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Article

Evaluation of the Nigerian Beverage Industry's Total Quality Management

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A B S T R A C T

This study examines the implementation and effectiveness of Total Quality Management (TQM) practices within Nigeria's beverage industry, focusing on eight critical factors: management leadership, quality department, training, product/service design, supplier quality management, process management, quality data and reporting, and employee relations. Data were collected from 92 respondents across five leading beverage companies using a validated questionnaire based on Black and Porter's (2007) TQM framework. Descriptive analysis using IBM SPSS Statistics Grad Pack revealed that the overall level of TQM practice in the industry is moderate. Strengths were identified in the visibility and coordination of the quality department, process automation, and top management's commitment to training. However, significant gaps exist in supplier quality management, availability and utilization of quality data, and employee involvement in quality decisions. The findings indicate that while foundational TQM elements are in place, strategic areas critical for achieving comprehensive quality excellence remain underdeveloped. The study underscores the importance of closing performance gaps through better supplier integration, data-driven decision-making, and enhanced employee feedback mechanisms. This research contributes to the understanding of TQM implementation challenges in emerging markets and provides practical insights for improving quality performance in Nigeria's beverage sector.

1. Introduction

According to Bon and Mustafa, (2013) the definitions of Total Quality Management (TQM) vary with respect to approach. It is described as the procedures and techniques that seek to reduce the defective product, service or process in order to increase the quality and efficiency (Worlu and Obi, 2019). From another approach, it is the continual method and techniques of sustaining continuous improvement and meeting customers' needs and expectations; which is the main philosophy of TQM (Aichouni et al., 2024; Karahan and Mete, 2014; Zehir et al., 2012; Juneja et al., 2011). TQM is also a management philosophy, utilised all over the world, with the objective of improving the operational and business performance of the organizations, by offering a systemic approach to continually improving the operative activities to continually fulfill customers' requirements (Kelly & Perez, 2025; Alawag et al., 2023). It stresses continuous improvement in an organization's internal processes as a way of increasing customer satisfaction (Bisho & Sam, 2022; Khan et al., 2020; Talib, 2013). TQM is a concept that have been accepted as an integrated management approach that have taken strong place in all sectors for process and performance improvement, waste reduction, business optimization and quality performance; and it is considered as essential to improving services and ensuring success of a business (Parshuram, 2015; Talib, 2013).

It is no surprise that TQM has now become the major business approach in present-day management and has currently been taken up by most companies around the globe to ensure competitiveness in the midst of growing constraints (Kelly & Perez, 2025; Natarajan, 2024; Alhih et al., 2020; Alotaibi et al., 2013). According to Parshuram, (2015) the challenges of establishing TQM in any service organization, lies basically in smooth connectivity between various business processes so that the organization can retain its customers, as the success of any business depends on customers' acceptability. Good and clear communications at all levels of organization are also necessary to achieving increased productivity and maintaining strong working relationships. The basic principle of TQM is that the cost of prevention is less than the cost of correction in the event of failure (Khadim et al., 2023; Abdulkadir, 2023; Chukwu et al., 2016).

Meanwhile, failure of TQM to achieve competitive advantage has been down to incomplete implementation of the crucial TQM practices and the absence of the assisting assets that must be simultaneously used with TQM for the achievement of competitive advantage (Ameer, 2023; Alotaibi et al., 2013). The intensity of global competition has led to significant changes in the way companies conduct their businesses, providing a higher quality services as a strategy for achieving competitive advantage (Keelson et al., 2024; Rubio-Andres et al., 2024; Karaev, 2023; Handoyo et al., 2023; Farida & Setiawan, 2022; Addae-Korankye, 2013).

However, the beverage industries in the country are plagued with low-capacity utilization, competition from foreign counterparts, poor road networks, and lack of a viable railway system (Obokoh & Goldman, 2016). Other hindrances are weak telecommunications, erratic power and poor water supply. Scarcity of raw materials and obsolete processes and machinery are other examples of the challenges faced in the industry in Nigeria (Uwadiegwu, 2015).

Despite the recognized importance of Total Quality Management (TQM) in enhancing operational performance, limited research has specifically identified the critical factors influencing TQM implementation within Nigeria's beverage industry. Existing studies often generalize across broader manufacturing sectors without addressing the unique challenges and current adoption levels within beverage production. This study, therefore, addresses this gap by evaluating the key factors affecting TQM and assessing its actual practice across five Nigerian beverage companies, aiming to establish a targeted framework for more effective TQM development and implementation within the sector.

The objective of this research is to determine the type of damage that occurs in the sludge centrifuge separator machine, and determine the factors that cause damage to the sludge centrifuge separator machine with Root Cause Analysis (RCA). In addition, this research will provide solutions to minimize the occurrence of damage to the machine.

2. Literature Review

TQM has emerged as a crucial management philosophy aimed at refining product quality, customer satisfaction, and operational efficiency across various industries (Vassos et al., 2024). According to Bannor et al. (2024), TQM encompasses continuous improvement, customer focus, and employee involvement, all of which are critical in meeting the dynamic demands of consumers in the beverage market.

The beverage industry, characterized by intense competition and stringent regulatory standards, demands consistent adherence to quality benchmarks. Mambanda (2017) emphasizes that the

adoption of TQM practices in beverage production ensures uniformity in product taste, safety, and packaging, which are significant determinants of brand reputation and customer loyalty. Various TQM tools, such as Statistical Process Control (SPC), Six Sigma, and ISO 9001 standards, are widely employed to monitor and control quality throughout the production chain (Chen, 2023).

Studies indicate that customer satisfaction in the food and drink industry is closely linked to perceived product quality, timely delivery, and responsive service, all of which are enhanced through TQM implementation (Braimah & Omoluabi, 2023). Moreover, TQM fosters a culture of employee involvement and continuous training, leading to improved process understanding and quality awareness among workers (Hariyani et al., 2024; Zehir & Zehir, 2023). This cultural change not only improves the quality of product but also reduces the cost of production as well as waste and, contributing to overall profitability.

