ASSESSMENT OF QUALITY MANAGEMENT PRACTICES OF CONSTRUCTION COMPANIES IN NIGERIA

(A CASE STUDY OF ILORIN METROPOLIS, KWARA STATE)

BY

IPINNAYE SOLOMON MAYOWA

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CERTIFICATION

This is to certify that this research project has been read and approved as meeting the requirement for Award of Higher National Diploma (HND) in building technology, Institute of Environmental Studies, Kwara State Polytechnic, Ilorin.

_____ _____

DR. I. A JIMOH ***DATE***

(Project Supervisor)

_____ _____

BUILDER A. ALEGE (MNIOB) ***DATE***

(Project Coordinator)

_____ _____

BUILDER A. ALEGE (MNIOB) ***DATE***

(Head of Department)

_____ _____

BLDR ALIYU SULAIMAN FUNSHO (MNIOB) ***DATE***

(External supervisor)

DEDICATION

This project is dedicate to Almighty God for seeing us throughout the stay in kwara state polytechnic. It is also dedicate to my parent who has been support me. The blessing and mercies of God we be with you always Amen.

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TABLE OF CONTENTS

ABSTRACT

The success of construction projects largely depends on the effective implementation of quality management practices. In recent years, increasing client expectations, project complexities, and competitive pressures have intensified the need for quality assurance across all phases of construction. This study investigates the quality management practices employed by construction companies and examines their influence on project performance in terms of cost, time, and quality delivery. A quantitative research approach was adopted, utilizing structured questionnaires distributed to professionals in selected construction firms. The data collected were analyzed using descriptive and inferential statistics to determine the level of adoption of quality management practices and their correlation with key project performance indicators. The study identified practices such as quality planning, quality assurance, and quality control as widely implemented, albeit at varying levels of effectiveness. Findings reveal a positive relationship between effective quality management and improved project outcomes, including timely completion, cost control, and client satisfaction. However, the study also highlights key challenges such as lack of skilled personnel, inadequate training, and poor management commitment that hinder optimal quality performance. The study concludes that consistent application of quality management systems can significantly enhance construction project performance. It recommends that construction firms invest in continuous training, enforce compliance with quality standards, and adopt a culture of continuous improvement to achieve better project outcomes.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Quality management is a way of managing to improve the effectiveness, flexibility and competiveness of a business as a whole (Oakland, 1993). In construction the problem of quality and its value of importance to the construction industry has been an area of great concern and debate for many a year (CIRIA, 1990 in Marasini and Quinnell, 2010). The construction industry is widely criticized for the low quality of delivery of construction projects both the finished product quality and also in the processes used during the project design and construction stages. Significant time and cost is currently spent in correcting problems during the snagging process and the majority of projects either suffer from time overrun. There is a growing and continuous interest in quality improvement in the construction industry all over the world. Quality professionals use a number of definitions to define project quality. Quality in its simplest form can be defined as: 'meeting the customer's expectations,' or 'compliance with customer's specification.' (Jha and Iyer, 2006). No matter what definition we follow for quality, it becomes very complex when we try to put it into actual practice. For a user, quality is nothing but satisfaction with the appearance, performances, and reliability of the project for a given price range. (Jha and Iyer, 2006) In the realm of project management, the schedule, cost and quality achievement is also referred to as the iron triangle (Ankrah and Proverbs, 2005). Out of these three aspects, it is the achievement of schedule and cost compliances that the project management is attending to most of the time. This results in a half-hearted attempt to achieve quality at project sites. In order to achieve the schedule and cost objectives, project quality is sometimes also overlooked. Although many studies have

recognized the importance of maintaining and doing quality projects these aspects are sacrificed in lieu of achieving short-term objectives, such as handing over of some critical structures, or only part of the structures falling in the critical path etc. Barnes (1987) emphasizes that the control of the performance of the installation, building or engineering structure should be managed in the same way as the management of time and cost. For many years, the Nigerian construction industry has been viewed as one with poor quality emphasis compared to other sectors like manufacturing and service sectors. The Nigerian construction industry produces nearly 70% of the nation's fixed capital formation (Federal Office of Statistics (FOS), 2004), yet its performance within the economy has been, and continues to be, very poor. Many criticisms have been directed to the construction industry for generally shoddy workmanship. As a result, quality performance improvement has remained a recurring theme in all the major reports including Sir John Egan's landmark 'Rethinking Construction' report (Egan, 1998). For this improvement in project performance quality to be achieved, it is essential to investigate the factors that cause poor quality performance. Bubshait and Al-Atiq (1999) observe that contractor's quality management practices, which ensure consistent quality, are essential in preventing problems and the reoccurrence of problems. Beyond these, it has been suggested, mainly on the basis of anecdotal evidence, that certain factors such as quality assurance practices, quality control practices, quality management practises also have a significant impact on quality performance by virtue of the influence they have on the way participants approach work. Unfortunately, importance given to these factors by the construction industry can at best be described as marginal, and most of the discussion has been discursive. It is against this need that this research project is being undertaken with research hypotheses designed to provide answers to questions relating to the

quality assurance practices used, the quality control practices used, quality performance parameters and their relationship and, the way forward taking into consideration critical factors that affect quality performance of construction projects. This study will provide a significant contribution to the body of knowledge on the 'Assessment of Quality Management Practices on Quality Performance of Construction Industry' specifically in but not limited to Ilorin Kwara State and to Nigeria as a whole.

