# Level of Implementation of Total Quality Management in Small and Medium Scale Construction Firms in South-East States Nigeria

Alintah-Abel U.V<sup>1</sup>; Okolie K.C<sup>2</sup>; Emoh F.I<sup>3</sup> & Agu, N.N<sup>4</sup>

<sup>1</sup>Department of Quantity Surveying, Faculty of Environmental Sciences, Enugu State University of Science & Technology (ESUT), Enugu

<sup>2</sup>Department of Building, Faculty of Environmental Sciences, Nnamdi Azikiwe University, Awka. <sup>3</sup>Department of Estate Management, Faculty of Environmental Sciences, Nnamdi Azikiwe University, Awka. <sup>4</sup>Department of Quantity Surveying, Faculty of Environmental Sciences, Nnamdi Azikiwe University, Awka. Corresponding Author: Alintah-Abel Uchechi V

**ABSTRACT:** Total Quality Management (TQM) has an important role in any company, since its implementation can continuously improve company's performance. The general purpose of this study was to investigate the concept and level of implementation of total quality management in small and medium scale construction firms in south- east Nigeria. The sample size of 328 respondents from small and medium scale construction firms was adopted for this study. They completed a questionnaire covering ten critical success factors of total quality management namely: Leadership and top management commitment and leadership, Customer Focus, continuous improvement, employee participation, Recognition and Award, Training, Quality culture, communication, performance measurement and strategic planning. The findings of this study indicated that the firms understands well the concept of total quality management with an average mean of 4.16, however their level of implementation is low. This is based on the p value which is 0.00 being less than 0.005.Based on the findings the construction firms should create systematic processes for their activities that in turn facilitates achieving the quality that meets customer's requirements.

**KEYWORDS:** Total Quality Management, Small and medium scale construction firms, south-east, Quality, Implementation

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## I. INTRODUCTION

The performance of small and medium scale construction firms (SMCFs) are vital because they play an important role in modern economies because of their flexibility and ability to innovate. They are considered the lifeblood of a modern economy. In most countries, they play a significant role in providing employment opportunities and they equally support large-scale manufacturing firms. Furthermore, they do not only contribute to outputs and employment, they also affect the competitive power of large organisations [1]. They are often suppliers of products and services to large organisations and therefore a lack of product quality and or service from them could affect the competitiveness of the larger organisation [2].

SMCFs are mostly indigenous firms; however they do not perform as expected. [3] opined that multinational and large construction firms have however continued to succeed in Nigeria as the preferred type of Construction Company. He discovered that Nigerian clients give them preference over their indigenous counterparts in the award of contracts because they perceive the performance of the former are better than the latter in work quality standards. This issue is crucial because the majority of firms in the construction industry are small and medium firms [4], [5]. [6], remarks that the major indicator of the contractor's performance is the client's satisfaction. Poor contractor's performance, is characterized by poor quality and low productivity, is common in the industry. The challenge before small and medium contractors is to determine the way in which the confidence of clients can be gained and their impression of these contractors can be reversed. According to[7], one of such practices is total quality management (TQM). It is believed that the benefits of higher customer satisfaction, better quality products and higher market are often obtained following the adoption of TQM by construction companies [8].

TQM focuses on the process of improvement, customer and supplier involvement and training and education in an effort to achieve customer's satisfaction, cost effectiveness and defect-free work and it provides culture and climate essentials for innovation and for technology advancement [9]. When total quality

management is fully applied in small and medium construction firms as an improvement tool, it will increase their profit level, increase the level of employment, and expand their business, innovation and overall development of the economy in Nigeria.

The desires of all beneficiaries such as stakeholders, customers (internal and external) to attain success in the construction industry are not enough to achieve the desired quality. Therefore, it is important to focus improvement efforts on TQM of small organisations so that the overall industry performance may be improved. It has been revealed to generally lead to competitive advantage through the utilization of varying strategies and elements including core values – style, integrity, care and innovation [10]. As such, all parties should be involved in implementation of TQM in other to effectively improve the construction industry in proper and methodological way.