In the context of emerging markets, beverage companies often encounter challenges such as inconsistent raw material supply and inadequate infrastructure, which can impede quality management (Dautner, 2023). Nonetheless, as highlighted by Igbadio & Asamber (2021), localized TQM strategies that focus on supplier development and infrastructural upgrades can mitigate these issues and ensure sustained product quality.

Digital technologies further reinforce TQM practices in the beverage industry. The use of automated quality monitoring systems, real-time data analytics, and machine learning aids in early detection of production defects and facilitates data-driven decision-making (Bousdekis et al., 2022; Culot et al., 2024). These innovations allow companies to respond promptly to deviations and uphold stringent quality standards.

Despite its numerous benefits, successful TQM implementation requires top management commitment, effective communication, and continuous employee training (Alawag et al., 2025). Resistance to change and inadequate resource allocation are common barriers identified in the beverage sector.

3. Research Methodology

The techniques through which the work was carried out are as presented below.

3.1 Study Sample

The research adopted a field survey approach for data collection. Five (5) of the seven (7) companies that fall under the beverage industry and which give information consent were used in the study. These companies include:

i. Classic Beverages Nigeria Limited; Plot 9A, Block E, Amuwo Odofin Industrial Estate, Mile 2, Lagos State.
ii. CWAY Food and Beverages Company Limited; Kessing Sheen Plaza, Ejigbo, Oshodi Isolo, Lagos State.
iii. International Breweries Plc; Ilesha, Osun State.
iv. Nigerian Bottling Company Plc; Asejire Plant, Oyo State.
v. Seven-Up Bottling Company Plc; Ikosi Road, Oregun, Ikeja, Lagos State.

3.2 Data Collection

A comprehensively designed Objective Evaluation Questionnaire (OEQ) was used as the principal instrument for primary data collection. A survey was adapted from a private sector study which developed and validated an instrument to measure the critical factors of Total Quality Management (Black & Porter, 2007). The adapted form of the survey as shown in Table 1 contained 20 questions decompose to the eight critical factors and described a worker's perception of actual quality practices within his/her organization. The questions contained in the questionnaires were structured in line with the Likert 5 Point Scale of Responses. It is a psychometric response scale primarily used in questionnaires to obtain participant's preferences or degree of agreement with a statement or set of statements. Likert-type or frequency scales use fixed choice response formats and are designed to measure attitudes or opinions (Koo & Yang, 2025; Kankaras, Capecchi, 2025). This gave the respondents the flexibility of multiple choice responses. The multiple responses included "Very low"; "Low"; "Medium"; "High" or "Very high" with each of the statements being made in the questionnaire. A typical survey item, as shown in Table 1, allows managers to indicate their perception of the degree or extent of a given practice within their organization.

Survey respondents were instructed to tick the number that represented their perception of quality management practices in their organization. Each critical factor was assessed using several component questions. For each component question and for each critical factor, the actual level of practice within or across organizations is represented by the average of the respondents' ratings for the component question

or critical factor. The scale scores were calculated by summing the component item ratings and dividing by the number of items.

Table 1. Critical factors of TQM and their component questions adapted from Black & Porter (2007)

Critical factors of TQM	Component questions
Role of management leadership and quality policy	1) Extent to which the top executive assumes responsibility for quality performance
	2) Degree of participation by major branch/department heads in the quality improvement process
	3) Extent to which quality goals and policy are understood within the organization
Role of the quality department	4) Visibility of the quality department
	5) Amount of coordination between the quality department and other departments
Training	6) Training in the Total Quality Concept (i.e. philosophy of organisation-wide responsibility for quality) throughout the organization
	7) Commitment of the top management to employee training
Product /service design	8) Clarity of product specifications and procedures
	9) Thoroughness of new product design reviews before the product is implemented or produced
Supplier quality management	10) Clarity of specifications provided to suppliers
	11) Extent to which suppliers are selected based on quality rather than price or schedule
Process management	12) Amount of incoming inspection, review or checking
	13) Amount of in-process inspection, review or checking
	14) Amount of final inspection, review or checking
	15) Degree of automation of the process to reduce production time
Quality data and reporting	16) Availability of quality data (error rates, defect rates, scrap, etc.)
	17) Extent to which quality data, control charts, etc. are displayed at employees' workstations
Employee relations	18) Amount of feedback provided to employees on their quality performance
	19) Degree of participation in quality decisions by non-supervisory employees
	20) Extent to which employees are recognised for superior quality performance

3.3 Survey Administration

The opinions of twenty (20) workers per company were sought. The survey respondents chosen within the five (5) companies were members of each company's quality council because these people serve to lead the quality focus within each company. Each survey respondent assessed the degree or extent of actual quality management practices in his/her organization according to the measure described above. IBM SPSS Statistics Grad Pack was primarily employed for descriptive statistical analysis of the data collected.

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3.4 Validation and Reliability

The questionnaire was adapted from a validated instrument and reviewed for content relevance. Performance gap analysis was conducted by comparing the average mean scores obtained to an ideal benchmark score of 5.0. It identifies both strengths and areas requiring improvement. Cronbach's alpha analysis was computed for each of the eight TQM critical factors using SPSS to ensure internal consistency. Responses from 92 valid questionnaires were entered into SPSS. Each survey item was coded according to its corresponding TQM factor which consisted of two to four component questions as shown in Table 1. Data were processed using IBM SPSS Statistics Grad Pack, focusing solely on descriptive statistics (means, standard deviations, frequencies, and percentages) as the study aimed to assess current TQM practices rather than test hypotheses, thus justifying the exclusion of inferential analysis.

