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Barriers and Benefits of Total Quality Management in the Nigerian Construction Industry: A review

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***Abstract*—** The more bigger a building project becomes, the more complex it will be, coupled with the fact that clients are now demanding for higher quality at a reduced cost and budget, these and many other challenges are faced by construction companies on how to adopt a strategy for higher quality at a reduced cost without affecting their profit margin and the clients requirement. This study recommends TQM as the only ways of solving these challenges in the construction industry.

***Keywords*—** TQM (Total quality management), Quality, client requirements, profit margin.

I. INTRODUCTION

Nowadays, construction professionals are faced with multifaceted challenges. Unprecedented changes are occurring in the construction industry, in the techniques, skills, methodology and most especially the expectations and attitudes of clients toward the end product of their building project. Quality has been a major problem in the Nigerian construction industry, especially when every construction professionals talks about quality, demand and promise quality in project implementation but in the end, fails to meet up with the required standard and client expectations. It is unfortunate that construction projects in Nigeria has continue to be plagued by unprecised quality goals and methods, all this contributes to a long term consequence in the construction industry in general. [1] the attainment of acceptable level of quality in the construction industry has been a problem, great expectation of time, money and resources both human and materials are wasted every year because of insufficient or non-existence of quality management procedures. [2] traced this chronic problem to low productivity, poor health and safety, inferior conditions, and inadequate quality management techniques which mean the standard of quality in the construction has not been properly managed. This problem may have an immediate or subsequent effect on the construction industry because competition has greatly intensified worldwide; organizations are looking beyond the firm next door to down sized competitors. Clients are now highly selective, banking on the past records of a company before giving out contracts. Therefore while majority of substandard work could be identified and rectified during construction and maintenance stage, certain defect may only be evident after the facilities are in operation and this could cause unnecessary nuisance to the owner [3]. Hence, most construction companies or organization need to change their concept of quality in order to survive in this highly competitive industry. [4] stated that the ability to identify what is changing in the environment and respond proactively through continuous improvement efforts has been viewed as a key element needed for organizational success. Accordingly, this study seeks to contribute to the literature by providing an insight on the barriers and benefits of implementing TQM in the Nigerian construction industry. In particular, this study aimed to:-

- Identify the barriers of practicing TQM in the Nigerian construction industry
- Determine the benefits of TQM in the Nigerian construction industry
- Suggest ways of improving TQM in the construction industry

II. STATEMENT OF PROBLEM

The major problem faced by most construction company in Nigeria is on how to adopt a strategy for high quality building that will satisfy the needs of the owner at a reduced and effective price and still ensure that they remain in business without any involvement in debt. Solving such a problem can be frustrating Most times, because various goals often seem to be inconsistent with one another such as low quality building resulting in the owner's dissatisfaction. These problems are multifaceted due to the fact that the owner wants to spend the least amount possible for the highest quality end product. The challenge now arises on how the company will meet the demand of the clients by providing high quality building at the lowest cost particularly in a time of extensive competition from various bidders. These and many more other factors increase the quality problem and results in company cutting corners in an effort to be more competitive, sometimes they also reduced bids by cutting profit margins in the hope of winning the few jobs available.

III. DEFINITION OF QUALITY AND TQM

Quality and TQM is more than a term but an activities that involves implementation, there are very few organizations, which have understanding of the real essence of the systems and implementation of quality. Most organization majorly concentrate in getting certified by ISO 9001 without actually implementing the quality system, their basis for getting certification is just based on the stiff competition in the outside

world which [5] refers to as "mere certification to get entry into the world market, he further explain that the concentration of organization is just to get the certificate, the need for implementation of ISO 9000 was understood in a wrong way and bringing the respect for the system down. Therefore quality is understood by different people in different ways, no matter what definition we follow for quality, it becomes very complex when we try to put it into actual practice [6]. According to ISO 9000 quality is defined as "The totality of characteristics of an entity that bears on its ability to satisfy stated or implied needs. American society for quality also define quality as an excellence in goods and services, especially to the degree they conform to requirements and satisfying customers. [7] explains quality as (a) conformance to the agreed requirement of the customer and (b) a product or services free of deficiencies. [1] explain quality based on the construction industry as "The meeting of requirements of the designer, constructor, and regulatory agencies as well as the owner. [8] believe quality is simply the conformance to ISO 9000 criteria. According to [9] quality is explained as the totality of features and characteristics of products that bears on its ability to satisfy stated or implied needs. It is obvious that there are no précised definition of quality due to various understanding and perspectives to individual, organization and researcher; but the major emphasis of agreement by different perspectives is "conformance to customer requirement". Understanding of what constitutes quality is essential by measure's to be taken [10]. TQM is often referred to as a journey, not a destination [11]. [12] believe that higher customer satisfaction, better quality products, and higher market can be achieved through the implementations of TQM. TQM is the way of life of an organization committed to customer satisfaction through continuous improvement [13]. TQM is also a corporate cultures characterized by increased Customer satisfaction through continuous improvement in which all employees in the firm actively participates [14]. They further explain that TQM can be the culmination of the following:

a. Quality

Is to continuously satisfy customers expectation

b. Total Quality - Is to achieve quality at low cost

c. Total quality management

Is to achieve total quality through everyone's participation. Therefore TQM is to continuously satisfy customers or client expectation and achieving quality at a low cost through everyone's participation.

IV. PERSPECTIVES PERSPECTIVES OF QUALITY IN THE PAST AND QUALITY IN THE PRESENT

Perspective of quality in the past and present

Perspective of Quality in The Past And Present: The manner in which we see quality in the past is different from the way we see it today, many researcher have carryout an in-depth research on the real meaning of quality, though for the past 30-40yrs there have been a reasonable improvement in the areas of quality , this improvement can be seen in the Table 1.0

TABLE 1

Past	***Present***
Quality is the responsibility of white collar workers and direct labor employees working on the product or building	Quality is everyone's responsibility, including white collar workers, the indirect labor force and the local staff
Quality defects should be hidden from the customer or client	Defects should be highlighted and brought to the surface for corrective action
Quality problem lead to blame, faulty justifications and excuses	Quality problems lead to cooperative solution
Corrections to quality problem should be accompanied with minimum documentation	Documentation is essential for lessons learnt so that mistake are not repeated
Increased quality will increase project cost	Improved quality saves money and increases business
Quality is internally focused	Quality is customer focused
Quality will most occur without close supervision of people	People want to produce quality products
Quality occurs during project execution	Quality occurs at project initiation and must be planned for within the project

a. Source: Kezner. (2003)

Barriers Of Practicing Tqm In The Nigerian Construction Industry

II) Barriers of Practicing Total Quality Management In The Nigerian Construction Industry:

Quality management practices include all the means employed by managers in an effort to implement their quality policies [15]. These activities include quality planning, control, assurance and quality improvement [15]. It has been widely accepted that there are some basic pitfall that prevents practioners from being quality organizations [13], this and many others are greatly affecting the popularity of the industry. The aim of construction companies may differ, but the importance of customers is a matter of common interest, and the ability of construction companies to adapt to new customer requirements is of vital importance for long term success. All enterprises regardless of size and financial status are involved in the quality revolution, QM is considered to be as important for small organizations as it is for larger organization but there are some barriers preventing the full implementation of TQM by organizations. Sometimes the problem can be traced to the

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nature of the construction process; that is , the projects are often very large, labour intensive and seldom situated in the same location, the workforce tends to be transient and demand fluctuates, subject to the client's perspective of value of the construction project. The intrusive complexity, uncertainty and dynamics of most construction projects create difficulties for even the best managers [16]. This makes construction projects a multifaceted activities where participants, each with their own perspectives and interest, are brought together to complete a project plan that typically change several time during construction, this changes most of a time lead to delay in completion of a construction project which nevertheless affects the quality of works. [17] observes that the construction industry has been reluctant to embrace the full concept of TQM. In a related development [17] found that the construction industry is reluctant to change, but is now trying to catch up with the TQM revolution that has transform many businesses. This have notwithstanding stripped the construction industry from the basics elements, which makes tasks become formidable [17]. [1] also highlighted another barriers which he describes as inefficient or non-existence quality management procedures, he further explain that attainment of acceptable levels of quality in the construction industry has long been a problem because great expenditure of time, money and resources, both human and materials are wasted very year. In a report presented by [18] the following were explained as the major barriers of TQM in the construction industry;

- **The nature of the construction process** – According [18] the nature of the construction is a complex system in which several participants, each with their own perspectives and interest , are brought together to complete a project plan that typically changes several times during construction.

- **Many parties involved in the construction process**; All the parties involved in the construction industry try to protect their own interests, even though a common project goal is share, they still tends to differ in what they hope to gain from the construction process [18].

- **Non-standardization -** The construction industry is characterized by its non-standardization, products are one offs and the production processes are to some extents different from each other, which means that no universal standard or specification can be applied to the product, which leads to difficulties in quality assurance [18].