## **II. STATEMENT OF THE PROBLEM**

Over the years, SMCFs in Nigeria have recorded a low level of participation and have often been sidelined in large scale construction activities [11]. They have not had a fair share of major construction activities in the country, as they are often awarded to multinational or large contractors whom are considered more technically and managerially more superior and efficient in funds acquisition and project execution. According to[12], Obasanjo in 2002 during his address at the commissioning of the headquarters of Small and Medium Development Agency of Nigeria (SMEDAN) in Abuja noted that there was a great disconnection between the SMEs and the large companies in Nigeria, pointing out that the multinational companies dominated business in the country even in the area of finished products. This is a dolorous situation that calls for deep and sober reflection.

Despite the fact that the importance of TQM is vital especially to small and medium construction firms, a very few research has been conducted to study the effect of TQM implementation on construction firms in Nigeria. In fact and to the best knowledge of the researcher, no research has been conducted to investigate the application of TQM in small and medium construction firms in south-east Nigeria. Therefore, this study aims to explore the implementation of Total quality management in small and medium construction firms in south-east Nigeria.

The research questions that guided this study are:

- 1. What are the Concepts of TQM in Construction Industry?
- 2. What is the current level of TQM implementation in SMCFs in South-East Nigeria?

### III. THE TOTAL QUALITY MANAGEMENT (TQM) CONCEPT

Total Quality Management (TQM) is a management philosophy that seeks to integrate all organisational functions to focus on meeting customer needs and organisational objectives[13]. According to [14], TQM is considered as an approach of continuous improvement in all quality aspects of the whole processes, goods, services and employees within the firm, and it aims at adding value to the delivered products to customers through continuous development of firm's processes and systems. It is also management approach that seeks to achieve and sustain long-term organizational success by encouraging employee feedback and participation, satisfying customer needs and expectations, respecting societal beliefs and values, and obeying governmental laws and regulations [15].

TQM is more than a management philosophy; it can be considered a convenient framework used in and by organizations to guarantee a systematic and permanent optimization of the added value in order to maximize the realization of their aims. As a consequence of this proactive approach, all primary, supporting and managerial processes have to be designed in a manner that ensures an optimal (perceived) quality for customers, employees and other stakeholders [16].

TQM is one of the strategic economic responsibilities of the firm. It is a "management philosophy" that includes different core values. The values of TQM are "customer focus", "continuous improvement", "process orientation", "everybody's commitment", "result orientation" and "learning from each other". Combined they are the prerequisites for quality management [17]. For successful implementation of TQM, an organisation's culture needs to be focused on its customers. An organization can move towards a customer- focused culture by listening to customers' view; analyzing; understanding; integrating and developing their expectation.

### IV. SMALL AND MEDIUM SCALE CONSTRUCTION FIRMS (SMCFs) IN NIGERIA

Definitions for SMCFs differ from country to country. [18] mentioned that various yardstick have been used to define SMCFs such as the value of assets employed and the use of energy. [5] highlighted that over time in Nigeria, the government has used various definitions and criteria in identifying what is referred to as Small and medium firms. At certain point in time, it used investment in machinery and equipment and working capital at another time, the capital cost and turnover were also used [19].

The National association of small and medium scale enterprise (NASME) defines a small sized firm as an organization with less than 100 employees and an annual turnover of \$500 million. The Central Bank of Nigeria defines SMCFs as an enterprise with an asset base of \$200 million excluding land and working capital with staff employed by the firm not less than 10 and not more than 300 [20]. The definition of MSMEs in Nigeria as contained in the National Policy on Micro, Small and Medium Enterprises [21], it is 10-49 employees and Assets (N million; excluding land and buildings) \$5-\$50 million and is 50-199 employees and Assets between \$50-\$500 million for small and medium construction firms respectively. [5] opine that small and medium scale construction firms play an important role in the construction by fostering income stability, growth in the industry and also the provision of infrastructure for the economy. [22] mentioned that an important feature of SMCFs in Nigeria have to do with the organisational structure, owing to its ownership status revolving around a family and as a result of which it is either run as a sole enterprise or partnership. Due to this, most of the firm's organizational structure is pyramidal and as such decision making and information dissemination in the firm.