4. Result and Discussion

The responses of each of the beverage company surveyed in this study are shown in Table 2. Ninety-two (92) questionnaires were recovered after administering twenty (20) questionnaires to each of the company. The result showed that Classic Beverages Nigeria Limited had a response rate of 90%, CWAY Food and Beverages Company Limited had a response rate of 80%, International Breweries Plc. and Nigerian Bottling Company Plc. both had a response rate of 100% while Seven-Up Bottling Company Plc. had a response rate of 90%. Table 3 classified the responses in terms of personnel (age, sex and educational qualification) and establishments. The results showed better response among the youthful workers (aged between 18 – 30 years) and less response among the older workforce. It also showed that most of the respondents are male workforce most of whom are learned.

Table 3. Personnel response classification

Classifications	Frequency	Percent (%)	Cumulative percent (%)
Age (years)			
18-30	42	45.7	45.7
31-45	27	29.3	75.0
46-55	23	25.0	100.0
Total	92	100.0	
Sex			
Male	55	59.8	59.0
Female	37	40.2	100.0
Total	92	100.0	
Educational Background			
Secondary	19	20.7	20.7
Tertiary	73	79.3	100.0
Total	92	100.0	

Table 2. Survey Response

Company	Questionnaires received	Questionnaires administered	Response rate (%)
Classic Beverages Nigeria Limited	20	18	90
CWAY Food and Beverages Company Limited	20	16	80
International Breweries Plc.	20	20	100
Nigerian Bottling Company Plc.	20	20	100
Seven-Up Bottling Company Plc.	20	18	90
Total	100	92	92

The educational qualification possessed by most of the respondent can be a good basis for improved TQM in the beverage industries since according to Karahan and Mete, (2014), assignments and group work undertaking at the university tertiary level of education provides basis for personnel effectiveness, efficiency and dynamism. Continuous improvement in TQM can be successful by changing educational methods in accordance with the objectives of learning, making improvements in education environment or changing education organization, which can be better achieved at the tertiary level rather than secondary (Parveen et al., 2024; Anastasiou & Ntokas, 2024; Geresom & Hazarika, 2024).

4.1 Role of Management Leadership in Quality Management Policy

The results in Table 4 showed that the extent of organizations' understanding of the goals and policies of TQM ranges from moderate to very high. The result showed that organizations have 60.9 % moderate understanding of goal and policy of TQM. 43.5 % of the respondents agreed that the extent of top executives' responsibility in TQM is high while in the opinion of 35% of the respondents is that top executives' responsibility in TQM is moderate as shown in Table 5. On degree of participation by major departments on TQM, Table 6 showed that the 52.2% of respondent supported high degree of participation. The result generally shows that currently the role of management leadership in the beverage industry is on the high side rather than low. This shows that the management have shown support for TQM since according to Omogbiya and Addah (2016), it is the responsibility of the management to identify what the customers want from time to time and determines how to cater for them. The vital task for any management is to outline quality goals, quality policies and quality plans in accordance with the four sides of the TQM pyramid (Sweis et al., 2019). These goals and policies should be clear and meaningful to all employees in the firm (Ngambi and Nkemkiafu, 2015).

Table 4. Extent of organizations' understanding of goals and policy of quality management

Extent	Frequency	Percent (%)
Moderate	56	60.9
High	27	29.3
Very high	9	9.8
Total	92	100.0

Table 5. Extent of top executives' responsibility in quality performance

Extent	Frequency	Percent (%)
Moderate	33	35.9
High	40	43.5
Very high	19	20.6
Total	92	100.0

Table 6. Degree of participation by major departments in quality improvement

Extent	Frequency	Percent (%)
Moderate	32	34.8
High	48	52.2
Very high	12	13.0
Total	92	100.0

4.2 Role of the quality department

The results in Figure 1 showed that most (48.9 %) of the respondents' opinion is that quality department is visible within the establishments. Table 7 showed that 43.5 % of respondents believed that high level of coordination between the quality department and other departments is obtainable. The quality department is responsible for quality audit which is essential for TQM development. The high visibility of the department and its coordination with other department is a clear indication that the beverage industry under consideration in this study has value for TQM. The active participation of the quality department in TQM as shown in the results is important to give top management the necessary insight into the problems experienced by the firm as described by Ngambi and Nkemkiafu (2015).

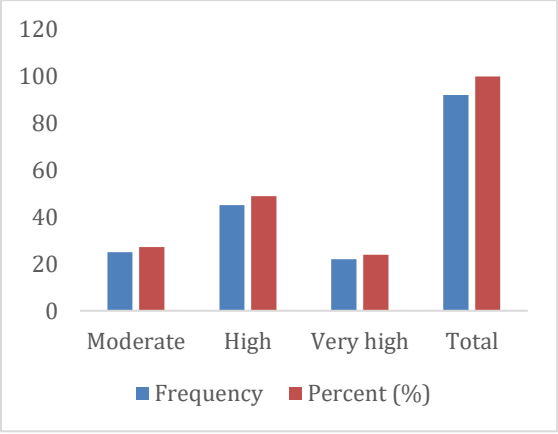

Figure 1. Visibility of the quality department

Table 7. Amount of coordination between the quality department and other departments

Extent	Frequency	Percent (%)
Moderate	29	31.5
High	40	43.5
Very high	23	25.0
Total	92	100.0

4.3 Training

The commitments of top management to employee training vary from low to very high as gathered from the study. Most (57.6%) of the respondents support the fact that the top management were committed to employee training as shown in Figure 2, which is evident with the high level (50 %) of training on TQM revealed in Table 8. Hosen *et al*. (2024) identified training as one of the basic steps within the organization to oversee effort made by management to improve TQM. The high commitment of management to training employee in the study areas show the drive of the industry towards improved TQM. Studies have shown that with effective training, employees know the industry and the structure of the firm better (Pujianto, 2024; Ngambi and Nkemkiafu, 2015). Effective training of employee also improves employees' skills and proficiency to work effectively and efficiently (Yimam, 2022; Martins, 2021; Urbancova et al., 2021; Sadikoglu and Okay, 2014). Furthermore, it will improve employees' loyalty to the firm, their motivation, and work-related performances.