- **Bidding process -** some contract bidding is open to only general contractors, who are required to do the hiring of subcontractors after they are awarded the contract, hence, some contractors only try to reduce allotted resources toward quality management in order to maintain a healthy profit margin for the job, thus attempts can be very costly. There are some other barriers which can be identified as ineffective tendering based procurement methods and lack of partnering based approach, Lack of payment of project management experience, skills and knowledge [19], organization fragmentation [20] and poor change and communication management [21], management commitment and leadership, training, teamwork, statistical methods, customer services, supplier involves and cost of quality. According to [22], the composition of product and services mostly differ from each other, and every project continues in a different place or environment. However, changing its location constantly can have some deficiencies in getting a quality concept. [22] further explain that the most important problem of the sector is lack of education of workers, when the workers are not well trained, the outcome of the product will be affected, and hence quality will not be achieved. [23] opined that installing any system without some measures of verifying whether it is doing the job it is intended to do is a waste of time and effort, he further explains that it is being effective after establishing a quality systems. [24] also found that most companies have no objectives measures apart from their perception of the system effectiveness. Another barriers identified by [25] indicates that site managers along with their supervisors establish quality but their decision are highly arbitrary. [26] identifies diversity and complexity of inputs, transformation processes used and output products produced by the construction industry and the fragmentation of quality management tasks. The fragmentation according to [26] is due to the many participants involved in the construction quality management since all their input contributes to the achievement of quality; their input can be integrated in a holistic and consistent way in manner which minimizes conflicts of interest. Lack of adequate budget, failure to plan adequately for quality, inadequate training at all levels except for top or senior management position and little recognition given to those who strive for quality improvement or project [27]. Table 2.0 summarizes the barriers of TQM in the construction industry.

TABLE 2

Barriers of TQM in the construction Industry	
1.	Lack of top management support
2.	Lack of top management leadership
3.	Difficulties in mapping processes and developing standard procedures
4.	Difficulties in taking corrective and preventive actions
5.	Difficulties in employing statistical quality control techniques in construction process
6.	Lack of workforce qualified in quality management implementation
7.	Lack of effective team/team building skills

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8. Difficulties in including quality measures, continuously monitored & construction process
9. Need for employing skills workforce
10. Difficulties in developing quality information system in construction process
11. Difficulties in quantifying cost of poor quality
12. Increases in paper work
13. Difficulties in finding workers who can claim to be experts in both construction and quality
14. Need for conducting continuous training programs for employee
15. High cost of developing and utilizing a quality management system
16. Difficulties in quantifying cost of quality
17. Incompatibility of standardized quality management system with the construction industry
18. Primary customer focus
19. Well-developed planning
20. Too tight schedules
21. Effects & established communication system
22. Transient nature of work
23. Selection of how bid subcontracting
24. TQM application to all field operation
25. Field employee regards TQM is irrelevant
26. Training for staff at all levels
27. Low education level of field forces

b. Gupolat, Adilla Damch and Yalcum Tatar (2011), Kazemi (N.d)

The major causes for the decline of construction productivity directly or indirectly involves poor management practice, that is, the commitment of organization and its thorough understanding of TQM can lead the firm to realization of higher quality in its undertaking. Usually the quality orientation is recognized by an organization commitment to developing and maintaining core competence based upon a quality focus. [28] traced the basic barriers of TQM in the UK to the fact that few firms appreciate TQM as a total effort and require culture change and management behavior, despite TQM initiatives. [28] asserted that organizational segmentation, reluctant managers, industrial relation and short term mission are some of the barriers of TQM implementation in UK. [29] also pointed out that organizational culture, lack of management commitment, lack of teamwork, poorly thought out plans, focus on short term profit, poor measurement techniques, lack of education and training programs, employee fear of losing their jobs are some of the barriers of TQM implementation. According to a thesis submitted by [30] seven prominent barriers of TQM which he called "seven deadly disease and obstacles of TQM" was pointed out and explained below:

a. Lack of constancy of purpose:

If a company goes out of business after having tried to implement a TQM program, it probably failed to create a constancy of purpose amongst its employees for quality of product and services. To sets this program apart from the others, something dramatic may have to be used. employees need something to convince them that this is different and is also long term

b. Emphasis on short term profit:

Companies may actually have to take short term loss to make the strategy work; this may require the involvement and cooperation between top management and the major stakeholders. With the probability of long term growth and profit, problem occurs when attempting to continue to convince impatient, profit driven owner.

c. Evaluation of performance

Merit rating or annual review: evaluation of personnel encourages competition amongst employees and usually results in less teamwork. Evaluations and merit rating force people to put themselves number one and the company two. This will result in production of poor quality and services.

