

Total Quality Management Practices in the Nigerian Construction Industry

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Abstract

Total quality management (TQM) is one of the many quality-oriented techniques that has been identified as a successful management philosophy that can be effectively implemented in the construction industry. The purpose of this paper is to assess the influence of Total Quality management (TQM) practices on organisational performance in medium and large sized construction companies in the Nigerian construction industry. A comprehensive review of relevant literature was carried out to identify the variables to be included in the questionnaire survey which was later self-administered to 155 managers of medium and large sized construction companies in Abuja, Nigeria. The data obtained from the survey were analysed using descriptive and inferential statistical tools. The findings from the survey revealed that there are six areas of quality practices within the organisations studied: Top Management Commitment, Customer Focus, Supplier Relationship, Employee Involvement and Empowerment, Work Environment and Benchmarking which were found to be statistically significant to TQM practices in their various organisational performance levels. The findings further indicate that construction companies implement TQM to a high extent in their various organisational levels which implies that TQM practices have high influence on organisational performance in construction companies. The findings from Africa on practices of TQM in the construction industry especially from the Nigerian construction industry perspective should arouse the interest of researchers globally who are keen in using comparable paradigm for continuous business improvement. Limited research on this subject in the study area attests to its originality. However, the findings presented here are of invaluable benefits to the management of construction companies as well as major stakeholders in construction in Nigeria and other developing countries to achieve excellence in organisational performance.

Keywords: *Construction companies, organisational performance, TQM, Managers and Nigeria*

1.0 Introduction

The construction industry is an important determinant on which the development of any country depends on [1]. It is therefore expected that the developmental stride of a country is hinged on the quality of projects and by extension the resultant infrastructure [2]. According to reference [3], quality is an essential ingredient that does not only affects the performance of projects but also the aesthetic and life span of the finished product. Based on the important role being played by quality, it becomes imperative for clients and end users of constructed facilities to have for their money. The emphasis now is not only cost and time but also fitness for intended purpose [4, 5, 6 & 7]. Over the years, the materials used in construction, the process of construction and the finished facility have subject of criticism on their quality [8].

According to reference [9], in order for organisations to survive in the midst of stiff competition in the business environment, adequate planning and improved management for their products and services are needed. Quality management is one of the fulcrums or pivots that determine the success that construction projects are hinged on; others are cost, time and safety. This can be achieved when construction firms adopt Total Quality Management (TQM – getting it

right the first time). TQM is a management approach to solving quality problems so that the needs of customers could be met on the long run [10, 11 & 12]. TQM has to do with improving products (goods and services) on a continuous basis which is imperative if a construction firm is to survive and remain in business [13]. Reference [13] stated that firms usually ensure that they are able to meet at least two of the requirements listed below:

- ✓ Fitness for purpose,
- ✓ Customer satisfaction and
- ✓ Product differentiation.

In the words of [14], TQM is considered to be top management priority with the advent of globalisation; they added that quality may be seen as freedom from variations.

Based on the above, TQM practices are *sine qua non* to the survival of organisational mission and vision; these create a roadmap into realising the goals espoused by any construction firm [7 & 15]. In keying in into this TQM practices, construction firms must have an understanding of their processes so that the implementation of TQM could result in the change desired by the firms in their culture, process and strategic priorities [16, 17 & 18]. Implementing TQM is the ability to translate, integrate and ultimately institutionalise TQM behaviours into everyday practice on the job.

Implementation of TQM is a major problem in construction industry especially in developing countries. Reference [19] asserted that for construction firms need adequate motivation and be emotionally involved. It has been established by [20] that construction firms that perform well are known to have adopted TQM practices in their operations. However, reference [21] stated that performance measurement should be done within the TQM framework by looking at this from the perspective of the employer and employee in order to have a holistic measurement in the outcome. In the Nigerian construction industry, many challenges are bedevilling the implementation of TQM in the areas of inadequate technical expertise, policy inconsistency and absence of incentive in project design and execution [22]. These challenges listed above are contributing negatively to the construction industry, and therefore need to be properly addressed.

