

CONSTRAINTS AND CHALLENGES IN THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT (TQM) IN CONTRACTING ORGANISATION

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ABSTRACT

Total Quality Management (TQM) is managing people and business processes to ensure complete customer satisfaction at every stage. As building projects get large and becoming complex, clients are requiring a higher quality standard for project delivery with lower construction cost. This study intends to assess the constraint and challenges in the implementation of TQM of construction companies. The cross-sectional research design is used for this study and the population entails construction professionals in indigenous and expatriate construction companies in Nigeria. Random sampling procedure was used to select the respondents. A total of 50 questionnaires were distributed and 30 was retrieved and used for the analysis. It gives a response rate of 60%. Statistical Package for Social Science (SPSS) 17th version is used to analyse using descriptive statistic and the Relative Importance Index (RII) of the level of importance of the factors were calculated. From the study is show that the factors affecting the implementation of TQM are management commitment factors, the role of quality department and training and education. The challenges of TQM are lack of available quality system documentation, lack of understanding of the process requirement and high cost to implement TQM. In conclusion, Nigeria construction companies do not have quality control and assurance manual that will be a guide to monitor the quality of the end products as such most projects are abandoned as a result of poor quality workmanship. It was therefore recommended that Nigeria construction companies should develop a framework for the purpose of quality standard and for them to compete with their counterpart globally.

Keywords: Construction Industry, Contracting Organisation, Nigeria, Organisation culture, Total Quality Management.

1. INTRODUCTION

Total Quality Management (TQM) is a way of managing people and business processes to ensure complete customer satisfaction at every stage. It emphasizes on a commitment to quality, communication of the quality message and recognition of the

need to change the culture of the organisation to create total quality. Customer satisfaction is one of the main objectives of TQM which directed organisational efforts towards the goal of TQM. TQM enhances innovative process in an organisation through continual improvement, thus ensure sustainable development (Bon & Mustafa, 2013). According to Ugboro and Obeng (2000), with the full adoption and implementation of TQM, there should be a turnaround in corporate culture and management approaches as compared to the traditional way of management in which top management gives order and employees merely obey them.

TQM is the management philosophy and company practices that aim to harness the human and material resources of an organisation in the most effective way to achieve the objectives of the organisation. The TQM concept is an aspect of continuous improvement which aims at quality as a key parameter of any successful business, hence the quality of a product or service is essential to TQM. According to Phenga and Teo(2004), TQM is a “journey” hence a change in behavior and culture of the organisation. TQM entails managing construction activities, the stakeholders, and construction process from the early stage of the project till the completion stage. TQM focus on meeting client requirement by providing quality services at a cost that provides value to the client. TQM can be sustained through leadership style at all levels of the organisation (Alwi *et al.* 2011).

TQM is a successful philosophy in the manufacturing sector (Bakar, *et al.* 2011) but the construction industry is behind other industries in implementing this concept. However, it can be adopted to improve quality and productivity and to ensure clients get good value for money (Phenga & Teo,2004). TQM also ensures reduction in quality costs (Iruobe, *et al.* 2010), better employee, job satisfaction because they do not need to attend to defects and client complaints (Phenga & Teo,2004), recognition by clients, work carried out correctly from the design stage and closer subcontractors and suppliers cordial relationships. TQM performance can be measured through top management commitment, customer involvement and satisfaction, employee involvement and empowerment, customer-supplier relationship and process improvement and management (Ahmadinejad *et al.* 2005; Baidoun, 2004; Atar, 2013).

Hernandez and Aspinwall(2008) cited in Odusami *et al.*(2010) opined that construction industry in UK had taken up the challenges of quality management hence it has led to increase in market shares and improvement in customer satisfaction unlike Nigeria where corruption practices and reconstruction of the oil boom as lead to poor quality construction projects, scarcity of materials, poor workmanship, poor quality output, delay, cost overrun and collapse of work due to not adhering to quality management According to Arditi and Gunaydin (1997) management commitment to improvement in the USA is very important; hence the construction professional should ensure adequate quality training, partnering agreement among the parties in the construction process in order to ensure quality end products. However, a feedback loop will ensure the improvement of the original quality used in the organisation. A clear understanding of the project scope, drawing, specification, and communication will aid quality process.

