Total Quality Management Practices and Operational Performance of Table Water Producers in Edo State

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ABSTRACT
This study examined the impact of Total Quality Management (TQM) practices on the operational performance of table water manufacturing firms in Edo State, Nigeria. The research specifically assessed the relationships between lean production, leadership, benchmarking, customer relationship management (CRM), and operational outcomes. Adopting a survey research design, the population consisted of managers from registered table water production firms, with a valid sample size of 446 respondents. Data were gathered using structured questionnaires and analysed through descriptive and inferential statistical techniques via SPSS Version 24.0. The findings revealed that lean production, leadership, and CRM had statistically significant and positive effects on operational performance. Although benchmarking exhibited a positive correlation, it was not statistically significant. Among the examined TQM constructs, CRM demonstrated the strongest influence on performance. The study further established a robust overall correlation between TQM practices and operational performance, with regression analysis confirming TQM as a significant predictor of operational efficiency. Consequently, it is recommended that table water producers prioritise CRM, strengthen lean production processes, and enhance leadership capacity to improve performance outcomes. Additionally, continuous improvement through strategic adoption of TQM should be promoted across the industry.

Keywords: *Total Quality Management, Operational Performance, Table Water Industry, Customer Relationship Management, Edo State*

INTRODUCTION
In today's global economy, intensified competition and rising customer expectations compel firms to pursue operational excellence as a strategic priority. Studies confirm that organizations in emerging economies, including Nigeria, increasingly face market pressures that demand improvements in product quality, efficiency, and customer responsiveness to ensure survival and competitiveness (Nguyen & Ngo, 2021; Khan & Naeem, 2022). For manufacturing sectors such as Nigeria's table water industry, these pressures are acute, given the dual challenge of meeting consumer health standards and delivering cost efficiency in a fragmented market (Obi, Adesanya, & Akinsola, 2023). A widely adopted framework for achieving operational excellence is Total Quality Management (TQM). Conceptually, TQM is a holistic philosophy that integrates leadership commitment, employee participation, process improvement, and customer-centricity to drive sustained performance (Al-Dhaafri & Al-Swidi, 2022). Contemporary studies show that TQM has evolved into a broader framework that incorporates lean practices, sustainability, and digital quality management systems, aligning with modern supply chain demands (Ferreira & Lopes, 2021; Hassan et al., 2022). Scholars emphasize that beyond traditional quality control, TQM increasingly supports firms in enhancing resilience and adaptability under uncertainty, particularly in industries facing regulatory and health-related scrutiny (Sahoo & Yadav, 2022).

Empirical research continues to validate the positive impact of TQM on operational performance across diverse contexts. For instance, recent studies in South Asia and Africa demonstrate significant gains in efficiency, customer satisfaction, and profitability from implementing TQM practices (Egwakhide & Osazevbaru, 2021; Jermsittiparsert et al., 2021). Operational performance, often measured through productivity, cost reduction, and service quality, is shown to improve where lean systems, benchmarking, and strong leadership are in place (Akinwale & Adepoju, 2022). However, in the Nigerian table water industry, evidence suggests persistent operational weaknesses, including poor product quality, inadequate packaging, and weak customer engagement (Afolabi & Oladimeji, 2021; Obi et al., 2023). These shortcomings undermine consumer trust and contribute to the spread of waterborne diseases such as typhoid and dysentery (WHO, 2022). The absence of lean production systems, limited benchmarking practices, and inconsistent leadership commitment further constrain operational efficiency. Yet, these same dimensions if properly embedded have been shown elsewhere to significantly enhance performance outcomes (Khan & Naeem, 2022). Although TQM has been extensively studied in manufacturing and service sectors globally, research specific to Nigeria's water industry remains limited. Existing works often explore the general relationship between TQM and overall organizational performance (Adeyeye, 2013; Agbo, 2020; Omoregbe & Umemezia, 2020), but rarely isolate its operational dimensions. This gap underscores the need for industry-specific analysis, especially as the Nigerian context is shaped by infrastructural deficits, regulatory gaps, and socio-economic conditions that differ markedly from other countries.

