data were analyzed using regression analysis. The study revealed that continuous improvement practices had a significant positive effect on project performance and broader organizational outcomes, especially when supported by a positive organizational culture. The authors recommended that utilities and similar firms embed continuous improvement into daily routines and performance evaluation systems to sustain long-term performance improvements.

Moderating Role of Organizational Culture on the Relationship between TQM adoption and Organizational Performance

Korang (2024) investigated TQM practices such as continuous improvement, customer focus, and employee involvement within the Electricity Company of Ghana. The study targeted engineers, project managers, and operations staff, with a sample of 265 respondents selected through stratified random sampling. Using regression analysis, the study found that organizational culture significantly strengthened the positive effects of TQM practices on organizational performance. The study recommended that firms cultivate cultures that promote learning, openness, and continuous improvement to maximize the benefits of TQM.

Similarly, Shuaiba and He (2024) explored Nigerian small and medium-sized enterprises (SMEs) to examine how organizational culture influences the relationship between TQM adoption and performance outcomes, including innovation, productivity, and market responsiveness. The population consisted of SME owners, managers, and quality coordinators, and 318 respondents were surveyed using structured questionnaires. Structural Equation Modeling revealed that SMEs with flexible, participative cultures experienced significantly higher performance improvements from TQM adoption than those with rigid, hierarchical cultures. The authors recommended that SMEs foster cultural values emphasizing flexibility, employee empowerment, and innovation to enhance TQM's effectiveness.

METHODOLOGY

Research Design

This study adopted a cross-sectional survey research design. The design is appropriate for obtaining quantifiable data from a large population and establishing relationships among variables such as Total Quality Management (TQM) adoption, firm performance and organizational culture. The study seeks to test formulated hypotheses using statistical techniques, thereby necessitating the collection of primary data through structured questionnaires.

Area of the Study

The study was conducted in Taraba and Adamawa States, focusing on Mambilla Beverages Nigeria Limited and Adama Beverages Limited, respectively. Mambilla Beverages Nigeria Limited is located in Kakara Village, Sardauna Local Government Area of Taraba State. It produces highland tea and other beverages. Its geographical coordinates are approximately Latitude 6.7256° N, Longitude 11.2880° E. Adama Beverages Limited is situated in Jimeta, Yola North Local Government Area of Adamawa State. The company is known for producing bottled water and fruit juices. Its geographical coordinates are approximately Latitude 9.3051° N, Longitude 12.4884° E. These two firms are chosen because they represent the structured manufacturing sector in North-East Nigeria and are suitable for studying the interplay of TQM adoption, organizational culture, and performance.

Population of the Study

The population of the study comprises of the entire workforce of the two selected firms: Mambilla Beverages Nigeria Limited consists of 189 employees, as reported by the company's management in 2025 (Ansho, Sunday, & Akpusugh, 2024), while Adama Beverages Limited through its Human Resources Department reported that there are 452 employees, (Bala, Nyaga &Moses, 2025). These figures confirmed from each firm's human resource department during field entry. Therefore, the total population of the study is 641 employees of both manufacturing firms.

Determination of Sample Size

The sample size for this study was determined using the Taro Yamane (1967) formula, which provides a simplified method for calculating sample size from a finite population. The formula is expressed as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n= required sample size

N= total population

e= level of precision (0.05 at 95% confidence level)

For this study, the total population is 641, and the margin of error is 5% (0.05).

Substituting into the formula:

$$n = \frac{641}{1 + 641(0.05)^2}$$

$$0.05^2 = 0.0025$$

$$641 \times 0.0025 = 1.6025$$

$$1 + 1.6025 = 2.6025$$

$$n = \frac{641}{2.6025} \approx 246$$

Therefore, the computed sample size is 246 respondents.