To be competitive in today’s market, it is necessary for construction companies especially developing countries like Nigeria to provide quality and value to their clients. Contractors who are the suppliers of construction services must address the

needs of the clients for projects success because clients need mirror the economic pressure and challenges faced by the contractors and the construction professionals. Hence the old adversarial procedure to manage construction projects should be put behind and a better means of developing direct relationships with the client should be adopted through teamwork at the job site.

TQM is widely used in manufacturing, health sector and other industries but rarely used in the construction industry (Pheng & Teo, 2003; Sodangi *et al.* 2010). TQM is a new approach in the construction industry (Madar, 2015). In relation to performance, TQM ensures client satisfaction, reduced wastage, increase in productivity, Just in Time”, low cost, teamwork among the stakeholders, and workers on construction sites (Madar, 2015; Al – Shdaifat, 2015). However, the construction industry requires a cultural change for the implementation of TQM from the top managers. The construction industry only requires TQM to provide a competitive advantage and improve their financial performance. TQM should be established to provide quality management at all phases of the projects since client satisfaction is the main prerequisite for quality management. Hence this study intends to assess the factors mitigating TQM of construction companies to ensure clients’ satisfaction and project delivery within time, cost and quality standard.

2. LITERATURE REVIEW

The construction industry globally enhances national construction demand by promoting industry performance, competitiveness and improved value for clients (Milford, 2009). Thus construction industry is an industry that contributes to a nation social and economic development (Adeagbo, 2014). It was realized that in Singapore that the industry required skill works for performance, while in South African there must be an enabling environment for the transformation of the industry. Hong Kong required a better procurement process for a better performance of the industry (Milford, 2009). These countries require an increase in the international competitiveness of their construction sector in order to secure a high proportion of business.

However, the industry enhances employment generation and contributes to the Gross Domestic Product (GDP) and Gross Fixed Capital Formation (GFCF) of any country (Okoye, 2016). It is only the construction sector that occurs twice in the national account of every nation (Lopes, 1998). The GFCF entails the total value of all new construction which includes construction works (building and civil engineering works). This also includes all capital alternatives that improve the lifespan of the project.

In 2006, it was reported that the construction industry is responsible for an average of 5-7% improvement of the GDP growth and over 42% of the GFCF over the last four decade (Olatunji & Bashorun, 2006). According to Anyanwu, et al. (2013), study agriculture was identified as the highest share of GDP and the least contributor to GDP was identified as the building and construction sector from 1990 to 2008 in Nigeria. Although the construction industry in Nigeria was identified as a fast growing sector of the economy, which recorded a growth rate of more than 20%

between 2006 and 2007. This growth has, however, not been commensurate with the growth of Nigeria's total GDP as the overall contribution of the construction sector to the country's GDP remains very low (Okoye, 2016).

The construction industry in Nigeria is growing in complexity and in order to be competitive at the global level (Agwu, 2012), total quality management should be strictly adhered to in order to ensure clients' satisfaction and for profitability. Many Nigeria construction companies have comprehensive quality plans just as safety plans as opined by Hinze (1997) cited in Agwu (2012) but the quality of the plan does not necessarily correlate to the company quality performance. Quality in each phase is affected by the quality in the preceding phase, therefore, customer service in each phase is important for the overall quality performance of the process (Oduami *et al.* 2010). Quality is, therefore, an important feature of any construction companies because the safety of the construction companies and the stakeholders depends on the quality of the structure (Idoro, 2010).