Reference [23] revealed that lack of management support towards implementations of TQM is an important factor. Similarly, reference [11] concluded in his study that most small sized companies are not implementing TQM due to their lack of knowledge and support from the management. In a related development, [24] pointed out that with increased top management commitment in terms of providing leadership, providing critical resources getting involved in the implementation of TQM, the implementation of TQM is likely to be more successful.

Based on references [23] and [11], the study of influence of TQM practices on organisational performance in medium and large sized construction firms in Abuja is imperative in order to determine what the situation is in those construction firms regarding TQM practices. Questionnaire survey as a data collecting instrument was used, in order to contribute to the body of knowledge and make recommendations on how best to achieve the project target.

2.0 Literature Review

This section discusses total quality management practices and performance measurement in order to situate the variables in the article.

2.1 Total Quality Management Practices

The use of TQM as a concept and philosophy has been on the increase by the various segments of the economy [24], service [25], government [26], banking [27] and education [28]. Largely, the adoption of TQM has been linked to developed countries such as the US, Japan and the UK but the research on its adoption in the developing countries has been in the last 10 years [29, 30, 31]. This is mainly due to the opening up of markets to global competitions resulting in quality improvement [32]. TQM has evolved since 1920s through a number of phases and it has its roots in the teachings of Drucker, Juran, Deming, Ishikawa, Crosby and others that studied, practised and brought refinements to the process of organisational management [33]. Reference [34] found out that TQM can be achieved, when the leadership of companies take charge of quality and aligning the workers' mindset towards the implementation of TQM. This can be achieved by improving employee involvement and commitment to TQM, and provide resources to overcome the impediments that might hamper the implementation of the practices of TQM [35, 36].

Consequent upon the above, it could be inferred that leadership of an organisation has a great role to play in the implementation of TQM. Reference [37] enunciated this by stating that managers must be dedicated and be more involved if time-tested partnership is to be forged. However, cases of lack of commitment and non-flexibility in the implementation of TQM by the leadership of firms are common [38, 39 & 40]. Reference [41] advocated for a situation whereby the philosophy and performance leadership are made superior.

There are ten (10) important elements of quality culture which TQM practitioners generally agree should be present in organisations whose culture complements TQM implementation and these according to reference [7], included leadership top management commitment, customer's management, training and education, team work, people management and empowerment, supplier partnership, quality planning and strategy, process management, reward and recognition and effective commitment.

2.2 Performance Measurement

In relating TQM practices to performance, various performance measures such as financial and non-financial ratios, innovation, operational and quality have been used by scholars [42]. It is expected that the quality of a product or service is hinged on the customer's expectation of that product or service which may be at variance to the expectation of the suppliers. Invariably, judging the quality of a product is a function of the customer. Firms tend to judge the quality of products using measures such as the rate of defects, cost of rework, salvage value, level of reliability it offers and its level of compliance to customers' expectations [15 & 43]. According to reference [44], customer retention and increase in market share are reflection of effective implementation of TQM. For customers to be loyal to their brand of products or services must be on offer. This is an indication of customer satisfaction, boosting confidence and limited number of complaints [45]. Reference [24] indicated that firms with improved quality of product and services usually translate to improve revenue and by extension, cost reduction. To this end, the financial performance of construction firms resulting from TQM practices adopted could be measured based on the sales increase, revenue generated, return on investment and market share cornered by the firms [31]. Studies have been carried out by references [39, 46, 47 & 48] which indicated strong relationship between TQM practices and financial and non-financial performance measures.

3.0 Methodology

The purpose of this current research is to assess the influence of TQM practices on organisational performance in medium and large sized construction companies in the Nigerian construction industry. A quantitative method was employed as the research design for this study. In choosing the respondents to participate in this research, the study aligned with the position of [49]. Reference [49] suggested that the participants in this kind of research must be the key players or stakeholders in the local construction industry. On that note, 260 registered medium and large construction firms in Abuja with Federation of Construction Industry (FOCI) were identified.