Although SMEs are seen as veritable and viable engines of economic development, the growth and development of SMEs especially SMCF in Nigeria have been slow and in some cases even stunted, due to a number of problems and challenges confronting this all-important sub-sector of the economy. Some of the problems highlighted by [23] include difficulties associated with complying with regulatory requirements in the specific areas of operations of the SMEs; problems of undercapitalization and difficulty with access to bank credits; bureaucratic bottlenecks; corruption and lack of transparency arising from government regulation and regulators; as well as government's lack of interest or focus in addressing the specific factors responsible for the abysmal performance of the sub-sector. [24] examined the problems and prospects of small building contractors in Nigeria and stated that the challenges facing small building contractors can either be induced by the operating environment (financial problems, government unfavorable fiscal policy (government policy, globalization effects, infrastructural facilities financial institutions etc) others are functions of the nature and character of SMEs themselves (poor management practice, poor accounting standards, shortage of manpower, financial indiscipline and corruption.

### **V. METHODS**

### **Research Hypothesis**

i.  $H_0$ : The level of implementation of TQM in SMCFs in South-East Nigeria is not low.

#### Participants

In this study, the population was 4 staff each from 456 small and medium construction firms that are registered in Abia, Ebonyi and Enugu in 2018. This gave it a total population of 1824 (456 x 4). Using taro Taro Yamane's N

formula n =  $\frac{N}{1+N(e)^2}$ When n = sample size N = population  $e^2$  = Margin of error (assumed 5%) 1 = unity or constant Therefore =  $\frac{1824}{1+1824 (0.05)^2}$   $\frac{1824}{1+(1824 \times 0.0025)}$   $\frac{1824}{1+4.56}$   $\frac{1824}{5.56}$  = 328 The sample size of 328 was adopted for this study

### Instrument

A survey instrument was developed and used to collect data. The survey items were composed and developed based on the review of related research literature of TQM. The survey consisted of two parts. The first part is composed of questions about basic demographic information. The second part of the questionnaire dealt with the concepts of TQM. Effort to implement and the level of implementation by itemizing 10 critical success factors of TQM. They are Leadership and top management commitment and leadership, Customer Focus, continuous improvement, employee participation, Recognition and Award, Training, Quality culture, communication, performance measurement and strategic planning. Each of the items in the survey was rated on a 5-point Likert scale. According to their perceptions of TQM implementation, participants were asked to assign a rating of 1 to 5 (strongly agree, partially agree, disagree, strongly disagree, and I don't).

## Validity and reliability

The factors had content validity since their items were adapted from the previous studies in the literature. Copies of the questionnaire were presented to three professionals in 2 small and medium scale construction firms for vetting. Their suggestions were incorporated into the final draft.

The reliability analyses of each of the ten critical success factors of TQM survey was performed using cronbach alpha. The results of reliability coefficients are presented in Table 1.

| Table 1: Reliability of TQM critical success factors |   |                     |  |  |  |  |
|--|---|---------------------|--|--|--|--|
| S/No   | Critical Success Factor                                 | Cronbach's<br>Alpha |  |  |  |  |
| 1  | Leadership and top management commitment and leadership | 0.869               |  |  |  |  |
| 2  | Customer Focus  | 0.980               |  |  |  |  |
| 3  | Continuous Improvement                                  | 0.989               |  |  |  |  |
| 4  | Employee Participation                                  | 0.982               |  |  |  |  |
| 5  | Recognition and Reward                                  | 0.963               |  |  |  |  |
| 6  | Training  | 0.954               |  |  |  |  |
| 7  | Quality Culture   | 0.879               |  |  |  |  |
| 8  | Communication   | 0.905               |  |  |  |  |
| 9  | Performance Measurement                                 | 0.806               |  |  |  |  |
| 10   | Strategic Planning                                      | 0.761               |  |  |  |  |

### **Pilot study**

The pilot involved a total of 7 respondents in the relevant firms and utilized the test retest approach. The questionnaire was administered to the 7 respondents who were asked to complete. After two weeks, the same questionnaire was administered to the same set of respondents. The responses for the first and second round were compared using the Pearson Product Moment Correlation Coefficient at a threshold of 0.7.Cronbach's coefficient alpha values vary between 0 and 1. It is also important to know that [25] suggest that alpha values above 0.7 can be considered as adequate.