Haupt and Whiteman (2004) and Bubshait and Al-Atiq (1999) reiterate that TQM as a management system has not been effective in the construction industry as much as it has been in other industries because of lack of adequate budget, failure to plan for quality, inadequate training at all levels except for top or senior management positions (Gunning & McCallion, 2007), and little recognition given to those who strive for quality improvement on their projects. Contractors have failed in setting out adequate funds required for the accomplishments of improving and maintaining the requisite quality expected of construction products and services.

According to Willar *et al.* (2009), the all-encompassing management philosophy, termed Total Quality Management (TQM) has generated a tremendous amount of interest and has emerged in the forefront as a major management movement, influencing many sectors of the economy worldwide. The subject matter has churned up some commitment on the part of the management of most contracting organizations, thereby increasing the level of quality culture available in those organizations. TQM consists of management principles aimed at achieving quality performance in all aspects, i.e. product, service, process, profit and productivity (Sodangi *et al.* 2010; Idrus & Sodangi, 2010). The fundamental difference between the QA/QC (Quality assurance/Quality control) approach and TQM is that the former is a "top-down" approach, whereas the latter is a centralized approach which makes TQM consists of management principles aimed at achieving quality performance in all aspects, i.e. product, service, process, profit, and productivity. The principles of TQM have been widely used by the manufacturing and service industries, and they have seemingly been welcomed by the construction industry as an opportunity to improve construction quality management (Sodangi *et al.* 2010). The success of applying TQM to the construction industry would be felt in the nearest time. Considerable research has been directed at implementing TQM in the construction industry. Most of which deal with specific building blocks of TQM (e.g. service quality, continuous improvement), with some attention focused on identifying opportunities, barriers to and procedures for implementing TQM in construction firms.

Zadry and Yusof (2007) developed the Theory of Constraints (TOC), this is to assist organizations to think about the problems, develop breakthrough solutions and

implement those solutions successfully by using Decision Tree analysis. The TOC can be assimilated into TQM implementation as a mechanism to ensure profitability and productivity of an organization. According to Panuwatwanich and Nguyen (2017), not all industries that implemented TQM had positive satisfaction. Thus Suwandeji (2015) opined that for public organization TQM factors affecting their implementation are leadership, training, organizational structure, communication, incentives, measurements and evaluation and teamwork. In addition, they noted that for management of strong teamwork, appropriate training, incentives and evaluation and effective communication contributed to public organization success.

Panuwatwanich and Nguyen (2017) stated that failure of TQM implementation is primarily due to lack of integration of TQM with cultural change. It is a rather a complex project for an organisation. However researchers have identified the types of organization culture to ensure successful TQM implementation and relate these organisation cultures between each other to show their relationship positively and negatively to TQM performance (Prajogo & McDermott, 2005; Zu *et al.*, 2009; Gimenez – Espin *et al.*, 2013). The organisation culture includes clan, adhocracy, and hierarchy and market culture. Changing things is easier than changing people thus the problem solving is easier than the cultural change aspect of TQM process.

3. RESEARCH METHODOLOGY

Survey research was used for this study and the population consists of construction professionals in construction companies in Nigeria. The construction professionals are made up of Quantity Surveyors, Engineers, Builders and Architect in both indigenous and expatriate construction companies. Random sampling technique was used, thus every respondent has an equal chance of being selected. A total of 50 questionnaires were distributed and 30 were duly filled and returned for the purpose of analysis. It shows an average response rate of 60%. SPSS 17th version was used for the analysis of data. Frequency, percentage and relative importance index (RII). RII formula as applied to this study is:

$$RII = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{5(n_5 + n_4 + n_3 + n_2 + n_1)}$$

where: 5-very importance, 4- importance, 3- moderately importance, 2- of little importance, 1- not importance

4. FINDINGS AND DISCUSSION

4.1 Demographical information of respondents

4.1.1 Professional qualification of respondents

Figure 1 is a graphical representation of respondents, from the bar chart 14 of the respondents are project managers, 8 are Engineers, 3 are architects and builders and 2 are quantity surveyors. It shows that TQM is an aspect of management which entails quality assurance and control hence the project's managers should have adequate skill in the knowledge of quality management. This is in support of Madar (2015), study

that TQM is an aspect of corporate management.