Proportional Distribution of Sample

To ensure fair representation of each organization, proportional allocation was applied using:

$$n_i = \frac{N_i}{N} \times n$$

Where:

n_i= sample allocated to each organization

N_i= population of each organization

N= total population (641)

n= total sample size (246)

Assuming the population distribution is:

Organization A = 452

Organization B = 189

Adama Beverages:

$$n_1 = \frac{452}{641} \times 246 \approx 173$$

Mambilla Beverages:

$$n_2 = \frac{189}{641} \times 246 \approx 73$$

Thus, a total sample of 246 respondents was proportionally distributed to ensure adequate representation of the study population.

Sampling Technique and Method

This study adopted a proportionate stratified random sampling technique to select respondents from the study population. Since the population comprises employees from two different organizations, stratification was necessary to ensure that each organization was adequately represented in the sample according to its size.

Within each stratum, simple random sampling was used to select individual respondents. This method gave every employee within each organization an equal and independent chance of being selected. Random selection was achieved through staff lists provided by the organizations, from which respondents were chosen using randomization procedures.

Instrument for Data Collection

The primary instrument for data collection was a structured questionnaire designed to measure the dimensions of TQMA, Organizational Performance and organizational culture. The questionnaire used a 5-point Likert scale ranging from "Strongly Disagree (1)" to "Strongly Agree (5)".

Validity of the Instrument

To ensure content and face validity, the questionnaire was reviewed my supervisor, co-supervisor and experts in Total Quality Management, Human Resource Management, and Organizational Studies. Adjustments

were made based on feedback to improve clarity and relevance.

Reliability of the Instrument

The Cronbach Alpha method was used to find out how reliable the study's tool was. The suggested level of 0.7 was used for this (Fraenkel & Wallen, 1993). Because of this, the device was thought to be good enough to use and very stable if the above conditions were met. However, the reliability test was conducted as pre-test to examine the reliability of the data collected for all the variables of study using the Cronbach Alpha statistical procedure in SPSS version 27 and the result is presented in Table 1.

Analytical Techniques

This study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4.0 software to analyze the data. PLS-SEM was considered suitable for this research because it can effectively handle complex models involving multiple constructs, moderating effects, and both reflective and formative indicators, even when the sample size is relatively small to medium (Hair et al., 2021; Ali et al., 2022).

Decision Rule and Model Specification

Hypotheses were tested at a 5% level of significance ($\alpha = 0.05$). The decision rule is: If p-value ≤ 0.05, reject the null hypothesis (significant) and If p-value > 0.05, fail to reject the null hypothesis (not significant)

A structural model was specified as:

Model Specification

Data Analysis

Let:

FP = Firm Performance

TMC = Top Management Commitment

CF = Customer Focus

EI = Employee Involvement

CI = Continuous Improvement

OC = Organizational Culture (moderator)

β_0 = Intercept

$\beta_1 – \beta_4$ = Coefficients of main effects

$\beta_5 – \beta_8$ = Coefficients of interaction effects (moderation)

ε = Error term

Main Effect Model (Without Moderation):

$FP=\beta0+\beta1TMC+\beta2CF+\beta3EI+\beta4CI+\varepsilon$

This model tests hypotheses H_0i to H_0iv.

Moderation Model (With Interaction Terms):

$FP=\beta0+\beta1TMC+\beta2CF+\beta3EI+\beta4CI+\beta5(TMC\times OC)+\beta6(CF\times OC)+\beta7(EI\times OC)+\beta8(CI\times OC)+\varepsilon$

This model tests hypotheses H_0v to H_0viii, examining how organizational culture moderates TQM dimension on firm performance.

DATA ANALYSIS AND DISCUSSION

The study examined the effect of Total Quality Management adoption (TQMA) dimensions such as; Top Management Commitment (TMC), Customer Focus (CF), Employee Involvement (EI), and Continuous Improvement (CI) on Organizational Performance (P), with Organizational Culture (OC) modeled as a moderator. A total of 239 valid observations were included in the final model estimation.