Accordingly, this study investigates the extent to which table water producers in Edo State adopt four critical dimensions of TQM lean production, leadership, benchmarking, and customer relationship management and how these practices influence operational performance. By focusing on sector-specific challenges and opportunities, the study contributes to filling the empirical and theoretical gap in understanding TQM's role in enhancing efficiency and customer satisfaction within Nigeria's water sector.

CONCEPT OF PERFORMANCE

In organisational settings, performance refers to the extent to which tasks are accomplished in line with predefined standards or benchmarks (Yucesoy & Barabasi, 2016; Mahmudova & Kovacs, 2018; Edobor & Umemezia, 2021). It reflects not only the outcomes achieved but also the processes undertaken to reach them. According to Shaibu (2014), performance is the cumulative result of coordinated efforts carried out within a clearly defined mission and objectives. Edobor and Umemezia (2021) further emphasise that performance is characterised by three dimensions: it encompasses both procedures and outcomes, it is purpose-driven through strategic alignment, and it cuts across multiple operational areas of an organisation. Performance evaluation therefore serves a crucial role in determining whether organisational goals are being met. Scholars typically distinguish between financial and non-financial indicators of performance (Shaibu, 2014; Mahmudova & Kovacs, 2018). Although financial measures such as profitability and return on investment remain widely used (Anning-Dorson, 2018), non-financial metrics particularly operational performance are increasingly valued for offering a broader perspective on organisational effectiveness (Al-Hakim & Yu, 2017; Zakiah & Nurazwa, 2020).

Operational performance, in particular, concerns how organisational activities contribute to efficiency and effectiveness (Gorbach, 2018). As Rouse (2009) and Das (2019) note, it involves aligning and integrating departmental functions with overall strategic objectives. Similarly, Azim and Ahmed (2015) describe it as measurable process outcomes, which may include cycle time, reliability, and inventory turnover. The main purpose of operational performance assessment is to determine how effectively internal systems, assets, and human capital are deployed to reduce costs and minimise risks (Praxie, 2021). There is no single universal metric for evaluating operational performance; instead, assessment frameworks are often context-specific and tailored to industry needs. Commonly applied indicators include product quality, cost efficiency, delivery speed, reliability, waste minimisation, flexibility, and timeliness (Birech, 2011; Voss, Ahlstrom & Blackmon, 2012; LaMarco & Seidel, 2019; Zakiah & Nurazwa, 2020). Fundamentally, operational performance arises from sound operations management, which entails the efficient use of resources to transform inputs into valuable outputs (Das, 2019). Several dimensions are central to this concept. Product quality is defined as the

ability of goods or services to meet customer requirements and remain defect-free (Zakiah & Nurazwa, 2020). Reliability refers to consistency in meeting customer expectations over time (Wang & Wang, 2006). Delivery performance measures the timeliness of product delivery from order to fulfilment and is often associated with just-in-time practices (Bask et al., 2009; Azim et al., 2015). In addition, operating costs represent the expenses incurred in day-to-day operations and maintenance (Murphy, 2021), while productivity reflects how efficiently resources are utilised to produce outputs (ILO, 2005; Nwannebuife, 2017). As Qureshi (2007) and Iqbal et al. (2018) argue, productivity integrates both efficiency and effectiveness, indicating the extent to which resources are deployed optimally to achieve results.