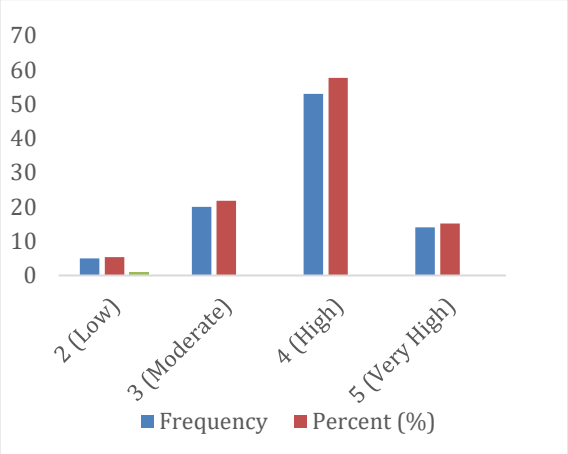

Figure 2. Commitment of the top management to employee training

Table 8. Level of training in the Total Quality Concept

Extent	Frequency	Percent (%)
2 (Low)	15	16.3
3 (Moderate)	31	33.7
4 (High)	46	50.0
Total	92	100.0

4.4 Product/Service Design

The result in Table 9 showed that 66.3 % of the respondents were of the opinion that product specifications and production procedures are moderately clear while 14 % and 4 % went for high and very high clarity. Most of the respondent, 55.4 % supported the fact that new product design is usually thoroughly reviewed before the production process is implemented as shown in Table 10. Only 23 % indicated that there were thorough reviews of product design. Quality control consists of exactness to which product or services match or conform to design specification (Syduzzaman *et al*., 2014; Munizu, 2013). Poor and unclear product design is a problem in products' quality management (Ngambi and Nkemkiafu, 2015). The moderate and high clarity of product specification, procedure and thoroughness of new product design review recorded in this result shows the industries effort to sustain TQM.

Table 9. Clarity of product specifications and procedures

Extent	Frequency	Percent (%)
2 (Low)	13	14.1
3 (Moderate)	61	66.3
4 (High)	14	15.2
5 (Very High)	4	4.4
Total	92	100.0

Table 10. Thoroughness of new product design reviews before the product is implemented or produced

Extent	Frequency	Percent (%)
2 (Low)	23	25.0
3 (Moderate)	51	55.4
4 (High)	18	19.6
Total	92	100.0

4.5 Supplier Quality Management

The result in Table 11 showed that the

entire respondent is of the opinion that there is either low (41.3 %) or moderate (58.7 %) clarity on product specification provided by the establishment to the suppliers. This is not far from the result in Table 14 where 38.1 % and 51.1% of respondent asserted that the extent to which suppliers are selected based on quality rather than price are low and moderate respectively. The clarity of product specification provided to suppliers gives assurance of how well products or service meets the targets and tolerances determined by its designers (Syduzzaman *et al*., 2014) which is also a measure of quality. The result in Table 13 and Figure 3 shows that there is need to improve most importantly on the clarity of product specification provided to suppliers and if possible, on the extent to which suppliers are selected based on quality rather than price or schedule

Table 11. Clarity of product specification provided to suppliers

Extent	Frequency	Percent (%)
2 (Low)	38	41.3
3 (Moderate)	54	58.7
Total	92	100.0

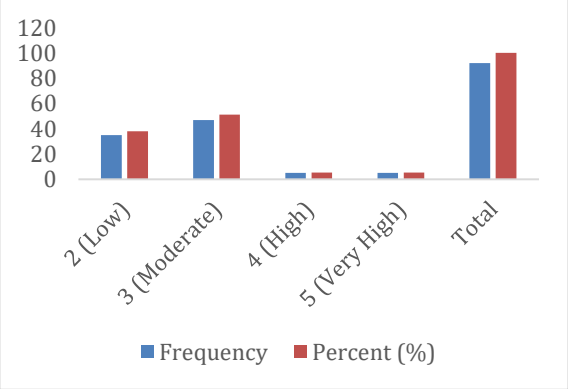

Figure 3. Extent to which suppliers are selected based on quality rather than price or schedule

4.6 Process Management

In the results on process management, 50 % of the respondents affirmed that the amount of income inspection, review or checking is moderate, while 45.7 % and 4.3 % declared high and very high respectively as shown in Table 12. The amounts of in-inspection, review or checking as declared by respondents are 53.3 % and 9.8 % in favour of high and very high respectively (Figure 4). The remaining 36.9 % showed moderate amount of in-inspection. The amount of final inspection, review or checking of products and production processes fall within the range of moderate, high and very high as shown by the response shown in Table 13. The results in Table 14 reveal a high degree of automation in the surveyed beverage companies, with 76.1% and 23.9% of respondents indicating high and very high automation, respectively. Automation significantly enhances efficiency by reducing manual handling, minimizing production time, and ensuring consistent throughput (Shamsuzzoha & Pelkonen, 2025; Ajiga et al., 2024). It also improves quality control by enabling precise, repeatable operations and integrating real-time monitoring systems that promptly detect deviations, thereby reducing defects, rework, and waste (Czerwińska et al., 2025; Ali et al., 2024). This alignment with Total Quality Management principles supports continuous improvement and operational excellence. Ngambi and Nkemkiafu (2015) have shown that process inspection has direct and indirect relationship between TQM and production cost respectively. The high level of process inspection, review and checking recorded in this study is a clear indication of the establishments' effort towards improved quality and if possible, at lower production cost. It must be noted that quality does not come from mass inspection of product but improvement of the production process (Jaafreh and Al-abedallat, 2013)