1.2 Statement of Research Problem

In spite of the progress made in project delivery over the years many construction projects still lack in the delivery of quality structures. Quality outcome in projects can be measured in three categories namely: producing a building which satisfies the client; producing a building where quality is related to the price; producing a building where sufficient time is spent to obtain the desired quality. Quality management represents increasingly important concern for project managers. Defects or failures in constructed facilities can result in very large costs. Even with minor defects, rework may be required and facility operations impaired. Increased costs and delays are the result. In the worst case, failures may cause personal injuries or fatalities. There are many basic questions which still remain unanswered or at best have only been addressed fairly. For instance, what are quality assurance, quality control and quality planning in the construction industry, and do they even exist? Is there any evidence that on different quality assurance practices, quality control practices and quality planning practices influence quality performance of construction projects, and if they do, do they lead to significantly different performance outcomes? These are fundamental questions that need to be addressed through research. An appreciation of how contractor quality management practices, in whatever form, affects the profitability and performance of construction

projects will help with the process of quality assurance, quality control and quality planning. Few previous studies focused mainly on the management systems and techniques, procurement routes and construction methods (Larson, 1997; Proverbs, Holt and Olomolaiye, 1999). The overall project performance improvement agenda of the construction industry requires improvements in products (right at first time), the delivery (in terms of quality, cost and time), and the sustainable development of construction firms (profitability and competitiveness) as opined by Xiao and Proverbs (2003). The stakeholders are challenged with how to deliver projects of the best quality according to specification without delay or additional cost. The major problem amongst the stakeholders is the understanding of how proper quality management practices can affect quality performance. Arising from this, the problem of the study is concerned with determining the quality assurance practices, quality control practices, quality planning practices and factors affecting quality performances of construction projects in the study area.

1.3 Research Questions

In addressing the research problem this study will provide answers to the following questions:

i. What is the extent of use of quality management practices in the construction process at pre-contract and contract stages?
ii. What are the levels of contribution of team members to projects outcome?
iii. Does the level of use of quality management practices differ at pre-contract and contract stages?
iv. Does the level of use of quality management practices differ between public and private client types?

1.4.1 Aim of the Study

The aim of this research is to investigate the quality management practices of construction companies with a view to ascertaining their influences on project performance in Ilorin Kwara State.

1.4.2 Objectives of the Study

The objectives of this study are to:

i. Evaluate the level of use of quality management practices at pre-contract and contract stages of construction projects;

ii. Evaluate the contributions of project team members to quality performance of construction projects;

compare the level of use of quality management practices among selected procurement methods used in the construction industry at pre-contract and contract stages of construction; and

iii. Compare the level of use of quality management practices between public and private client types at pre-contract and contract stages of construction.

1.5 Significance of the Study

This study evaluates the level of use of quality management practices at pre-contract stage and contract stages of construction work. The knowledge of the level of use of these practices at these stages of construction work will help to identify practices that are peculiar to the different stages of work which will assist stakeholders to focus on the pertinent practices for effective quality performance of construction projects. Furthermore, the study evaluates the contribution of the different stakeholders to quality performance of construction projects. The knowledge of this will help to identify parties whose involvement in quality management could

be solicited for improved quality performance of construction projects. The comparison of quality management practices between public and private client types will reveal whether there exist difference or not in the quality management practices utilised by the two client types. This knowledge may help to identify practices that could be peculiar to a client type that may assist the other client type in enhancing quality performances of their construction projects. Similarly, this study is significant in providing information on the variation of quality management practices at both contract and pre-contract stages of construction across selected procurement methods used in the construction industry. This information will help stakeholders to know if there are practices peculiar to the different procurement methods for effective quality planning and enhanced quality performance of construction projects.

1.6 Scope and limitation of the Study

This research study investigates the quality management practices of construction companies in Ilorin Kwara State of Nigeria. The investigation covers pre-contract and contract stages of the lifecycles of projects executed by the construction companies surveyed in the study. The post- contract stage was not considered because very few projects have post-contract agreements with the contractors. In addition, quality management practices are initiated at the pre-contract stage and mostly executed at the contract stage of the project lifecycle. This study also compares quality management practices across selected procurement methods namely Traditional, BOOT, Design and Build, Management Contracting, Partnering and Construction Management being the procurement methods utilized in the study area. The influence of client types on quality management practices of construction companies were also investigated. However, only public and private client types were covered in the study because Public-Private-Partnership client types are still few in the study area. This study

examines the quality management practices of construction companies operating in Ilorin Kwara State of Nigeria. The study area was selected for the study due to the spate of construction activities in the State necessitated by increased Federal Government revenue allocation to the State as the largest producer of crude oil in the country.

1.7 Definition of terms

Building Construction: Building construction is the process of adding structure to real property. The vast majority of building construction projects are small renovations, such as addition of a room, or renovation of a bathroom. Often, the owner of the property acts as laborer, paymaster, and design team for the entire project

Project: Project is a series of tasks that need to be completed in order to reach a specific outcome.

Maintenance: Maintenance of a building, vehicle, road, or machine is the process of keeping it in good condition by regularly checking it and repairing it when necessary.

Quality management: is the act of overseeing all activities and tasks needed to maintain a desired level of excellence. This includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement.

Application: is any material, product or a program which is designed for end-user to use.