TOTAL QUALITY MANAGEMENT

Earlier studies conceptualised Total Quality Management (TQM) through some lenses such as "factors" (Douglas & Judge, 2001), "principles" (Marrow, 1997), and even "organisational culture" (Kanji & Wallace, 2000) thus highlighting its multidimensional nature. Integrating these viewpoints, TQM may be seen as a holistic management philosophy aimed at achieving continuous improvement across all organisational functions. Its core purpose is to deliver superior products and services that meet or exceed customer needs more effectively, efficiently, and safely than competitors, through collective involvement led by top management (Al-Qudah, 2012; Adam & Anderson, 2020). As a strategic initiative, TQM enhances organisational systems and processes to drive better operational performance (Jabeen & Mahmood, 2014; Esiaba, 2016). When properly executed, its benefits include lower production costs, stronger employee commitment, improved supplier relations, and enhanced operational and overall business outcomes (Esiaba, 2016; Adams & Anderson, 2020). Importantly, TQM is not a one-time project but a continuous improvement effort requiring active participation across all levels of the organisation.

Lean Production

The concept of lean is fundamentally centred on improving operational efficiency by identifying and eliminating waste from processes. Its primary objective is to eliminate non-value-adding activities so that resources are directed toward enhancing customer value (Hallam, 2019; Siddiqui, 2021). In this sense, lean represents a customer-driven philosophy that simultaneously reduces waste and creates value. Within manufacturing systems, lean practices streamline production by eliminating inefficiencies, thereby ensuring customers receive higher quality, lower-cost, and more responsive services (Monarch, 2016).

Leadership

Leadership has long been recognised as a decisive factor in shaping organisational culture and performance. Within the context of Total Quality Management (TQM), leadership is viewed as the cornerstone that determines the extent to which quality principles are embedded across organisational systems (Oakland, 2014). Effective leadership provides the vision, strategic direction, and commitment necessary for fostering a culture of continuous improvement (Laureani & Antony, 2017). By clearly communicating objectives, empowering employees, and encouraging participation, leaders create an environment in which TQM can flourish.

In TQM research, leadership is consistently emphasised as a driving force for quality-oriented change, largely because of its role in influencing employee motivation and organisational alignment (Dubey & Gunasekaran, 2015). Leaders serve not only as decision-makers but also as role models who set behavioural standards, encourage open communication, and ensure accountability. These functions are critical in establishing the trust and engagement necessary for continuous improvement (Zehir et al., 2012). Empirical evidence demonstrates that leadership positively impacts operational performance by strengthening innovation capacity, enhancing adaptability, and improving customer satisfaction (Hietschold, Reinhardt, & Gurtner, 2014; Calvo-Mora et al., 2018).

Benchmarking

Benchmarking is increasingly recognised as a strategic performance management tool that enables organisations to align their processes with industry best practices and close performance gaps. It involves

systematically comparing an organisation's products, services, and processes against those of top-performing firms, identifying superior methods, and adapting them internally to enhance efficiency and competitiveness (Camp & Brauch, 2018; Sarkis & Zhu, 2018). In this sense, benchmarking is not simply a measurement exercise but a learning mechanism that promotes continuous improvement and innovation. Recent studies highlight benchmarking's role in strategic renewal and organisational learning. By exposing firms to external best practices, benchmarking encourages the questioning of outdated methods and the adoption of more efficient and innovative approaches (Yilmaz & Flouris, 2017; Reddy & Rao, 2020). This process is particularly important in environments of rapid technological change, where organisations must remain adaptive and responsive to market shifts. For instance, digital benchmarking initiatives now allow firms to compare real-time performance indicators using big data and analytics, significantly reducing inefficiencies and accelerating knowledge transfer (Benková et al., 2020; Lin et al., 2022). Benchmarking can be categorised into multiple forms internal (within the same organisation), competitive (against rivals), industry (within the same sector), and generic (across unrelated industries). Regardless of the form, the benchmarking cycle typically includes performance measurement, gap identification, adaptation of best practices, and continuous reassessment (Anand & Kodali, 2008; Benková et al., 2020). The strength of benchmarking lies in its ability to facilitate evidence-based decision-making, allowing firms to evaluate progress systematically and refine their strategies for long-term competitiveness (Lin et al., 2022).