Table 12. Amount of incoming inspection, review or checking

Extent	Frequency	Percent (%)
3 (Moderate)	46	50.0
4 (High)	42	45.7
5 (Very High)	4	4.3
Total	92	100.0

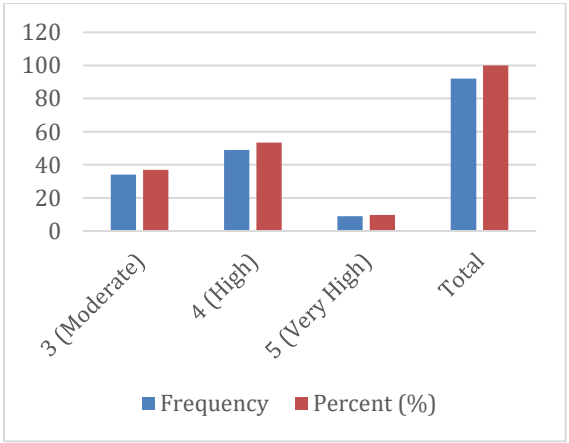

Figure 4. Amount of in-process inspection, review or checking

Table 13. Amount of final inspection, review or checking

Extent	Frequency	Percent (%)
3 (Moderate)	40	43.5
4 (High)	35	38.0
5 (Very High)	17	18.5
Total	92	100.0

Table 14. Degree of automation of the process to reduce production time

Extent	Frequency	Percent (%)
4 (High)	70	76.1
5 (Very High)	22	23.9
Total	92	100.0

4.7 Quality Data and Reporting

The result in Table 15 and 16 follow the same trend as in the previous sections. Most of the respondents (55.4 % and 59.8 %) asserted low availability of data on quality; and extent to which quality data, control charts, etc., are displayed at employees' workstations. This is clear evidence that the Nigeria establishment are not serious with regards to keeping of data. Quality data and reporting helps to identify potential cause for a particular quality problem (Bernardi et al.,2023; Hassenstein & Vanella, 2022; Syduzzaman *et al*., 2014). An establishment driven by TQM system can rely on such quality data and report displayed at employees' workstation to improve production processes, as well as products and services quality.

Table 15. Availability of quality data (error rates, defect rates, scrap, etc.)

Extent	Frequency	Percent (%)
2 (Low)	51	55.4
3 (Moderate)	29	31.5
4 (High)	12	13.1
Total	92	100.0

Table 16. Extent to which quality data, control charts, etc., are displayed at employees` workstations

Extent	Frequency	Percent (%)
2 (Low)	55	59.8
3 (Moderate)	28	30.4
4 (High)	9	9.8
Total	92	100.0

4.8 Employee Relations

The result in Table 17, shows that moderate (52.2 %) amount of feedback is provided to employees on their quality performance, with 29.3 % low and only 18.5 % high. Table 18 show 30.4 % low and 64.2 % moderate degree of participation in quality decisions by non-supervisory employees. Table 19 shows 21.8 % low, 47.8 % moderate and 30.4 % high, as extent to which employees are recognized for superior quality performance of products.

There is a clear indication that feedback is necessary for improved TQM (Faiesal & Aziz, 2018; Talib *et al*., 2010). Feedback from non-supervisory employees and customers is important to help implement TQM, improve organizational performance and ultimately gain customers' satisfaction (Talib, 2013). There is need for improved feedback since it is the center of attraction and driving force in the TQM philosophy. It is the responsibility of the employee to suggest innovative ideas for solving problems or develop new products (Bon and Mustafa, 2013).

Table 17. Amount of feedback provided to employees on their quality performance

Extent	Frequency	Percent (%)
2 (Low)	27	29.3
3 (Moderate)	48	52.2
4 (High)	17	18.5
Total	92	100.0

Table 18. Degree of participation in quality decisions by non-supervisory employees

Extent	Frequency	Percent (%)
2 (Low)	28	30.4
3 (Moderate)	59	64.2
4 (High)	5	5.4
Total	92	100.0

Table 19. Extent to which employees are recognized for superior quality performance

Extent	Frequency	Percent (%)
2 (Low)	20	21.8
3 (Moderate)	44	47.8
4 (High)	28	30.4
Total	92	100.0

4.9 Performance of TQM Practice in Nigeria Beverage Industry

Performance of TQM practices in the Nigerian beverage industry conducted by comparing the average mean scores from with

an ideal benchmark score of 5.0 is shown in Table 20 below. The highest-rated areas include the Role of the Quality Department (3.95), Process Management (3.82), and Management Leadership (3.71). These reflect reasonable alignment with TQM best practices.

Weak Areas Requiring Improvement includes, Quality Data and Reporting (2.54). It has the largest performance gap (2.46) suggests inadequate tracking and visualization of quality metrics like defect rates or process data. Meanwhile, Supplier Quality Management (2.68), with substantial gap point of 2.32 indicates low emphasis on quality-based supplier selection and specification clarity. Employee Relations (2.91) has a gap of 2.09 which shows limited employee feedback mechanisms, involvement, and recognition; while Product/Service Design (3.02) with a gap of 1.98 indicates moderate clarity in product specifications and insufficient review processes.

Table 20. Performance of TQM Critical Factor for Nigerian Beverage Industry adapted from Black & Porter (2007)

Critical factors of Total Quality Management	Average mean/ scale score	Standard deviation	Ideal Score	Performance gap
Role of management leadership and quality policy	3.71	0.706	5.0	1.29
Role of the quality department	3.95	0.734	5.0	1.05
Training	3.58	0.785	5.0	1.42
Product /service design	3.02	0.677	5.0	1.98
Supplier quality management	2.68	0.660	5.0	2.32
Process management	3.82	0.659	5.0	1.18
Quality data and reporting	2.54	0.692	5.0	2.46
Employee relations	2.91	0.668	5.0	2.09

Table 21 shows that all eight TQM factors achieved Cronbach's alpha values above the acceptable threshold of 0.70, confirming strong internal consistency and reliability of the instrument. These results validate the questionnaire as a dependable tool for measuring TQM practices in the Nigerian beverage industry.