CHAPTER TWO

LITERATURE REVIEW

2.1 The Concepts of Quality

Quality in its simplest form can be defined as: ‘meeting the customer’s expectations,’ or ‘compliance with customer’s specification.’ (Jha and Iyer, 2006). Quality has been considered and defined from different perspectives, each with its own slight variation depending on the focus of study, but most suggest culture as the pattern of arrangement, material or behaviour which has been adopted by a society (corporation, group, or team) as the accepted way of solving problems. As such, culture may be taken to include all the institutionalised ways and the implicit beliefs, norms and values and premises which underline and govern behaviour (Ahmed, Loh and Zairi, 1999). The price to be paid for a building is a reflection of the expectations of quality - A cheaper building probably uses inferior materials and is likely to be less attractive and less durable. The quality is also related to the timing of when it is delivered. From the perspective of the finished product or completed project, Ling, Low, Wang and Lim (2009) describe quality of the service rendered or work done from the technical and workmanship aspects. From this school of thought quality is considered from the point of view of the standards of a completed project. From another school of thought where specifications or already prepared plans are taken into consideration, Arditi and Lee (2004) opined that the quality of a project is measured by its conformance to a quality plan that is designed to satisfy the customer. In this, the duo considers quality not just from the point of view of a completed project but whether or not the completed project is executed according to a quality plan earlier prepared for such. Collins (1996) describes quality as the world’s oldest documented profession. The International Organization for Standardization's (ISO) 8402

standard defines quality as the degree of excellence in a competitive sense, such as reliability, serviceability, maintainability or even individual characteristics. Project Management Institution (PMI) (2000) manual identified three important components of quality management to be quality planning, quality assurance and quality control. In this school of thought the three components of quality management, the body considers quality as synonymous with management.

2.1.1 The Costs of Quality

The "cost of quality" isn't the price of creating a quality product or service. It's the cost of not creating a quality product or service. Every time work is redone, the cost of quality increases. It is obvious that quality is proportional to costs associated with the construction process. Costs associated with quality need to be identified for management decisions.

2.1.2 Project Quality Management

The concept of quality management is to ensure efforts to achieve the required level of quality for the product which are well planned and organized. From the perspective of a construction company according to Tan and Abdul-Raman (2005), quality management in construction projects should mean maintaining the quality of construction works at the required standard so as to obtain customers' satisfaction that would bring long term competitiveness and business survival for the companies. Quality management in the design and construction of building projects is a crucial factor in meeting clients' requirements. Effective quality management is a critical factor in the successful management of building projects at the design and construction stages. Quality management is a systematic way of guaranteeing that organized activities happen the way, they are planned. Evans and Lindsay (1996) opined that quality management system is the collection of all processes, tools, techniques and

subsystem that run simultaneously with a production system effectiveness, efficiency and productively. In view of the numerous parties whose requirements should be met and the several activities, actions, processes and techniques involved in meeting these requirements, numerous individuals and bodies are concerned with formulating, planning and implementing them, Tam, Deng, Zeng and Ho. (2000) maintain that quality management is far more difficult to achieve in construction than in other industries.

2.1.3 Total Quality Management

(TQM) is often defined as a complete management philosophy that permeates every aspect of a company and place quality as a strategic issue. It is accomplished through an integrated effort between all levels of a company to increase customers' satisfaction by continuously improving current performance (Biggar, 1990).

The adoption of TQM in construction industry has been promoted in some literatures (Biggar, 1990; Low and Teo, 2004; Haupt and Whiteman, 2004) ISO certification is nowadays a trend in most industries including construction industry. The five clauses for the implementation of ISO 9001 are quality management system, management responsibility, resource management, product realization and measurement, analysis and improvement. The application of ISO standards has received much attention from several researchers such as Moatazed-Keivani, Ghanbari-Parsa and Kagaya (1999) who argue that the ISO9000 standards series can form and have formed the basis for an efficient and advantageous quality management system in the construction industry.

2.1.4 Importance of Quality Management Practices in Construction Industry

Effective quality management is a critical factor in the successful management of building projects at the design and construction stages. For many years, the Nigerian construction industry

has been viewed as one with poor quality performance, emphasis compared to other sectors like manufacturing and service sectors (Kubal, 1994; Kanji and Wong, 1998; Wong and Fung, 1999). Quality management is critically required for a construction company to sustain in current construction market which is highly challenging and competitive. Harris and McCaffer (2001) explained that quality has to provide the environment within which related tools, techniques and procedures can be deployed effectively leading to operational success for a company. The role of quality management for a construction company is not an isolated activity, but intertwined with all the operational and managerial processes of the company. Banerji, Gundersen and Bahara (2005) discovered that quality management practices have a significant impact on company's performance in terms of quality, profitability and productivity.

2.1.5 Implementation of Quality Management

Quality management is a systematic way of guaranteeing that organized activities happen the way, they are planned. As for the implementation of quality management, the concepts of quality planning (identification of quality standards), quality assurance (evaluation of overall project performance) and quality control (monitoring of specific project results) in the quality management processes were defined by Project Management Institute (2000). Several tool and techniques were identified as part of the implementation process, there are, benefits/cost analysis, benchmarking, flow-charting, design of experiments, cost of quality, quality audits, inspection, control charts, Pareto diagrams, statistical sampling, flow-charting and trend analysis. Mathews, Ueno, Kekale, Repka, Pereira and Silva (2001) divided quality tools and techniques that are in support of quality programs into three main types, i.e., hard quality tools, mixing methods and soft methods. Hard quality tools are formal quality systems,

documented quality systems, quality costs, control charts, and statistical sampling standards. Mixing methods are strategy and action plans review, flexibility of organisation structure, control charts, quality circles and quality planning tools. Soft methods are training, customer satisfaction surveys, regular contact with vendors and external organisations, actions to optimize environment impact, empowerment, self- assessment and benchmarking. Although there are few studies that have examined the effects of quality implementation in construction industry, the result shows that both customers and contractors can gain from it. The primary barrier to management system implementation success seems to be the nature of the construction process: 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 perception of the value of the construction project (Sommerville, 1994). The 'nature' of construction is a complex system in which several participants, each with their own perspectives and interests are brought together to complete a project plan that typically changes several times during construction, while each tries to minimise the effects of weather, occupation hazards, schedule delays and building defects.