Customer Relationship Management

Customer relationship refers to an organisation's capacity to anticipate, respond to, and fulfil client needs in a timely and effective manner (El-Annan, Haidoura, Shatila & Alozian, 2020). Within the Total Quality Management (TQM) framework, this dimension is not limited to transactional service delivery but extends to building long-term relational value through trust, responsiveness, and continuous improvement. Customer Relationship Management (CRM) formalises this by integrating management commitment, cross-functional collaboration, and open communication channels aimed at ensuring customer satisfaction and loyalty (Holmberg, 2015; Chatterjee, Rana, & Dwivedi, 2021). At its core, CRM seeks to retain and nurture customers by creating strong, profitable, and sustainable relationships. Contemporary scholars describe CRM as a strategic, cross-functional process designed to personalise customer interactions across multiple touchpoints, leverage data analytics for segmentation, and deliver superior value that drives both customer retention and business performance (Buttle & Maklan, 2019; Chatterjee et al., 2021). This aligns with earlier conceptualisations of CRM as a continuous dialogue with customers, with tailored treatment for high-value segments (Su et al., 2010).

Theoretical Underpinning

Systems theory, first introduced by Von Bertalanffy (1968), explains that a system is made up of interdependent elements whose behaviours differ when examined individually compared to when they interact collectively (Mele, Pels & Polese, 2010; Teeboom, 2018). The theory stresses the importance of these interactions, noting that the outcomes produced through collaboration are distinct from those generated by single components acting alone (Teeboom, 2018). Systems can be categorised as open, closed, or isolated. Open systems interact with their external environment, closed systems function without external influence, and isolated systems remain completely detached (Mele et al., 2010). Of these, open systems have attracted the most scholarly attention (Katz & Khan, 1978), leading to the development of the open system theory. This approach suggests that organisations succeed by maintaining constant exchanges with their environment, adapting to external requirements to build and sustain capabilities (Mele et al., 2010; Teeboom, 2018). Inputs from the environment are transformed into outputs, enabling organisational sustainability through adaptability. Open systems display characteristics such as homeostasis, self-regulation, equilibrium, autopoiesis, and equifinality (Mele et al., 2010). These features allow them to stay balanced, adjust internally, and achieve results through different possible pathways. Such flexibility equips organisations to respond effectively to both challenges and opportunities in their operating environment (Daft, 2001). This study adopts open systems theory as its guiding framework, given its close connection with Total Quality Management (TQM). Both emphasise continuous learning, adaptability, and ongoing improvement as key

strategies for meeting evolving customer needs and expectations (Shiba, Graham & Walden, 1993).

Empirical Review

Studies on quality management and lean practices consistently demonstrate their positive impact on organisational performance. In manufacturing-intensive contexts such as the Indian process and automobile industries, lean principles including just-in-time purchasing, process standardisation, and quality management have been shown to improve productivity, reduce costs, and optimise inventory management (Yadav, Jain, & Mittal, 2020; Sharma & Modgil, 2022). Similar evidence from Pakistan and Indonesia highlights that Total Quality Management (TQM) practices particularly continuous improvement, customer orientation, and leadership commitment significantly enhance competitiveness in textiles and food SMEs (Khan & Naeem, 2022; Sutrisno & Timotius, 2019). These findings underline that the benefits of TQM extend beyond efficiency, shaping innovation and long-term adaptability. Leadership, a critical dimension of TQM, has been widely recognised as a determinant of organisational success. Recent studies show that participatory, transformational, and servant leadership styles foster higher productivity, innovation, and employee commitment, whereas transactional approaches may limit long-term gains (Calvo-Mora et al., 2018; Alqatawenh, 2018; Dubey & Gunasekaran, 2015). Empirical work in Nigeria and the UAE further affirms that leadership styles oriented toward empowerment and inclusivity strengthen operational and business outcomes (Ibrahim & Daniel, 2019; Obiora & Iwuanyanwu, 2021). Benchmarking has also been established as a performance enabler by providing firms with opportunities to learn from best-in-class practices. Empirical evidence from both the public and private sectors demonstrates that benchmarking drives competitive advantage, profitability, and service innovation by reducing inefficiencies and creating measurable performance standards (Benková et al., 2020; Silva, Gomes, & Lopes, 2021). Equally, Customer Relationship Management (CRM) has been shown to improve business performance by fostering loyalty, trust, and communication with clients. Studies across Nigerian banks and SMEs report that effective CRM practices, particularly enquiry handling, responsiveness, and customer engagement contribute to higher satisfaction and operational efficiency (Josiah & Nkamere, 2019; Chatterjee, Rana, & Dwivedi, 2021). With the integration of digital platforms, CRM has become increasingly strategic, enabling real-time interaction and predictive customer analytics (Nguyen, Simkin, & Canhoto, 2020). Overall, the literature positions TQM as a strategic tool for achieving operational excellence and competitiveness across diverse sectors and geographies (Sony, Antony, & Douglas, 2020; Omoregbe & Umemezia, 2020). However, in Nigeria's table water industry, persistent challenges remain. Problems such as poor product quality, weak management systems, and recurring customer dissatisfaction suggest that TQM adoption is often fragmented or superficial (Bello & Dalibi, 2017; Mohammed & Dansobo, 2018). These gaps highlight the need for context-specific research on how TQM practices, particularly lean production, leadership, benchmarking, and CRM, influence the operational performance of table water firms in Edo State.