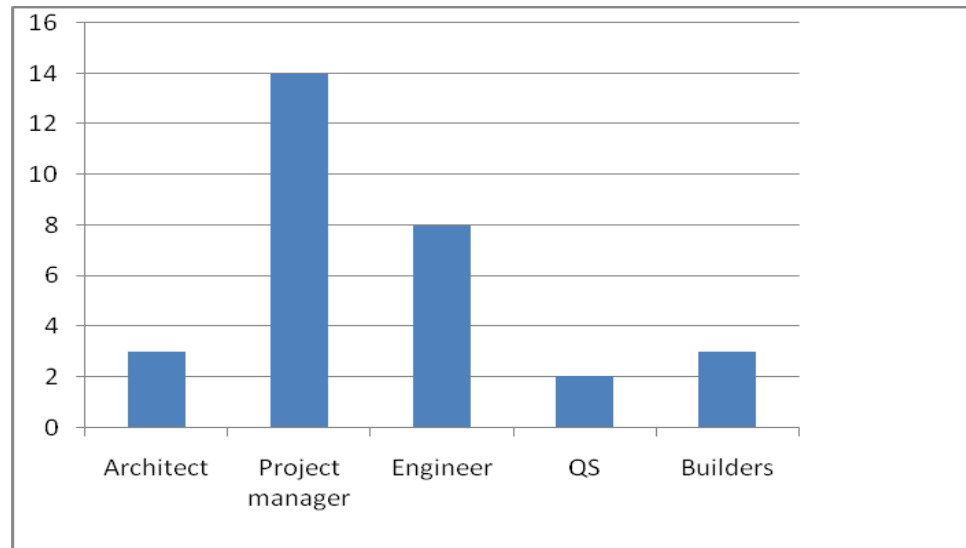


Fig1: Professional Qualification of the respondents

4.1.2 Numbers of years in the construction companies

From Figure 2 the number of years respondents have spent in the construction companies shows that 10 of the respondents have spent between 3-6years in the construction companies, 7 have spent 11-15years while 6 have spends not less than 3years. This confirms that the respondents have adequate experience within the construction companies to be able to provide information on the total quality management of contracting organisation.