The study considered these firms as those that play key role in the industry and thus considered them as population sample for the study [50]. The consideration for these categories of construction organisations in the study was in consonance with the recommendation of previous researchers [50, 51, 52] because extent of quality management practices in these group of organisations is recognised to be relatively more pronounced than the smaller organisations [50]. This assertion reaffirmed the stance of [51] who contended that quality management practices of small firms are likely to be less cutting-edge or crude. For a wider study, sampling requirements is considered to be essential. Therefore, this study adopted reference [53] table for sample size N-n, while capital letter N=260 is the population size and small letter n=155 is the required sample size. A total sample size of 155 was drawn for the study, therefore medium and large sized construction firms in Abuja was 260 and 155 questionnaires were administered to medium and large construction firms in Abuja.

The study also targeted the class of respondents that participated in a similar research [such as 50]. These participants included the construction organisation general manager, quality systems managers, respondents' contracts managers etc. (e.g. professional personnel manager, quality engineer, quantity surveyor, project engineer, etc.) who [49] reportedly considered as those that are most likely to be the "supposed" leaders in terms of quality management within their respective organisations. By using theoretical dimensions of TQM, together with empirically based information, a sound basis is provided for describing organisational performance, unique to the problem being investigated, and the development of questionnaire with applicable questions that are based on variable contained in the TQM dimensions.

For the purpose of this study, the structured questionnaire was designed to consist of two sections. The first section collected information on the respondents' organisations, i.e., the company's profile. The data on TQM practices within the study area form the crux of the second section of the survey. This section elicited data on the influence of TQM organisational performance. This section was designed with reference to the existing empirical studies on TQM practices within and outside the construction industry. Most of the items identified in the studies reviewed on TQM were considered pertinent to the construction context. Therefore, the instrument used for this study was modified to fit into the construction context, and the item in the questionnaire explained a practice that required the respondents to rate the degree at which TQM is being practised within the studied organisations on a 1 to five-point Likert scale; "1" being "very lowly practised" to "5" being "very highly practised."

The data collected from the questionnaires were analysed using descriptive and inferential statistics which included percentages, mean scores and regression analysis.

4.0 Results and Discussion

Table 1: Response rate

	Frequency	percentage
Questionnaire Administered	155	100.0
Questionnaire Received	128	82.58

Table 1 shows that one hundred and fifty-five (155) questionnaires were administered to companies in Abuja, one hundred and twenty-eight (128) were retrieved approximately 82.58% of the questionnaires administered.

Table 2: Demographic information of respondents

Background information	Frequency	Percentage
Academic qualification		
National Diploma	10	7.8
Higher National Diploma	25	19.5
BSc/BTech	50	39.1
MSc/MTech	38	29.7
Others	5	3.9
Total	128	100.0
Profession		
Builder	50	39.1
Civil Engineer	20	15.6
Architect	18	14.1
Quantity Surveyor	20	15.6
Others	20	15.6
Total	128	100.0
Experience		
0-5 Years	26	20.3
6-10 Years	20	15.6
11-15 years	46	35.9
16-20 Years	31	24.2
Above 20 years	5	3.9
Total	128	100.0
Number of Employees		
1-49	-	-
50-249	31	24.21
Above 250	97	75.78
Total	128	100.0

Table 2 shows the demographic characteristics of the respondent. Out of the questionnaires administered, a total of 128 valid questionnaires were returned, from which respondents with the National Diploma were 10 in number (7.8%), Higher National Diploma 25 (19.5%), BSc/BTech 50 (39.1%), MSc/MTech 38 (29.7%), while others were 5 in number (3.9%). With respect to profession, 50 respondents were Builders (39.1%), Civil Engineer 20 (15.6%), Architects were 18 (14.1%), Quantity Surveyor 20 (15.6%), and Others 20 (15.6%). From Table 2, in terms of years of experience 0-5 years 26 respondents (20.3%), 6-10 years 20 respondents (15.6%), 11-15 years 46 respondents (35.9%), respondents with years of experience ranging between 16-20 were 31 (24.2%), those having experience above 20 years were 5 (3.9%). In order to ascertain the class of the firm, firms having between 50-249 employees were 31 (24.21%), and those having employee in excess or above 250 were 97 (75.78%). This is based on reference [54] classification.