METHODOLOGY

This study adopted a survey research design to examine the link between total quality management (TQM) practices and operational performance in table water firms in Edo State. The design integrated both quantitative and qualitative elements, allowing systematic investigation of prevailing practices and managers' perceptions. Primary data were obtained from production and marketing managers, who play key roles in operational processes.

The study population consisted of 223 registered firms under the Association of Table Water Producers (ATWAP), Edo State, as of December 2024. From each firm, two top managers were purposively selected, resulting in a sample of 446 respondents. Data were collected using a structured, closed-ended questionnaire developed in line with the study objectives. Content and face validity were ensured through expert review, while reliability was confirmed with a pilot test involving 20 respondents outside the main sample. Cronbach's Alpha values indicated strong internal consistency across the constructs: Lean Production (0.835), Leadership (0.709), Benchmarking (0.724), Customer Relationship Management (0.753), and Operational Performance (0.801), all exceeding the 0.70 threshold.

Model specification

In order to capture the effect of total quality management practices on operational performance among table water producers, a multiple regression model was adapted. Variables included in the model were derived from the questionnaire.

Expressing the equation in functional form:

$$OPF = f(LNP, LDS, BMK, CRM) \quad (1)$$

In its linear mathematical form, the model becomes:

$$OPF = \alpha_0 + \alpha_1 LNP + \alpha_2 LDS + \alpha_3 BMK + \alpha_4 CRM + \varepsilon \quad (2)$$

Where:

OPF = Operational Performance
LNP = Lean Production
LDS = Leadership
BMK = Benchmarking
CRM = Customer Relationship Management
α_0 = Intercept
$\alpha_1 - \alpha_4$ = Coefficients of the independent variables
ε = Stochastic error term

***A priori* expectations:** $\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0$, this implies that each of the TQM practices is expected to positively influence operational performance.

The data collected were analysed using descriptive and inferential statistics. Descriptive tools, including frequency counts, means, and standard deviations, were applied to profile respondents and summarize study variables, while Pearson correlation and multiple regression were employed to test the hypotheses. All analyses were conducted with SPSS (version 20.0) at the 5% significance level.

Descriptive statistics

This section presents descriptive analysis of the responses from questionnaire distributed to managers of table water manufacturing companies in Edo State, based on the their demographic profile.