### Data analysis

All statistical analyses were carried out using SPSS version 22. Percentages, means and standard deviations were used for the analysis. One Sample T – Test was used to test the hypothesis.

### Procedures

The survey was distributed to small and medium scale construction firms in 3 south-east Nigeria. They were delivered through mails and emails to the participant's email address along with a cover letter introducing and explaining the purpose of the study, stressing the confidentiality of responses and enlisting the response of the participant. A total of 328 questionnaires were distributed, and with follow-up phone calls and emails, 303 of the total were returned resulting in a 92% response rate.

## VI. RESULTS

## 6.1 Part One: General Information

94 respondents (31%) have worked between 1-5 years, 79 respondents (26.1%) have worked between 6 to 10 years, 67 respondents(22.1%) have worked between 11-15 years and 36 respondents(11.9%) have worked between 16-29 years, while 27 respondents (8.9%), have worked over 20 years. The trend therefore, shows that majority of the respondents are experienced and as such can provide informed opinion about the subject matter. In terms of their academic qualification, majority of the respondents (127) representing 41.9% have Bachelor's (first) degrees, followed by 79 (26.1%) who have M.Sc. The next is 62 (20.5%) who have Higher National Diplomas followed by 33 (10.9%) who have other qualifications. However, 2 respondents representing 0.7% have a PhD. Generally, the above scenario reflects the level of education, albeit the reasoning ability of the respondents, which is considered impressive, above average and will be pertinent for the total quality management issue under study.

106 respondents (35%) have between 10- 49 employees, 97 respondents (26.1%) have between 55 to 99 years, 54 respondents (17.8%) have between 150-199 years while 46 respondents (15.2) representing 15.2% have worked between 100-149 years. Following [21], small-size companies have between 10- 49 employees while medium size companies have between 50- 199 employees. This shows that majority of the construction firms are medium size and this supports what [26] says that that the majority of contracting firms in our construction industries were medium-size companies whose activities were limited to the locality.

## 6.2 Part Two: TQM Statements

## 6.2.1 Research question one

What are the concepts of TQM in construction industry?

## Decision rule

The mean base line is determined as follows; having five (5) likert questionnaire options which are

| SA= strongly agre | e - | - | 5 |
|-------------------|-----|---|---|
| A= Agree          |     | - | 4 |
| D= strongly disag | ree | - | 3 |
| SD= disagree      |     | - | 2 |
| DN= Don't Know    | · . | - | 1 |

The mean of the response option becomes

$$\frac{5+4+3+2+1}{r} = 3.0$$

Therefore the decision was made that any mean score up to and above the stated average of 3.0 was interpreted as accepted that is positive while any mean score below 3.0 was considered as reject that is negative. The first research question anchored on identifying the Concept of TQM in Construction Industry. The break down is indicated in table (2) below

#### Table 2: Ranking of the Concept of TQM

| Issues Raised  | Strongly<br>agree (5) | Agree<br>(4) | Strongly<br>disagree<br>(3) | Disagree<br>(2) | Don't<br>Know<br>(1) | Mean  | STD<br>DV | Rank |
|--|-----------------------|--------------|-----------------------------|-----------------|----------------------|-------|-----------|------|
| Is a management philosophy to achieve the organizational goal  | 141                   | 124          | 3                           | 4               | 31                   | 4.122 | 0.82      | 4    |
| It is an effective system to ensure<br>production and service at the<br>most economical levels that<br>allow customer satisfaction   | 199                   | 48           | 11                          | 19              | 26                   | 4.237 | 0.68      | 3    |
| It is an approach of continuous improvement in all quality   | 184                   | 68           | 22                          | 19              | 10                   | 4.310 | 0.79      | 1    |
| It is a quest for excellence,<br>creating the right attitudes and<br>quality control management<br>philosophy that promotes cost<br>effectiveness and sustainable<br>project quality to client<br>satisfaction | 63                    | 198          | 2                           | 16              | 24                   | 3.864 | 0.51      | 5    |
| Is a management practice<br>through the organization geared<br>to ensure the organization<br>consistently meets or exceeds   | 173                   | 73           | 33                          | 13              | 11                   | 4.267 | 0.62      | 2    |
| customer requirements<br>Grand mean  |                       |              |                             |                 |                      | 4.16  | 0.68      |      |