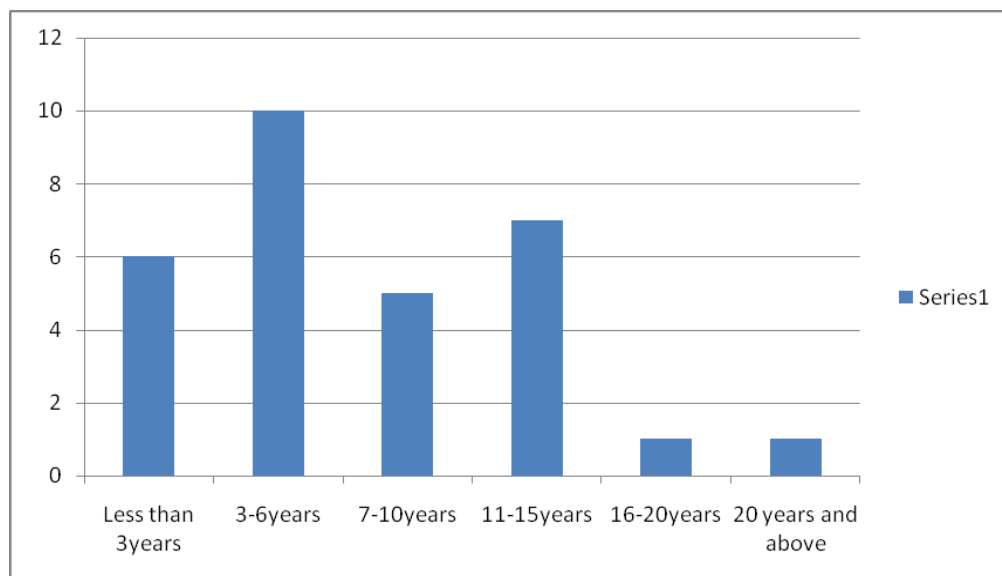


Fig2: Numbers of Years in construction companies

4.2 Factors affecting implementation of TQM

The result of the factors affecting the implementation of TQM is displayed in Table 1. The identified factors are management commitment factors, the role of quality department, training and education, employee involvement, supplier partnership, project design, quality policies, quality data reporting and clients' satisfaction orientation. Each of these major factors consists of sub factors as shown in the table below.

For management commitment factors, the most significant factors are top management assumes responsibility for quality performance (RII =0.93), acceptance of responsibilities for quality by the departmental head (RII= 0.89) and clear consistent communication of mission statements and objectives (RII=.0.89). For the role of quality department, the establishment of the quality department (RII=0.88), the effectiveness of quality awareness (RII=0.82) and effectiveness of the department (RII =0.81) is an important factor for implementation of TQM.

Quality related training given to managers, supervisors and employees (RII=0.89), Specific work skill training given to employee through the company (RII=0.85) and Training in problem identification, solving skills and quality improvement skills (RII=0.82) are important factors affecting training and education for implementation of TQM. For employer involvement factor, quality circle or worker involvement in type organization (RII=0.81), recognition of employee for superior quality performance (RII=0.78) and participation in quality decision by non-supervisory employees (RII=0.77) are relative importance factors while for suppliers partnership, use of supplier rating system (RII=0.83), selection of the supplier based on quality instead of price (RII=0.82) and clarity of specification provided by supplier (RII-0.81) are major significant factors.

Coordination among professionals involved in project design (RII=0.91), analysis of client's requirement (RII=0.89) and Clarity of project design (RII=0.88) are most importance project design factors. For quality policies, Implementation of strategies focused on quality (RII=0.89), self inspection of work by workers and inspection (RII=0.87), review and checking(RII=0.87) are importance factors while for quality data and reporting the relative importance index factors that are deemed importance are extent to which quality data are available to managers and supervisors (RII=0.82), extend to which quality data are used as tools to manage quality (RII=0.80) and extent to which quality data are available to employees (RII=0.80). Determinations of improvements in client's satisfaction (RII=0.89) and Commitments to clients through the strengthening of policies (RII=0.87) are major significant clients' satisfaction orientation factors for TQM implementation.