Table 1: Demographic profile of respondents

Demographic Characteristic	Category	Percentage (%)
Gender	Male	75.8%
	Female	24.2%*
Age	40 years and above	37.8%
	(Other age groups implied)	(62.2%)
Education	B.Sc./HND	46.6%
	Postgraduate	19.9%
	(Other qualifications)	(33.5%)
Work Experience	5 - 9 years	40.3%
	(Other experience levels)	(59.7%)

Source: Researchers' compilation, 2025

From table 1, the demographic data showed that the majority of respondents were male (75.8%), indicating a gender imbalance in the sector. In terms of age, 37.8% were aged 40 and above, suggesting that most participants were mature and likely experienced. Regarding education, 46.6% held B.Sc./HND degrees, and 19.9% held postgraduate qualifications, demonstrating a relatively well-educated sample. Most respondents (40.3%) had between 5 to 9 years of work experience, suggesting a solid base of industry knowledge. These factors collectively enhance the credibility and relevance of the data obtained.

Table 2: Descriptive statistics on TQM Practices and Operational Performance

TQM Construct	Specific Practice / Indicator	Mean Score ($\bar{X}$)	Overall Mean & Interpretation
Lean Production	Demand-driven production	3.95	Grand Mean: 4.13 Strong prevalence of lean practices but challenged by overproduction and poor maintenance.
	Detection of leakages	4.16	
	Recognition of delays	4.12	
	Overproduction	4.18	
	Inadequate equipment maintenance	4.24	
Leadership	Insufficient top management commitment to quality	4.22	Grand Mean: 4.18 Active leadership is present, but it is misaligned with quality objectives, prioritizing profit over quality.
	Limited inspection	4.22	
	Weak communication	4.10	
	Profit prioritisation	4.20	
Benchmarking	Limited concern for competitors	4.23	Grand Mean: 4.12 Benchmarking practices exist but are insular and internally focused, with little external engagement.
	Low external information sharing	4.23	
	Reduced training opportunities	4.16	
Customer Relationship Management (CRM)	Modest growth in customer base	3.72	Grand Mean: 3.38 Critical gaps in CRM effectiveness. Strategies are weak, especially in retention and handling defects.
	Weak customer retention strategies	3.26	
	Customer-focused strategies	2.82	
	Concessions for defective products	3.13	
Operational Performance	Timely delivery	3.97	Grand Mean: 3.39 Performance is slightly above average but constrained. Strengths in delivery and growth are offset by high complaints and weak demand generation.
	Organisational growth	4.03	
	Reduction in customer complaints	2.79	
	Leadership-driven demand	2.88	
	Training impacts	3.40	

Source: Researchers' compilation, 2025

From table 2 above, findings on lean production revealed strong adherence to practices such as demand-driven production ($\bar{X}$ = 3.95), detection of leakages ($\bar{X}$ = 4.16), and recognition of delays ($\bar{X}$ = 4.12). However, overproduction ($\bar{X}$ = 4.18) and inadequate equipment maintenance ($\bar{X}$ = 4.24) remained challenges. The overall mean of 4.13 confirmed the prevalence of lean practices despite these weaknesses. Leadership was positively rated but suggested misalignment with quality objectives. Respondents reported insufficient top management commitment to quality ($\bar{X}$ = 4.22), limited inspection ($\bar{X}$ = 4.22), weak communication ($\bar{X}$ = 4.10), and profit prioritisation ($\bar{X}$ = 4.20). The grand mean (4.18) reflects active leadership but with misplaced emphasis.

Benchmarking practices were generally internalised, with firms showing limited concern for competitors ($\bar{X}$ = 4.23), low external information sharing ($\bar{X}$ = 4.23), and reduced training opportunities ($\bar{X}$ = 4.16). The grand mean of 4.12 indicates benchmarking exists but is insular.

Customer relationship management (CRM) was comparatively weaker, with modest growth in customer base ($\bar{X}$ = 3.72) and weak customer retention strategies ($\bar{X}$ = 3.26). Customer-focused strategies ($\bar{X}$ = 2.82) and concessions for defective products ($\bar{X}$ = 3.13) were poorly rated, yielding an overall mean of 3.38, which signals critical gaps in CRM effectiveness. Operational performance was mixed. Timely delivery ($\bar{X}$ = 3.97) and organisational growth ($\bar{X}$ = 4.03) were rated highly, but reductions in customer complaints ($\bar{X}$ = 2.79) and leadership-driven demand ($\bar{X}$ = 2.88) were low. Waste reduction ($\bar{X}$ = 3.24) and training impacts ($\bar{X}$ = 3.40) were moderate. The grand mean of 3.39 shows that operational performance was slightly above average but constrained by leadership and CRM challenges.