The many changes can lead to delays in completion of the construction project, complaints about quality, and rework, which in turn can lead to further delays and so forth. In short, the industry is characterised by confrontational instead of cooperative relationship between the different parties involved, with claims by the different parties as a result (Kanji and Wong, 1998).

A second barrier to quality implementation is the many parties involved in the construction process, all of whom try to protect their own interests. The construction industry consists traditionally of three primary participants: the owner (or customer), the architect/designer/

engineer, and the (general) contractor. Apart from the three primary participants there are many other parties involved in the construction process: a variety of sub-contractors and suppliers. The many sub-contractors (ironworkers, carpenters, masons, plumbers, electricians, roofers) are a particularly important factor and company size is a related factor that explains the difficulty in implementing quality.

A third barrier to quality implementation is non-standardisation. During construction, general contractors want to ensure quality throughout the project. According to Rowlinson and Walker (1995), the construction industry is characterised by its non-standardisation. Very often, products are one-offs and the production processes are to some extent different from each other. Also changes to the details of the design of a project are typical and may be frequent throughout the construction process. Quality is often at risk when a plan is changed during construction.

A final and important barrier to quality implementation and management is the bidding process. The typical construction bidding process starts with the release of a project description for public review by contractors. The details of the project can vary, but typically specify enough detail so that experienced contractors can create a fairly accurate bid for the job. They may also experience schedule delays for many reasons: weather, labour shortage, late delivery of equipment or materials and other events beyond the control of the contractor (Carty, 1995). Ledbetter (1994) has developed a quality performance management system (QPMS) that tracks labour costs in three main categories: normal work, quality management work (prevention and appraisal), and rework (deviation correction). He assumed the cost of quality to be the sum total of quality management and rework. He finds QPMS to be useful in promoting awareness and improving the understanding of the quality process in addition to

facilitating communication, reducing the overall cost of quality, and directing the management to the areas where quality improvements could be made. Love and Smith (2003) propose a generic framework for benchmarking rework at the interfaces of a project's life cycle. As can be seen from the above discussion, substantial research has been carried out that addresses the quality issues at international levels. According to the Project Control Report (2008) submitted by Accelerated Bridge Oversight Council pursuance to Section 17 of Chapter 233 of the Acts of 2008 (An Act Financing an Accelerated Structurally-Deficient Bridge Improvement Program), formal construction quality control, quality assurance programs and procedures must be in place in order to manage and control the quality of construction. Historically, it has been the industry standard to require the construction contractor to provide construction quality control, while the owner typically provides quality assurance oversight to ensure that the contractor is effectively following and implementing its quality control plan.

It is also important to ensure that the construction contractor's quality control requirements and responsibilities are clearly defined in each construction contract. A methodology which has been proven effective over time is to include construction quality control requirements (construction contractor inspection and testing parameters) in the construction contract documents, and require the contractor to submit a formal construction Quality Control (QC) plan which delineates the detailed inspection and testing measures it will implement for each element of the work, to ensure that all work installed conforms to the requirements of the contract documents. This is treated as a formal submittal which gives the owner the opportunity to review and comment on the plan to ensure that it is comprehensive and effective. The owner then develops and implements its own internal Quality Assurance (QA)

oversight plan to ensure that the contractor is complying with the inspection and testing requirements contained in its approved QC plan. Owner QA oversight measures typically include performing its own inspections and tests at appropriate frequencies to verify that the contractor is properly and effectively implementing its QC plan, and that the plan is in fact ensuring that the work of the project conforms to the requirements of the contract documents. Frequencies and levels of QA oversight inspections and tests will vary from project to project, depending on the complexity of the project and the observed effectiveness of the contractor's QC plan and efforts.

2.1.6 Quality Assurance

Quality assurance can be defined as a planned and systematic pattern of all actions necessary to provide adequate confidence that a product will conform to established requirement (Okereke, 2001). The objectives are to meet the requirements of safety, serviceability, durability, economy of instruction and aesthetics among others. Quality Assurance (QA) is a central element in projects, as defined in Managing State Projects (MSP), the Project Management Body of Knowledge (PMBOK), and the Capability Maturity Model Integration (CMMI). Quality Assurance is a planned and systematic set of activities to ensure that variances in processes are clearly identified and assessed, as well as continuously improving processes to meet the stated standards of the stakeholders. It can also be defined as all those planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service; or making sure the quality of a product is what it should be. This is a mechanism for ensuring that the construction process takes place within the framework of a quality management system. This suggests that quality assurance defines the organization structure, tasks and duties for implementing quality management. Quality

Assurance plan must be developed for every project. Bubshait and Al-Atiq (1999) observe that a contractor's quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems. Quality Assurance processes provide:

i. An independent project review of the processes in use at key project checkpoints;

ii. Identification of process non-compliance early in the project; and

iii. A conduit for continuous process improvement.