Table 21. Cronbach's Alpha for Each TQM Factor

Critical factors of Total Quality Management	Item Numbers	No. of Items	Cronbach's Alpha (α)	Interpretation
Role of management leadership and quality policy	Q1-Q3	3	0.82	Good
Role of the quality department	Q4-Q5	2	0.78	Acceptable
Training	Q6-Q7	2	0.85	Good
Product /service design	Q8 Q9	2	0.76	Acceptable
Supplier quality management	Q10-Q11	2	0.74	Acceptable
Process management	Q12-Q15	4	0.81	Good
Quality data and reporting	Q16-Q17	2	0.79	Acceptable
Employee relations	Q18-Q20	3	0.83	Good

5. Conclusion

The findings from this study indicate that the Nigerian beverage industry exhibits a moderate level of Total Quality Management (TQM) implementation. While commendable progress has been made in management leadership, departmental visibility, and automation of processes, there remains a critical need to improve supplier quality integration, systematic quality data reporting, and employee engagement mechanisms. In particular, low clarity in supplier specifications, poor use of performance data, and limited feedback and recognition systems for employees represent major weaknesses. Addressing these gaps through targeted policies and continuous training will be vital for the industry to enhance competitiveness and customer satisfaction. Ultimately, institutionalizing TQM as a holistic, organization-wide strategy will support sustainable operational excellence within Nigeria's beverage manufacturing sector.

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References

Abdulkadir, K. (2023). Total quality as an effective tool for achieving customer satisfaction, patronage, productivity gains and sustainability in organizations. *Studies in Economics and Business Relations*, 4(2), 37-53. DOI:10.48185/sebr.v4i2.893

Addae-Korankye, A. (2013). Total quality management (TQM): A source of competitive advantage, a comparative study of manufacturing and service firms in Ghana. *International Journal of Asian Social Science*, 3(6),1293-1305.

Aichouni, A. B. E., Silva, C., Ferreira, L. M. D. F. (2024). A systematic literature review of the integration of Total Quality Management and industry 4.0: Enhancing sustainability performance through dynamic capabilities. *Sustainability*, *16*(20), 9108. https://doi.org/10.3390/su16209108

Ajiga, D., Okeleke, P. A., Folorunsho, S. O. & Ezeigweneme, C. (2024). The role of software automation in improving industrial operations and efficiency. *International Journal of Engineering Research Updates*, 07(01), 022-035.

Alawag, A. M., Alaloul, W. S., Liew, M. S., Musarat, M. A., Baarimah, A. O. & Ammad, S. S. S. (2023). Critical success factors influencing total quality management in industrialised building system: A case of Malaysian construction industry. *Ain Shams Engineering Journal*, 14(2), 101877. https://doi.org/10.1016/j.asej.2022.101877

Alhih, M. M., Tambi, A. M. A. & Yusof, Y. (2020). Total quality management and business excellence. *International Journal of Academic Research in Business and Social Sciences*, 10(12), DOI:10.6007/IJARBSS/v10-i12/8367

Ali, Y., Shah, S. W., Arif, A., Tlija, M., & Siddiqi, M. R. (2024). Intelligent Framework Design for Quality Control in Industry 4.0. *Applied Sciences*, *14*(17), 7726. https://doi.org/10.3390/app14177726

Alotaibi, F., Yusoff, R. Z. & Islam, R. (2013). Assessing the impact of total quality management practices and quality culture with competitiveness of Saudi contractors. *American Journal of Applied Sciences*, vol. 10, no. 6, pp. 638-645.

Alawag, A. M., Alaloul, W. S., Mohamad, H., Liew, M. S., Awang, M. & Baarimah, A. O. (2025). Evaluating the role of critical success factors of Total quality management (TQM) implementation through Smart PLS in industrialized building projects (IBS). *Ain Shams Engineering Journal*, 16(3), 103294. https://doi.org/10.1016/j.asej.2025.103294

Ameer, M. S. (2023). Impact of total quality management practices on supply chain management practices and firm performance. *SSRN Electronic Journal*. DOI:10.2139/ssrn.4338586

Anastasiou, S. & Ntokas, K. (2024). Leadership and Quality Enhancement in Secondary Education: A Comparative Analysis of TQM and EFQM. *Merits*, *4*(4), 440-452. https://doi.org/10.3390/merits4040031

Bannor, R. K., Oppong-Kyeremeh, H., Boateng, A. O., Kyire, S. K. C., Bold, E., Nimo M. A. (2024). Total quality management practices among women shea processors: Implication for job performance and household expenditure. *Cleaner and Circular Bioeconomy*, 9, 10011. https://doi.org/10.1016/j.clcb.2024.100118

Bernardi, F. A., Alves, D., Crepaldi, N., Yamada, D. B., Lima, V. C. & Rijo, R. (2023). Data quality in health research: Integrative literature review. *Journal of Medical Internet Research*, 25, e41446. doi: 10.2196/41446

Bisho, A. H. A. I. & Sam, M. F. M. (2022). Total quality management integrated strategy: Its implication to organizational success. *Proceedings on Engineering Sciences*, 4(3), 371-378. DOI:10.24874/PES04.03.014

Black, S. A. & Porter, L. J. (2007). Identification of the critical factors of TQM. *Decision Sciences*, 27(1), 1-21.