d. Mobility of top management;

Retaining the chief executive officer and other top managers is growing problem in the US. With corporate mergers and leverage buyout, top executives find themselves moving around quite often, usually before they have made away real, long term impact e.g. The average engineer moves around every 2-3 years in an effort to either find a better paying job, one with more responsibility.

e. Running a company on visible figure alone-counting money

This disease according to [30] is difficult to avoid because most owners are concerned with hard figures and the bottom line. However, if TQM is given a viable chance to succeed, then the invisible figure will eventually affect the visible ones. E.g. as the number of a company's satisfied customers increases the effect will be an increase in revenue, a visible figure. As quality (an invisible figure) improves, cost, a visible figure, will decreases, the correlation are sometimes difficult to prove because they take time to occur.

f. Excessive medical costs and excessive costs of warranty, fuel by lawyers that work in a contingency:

For construction industry, these may be the two biggest deterrents to most implementing TQM, but for survival as well, concerning medical costs for some companies this is the largest single expenditure. Law suites are either generated by internal employee or external entities. Most lawsuits that come within involve safety and health issues. TQM program will correct some of this problem, but not all of it. As quality increases and defects decreases, accidents caused from faulty products will decrease.

g. Other obstacles to TQM (Deming, cited in salter 1993) are

- Neglect of long range planning & transformation
- The supposition that solving problem, automation, gadgets and new machinery will transform industry
- Search for examples
- Our problems are different
- Obsolescence in schools

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- Reliance on quality control department
- Blaming the workforce for problems
- Quality before inspection
- False starts
- The unmanned computer
- Meeting specification's
- Inadequate testing of prototypes
- Anyone that comes to try to help us must understand all about or business

V. BENEFITS OF TQM IN THE CONSTRUCTION INDUSTRY

According to [31] TQM is widely recognized as an enabler for performance in the industry, after being successfully implemented worldwide by many highly competitive organizations to improve performance and productivity, especially within the service and manufactured industries. In s related development [29] observes that TQM adoption within an organization has become vital strategy for all organization aspects after being considered an important operational level element by some firm. TQM can also be said to be a means of achieving excellence by companies around the world [32]. It can also improve financial performance, higher customer satisfaction, higher product quality [32]. [32] observes that, organization have already realized that their only way of surviving in today's competitive global market is to become a successful total quality organization. It therefore means that organizations should start working toward achieving quality system for their product in order for the client or customer to derive a reasonable satisfaction. Though the implementation of TQM is not an easy task, as it requires a total change in organizational culture, shifting of responsibility to management, and a continuous participation of all the quality improvement process [33]. With effective implementation of TQM come improved company moral and a companywide spirit of teamwork, more importantly comes a heightened sensitivity to the market and customers [34]. He also explained that TQM enhances the company's ability to discover potential failures before they turn into disaster [34]. In a related development [35] believe that companies should focus on problem prevention rather than problem solving, meaning that problems are design out of the construction process, workers now perform error free jobs. More so, implementation of TQM will bring about enlightenment and empowerment of subordinates as well as open channels of communication that are somewhat fostered by the construction company leadership. TQM benefits include customer improvement, training and retaining of staffs, customer satisfaction. Top management support, defect free product at first attempt, elimination of reworks and cost effectiveness [36].The implementation of TQM will results in better quality products and services, delivery and administration which ultimately satisfy the clients functional and aesthetic requirements to a defined cost and stated completion time. Table 3.0 present the summary of the benefits of TQM to the construction industry.

TABLE 3

Benefits of TQM in the construction industry
1. More repeat customers
2. Reduced rework
3. Improved employee job satisfaction
4. Improved relationships with architect/engineers
5. Higher productivity
6. Reduced claims
7. Lower employee turnover
8. Improved schedule performance
9. Improved relationship
10. Better chances in bidding process with prequalification
11. Reduced change order
12. Better customer satisfaction/more repeat customers
13. Reduced more conformities
14. Reduces waste of resources e.g. labor, materials and money
15. Reduced cost of poor quality
16. Increased competition advantage over competitors
17. Success in realizing long term strategic plans of the company
18. Better chances in bidding process with prequalification
19. Improved budget performance
20. Increases market share
21. Better chances in winning contractors international markets
22. Improved employees job satisfaction
23. Better chances of winning contracts in domestic market

b. . *Hoonerker, Carayon & Loushine (2010), Gupolat, Damci & Tartar (2011)*

VI. IMPROVING TQM IN THE CONSTRUCTION INDUSTRY

Every organization has no choice but to anticipate the future, to balance the short and long term goals. The fact is that for any construction company or organization to achieve TQM, the decision need to start now. The decisions, actions, resources allocation, and work down now will create the future, the long-term goals is based largely on short term plans and decisions, unless the long term goals is considered when making short term plans and decision, the result will be a lack of direction that will eventually ruin the organization. Long term planning prevents the construction industry from uncritically extending present trends into the future, from assuming that today's building techniques, skills and technologies will be the same of tomorrow. Accordingly, the following ways of improving TQM in the construction industry was suggested and explained by [37]