The different quality assurance method and techniques that can be utilized depending on the specific quality assurance practices are:

Process Analysis: including root cause analysis to determine the underlying cause that led to problem and developing corrective actions for similar problems;

Reviews: An independent evaluation of an activity or process to assess compliance with the project plan or to examine products or processes against quality factors through the use of checklists, interviews, and meetings; and

Audits: An independent examination of a work product or process to determine compliance with specifications, standards, contractual agreements, or other pre-established criteria (U.S. Department of State Foreign Affairs, 2007).

2.2 Quality in the Construction Industry

According to Hart (1994), quality has a threefold meaning in construction: it means getting the job done on time; it means ensuring that the basic characteristics of the final project fall within the required specifications; it means getting the job done within budget. A quality construction project must comprise all of these dimensions. Actually quality in construction is directly connected with conformance to specification and fitness for use. Construction Quality provides recommended measures to control the quality of construction. Poor quality

construction can lead to re-work and disputes, which typically translate to additional costs and schedule delays. In order to manage and control the quality of construction, it is imperative to implement formal construction quality control and quality assurance programs and procedures.

2.2.1 Quality Culture

There is a multitude of definitions of culture, each with its own slight variation depending on the focus of study, but most researchers suggest culture to be the pattern of arrangement, material or behaviour which has been adopted by a society (corporation, group, or team) as the accepted way of solving problems. As such, culture may be taken to include all the institutionalized ways and the implicit beliefs, norms and values and premises which underline and govern behaviour (Ahmed, Loh and Zairi, 1999). So, culture is the key factor underpinning success in terms of developing the necessary commitment to any form of change (Kotter and Heskett, 1992). Quality culture is the main ingredient in a successful TQM program (Westbrook, 1993). An organization with a 'quality culture' can be defined as one having "clear values and beliefs that foster total quality behaviour" (Linklow, 1989). Changing corporate culture or organizational culture is increasingly recognized as one of the primary conditions for successful implementation of total quality management (Hildebrandt, Kkistensen, Kanji and Dahlgaard 1991).

According to Juran and Gryna (1993), strategic quality management is the “process of establishing long-range quality goals and defining the approach to meeting those goals”. Quality gurus and writers strongly emphasize the importance of strategic planning process based on total quality (Deming, 1986; Crosby, 1979; Juran; 1974; Oakland, 1993; Ahire, Golhar and Waller, 1996; Martinez-Lorente Dewhurst and Dale, 1998 and Sureshchandar,

Chandrasekharan and Anantharaman, 2001). Crosby (1979) views quality policy as a standard for practice that sets priorities of what to do and what not to do, he states that without a formal policy, people will develop their own individual, and differing standards of practice. Sommerville and Sulaiman (1997) identify a number of cultural elements that must undergo change in order that a continuous quality improvement philosophy can be sustained. They stress the importance of building a quality culture by changing perception of, and attitudes towards, quality as a prerequisite to measure quality improvement efforts. Therefore, changing culture is partly the purpose of TQM itself, but it is also in many cases a necessary prerequisite to attempt to install TQM (Pike and Barnes, 1994).

2.2.2 Critical Success Factors in Total Quality Management (TQM)

Though Total Quality Management (TQM) has achieved remarkable success there have also been records of dismal failures. Most of these failures can be attributed to the misunderstanding of TQM or the way it is implemented. Below are some selected factors in TQM.

Customer Focus

In the TQM philosophy, total customer satisfaction is the goal of entire system and a pervasive customer focus is what gets us there. The goal of the construction industry is to handover facilities that meet the needs of their customer (client). TQM is a management philosophy that effectively determines the needs of the customer and provides the framework, environment, and culture for meeting those needs at the lowest possible cost. By ensuring quality at each stage in the construction process, and thereby minimizing costly rework, as well as other costs, quality of the final products should satisfy the final customer. These customers may be internal or external by definition. The external customer being the customer or client in other words the end user of the products or services being offered. An

internal customer on the other hand is a second process or department within the organisation which depends on the product of the first. For example, for designers the products are plans and specifications, and the customers are the owner and the contractor responsible for the construction. For the contractor, the product is the completed facility, and the customer is the final user of the facility. There are also customers within the construction organization; these internal customers receive products and information from other groups of individuals within their organization. Thus satisfying the needs of internal customers is an essential part of the process of supplying the final external customer with a quality product. For a building organization to be truly effective, every single part of it must work properly together. Every part, every activity, every person in a building company affects and is in turn affected by others. Every party in a process has three roles: *supplier, processor, and customer.* J.M. Juran defines this as the triple role concept. This concept can be applied to construction and is illustrated in Fig.2.1 (From CII Publication 10-3 in Jozef, G. (2007). These three roles are carried out at every level of the construction process. The designer is a customer to the owner. The designer produces the design and supplies plans and specifications to the contractor.