Table 1: Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability	AVE
Customer Focus	0.911	0.931	0.693
Continuous Improvement	0.933	0.946	0.715
Employee Involvement	0.884	0.912	0.633
Organizational Culture	0.925	0.941	0.695
Organizational Performance	0.884	0.910	0.591
Top Management Commitment	0.888	0.913	0.599

Source: Field survey, 2026

All constructs exceed the recommended threshold of 0.70 for both Cronbach's alpha and composite reliability, confirming strong internal consistency. Continuous Improvement demonstrates the highest reliability ($\rho c = 0.946$), indicating exceptionally consistent responses across its indicators. These findings confirm that the measurement scales used in this study are statistically reliable and internally coherent.

Hypotheses Testing

Table 2: Coefficient of Determination R^2

Endogenous Construct	R^2	Adjusted R^2
Organizational Performance	0.923	0.920

Source: Field survey, 2026

The model explains 92.3% of the variance in performance. This is exceptionally high and indicates strong predictive power. However, such magnitude may partly result from multicollinearity among predictors. The R^2 value for Organizational Performance is 0.923, with an adjusted R^2 of 0.920. This indicates that 92.3% of the variance in

Organizational Performance is explained by the predictor variables. According to established guidelines, R^2 values above 0.75 are considered substantial. Therefore, the model demonstrates exceptionally strong explanatory power.

Table 3: Direct Effects (Path Coefficients)

Path	B	f^2
TMC → P	0.779	1.196
CI → P	0.316	0.256
CF → P	0.251	0.052
EI → P	-0.021	0.001
OC → P	-0.302	0.061

Source: Field survey, 2026

Table 4: Moderation Analysis

Interaction effects were examined to assess the moderating role of Organizational Culture.

Interaction	B	f^2
OC × TMC → P	0.035	0.003
OC × CF → P	-0.028	0.002
OC × EI → P	0.007	0.000
OC × CI → P	0.020	0.001

Source: Field survey, 2026

Model Fit

The SRMR (Standardized Root Mean Square Residual) value is 0.078. Since SRMR is below the recommended threshold of 0.08, the model demonstrates acceptable overall fit.

DISCUSSION OF FINDINGS

The discussion of findings is based on the objectives of the study.

Top Management Commitment and Organizational Performance

The findings of this study revealed that Top Management Commitment (TMC) has a very strong positive effect on organizational performance ($\beta = 0.779$, $f^2 = 1.196$). This indicates that leadership commitment is the most influential predictor of performance among all the TQM dimensions examined. The finding is consistent with the study of Abdulameer and Mohammed (2024), who found that top management commitment significantly enhanced operational performance among manufacturing firms in Iraq. Similarly, the finding agrees with Olabimtan and Olopete (2024), who reported that top management commitment was one of the strongest predictors of organizational performance among construction firms in Abuja, Nigeria. The consistency of these findings suggests that regardless of industry or geographical location, leadership commitment remains a critical success factor for effective TQM implementation and superior organizational performance.

Continuous Improvement and Organizational Performance

The study further revealed that Continuous Improvement (CI) has a positive and moderate effect on organizational performance ($\beta = 0.316$, $f^2 = 0.256$). This indicates that organizations that continuously review, refine, and improve their processes are likely to experience better operational efficiency, product quality, and overall performance. This finding is in agreement with Oke and Adeleke (2024), who found that continuous improvement practices significantly enhanced organizational competitiveness and performance among Nigerian manufacturing firms. The result is also consistent with Korang (2024), who found that continuous improvement positively influenced project performance and organizational outcomes in the Electricity Company of Ghana. The similarity between these findings suggests that continuous improvement remains a fundamental element of TQM that enables organizations to identify operational inefficiencies, eliminate waste, and achieve sustainable performance improvements.

Customer Focus and Organizational Performance

The findings showed that Customer Focus (CF) positively influences organizational performance ($\beta = 0.251$, $f^2 = 0.052$), although the magnitude of the effect is relatively smaller compared to top management commitment and continuous improvement. This result suggests that organizations that prioritize customer needs, gather customer feedback, and align their products and services with customer expectations are likely to achieve better performance outcomes. The finding is consistent with Maswadeh and Al-Zumot (2020), who found that customer focus had a significant

positive effect on organizational performance among transport companies in Jordan. Similarly, the result supports the findings of Korang (2024), who reported that customer focus significantly enhanced project and organizational performance in the Electricity Company of Ghana. The consistency of these findings suggests that customer-oriented organizations are better positioned to understand market demands and respond effectively to customer expectations.