Correlations matrix

In establishing relationships among different variables, Pearson correlation analysis was further conducted. The results are shown in Table 3 below.

Table 3: Pearson Correlation

		LNP	LDS	BMK	CRM	OPF
LNP	Pearson Correlation	1	.855**	.656**	.352**	.476**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	397	397	397	397	397
LDS	Pearson Correlation	.855**	1	.642**	.388**	.434**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	397	397	397	397	397
BMK	Pearson Correlation	.656**	.642**	1	.343**	.413**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	397	397	397	397	397
CRM	Pearson Correlation	.352**	.388**	.343**	1	.796**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	397	397	397	397	397
OPF	Pearson Correlation	.476**	.434**	.413**	.796**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	397	397	397	397	397

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 showed that Pearson correlation was used to assess the linear relationship among the variables. It showed that lean production (LNP), leadership (LDS), benchmarking (BMK), and customer relationship management (CRM) all positively and significantly correlated with operational performance of table water

producers in Edo State. This implied that there was a direct relationship between the independent and dependent variables.

Model results

This section includes multiple regression results that were used to estimate the influence of total quality management practices on the operational performance of table water producers in Edo State. It comprised the results from the model summary, Analysis of variance (ANOVA) and coefficients.

Table 4: Total Quality Management Practices and Operational Performance

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.854	.954		2.993	.003
Lean production (LNP)	.312	.056	.316	5.554	.000
Leadership (LDS)	-.209	.078	-.153	-2.693	.007
Benchmarking (BMG)	.071	.050	.055	1.406	.161
Customer relationship management (CRM)	.835	.036	.725	23.333	.000
$R = .827^a$, $R^2 = .684$; Adjusted $R^2 = .681$; F-Statistic = 212.097; F-Statistic (Prob.) = $.000^b$ Number of Observation = 397 Dependent Variable: Operational Performance (OPF)					

Source: Researchers' compilation, 2025

The regression analysis revealed that three TQM dimensions significantly influenced operational performance. Lean production ($\beta = 0.312$, $p < 0.001$), leadership ($\beta = -0.209$, $p < 0.01$), and customer relationship management ($\beta = 0.835$, $p < 0.001$) emerged as key predictors, while benchmarking ($\beta = 0.071$, $p = 0.161$) showed no significant effect. The model produced an R value of 0.827, indicating a strong positive association between TQM practices and operational performance. The coefficient of determination ($R^2 = 0.684$) confirmed that about 68.4% of the variation in operational performance among table water producers in Edo State was explained by the combined effect of lean production, leadership, benchmarking, and CRM. The remaining 31.6% variation was attributable to factors outside the model. The F-statistic ($F = 212.097$, $p < 0.001$) further confirmed that the model was statistically significant, establishing TQM practices as a strong overall predictor of operational performance.

Hypotheses testing

The results in Table 4 were used to test the hypotheses one to five:

Ho_1: *There is no significant relationship between lean production and operational performance of table water producers in Edo State.*

Table 4 indicates a significant association between lean production and the operational performance of table water producers in Edo State ($\beta = 0.312$; $p = 0.000$). The t-value of 5.554 and the p-value below the 5% significance threshold further validate this outcome. Consequently, the null hypothesis was rejected, leading to the conclusion that lean production has a meaningful impact on the operational performance of water producers in Edo State.

Ho_2: *There is no significant relationship between leadership and operational performance of table water producers in Edo State.*

Table 4 reveals a significant relationship between leadership and the operational performance of table water producers in Edo State (β = -0.209; p = 0.007). The t-value of -2.693 and the p-value below the 5% threshold confirm this finding. Accordingly, the null hypothesis was rejected, and it was concluded that leadership significantly influences the operational performance of water producers in Edo State.