Table 1: Factor Affecting the Implementation of TQM

Factors Implementing TQM	RII	R
A. Management commitment factors		
Top management assumes responsibility for quality performance	0.93	1
Acceptance of responsibilities for quality by departmental head	0.89	2
Clear, consistent communication of mission statements and objectives	0.89	2
Top management supports long term quality improvement process	0.87	4
Degree top management considers quality improvement as a way to increase profits	0.85	5
Degree of comprehensiveness of the quality plan within the company	0.83	6
Specificity of quality goals within the company	0.82	7
Quality goals and policy are understood within the company	0.82	7
Importance attached to quality by the top management	0.81	9
Commitment of the top management to employees training	0.78	10
B. Role of quality department		
Establishment of quality department	0.88	1
Effectiveness of the quality awareness	0.82	2
Effectiveness of the quality department	0.81	3
Visibility of quality department	0.80	4
Quality department accesses to top management	0.79	5
Utilization of quality staff professionals as consulting resources	0.79	5
Autonomy of the quality department	0.75	7
C. Training and education		
Quality related training is given to managers, supervisors, and employees	0.89	1
Specific work skill training is given to employee through the company	0.85	2
Training in problem identification, solving skills and quality improvement skills	0.82	3
Programs to develop teamwork among employees	0.81	4
Training in the total quality concept	0.81	4
Quality awareness building among employees	0.79	6
Availability of resources for employee training	0.79	6
Training for employees to implement quality circle type program	0.78	7
Training in interactive skills	0.77	8
Employees are trained in statistical improvements techniques	0.69	9
Training in advanced statistical techniques in the company	0.62	10
D. Employee involvement		
Quality circle or worker involvement in type organisation	0.81	1
Recognition of employee for superior quality performance	0.78	2
Participation in quality decision by non supervisory employees	0.77	3
Involvement of lower level workers in decision making by top management	0.67	4
E. Supplier partnership		
Use of supplier rating system	0.83	1
Selection of the supplier based on quality instead of price	0.82	2
Clarity of specification provided by the supplier	0.81	3
Technical assistance to improve the quality and responsiveness of suppliers	0.78	4
Involvement of the supplier in the project development process	0.67	5
F. Project design		
Coordination among professionals involved in project design	0.91	1
Analysis of client's requirement	0.89	2
Clarity of project design	0.88	3
Determination of quality standard	0.87	4
Design of the implementation system	0.85	5
G. Quality policies		
Implementation of strategies focused on quality	0.89	1
Self-inspection of work by workers	0.87	2
Inspection, review, and checking	0.87	2
Policy of preventive equipment maintenance	0.84	4
Clarity of work or process instruction given to the employee	0.84	4
Use of acceptance sampling to acceptance lots of hatches of work	0.81	6
Zero defect as the quality performance standard	0.79	7
Use of statistical control charts to control process	0.75	8
H. Quality data and reporting		
Extent to which quality data are available to managers and supervisors	0.82	1
Extent to which quality data are used as tools to manage quality	0.80	2
Extent to which quality data are available to employees	0.80	2
Extent to which quality data, control charts are displayed at employees' work site	0.76	4
I. Client's satisfaction orientation		
Determination of improvements in client's satisfaction	0.89	1
Commitments to clients through strengthening of policies	0.87	2
Comparisons of client's satisfaction with competitors and internal indicators	0.85	3

4.3 Maintenance factors of TQM in contracting organization

The respondents were told to rank their level of importance to the various maintenance factors of TQM. From Table 2, it shows that management committee (MIS=0.93) and quality awareness and review (MIS=0.91) were the major significance factors responsible for the implementation of TQM. Other significance factors include:

develop a quality improvement plan (MIS=0.87), quality measurement (MIS=0.86) and identify client's requirements (MIS=0.85). Establish an ad-hoc committee for zero defect programme (MIS=0.74), do it all over age (MIS =0.73) and supervisor (MIS=0.66) were the least rank important factors for implementation of TQM.

Table 2: Factors responsible for the successful maintenance of TQM in contracting organization

Maintenance Factors	MIS	Rank
Management commitment	0.93	1
Quality awareness and review	0.91	2
Develop a quality improvement team	0.87	3
Quality measurement	0.86	4
Identify client's requirement	0.85	5
Goal setting	0.85	5
Cost of quality	0.84	7
Analyse feedback	0.84	7
Define specification	0.83	9
Application of evaluation measurement	0.81	10
Error causes removed	0.81	10
Zero defect day in a year/month/week	0.81	10
Correction action	0.81	10
Recognition of people	0.79	14
Quality councils	0.76	15
Establish an ad-hoc committee for the zero defect programme	0.74	16
Do it all over the age	0.73	17
Supervisor training	0.66	18

MIS – Mean Item Score

4.4 Challenges in the implementation of TQM in contracting organisation

From Table 3, it shows that lack of available quality system documentation (MIS=0.75), lack of understanding in the process requirement (MIS=0.75), high cost to implement (MIS=0.74), lack of TQM exposure (MIS=0.74) and lack of planning (MIS=0.74) were the most important challenges faced in the implementation of TQM in contracting organisations. The least rank challenges as rated by the respondents were the difficulty of verbal communication (MIS=0.64), Lack of subordinate propensity to follow orders (MIS=0.60) and Lack of time to implement TQM/time consuming (MIS=0.59).