Table 3: Regression analysis of TQM and operational performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	.230	.126		1.822	.071	
Top Management Commitment	.037	.084	.037	.443	.658	Not significant
Customer Focus	.252	.064	.274	3.930	.000	Significant
Supplier Relationship	.499	.091	.520	5.473	.000	Significant
Employee Involvement and Empowerment	.257	.058	.279	4.415	.000	Significant
Work Environment	-.001	.070	-.001	-.017	.986	Not significant
Benchmarking	-.112	.095	-.111	-1.169	.245	Not significant
R	.943					
R²	.889					
Adjusted R²	.884					

The significant level of $P < 0.05$ at 95% confidence level, customer focus, supplier relationship and employee involvement and empowerment are statistically significant to operational performance while top management commitment, work environment and benchmarking are not significant. Product and process management symbolises managing application sequences which allocate in favour of operational performances in different factors along, with constituting technical approaches for analysis and investigations [55].

Table 4: Regression analysis of TQM and inventory performance

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	.111	.197		.566	.572	Not significant
Top Management Commitment	.081	.130	.073	.623	.534	Not significant
Customer Focus	.145	.100	.141	1.455	.148	Not significant
Supplier relationship	.553	.142	.514	3.896	.000	Significant
Employee involvement and empowerment	.480	.091	.464	5.288	.000	Significant
Work environment	-.079	.110	-.079	-.719	.474	Not significant
Benchmarking	-.210	.149	-.186	-1.413	.160	Not significant
R	.887					
R²	.786					
Adjusted R²	.776					

The significant level of $P < 0.05$ at 95% confidence level, supplier relationship and employee involvement and empowerment are statistically significant to Inventory performance while top management commitment, customer focus, work environment and benchmarking are not significant. Reference [16] suggested that quality management has major influences in

innovativeness as well as technical performance; where by enhancing functionalities and technical performance in current inventions are just as important as new product design (NPD).

Table 5: Regression analysis of TQM and employee performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	1.696	.125		13.517	.000	Significant
Top Management Commitment	-.033	.083	-.053	-.396	.693	Not significant
Customer Focus	.356	.064	.621	5.583	.000	Significant
Supplier relationship	-.561	.091	-.939	-6.191	.000	Significant
Employee involvement and empowerment	.290	.058	.504	4.997	.000	Significant
Work environment	-.251	.070	-.455	-3.595	.000	Significant
Benchmarking	.700	.095	1.116	7.369	.000	Significant
R	.847					
R²	.718					
Adjusted R²	.704					

The significant level of $P < 0.05$ at 95% confidence level, customer focus, supplier relationship, employee involvement and empowerment, work environment and benchmarking are statistically significant to Employee Performance while only top management commitment is not significant. Workers empowerment can be facilitated by providing them with suitable resources, task and ability to design, classify, employ, gauge their work, and take necessary actions to fully optimize their contributing to the companies in the most valuable ways [56].

Table 6: Regression analysis of TQM and innovation performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	.955	.202		4.731	.000	Significant
Top Management Commitment	.030	.134	.031	.223	.824	Not significant
Customer Focus	.344	.103	.386	3.350	.001	Significant
Supplier relationship	-.669	.146	-.720	4.585	.000	Significant
Employee involvement and empowerment	.901	.093	1.010	9.669	.000	Significant
Work environment	-.238	.113	-.277	2.117	.036	Not significant
Benchmarking	.365	.153	.375	2.392	.018	Not significant
R	.835					
R²	.698					
Adjusted R²	.683					

The significant level of $P < 0.05$ at 95% confident level, customer focus, supplier relationship, employee involvement and empowerment are statistically significant to innovation performance while top management commitment, work environment, benchmarking are not significant. Reference [57] findings give support to the view that in fact TQM practices have a positive association with the adoption of technological innovation.