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- Float the idea and brainstorm it with the execution team: if you are wrong, and a quality improvement program is not best for the company, you will want someone to tell you right off. If you are right you will want the executives team to be able to say "we came up with this great ideas"
- Brainstorm even more: if the basic idea is a go, then brainstorm the best name, source of resistance and support, how to investigate standards and best practices, and how to display it internally
- Develop the brainstorm, results into a feasible-if audacious-strategic plan, then beat upon it- Have the executive team create plan that look workable, then run it through program analysis, portfolio analysis, SWOT(strength, weakness, opportunity and threat) evaluation, and anything else you can do to test the idea
- Making a marketing plan and sell the idea: Figure out how the program is likely to benefit each stakeholder group, and give them a straw man to shoot down. Then involves other leaders and stakeholders representatives the same way you brought in your own management team, listen to them, and let them be convinced, and then sell you on your own ideas
- Create a team to lead the way, and give it full support: Have a team build a plan that includes training, deployment, management, and feedback. Review it thoroughly, and show up for kickoff day
- Stay on top of the program: Make sure it is working well and promote it. Assign resources to problem areas, and publicly reward success
- Listen and respond: Each workers in the company will make this or her own if you lead the way in appreciating every idea- good or bad-and in making decisions based in understandable, empirical and far evaluation
- Keep it simple: Some parts of this will be inherently complex so its pay to keep everything as simple as it can be
- Have the company make it their own, and keep running the wheel: The program must become an ongoing process of managed quality improvement.

Another important way by which TQM can be improved is explained by [23] below

a. Plan

This is the starting point. Select a process for improvement. It may be a process that suggest the greatest payback, or the process that suggest the greatest opportunity for success. It is better to select a process that shows the greatest potential for successful improvement. After selecting the process, analyze it and plan a change that will have beneficial effect

b. *Do*

Do not announce the plan as a mandatory change across the entire system. That can lead to knee jerking the workforce. If the plan does not have the desired effect, or even make things worse, the project team and management may lose confidence in the model

c. Check

The effect of the change is a careful and comprehensive study of the results. The project team must fully understand the effect of the change, why they occurred, and how they might affect other process.

d. Act:

If the results are as expected (if they slow the intended beneficial effect), implement the change system wide. If the results are not as expected, more forward in the cycle to the plan step and remote the process to analyze it again and prepare new plan

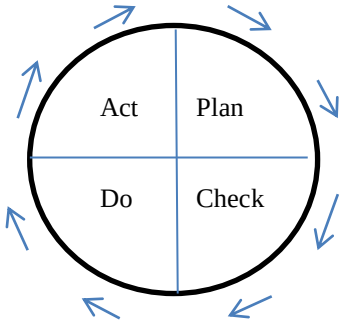
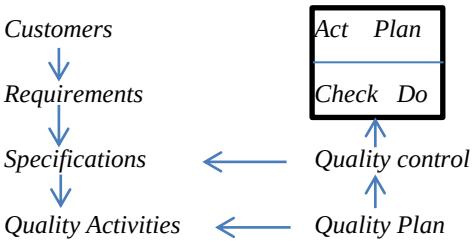


Figure 1.0 The Plan-Do-Check Act cycle



Quality journey: Quality improvement, source: ***Kenneth H. Rose (2005)***

CONCCLUSION

The complex and dynamic nature of the construction industry makes the concept of TQM to remain ambiguously defined. The objectives of every project are to meet the requirement and satisfaction of the client within the stipulated time and budget without affecting quality. The approach of implementing TQM is one of the techniques to detect any flaws in the construction industry. It provides opportunities for improvement, it also helps organization to identify the barriers and benefits, serving as yardstick for performance assessment, this study evaluate the possible benefits and barriers of implementing TQM in the construction industry through a

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thorough review and recommendations on the ways of improving TQM in the construction industry using two practical approaches as a yardstick. However, this paper would serve as a guideline for the construction industry through its in-depth knowledge on the benefits and barriers of TQM.

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