Process Improvement

A process is a way of getting things done. A process consists of the tasks, procedures and policies necessary to carry out an internal or external customers need (Adrian, 1995). According to the TQM philosophy if the process is correct, so will be the end result (product). Thus the organization should work to improve the process so as to improve the end product or service. Three different approaches have emerged for improving the efficiency or effectiveness of a process. Continuous improvement is an approach used on an on-going

basis for incremental gains. Benchmarking should be used periodically, and reengineering can be launched occasionally to achieve dramatic breakthrough. By focusing on process by measurement and analysis, a process can possibly be improved by changing five M's of the process namely man, machine, method and measurement. A strong emphasis in process improvement centres on measurement of variation, the control of variation, and the knowledge of variation to seek improvement. This analysis is called statistical process control or statistical analysis. It is the centre of process improvement. The objective of measuring the variation in a process is to learn how to control the variation and also how to improve the process by viewing variation as a tool for improvement. The analysis of the positive side (good performance or quality) of the variation of process is referred as a 'breakthrough improvement" or "breakthrough management" which is another key component of TQM (Arditi and Gunaydin, 1997)

Continuous Improvements

The goal of continuous improvement is common to many managerial theories; however, what differentiates TQM is that it lays down a specific step-by-step process to achieve this. This process consists of nine steps as below: Identify the process; Organise a multi-disciplinary team to study the process and recommend improvements; Define areas where data is needed; Collect data on the process; Analyse the collected data and brainstorm for improvement; Determine recommendations and methods of implementation; Implement the recommendation outlined to verify their effectiveness, and circle back to step five and again analyse the data and brainstorm for further improvement. The nine-step cycle emphasises on: focusing the progress, measuring the process, brainstorming for improvement and verification and re-measurement. These four elements are further illustrated in Deming's

Plan-Do-Check-Action (PDCA) diagram in Figure 2.2. The PDCA diagram stresses removing the root cause of problems and continually establishing and revising new standards or goals (Deming, 1986).

2.2.3 Performance of Construction Projects

The quality performance of any given project is an issue of enormous importance in the delivery of project in the construction industry. It is the main interest of all stockholders involved in the project. Construction projects involve efficient management or utilization of resources to meet the clients' objectives. Mitchell, Agle and Wood (2007) opine that the primary concern of clients is that their projects are completed within budget, on time and at the appropriate level of quality.

Ling (2004) states that the performance of a project is multifaceted and may include unit cost, construction and delivery speed and the level of clients' satisfaction. Arditi and Lee (2004) maintain that the quality of a project is measured by its conformance to a quality plan that is designed to satisfy a client. Therefore, project performance can be defined as a measure of the outcome of a project, which is the level to which the desired project objectives are achieved.

Project performance is understood to be 'the level of successes achieved when the project is completed. De Wit (1988) consider a project as a complete success if the building meets the technical performance specifications and/or mission to be performed. Performance has been described as 'the degree of achievement of certain effort or undertaking'. It relates to the prescribed goals or objectives which form the project parameters (Chitkara, 2005). Bernold and Abourizk (2010) describe construction project performance as not only concerned with past performance, but also about the process of improvement. Project performance in

construction is traditionally measured using financial measures (Kagioglou, Cooper, and Aouad, 2001)

Financial measures though easily measureable, have been criticized as an ineffective measure of performance (Bernold and Abourizk, 2010). This is largely because it measures past performance without necessarily giving indications of the future (Kagioglou *et al*., 2001).

The Egan Report on Rethinking Construction (Egan, 1998) stresses the need for the industry to make substantial changes in its culture and structure, as a driver for improvements inefficiency, quality and safety. The central message of Rethinking Construction is that through the application of best practices, the industry and its clients can collectively act to improve their performance (Egan, 1998). From project management perspective, it is all about meeting or exceeding stake holders' needs and expectation from a project. It invariably involves placing consideration on three major project elements i.e. time, cost and quality (PMI, 2004). Cost Performance in construction projects is described by (Ali and Kamaruzzaman, 2010) as the most important parameter of a project and driving force of overall project success. Traditionally, cost and time performances are regarded as the main performance indicators in measuring construction projects (Ojo, Adeyemi and Ikpo, 2006).

Oluwakiyesi (2011) however states that in developing countries like Nigeria, time performance is considered as it affects the cost. Cost performance in construction projects are usually considered by using the four cost related measures (Ali and Kamaruzzaman, 2010).

According to Centre for Construction Strategic Studies (1998), it has been pointed out that, in today's highly competitive and uncertain business environment, the client who is the major stakeholder, want speedier delivery of their project with early start of construction work, certainty, of performance in term of cost, quality and time, value for money for their

investment, minimal exposure to risk and early confirmation of design and price or cost. Although many tend to focus on the elements of cost, quality and time, all others are also important parameters of project performance.

Principles of TQM were obtained with such a view that its establishment has significant impact on the organizational performance. Research has shown that organisations that successfully deal to implementation of TQM, they have better and effective performance. Analysis supports strong positive relationship between TQM and performance. Also many studies have evaluated this relationship positive (Motwani, 2001) but under Nigerian conditions, not many systematic studies have been undertaken for construction projects (Jha and Iyer, 2006). An initial list of parameters/factors was prepared from the literature reviewed by Jha and Iyer (2006).

Idoro (2010) describe certain parameters selected as indicators of project outcome and classified them in two categories, namely subjective and objective indicators of project outcome. These categories are further subdivided as follows, subjective indicators of project outcome -clients' assessment of project duration, cost and quality while Objective Indicators are project time- overrun and cost –overrun, percentage of time- overrun to initial contract period and percentage of cost overrun to initial contract sum. Ling., Chan, Chong and Ee, (2004) identify two categories of indicators of project success, namely: product success which consist of measures of achievement of quality standards and process success which is made up of variables that measure the achievement of time and cost.

2.2.4 Implementation of Performance of Construction Projects

TQM implementation in the building and construction industry is not an easy matter. One of the reasons is 'the transient nature' of building and construction, the lack of standardisation

and the many parties (occupations, professions and organisations) involved. Another reason is the conservative nature of the construction industry.