Employee Involvement and Organizational Performance

Contrary to expectations, the study found that Employee Involvement (EI) has a negligible negative effect on organizational performance ($\beta = -0.021$, $f^2 = 0.001$). This result indicates that employee involvement did not significantly contribute to performance within the context of the study. The finding suggests that employee participation mechanisms may not be effectively implemented or may exist only at a superficial level without granting employees meaningful authority in decision-making and problem-solving processes.

This finding contradicts the study of Ibrahim and Mahmood (2023), who reported that employee involvement significantly improved organizational performance in Malaysian manufacturing firms through enhanced productivity, teamwork, and operational efficiency. The result also disagrees with Psomas and Jaca (2023), whose study across European organizations found that employee involvement positively influenced organizational performance through quality improvement initiatives. The disparity between the current finding and previous studies may be attributed to contextual differences. In many developing-country manufacturing environments, organizational structures are often highly centralized, limiting employees' participation in decision-making. Additionally, involvement initiatives may be symbolic rather than substantive, thereby reducing their potential impact on performance. Therefore, while previous studies support the positive role of employee involvement, the current findings suggest that employee participation alone may not improve performance unless it is accompanied by genuine empowerment, delegation of authority, and supportive organizational systems.

Organizational Culture and Organizational Performance

The study found that Organizational Culture (OC) has a negative direct effect on organizational performance ($\beta = -0.302$, $f^2 = 0.061$). This finding appears unexpected because organizational culture is generally considered a positive driver of organizational effectiveness. However, the negative coefficient may not necessarily indicate that culture adversely affects performance. Rather, it may be a statistical suppression effect resulting from the high interrelationships among the predictor variables included in the model. This situation often occurs in multivariate analyses where culture shares substantial variance with other TQM dimensions.

Although no direct empirical study among those reviewed reported a negative effect of organizational culture on performance, the finding differs from Korang (2024), who emphasized that a supportive organizational culture positively influences organizational outcomes by facilitating the implementation of TQM practices. It also contradicts Shuaiba and He (2024), who found that participative and flexible organizational cultures enhanced performance among Nigerian SMEs. The result suggests the need for further investigation into the nature of cultural dimensions operating within the studied organizations.

Moderating Role of Organizational Culture on the Relationship between TQM Dimensions and Organizational Performance

The moderation analysis revealed that organizational culture does not significantly moderate the relationships between TQMA dimensions and organizational performance. All interaction effects were extremely small, including OC × TMC → P ($\beta = 0.035$, $f^2 = 0.003$), OC × CF → P ($\beta = -0.028$, $f^2 = 0.002$), OC × EI → P ($\beta = 0.007$, $f^2 = 0.000$), and OC × CI → P ($\beta = 0.020$, $f^2 = 0.001$). Furthermore, the effect sizes were substantially below the recommended threshold of 0.02, indicating negligible moderation effects. This suggests that variations in organizational culture do not significantly strengthen or weaken the effects of top management commitment, customer focus, employee involvement, or continuous improvement on organizational performance.

This finding contradicts the study of Korang (2024), which found that organizational culture significantly strengthened the relationship between TQM practices and project outcomes in the Electricity Company of Ghana. Korang argued that a supportive culture characterized by learning, openness, and collaboration amplified the effectiveness of TQM initiatives. Similarly, the result disagrees with Shuaiba and He (2024), who found that organizational culture significantly enhanced the impact of TQM adoption on innovation, productivity, and market responsiveness among Nigerian SMEs. Their study concluded that organizations with flexible and participative cultures derived greater performance benefits from TQM implementation than organizations with rigid cultures.