Table 7: Regression analysis of TQM and social responsibility

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	.439	.207		2.123	.036	Not significant
Top Management Commitment	-.006	.137	-.006	-.042	.966	Not significant
Customer Focus	-.182	.105	-.192	-1.727	.087	Not significant
Supplier relationship	-.259	.149	-.263	-1.734	.085	Not significant
Employee involvement and empowerment	.137	.095	.145	1.434	.154	Not significant
Work environment	.206	.115	.227	1.790	.076	Not significant
Benchmarking	.940	.156	.910	6.008	.000	Significant
R	.847					
R²	.718					
Adjusted R²	.704					

The significant level of $P < 0.05$ at 95% confidence level, benchmarking was the only TQM practice that is statistically significant to social responsibility while top management commitment, customer focus, supplier relationship, employee involvement and empowerment and work environment are not significant.

Table 8: Regression analysis of TQM and customer focus results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	.317	.278		1.142	.256	Not significant
Top Management Commitment	.118	.184	.098	.638	.525	Not significant
Customer Focus	-.222	.141	-.201	-1.571	.119	Not significant
Supplier relationship	-.442	.201	-.384	-2.201	.030	Not significant
Employee involvement and empowerment	.416	.128	.376	3.242	.002	Not significant
Work environment	.317	.155	.297	2.044	.043	Not significant
Benchmarking	.700	.210	.579	3.325	.001	Significant
R	.792					
R²	.627					
Adjusted R²	.609					

The significant level of $P < 0.05$ at 95% confident level, benchmarking was only TQM practice that is statistically significant to customer focus results while top management commitment, customer focus, supplier relationship, employee involvement and empowerment and work environment are not significant. Companies must establish supply chain partnerships to motivate supplies to provide materials needed to meet customer expectations [58, 59].

Table 9: Regression analysis of TQM and market and financial performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	2.099	.265		7.915	.000	Significant
Top Management Commitment	.632	.176	.713	3.595	.000	Significant
Customer Focus	.515	.135	.629	3.821	.000	Significant
Supplier relationship	-.595	.191	-.697	-3.108	.002	Significant
Employee involvement and empowerment	.772	.122	.941	6.306	.000	Significant
Work environment	-.758	.148	-.960	-5.127	.000	Significant
Benchmarking	-.246	.201	-.275	-1.228	.222	Not significant
R	.619					
R²	.383					
Adjusted R²	.352					

The significant level of $P < 0.05$ at 95% confidence level, top management commitment, customer focus, supplier relationship, employee involvement and empowerment and work environment are statistically significant to market and financial performance while benchmarking is the only TQM practice not significant. Reference [46] established that a larger data set revealed that in the post implementation period, the sample of effective TQM implementers significantly outperformed the various method control group.

5.0 Conclusion and Recommendations

The recognition and transference of TQM as an effective management philosophy from the manufacturing industry to help in raising the level of quality and productivity in the construction industry has proved to be recipe for construction companies' survival in the ever-expanding global market. The principle has helped organisations to see TQM as a journey not a destination. The main objective of this paper is to assess the influence of Total Quality management (TQM) practices on organisational performance in medium and large sized construction companies in the Nigerian construction industry. Through extensive literature review, a research instrument was developed to investigate TQM practices in the Nigerian construction industry and other performance related issues. By analysing the data elicited from the survey to identify TQM practices and performance related measures. The TQM performance measures showed by the study included top management commitment, customer focus, supplier relationship, employee involvement and empowerment, work environment and benchmarking. On the influence of TQM on organisational performance, the following measures were reflected: operational performance, inventory management performance, employee performance, innovation performance, social responsibility, customer results and market and financial performance were significant to TQM, which implies that TQM practices have a high influence on organisational performance in construction companies in the study area. TQM can only be beneficial to the Nigerian construction firms if a framework for implementing TQM in construction is provided. Finally, in order to fully benefit from the implementation of TQM in the construction industry, the stakeholders as well as government should adopt new reforms toward quality policies and place emphasis on the quality concepts on construction projects. At organisation level, human resources management should enhance training, motivation and retention of good employees, improve employee involvement/skill and organisational structure and allocate sufficient resources to implement TQM successfully.

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