Ho_3: *There is no significant relationship between benchmarking and operational performance of table water producers in Edo State.*

Table 4 indicates that customer relationship management had no significant relationship with the operational performance of table water producers in Edo State (β = 0.071; p = 0.161). The t-value of 1.406 and the p-value above the 5% significance level confirmed the result. Therefore, the null hypothesis was accepted, leading to the conclusion that customer relationship management does not significantly influence the operational performance of water producers in Edo State.

Ho_4: *There is no significant relationship between customer relationship management and operational performance of table water producers in Edo State.*

Table 4 reveals that customer relationship management had a significant effect on the operational performance of table water producers in Edo State (β = 0.835; p = 0.000). The t-statistic of 23.333 and the p-value below the 5% significance threshold confirmed this result. Consequently, the null hypothesis was rejected, and it was concluded that customer relationship management plays a significant role in enhancing the operational performance of table water producers in Edo State.

DISCUSSION OF FINDINGS

This study examined the influence of total quality management (TQM) practices namely lean production, leadership, benchmarking, and customer relationship management (CRM) on the operational performance of table water producers in Edo State, Nigeria. Results indicated that lean production had a positive and significant effect on performance (β = 0.312, $p < 0.05$), suggesting that streamlining production processes enhances efficiency, even though challenges such as production delays, overproduction, and poor equipment maintenance persist. This outcome corroborates the findings of Aninawash et al. (2018) and Amal and Umarali (2017) but differs from the conclusions of Jabeen et al. (2015). In contrast, leadership exhibited a significant negative effect (β = -0.209, $p < 0.05$), implying that prevailing management approaches hinder operational effectiveness. Weak commitment to quality improvement and inadequate managerial involvement in change initiatives were noted as major shortcomings. While this supports Jabeen et al. (2015) on the relevance of leadership, it conflicts with studies such as Al-Khajeh (2018), which reported a positive leadership performance link. Benchmarking, though positive, did not significantly influence performance (β = 0.071, p = 0.161). This suggests that producers limited competitive awareness and lack of engagement with industry peers reduce its impact, which contrasts with the evidence presented by Sofijanovai et al. (2013) and Agbo (2020). Lastly, CRM emerged as a strong positive and significant predictor of operational performance (β = 0.835, $p < 0.05$). This underscores the critical role of customer-focused strategies in sustaining performance, even though weaknesses remain in structured planning. This result is consistent with Josiah and Nkamere (2019), who emphasized the value of customer engagement in driving organizational success.

CONCLUSION

The increasing dynamism of today's business environment, coupled with rising competition, underscores the importance of table water producers adopting best practices through total quality management (TQM). However, such adoption is unlikely to succeed unless organizational leaders fully understand and embrace the changes that TQM requires. The findings of this study confirm that firms integrating TQM practices are positioned for superior performance outcomes. As providers of safe drinking water to households and businesses, table water producers play a vital societal role, and implementing TQM can significantly enhance

their operational efficiency.

Drawing from the study's results, several recommendations are made to strengthen operational performance in Edo State's table water industry. First, producers should embrace lean production by aligning output with actual customer demand, thereby minimizing delays and overproduction. Practices such as just-in-time delivery, consistent equipment maintenance, and oversight by quality assurance professionals are essential. Second, leadership effectiveness must be enhanced management should empower staff, conduct routine quality assessments, and participate actively in planning and change initiatives, while shifting organizational focus from purely profit-driven objectives toward quality improvement. Third, benchmarking should be intensified by identifying industry best practices, setting clear performance goals, and training personnel in modern water production methods. Finally, customer relationship management requires reinforcement through effective record-keeping, timely complaint resolution, and strong feedback systems. Such measures will not only improve customer satisfaction but also contribute to sustained operational excellence across the sector.

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