Bon, A. T. & Mustafa, E. M. A. (2013). Impact of Total Quality Management on innovation in service organizations: Literature review and new conceptual

framework. Malaysian Technical Universities Conference on Engineering & Technology 2012, MUCET 2012. Procedia Engineering 53, 516 – 529.

Bousdekis, A., Lepenioti, K., Apostolou, D., & Mentzas, G. (2022). Data analytics in quality 4.0: literature review and future research directions. *International Journal of Computer Integrated Manufacturing*, *36*(5), 678–701. https://doi.org/10.1080/0951192X.2022.2128219

Braimah, B. A. & Omoluabi, E. T. (2023). Total Quality Management (TQM) and the performance of fast-food business in Auchi, Edo State, South-South geo-political zone of Nigeria. *Journal of Business Management, Innovation and Creativity*, 2(2), 97-109.

Chen, J. K. (2023). Identifying critical success factors of total quality management via comprehensive assessment of soft and hard factors. *The TQM Journal*, 36(3), 679-701. https://doi.org/10.1108/TQM-03-2020-0058

Chukwu, B. A., Adeghe, R. I. & Anyasi, E. (2016). Impact of total quality management on performance of beverage companies in Nigeria. *International Journal of Economics, Commerce and Management*, 4(11), 190-201. http://ijecm.co.uk/

Culot, G., Podrecca, M. & Nassimbeni, G. (2024). Artificial intelligence in supply chain management: A systematic literature review of empirical studies and research directions. *Computers in Industry*, 162, 104132. https://doi.org/10.1016/j.compind.2024.104132

Czerwińska, K., Pacana, A., & Ostasz, G. (2025). A Model for Sustainable Quality Control Improvement in the Foundry Industry Using Key Performance Indicators. *Sustainability*, *17*(4), 1418. https://doi.org/10.3390/su17041418

Dautner, M. (2023). Navigating the Beverage Industry with ERP Systems. https://www.inecta.com/blog/navigating-the-beverage-industry-with-erp-systems

Faiesal, Z. & Aziz, N. A. B. A. (2018). Value of customer feedback in quality management for construction quality improvement: initial perspective review. *International Journal of Economics and Management Studies*, 5(11), 1-5. DOI:10.14445/23939125/IJEMS-V5I11P101

Farida, I. & Setiawan, D. (2022). Business strategies and competitive advantage: the role of performance and innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 163-178. https://doi.org/10.3390/joitmc8030163

Geresom, I. & Hazarika, A. (2024). Implementation of total quality management (TQM) in tertiary institutions in Uganda: A case study of school of Hygiene-Mbale. *Journal of Sustainable Development Innovations*, 1(1), 1-15. DOI: 10.61552/JSI.2024.01.001

Handoyo, S., Suharman, H., Ghani, E. K. & Soedarsono, S. (2023). A business strategy, operational efficiency, ownership structure, and manufacturing performance: The moderating role of market uncertainty and competition intensity and its implication on open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100039. https://doi.org/10.1016/j.joitmc.2023.100039

Hariyani, D., Hariyani, P, Mishra, S. & Sharma, M. K. (2024). Statistical analysis of total quality management employees, customers, suppliers, and management dimensions in hotel industries in Jaipur city, Rajasthan, India. *Sustainability Analytics and Modeling*, 4, 100033. https://doi.org/10.1016/j.samod.2024.100033

Hassenstein, M. J. & Vanella, P. (2022). Data quality—Concepts and problems. *Encyclopedia*, *2*(1), 498-510. https://doi.org/10.3390/encyclopedia2010032

Hosen, S., Hamzah, S. R., Ismail, I. S., Alias, S. N., Aziz, M. F. & Rahman M. M. (2024). Training and development, career development, and organizational commitment as the predictor of work performance. *Heliyon*, 10(1), e23903.

Igbadio, A. & Asamber, U. (2021). Total Quality Management and performance of Small Medium Scale Enterprises (SMEs) in Nigeria. *South Asian Research Journal of Business and Management*, 3(6), 204-214.

Jaafreh, A. B. & Al-Abedallat, A. Z. (2013). The effect of quality management

practices on organizational performance in Jordan: An empirical study. *International Journal of Financial Research*, vol. 4, no. 1, pp. 93 – 109.

Juneja, D., Ahmad, S., Kumar, S. (2011). Adaptability of Total Quality Management to service Sector. *International Journal of Computer Science & Management Studies*, 11(2), 2231 –5268.

Kankaras, M. & Capecchi, S. (2025). Neither agree nor disagree: use and misuse of the neutral response category in Likert-type scales. *Metron*, 83, 111-140. https://doi.org/10.1007/s40300-024-00276-5

Karaev, F. (2023). The impact of competitive strategies on firm performance: the mediating role of market orientation and innovation: An empirical study of the Georgian beverage sector. *Technology and Investment*, 14, 119-135. doi: 10.4236/ti.2023.142007.

Karahana, M. & Mete, M. (2014). Examination of total quality management practices in higher education in the context of quality sufficiency. 2nd World Conference on Business, Economics and Management - WCBEM2013, Procedia - Social and Behavioral Sciences, 109, 1292 – 1297.

Keelson, S. A., Cug, J., Amoah, J., Petrakova, Z., Addo, J. O., Jibril, A. B. (2024). The influence of market competition on SMES' performance in emerging economies: Does process Innovation Moderate the Relationship? *Economies*, *12*(11), 282. https://doi.org/10.3390/economies12110282

Kelly, R. C. & Perez, Y. (2025). What is Total Quality Management (TQM), and Why is it important? *The Investopedia Express Podcast*. https://www.investopedia.com/terms/t/total-quality-management-tqm.asp

Khadim, N., Thaheem, M. J., Ullah, F. & Mahmood, M. N. (2023). Quantifying the cost of quality in construction projects: An insight into the base of the iceberg. Springer Nature, 57, 5403-5429.