The inconsistency between the present findings and previous studies may be due to contextual and organizational differences. It is possible that the

organizations investigated in this study possess relatively homogeneous cultural characteristics, thereby limiting the variability necessary to produce a moderating effect. Another possible explanation is that TQMA may already be sufficiently institutionalized, making their effectiveness less dependent on cultural conditions. Consequently, while organizational culture remains an important organizational attribute, the findings suggest that it does not significantly alter the relationship between TQM adoption and organizational performance within the context of the present study.

Conclusions

Based on the findings of this study, it can be concluded that leadership commitment is the cornerstone of Total Quality Management (TQM) effectiveness in manufacturing firms in North-East Nigeria. Firms where management demonstrates active involvement, strategic guidance, and resource allocation consistently achieve higher operational efficiency, improved quality outcomes, and enhanced competitiveness. This underscores that the role of top management is fundamental in driving organizational performance.

The study further establishes that Continuous Improvement functions as the operational driver of performance, working hand-in-hand with strategic leadership. By ensuring that processes are systematically refined, monitored, and executed efficiently, continuous improvement translates strategic intent into measurable operational gains.

Customer Focus also contributes positively to organizational performance, particularly by aligning services and operations with client expectations. However, its effect is relatively smaller compared to the influence of leadership commitment and continuous improvement, indicating that customer-oriented practices are supportive rather than primary drivers of performance outcomes.

Interestingly, Employee Involvement alone does not significantly enhance performance in the studied firms. This suggests that employee participation may be limited in scope or symbolic unless it is reinforced by strong leadership, well-structured participation mechanisms, and meaningful empowerment systems.

While Organizational Culture is theoretically important, the study finds that it does not significantly moderate the relationship between TQM dimensions and organizational performance within the context of North-East Nigerian manufacturing firms. This implies that when leadership is strong and TQM practices are institutionalized, cultural factors may play a less pronounced role in shaping performance outcomes.

Recommendations

Based on the findings of this study, the following recommendations are proposed for Adama Beverages Yola, Mambilla Beverages Kaka, and similar manufacturing firms in North-East Nigeria:

i. Firms should prioritize active and visible leadership commitment to quality management. Top executives must provide strategic direction, allocate adequate resources, and champion TQM initiatives. Even though organizational culture showed minimal moderating effects, strong leadership remains the most decisive factor in driving performance.

ii. Organizations should institutionalize mechanisms for continuously understanding and meeting customer needs. This includes collecting and analyzing customer feedback, aligning operations with client expectations, and integrating customer-oriented policies into strategic decision-making. While culture did not significantly moderate this relationship, reinforcing customer-centric values through internal norms may enhance responsiveness.

iii. Firms should create structured participation systems that allow employees to contribute meaningfully to decision-making, problem-solving, and quality improvement initiatives. Empowerment programs, training, and participative management approaches should be implemented to ensure employee involvement positively impacts organizational performance.

iv. Manufacturing firms should adopt systematic continuous improvement practices, including process reviews, performance monitoring, error reduction systems, and training programs. While organizational culture had limited moderating effects, embedding improvement practices into daily operations ensures sustained operational efficiency and product quality.

v. Although the study found minimal moderating effects of culture, firms are encouraged to maintain a supportive, learning-oriented, and flexible culture. Such a culture can complement leadership, customer focus, employee involvement, and continuous improvement, particularly as TQM initiatives mature and expand.

vi. Firms should implement TQM dimensions holistically, recognizing the interdependence of leadership, customer focus, employee involvement, and continuous improvement. Synergistic application of these dimensions is likely to maximize organizational performance.

vii. Firms should periodically evaluate the effectiveness of TQM practices to identify gaps, assess the alignment between leadership, employee practices, and customer needs, and adjust strategies accordingly to sustain high performance outcomes.

viii. Given the unique operational and cultural context of North-East Nigerian manufacturing firms, organizations should adapt global TQM best practices to local realities, ensuring practical implementation that considers resource constraints, workforce characteristics, and market conditions.

ix.

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