Table 3: Challenges in the implementation of TQM in contracting organisation

constraints on implementation of TQM	MIS	Rank
Lack of available quality system documentation	0.75	1
Lack of understanding of the process requirement	0.75	1
High cost to implement TQM	0.74	3
Lack of planning to implement TQM	0.74	3
Lack of TQM exposure	0.74	3
Lack of continuous professional development	0.73	6
Lack of documentation of suppliers, materials, and services	0.72	7
Lack of awareness in benefit of TQM	0.71	8
Lack of support from the top management	0.71	8
Lack of understanding in the TQM	0.70	10
Difficulty of verbal communication	0.64	11
Lack of subordinate propensity to follow orders	0.60	12
Lack of time to implement TQM/time consuming	0.59	13

4.5 Discussion of Findings

From the analysis, it shows that the factors affecting the implementation of TQM in Nigeria contracting organisation are grouped into these following factors. They are management commitment factors, the role of quality department, training and education, employee involvement, supplier partnership, project design, quality data and reporting and client's satisfaction orientation. From these major factors, the various factors identified are top management assumes responsibility for quality performance, acceptance of responsibilities for quality by departmental head, clear consistent communication of mission statements and objectives, establishment of quality department, effectiveness of quality awareness, effectiveness of the department, supervisors and employees, specific work skill training given to employee through the company, training in problem identification, solving skills and quality improvement skills, quality circle or worker involvement in type organisation, recognition of employee for superior quality performance, participation in quality decision by non - supervisory employees , use of supplier rating system, selection of the supplier based on quality instead of price, clarity of specification provided by supplier, coordination among professionals involved in project design , analysis of client's requirement, clarity of project design, implementation of strategies focused on quality, self inspection of work by workers, inspection, review and checking, extent to which quality data are available to managers and supervisors, extent to which quality data are used as tools to manage quality, extent to which

quality data are available to employees, determinations of improvements in client's satisfaction and commitments to clients through strengthening of policies. According to Suwandej (2015), factors affecting TQM identified were training, teamwork, leadership, communication and organisation structure. It is in agreement with the findings of this study. Other factors identified by other researchers were human resources utilization, management process control, strategic quality planning and top management knowledge (Lewis *et al.*, 2006; Soltani *et al.*, 2008; Abdallah *et al.*, 2009).

The maintenance factors responsible for successful implementation of TQM are management commitment, quality awareness, and review and developing a quality improvement team. However, the following difficulties are an issue faced by the stakeholders in the implementation of TQM in Nigeria as identified in this study. They are a lack of available quality system documentation, lack of understanding of the process requirement, high cost to implement, lack of TQM exposure and lack of planning. These identified challenges will enable Nigeria construction companies to compete in the global market. Dahiya and Bhatia (2013) identified quality culture, autocratic style of leadership, the improper channel of communication and lack of employee committee as a challenge for implementation of TQM. Their findings are in line with this study. It shows that for implementation of TQM in an organization adequate planning through proper channel of communication is important.

5. CONCLUSION AND RECOMMENDATION

In conclusion, the factors affecting implementation of TQM in Nigeria construction companies are management commitment factors, the role of quality department, training and education, employee involvement, supplier partnership, project design, quality data and reporting and client's satisfaction orientation. However, the construction companies are also faced with the challenges of lack of available quality system documentation, lack of understanding in the process requirement, high cost to implement TQM, lack of TQM exposure and lack of planning. These issues prevent the Nigeria construction companies from competing with their counterpart in the global world and the clients are not satisfied with the end products hence there are cases of cost overrun, delays and collapsing of the building. Nigeria construction companies should develop strategies or framework for effective implementation of TQM so that they could compete in the global market. The total quality manual should be enforced to ensure quality control and quality assurance mechanism in all construction process.

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