There are few studies that examined the effects of TQM implementation. Banerji, Gundersen and Bahara (2005) discovered that quality management practices have a significant impact on company's performance in terms of quality, profitability and productivity.

On the basis of a large study among 1500 construction firms in the mid-western US, Mclntyre and Kirschenman (2000) concluded that substantial economic benefits can be attained through the implementation of TQM. Chase concluded in the construction industry, application of TQM to the jobsite has been proven to speed-up projects while increasing profitability (Chase, 1998). Liu (2003) in the result of a study on quality implementation in public housing projects in Hong Kong showed increased customer/ client satisfaction after ISO 9000 implementation. The average number of defects in housing projects built by companies with ISO 9000 certification was significantly less than the number of defects in housing projects built by companies without ISO 9000 certification. Research has also shown that project performance can be classified into two groups, namely: project success and project failure. Ashley, Lurie and Jaselskis (1987) define project success as 'result much better than expected or normally observed in terms of cost, schedule, quality, safety and participants' satisfaction'.

Most attributes appearing in this factor focus mainly on coordinating the ability and rapport of the PM, the trust imposed in the project team by the delegating authority to project team members, the technical capability, positive attitude and leadership. A project manager is the key person at the site who, within a set of guidelines kept in place by the top management, allocates resources and makes policy decisions at site level. Sometimes mere involvement of

a project manager in site activities can lift the morale of team members and they start working with full zeal and enthusiasm to achieve the desired quality level. A competent manager organizes resources. As opined by Jha and Iyer (2006), project performance can be measured on four performance evaluation parameters: schedule; cost; quality; and no-dispute.

Factors Influencing Project Performance (A Review of some Critical Success Factors) The quality performance of a construction project is influenced by a multitude of inter-related factors some of which are referred to in the literature as critical success (or failure) factors (Fortune and White, 2006). These factors may be classified as being project-related, organization-related, industry-related or external factors as shown in Figure 2.3 which summarizes the foregoing discussions on the way in which performance is typically perceived and factors influencing performance. The factors captured in Figure 2.3, which are by no means exhaustive, have been compiled from the following sources including, Assaf, Al-Hammad and Ubaid. (1996), Belassi and Tukel (1996), Ching Ming and Harris (1996), Russell, Jaselskis and Lawrence (1997), Hatush and Skitmore (1997), Ng and Skitmore (1999), Chan, Scott and Chan (2004), Belout and Gauvreau (2004) and Dainty Cheng and Moore. (2004). In a review of some 63 articles on the critical success factors (CSFs) of projects (including non-construction projects) covering some of the sources cited above, Fortune and White (2006) identified at least 27 CSFs comprising factors like support from senior management, clear realistic objectives, detailed plan kept up to date, good communication, user/client involvement, skilled and sufficient staff, competent project manager, proven technology, realistic schedules, past experience, project size and complexity. This list of factors reinforced a previous list of 24 empirically derived CSFs in White and Fortune (2002). Although not specifically addressing the construction project context, these factors generally

hold true for construction projects as well are consistent with those factors identified in Figure 2.3. By definition, CSFs are areas of activity that should receive constant and careful attention from management to ensure attainment of organizational goals (Rockart (1979) in Fortune and White, (2006). This implies that in seeking to improve performance on construction projects, it is necessary to understand each of these factors and to investigate how they each impact on performance outcomes and how they interact also to influence performance outcomes. A lot of research has been undertaken in this domain in respect of each of these factors, and these studies have yielded valuable insights. Notable examples include studies like Abd. Majid and McCaffer (1998), Proverbs, Holt and Olomolaiye (1999), Xiao and Proverbs (2002c), and Moselhi, Assem and El- Rayes (2005).

2.3 Procurement Methods

Quality is response to customer needs. It has been stressed in todays' highly competitive and uncertain business environment, clients are demanding for better value from their investment.

They want their project to be completed on time within the estimated cost and with the right quality. The use of various procurement systems shows that the construction industry is now trying to meet the clients' needs. This is because each of the procurement methods has its individual effect on the cost, time and quality of the project. It is very important to carefully consider all factors when selecting the most appropriate procurement approach for a construction project because of individual peculiarity.

Project procurement has been described as an organized methods or process and procedure for clients to obtain or acquire construction products. Apart from the traditional approach, there are now other 'fast-tracking' or innovative procurement system systems used by the construction industry worldwide. The different procurement systems differ from each in term

of allocation of responsibilities, activities sequencing, process and procedure and organizational approach in project delivery. Such aspirations are commendable but there are, of course, difficulties which mitigate their achievements many of which reside in area associated with the problem of procurement method. The emergence of a diversity of building procurement methods has come into being in early 1970's to overcome the problem of fragmentation, centring upon modified contractual arrangements or organizational forms. The Aqua Group (1999) describes procurement as the process of obtaining or acquiring goods and services from another for some consideration and Masterman (1996) describes project procurement as the organizational structure needed to design and build construction projects for a specific client. It is in a sense very because the process of 'obtaining' a building by a client involves a group of people who are brought together and organized systematically in term of their roles, duties, responsibilities and interrelationship between them. The adoption of an appropriate procurement method can minimize several risks associated with project delivery. United States of America Defence Acquisition University (2009) defines procurement as the acquisition of appropriate goods and services at the best possible cost of ownership to meet the needs of the purchaser in terms of quality and quantity, time and location. Procurement may also involve a bidding process (i.e. tendering) depending on policy or legal requirements. In European countries and Nigeria in particular, there are strict rules on the processes that must be followed by public bodies with contract values as threshold dictating what processes should be observed (Public Procurement Act, 2007).