Source: Researcher's field survey (2018)

From the result in the table above, the mean of the individual questionnaire items are all above the criterion mean base line of 3.0 indicating that the questionnaire items answers the research questions one. More so the grand mean of the standard deviation is above 0.5 which also indicates that there is correlation among responses from the respondents. From the table 2 each of the respondents gave their personal evaluation of each statement. As the Table illustrates, Result show that It is an approach of continuous improvement in all quality ranks first with mean scores of 4.310, while is a management practice through the organization geared to ensure the organization consistently meets or exceeds customer requirements establishing housing budget ceilings ranked 2nd with a mean score of 4.267. Other concept such as it is an effective system to ensure production and service at the most economical levels that allow customer satisfaction (4.237), is a management philosophy to achieve the organizational goal (4.122) and it is a quest for excellence, creating the right attitudes and quality control management philosophy that promotes cost effectiveness and sustainable project quality to client satisfaction (3.864) ranked, 3rd, 4th and 5th respectively.

However the difference in their mean is small (minimal variance among their mean). They have an average mean of 4.16. This support what different authors stated that TQM is presented differently in different

points of view, as there is no general and formal definition of TQM which can fit or be implemented in all organisations within all sectors. TQM definitions are different in each region and each country, based on national and organisational culture and perception of quality, and the requirement of that culture.

## 6.2.2 Research question two

What is the current level of TQM implementation in SMCFs in South-East Nigeria?

The third research question stated," What is the current level of TQM implementation in SMCFs in South-East Nigeria?"

To answer this research question, means, standard deviation, t-test and ANOVA were computed. The results are presented in tables 3, 4 and 5

| S/N | Leadership and top management commitment and leadership   | Mean   |
|-----|---|--------|
| 1   | Top management actively participates in quality management activities   | 2.6898 |
| 2   | Top management learn quality-related concepts and skills  | 2.6799 |
| 3   | Top management discusses many quality-related issues in top management meetings   | 2.7822 |
| 4   | Top management focuses on product quality rather than yields  | 2.6370 |
|     | Customer Focus  |        |
| 5   | We actively and regularly seek customers input to identify their needs and expectations   | 2.9043 |
| 6   | Customer needs and expectations are effectively disseminated and understood<br>throughout the workforce   | 26007  |
| 7   | We systematically and regularly measure customer satisfaction   | 2.9076 |
| 8   | Ouality-related customer complaints are treated with top priority   | 2.8779 |
| U   | Continuous Improvement  | ,      |
| 9   | Company emphasizes improvement rather than maintenance  | 2.6601 |
| 10  | My company emphasizes the best implementation of continuous improvement process for all tasks at all levels   | 2.6766 |
| 11  | The company compare customer satisfaction levels with that of competitors   | 2.7558 |
| 12  | Company records are kept for future decision making and for the purpose of efficiency (learning from mistakes and identification of successful activities) and continuity | 2.8614 |
|     | Employee Participation  |        |
| 13  | Management meet employee regularly to update them on the progress or otherwise of the company   | 2.6799 |
| 14  | Employees are actively involved in quality-related activities   | 2.5941 |
| 15  | There is a conscious policy by management to ensure good working condition for<br>employees   | 2.1815 |
| 16  | Most employees suggestions are implemented after an evaluation  | 2.5545 |
|     | Recognition and Reward  |        |
| 17  | Our firm improves working conditions in order to recognize employee quality management efforts  | 2.7228 |
| 18  | Our firm has salary promotion scheme to encourage employee participation in quality management  | 2.4356 |
| 19  | Position promotions are based on working quality in our firm  | 2.4455 |
| 20  | Excellent suggestions are financially rewarded  | 2.1914 |
|     | Training  |        |
| 21  | Employees get training regularly to improve company outputs   | 2.5182 |
| 22  | Adequate resources are arranged for employee education and training   | 2.4719 |
| 23  | The company has scheduled employee training   | 2.4026 |
| 24  | There is scheduled training for the further development of management   | 2.6931 |
|     | Quality Culture   |        |
| 25  | Our firm constantly adapt to cultural change to fit with the changes in the business environment  | 2.7129 |
| 26  | There is an ongoing creation of quality awareness among employees   | 2.5809 |
|     | Communication   |        |
| 27  | Our company continually tries to improve communication  | 3.0693 |
| 28  | Our company clearly communicates its strategies and goals with employees  | 2.8515 |
| 29  | Employees receive regular feedback to make performance developments   | 2.5347 |
|     | Performance Measurement   |        |