Khan, R. A., Mirza, A. & Khushnood, M. (2020). The role of total quality management practices on operational performance of the service industry. *International Journal for Quality Research*, 14(2), 439-454. DOI:10.24874/IJQR14.02-07

Koo, M. & Yang, S.-W. (2025). Likert-Type Scale. *Ncyclopedia*, *5*(1), 18. https://doi.org/10.3390/encyclopedia5010018

Martins, P. S. (2021). Employee training and firm performance: Evidence from ESF grant applications. *Labour Economics*, 72, 10205. https://doi.org/10.1016/j.labeco.2021.102056

Munizu, M. (2013). The impact of total quality management practices towards competitive advantage and organizational performance: Case of fishery industry in South Sulawesi province of Indonesia. *Pakistan Journal of Commerce and Social Sciences*, 7(1), 184-197.

Natarajan, R. N. (2024). Total quality management. *Encyclopedia of Production and Manufacturing Management*, 804-812. https://link.springer.com/referenceworkentry/10.1007/1-4020-0612-8_997

Ngambi, M. T. & Nkemkiafu, A. G. (2015). The impact of total quality management on firm's organizational performance. *American Journal of Management*, 15(4), 69 – 85.

Obokoh, L. O. & Goldman, G. (2016). Infrastructure deficiency and the performance of small and medium sized enterprises in nigeria's liberalised economy, *Acta Commercii*, 16(1). DOI:10.4102/ac.v16i1.339

Omogbiya, O. S. & Addah, G. O. (2016). Effect of total quality management on the Performance of brewery industry in Nigeria: An empirical study of selected breweries in Lagos State, Nigeria. *NG-Journal of Social Development*, 5(2), 114 – 121.

Parshuram, H. (2015). Total quality management as applied to service sector with relevance to Indian situations. *Journal of Management Research and Analysis*, 2(2), 127-132.

Parveen, K., Phuc, T. Q. B., Alghamdi, A. A., Kumar, T., Aslam, S., Shafiq, M. & Saleem, A. (2024). The contribution of quality management practices to student performance: Mediated by school culture. *Heliyon*, 10(15), e34892. https://doi.org/10.1016/j.heliyon.2024.e34892

Pujianto, S. (2024). Effectiveness of employee

training and development in increasing productivity and innovation in multinational companies. *Global International Journal of Innovative Research*, 2(9), 2245-2256. DOI:10.59613/global.v2i9.325

Rubio-Andres, M. Linuesa-Langro, J., Gutierrez-Broncano, S. & Sastre-Castillo, M. A. (2024). How to improve market performance through competitive strategy and innovation in entrepreneurial SMEs. *International Entrepreneurship and Management Journal*, 20, 1677-1706.

Sadikoglu, E. & Okay, H. (2014). The effects of total quality management practices on performance and the reasons of and the barriers to TQM practices in turkey. Hindawi Publishing Corporation. Advances in Decision Sciences, 1 – 17.

Shamsuzzoha, A. & Pelkonen, S. (2025) A robotic process automation model for order-handling optimization in supply chain management. *Supply Chain Analytics*, 9, 100102. https://doi.org/10.1016/j.sca.2025.100102

Sweis, R. J., Ismaeil, A., Obeidat, B. & Kanaan, R. (2019). Reviewing the literature on total quality management and organizational performance, *Journal of Business & Management (COES&RJ-JBM)*, 7(3), 192-215. DOI:10.25255/jbm.2019.7.3.192.215

Syduzzaman, Rahman, M., Islam, M., Habib, A. & Ahmed, S. (2014). Implementing total quality management approach in garments industry. *European Scientific Journal*, 10(34) 341 – 358.

Talib, F. (2013). An overview of Total Quality Management: Understanding the fundamentals in service organization. *International Journal of Advanced Quality Management*, 1(1), 1-20.

Talib, F., Rahman, Z. & Qureshi, M. (2010). The relationship between total quality management and quality performance in the service industry: A theoretical model. *International Journal of Business, Management and Social Sciences*, 1(1), 113-128.

Urbancova, H., Vrabcova, P., Hudakova, M. & Petru, G. J. (2021). Effective training evaluation: The role of factors influencing the evaluation of effectiveness of employee training and development. *Sustainability*, *13*(5), 2721. https://doi.org/10.3390/su13052721

Uwadiegwu, O. (2015). Globalization and industrial development in Nigeria. IOSR *Journal of Humanities and Social Science (IOSR-JHSS)* 20(1), 62-122. www.iosrjournals.org

Vassos, V., Voltezou, A., Stavropoulos, A., Stavropoulou, E., Stefanis, C., Tsigalou, C., Nena, E., Chatzaki, E., Constantinidis, T. C., & Bezirtzoglou, E. (2024). The Role of Total Quality Management in the Pharmaceutical, Food, and Nutritional Supplement Sectors. *Foods*, *13*(16), 2606. https://doi.org/10.3390/foods13162606

Worlu, R. E. & Obi J. N. (2019): Total Quality Management practices and organizational performance. *Covenant Journal of Business & Social Sciences (CJBSS)*. 10(1): 2006-0300.

Yimam, M. H. (2022). Impact of training on employees performance: A case study of Bahir Dar university, Ethiopia. *Cogent Education*, 9(1), 2107301. https://doi.org/10.1080/2331186X.2022.2107301

Zehir, C., Ertosun, Ö. G., Zehir, S., Müceldilli, B. (2012). Total quality management practices' effects on quality performance and innovative performance. International Conference on Leadership, Technology and Innovation Management, Procedia - Social and Behavioral Sciences, 41, 273 – 280.

Zehir, S., & Zehir, C. (2023). Effects of Total Quality Management Practices on Financial and Operational Performance of Hospitals. *Sustainability*, *15*(21), 15430. https://doi.org/10.3390/su152115430