## Table 3 Questions related to level of implementation

| 30              | My company adopts a self-assessment system to improve performance  |        |  |  |
|-----------------|--|--------|--|--|
| 31              | Competitive benchmarking is made against primary competitors   | 2.7426 |  |  |
| 32              | My company is tracking quality cost to reduce the cost of waste, rework and rejection  | 2.7393 |  |  |
|                 | Strategic Planning   |        |  |  |
| 33              | We know our company mission  | 2.4323 |  |  |
| 34              | Our firm has a comprehensive and structured planning process which regularly sets<br>and reviews short and long-term goals       | 2.9505 |  |  |
| 35              | Our firm incorporates the needs of all stakeholders when we develop our plans, policies and objectives                           | 2.5809 |  |  |
| 36              | There is a written statement of strategy covering all business operations which is articulated and agreed by our senior managers | 2.7063 |  |  |
| Overall average |  |        |  |  |
|                 |  |        |  |  |

## VII TESTING OF HYPOTHESIS

To test the null hypothesis: The level of implementation of TQM in SMCFs in South-East Nigeria is not low.

Data used: Table 2

Statistical tool: One Sample T – Test

Data analysis software: SPSS version 22

**Decision Rule:** Reject the null hypothesis if p-value is less than or equal to 0.05 [Level of significance ( $\alpha$ )]; otherwise do not reject.

## Table 3 One-Sample result of level of implementation of TQM

|                                    | Ν  | Mean     | Std. Deviation | Std. Error Mean |
|------------------------------------|----|----------|----------------|-----------------|
| The level of implementation of TQM | 36 | 2.644769 | .1985437       | .0330906        |

|  | Test Value = 3.0 |    |          |            |   |        |
|--|------------------|----|----------|------------|---|--------|
|  |                  |    | Sig. (2- | Mean       | 95% Confidence Interval of the Difference |        |
|  | Т                | Df | tailed)  | Difference | Lower                                     | Upper  |
| The level of<br>implementation of<br>TQM | -10.735          | 35 | .000     | 3552306    | 422408                                    | 288053 |

## Table 4 One-Sample Test

**Source:** Researcher's computation and extract from SPSS version 22 (2018)

**Decision, Conclusion and Reason:** From the first table, the mean there is 2.644769 and this mean is less than 3.0 which is the mean cut – off point. Then from the second table, the mean difference is -0.3552306 and the p – value is 0.000, less than 0.05. Since the P-value of 0.000 is less than 0.05. Hence we reject the null hypothesis and conclude that the level of implementation is low.

## VIII. CONCLUSIONS AND RECOMMENDATIONS

Based on the empirical results, it is reasonable to conclude that small and medium construction firms in south east Nigeria understand very well the concept of total quality management. They equally implement Total Quality Management (TQM) in their firms, however the level of implementation is low.

Understanding the concept of quality is not enough for meeting customer requirements. Therefore, it is important that the client's construction company should focus so as to understand their processes and end results which can be achieved by creating systematic processes for their activities that in turn facilitates achieving the quality that meets customer's requirements. In addition, enforcement of quality standards must be given urgent attention and those that will be appointed to enforce quality must be professionals with integrity. Adequate training should be given to all employees and management to improve their proficiencies in their tasks. With effective training, employees know the industry and the structure of the firm. In addition, effective training will improve employees' loyalty to the firm, motivation, and work performance.

Although the findings of the current study are limited to southeast and therefore not generalizable, this study still contributes to construction total quality management debate and can reflect quality assessment practices in other developing countries particular those in sub-Sahara Africa. A replication of this study using larger sample sizes and greater geographical diversity would be obviously valuable in re-examining the validity of its findings.

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