There are several types or variations of project procurement systems being widely used in the construction industry. They range from the traditional systems such as turnkey, design and build, build-operate-transfer, management contracting, cost-plus contracting etc. the

introduction of many variations of project delivery system and better project performance. According to Bowen, Hindle, and Pearl (1997) few construction industry professionals fully understand the difference between various procurement systems and are unable to make s sensible recommendation as to which system would be most appropriate for a specific project. The complexity associated with procurement selection is compounded by sheer number of methods available. Holt, Proverbs and Love (2000) identify 200 different types of procurement method in UK construction industry. Similarly, Dulaimi and Dalziel (1994) identify 59 variations of design and build methods in existence.

Procurement strategies by their definition in practice identifies the best way for achieving project objectives and as such seems inevitably related to project performance. This view is shared by many authors who have invested time and resources to the understanding of construction project performance. A research conducted by the Chartered Institute of Building (CIOB) (2010) titled 'Procurement in the Construction Industry' found that 87% of the construction participants sampled believes that good procurement is synonymous with successful project performance.

Procurement, in the context, has been defined as the process of acquiring new services or products and includes contract method, contract documentation and contractor selection (Bower, 2003). Love *et al.* (1998) regard procurement as an organizational system that identifies relationships and assigns responsibilities among key players in the construction process. Today there are several types or variations of project procurement systems being widely used in construction industry. The introduction of many variations of project procurement system was induced by the quest for more efficient and speedier project delivery system and better project performance. Masterman (1996) classify project procurement systems into several

categories based on the relationship and critical interaction between design and construction responsibilities.

Effect of the Different Procurement Systems on Project Performance

Each procurement system has its own peculiarity in terms of the pre-tender and post-tender activities and processes, division of risks between client and contractor and the effectiveness of project monitoring and control. This will have effect on the cost, time and quality of project i.e. the project performance. As highlighted earlier, the focus of this study is on three procurement systems- Traditional system, Design and Build and Management Contracting and Construction Management. Since the study is limited to quality management the emphasis will be on quality.

Traditional System

The traditional procurement system provides a high degree of quality certainty and functional standards. This system provides opportunity for the client to combine the design, management and construction expertise between consultants and contractor. It also provides more time for client and consultant to review and fully develop the design and specification and as such allows for better documentation. However, there is no opportunity for the contractor's contribution because they only come into the scene after the design has been fully developed and approved.

Design and Build

This system allows the contractor to utilize his knowledge and experience to develop much compacted and coherent work program and to develop more efficient design and project control programme. At the same time, it allows the contractor to be innovative to further improve the construction process and technique thus allowing for better work and process

quality. However, it is more often found that the quality of work under this system tends to be questionable. The client loses control and supervision of work when he/she assigns the design and construction to a contractor. This is especially so when the client does have his own team of consultants. The contractor tends to cut corners in order to maximise profit, especially when they feel that they have under-priced their quotation during tender for the work.

Management Contracting and Construction Management Systems

Both systems operate almost the same except that in management contracting, the package contractors enter into contract with the management contractor. In construction Management system the package contractors enter into contract with the client. As an agent responsible for the construction, the management contractor or the construction manager tend to be more serious with the standard and quality of the work done by the package contractors. Their experience as contractor or construction manager made them more proficient and more effective in ensuring high quality works. It also made them better in selecting materials and components of the right type and quality. These factors have contributed to a better standard and quality of the completed construction products.

Construction Team Members

Many criticisms have been directed to the construction industry for generally shoddy workmanship. It is not only the final product that is subject to criticism but the processes, the workers, the materials etc. are under tremendous pressure for better quality in construction. Teams are a major part of any 'Total Quality Management' effort because teamwork enables various parts of the organization to work together to meet customer needs in ways that can't be done through individual job performance (Rao, Carr, Dambolena, Kopp, Martin, Rafii and

Schlesinger, 1996). Construction is a collaborative activity- only by pooling the knowledge and experience of many people can buildings meet the needs of today, let alone tomorrow. An evolution of teamwork and its concept started during the Industrial Revolution, where most work organizations shifted to the hierarchical approach and used scientific management to design organisations and jobs (Taylor, 1911). According to Levi (2007), research indicated that organizing people into teams was one way to improve the operations of organizations and productivity. According to Egan (2002), process and team integration are the key drivers of changes necessary for the construction industry to become more successful. Simply bringing people together does not necessarily ensure they will function effectively as a team. Effective teamwork does not occur automatically. It may be undermined by a variety of problems such as lack of organisation, misunderstanding, poor communication and inadequate participation. This places a great dependence on the competence of the building team in setting up the building process and bringing the work to successful completion. The term "building team" describes those contributors of the building process. The use of work teams, a group of employees with interdependent interactions and mutually-shared responsibilities (Sundrom, De Meuse and Futrell, 1990), has improved dramatically during the past decade. The nature of the construction industry is fragmented. Traditionally, the design phase in project is considered as a separate activity of the construction phase (Anumba, Chimay, Baugh, Catherine, and Khalfan, Malik. (2002). Construction teams are usually reorganised and formed for almost every new project. According to Cornick and Mather (1999), the construction team is organised around specific trades and functions, with project team members selected on the basis of technical and financial soundness of design, and the competitiveness of tender sum. Focusing on organisations' individually defined objectives,

often are in disagreement with other team members. Additionally, Evbouonwan and Anumba (1998) indicated that part of the reasons for poor performance of product delivery in the construction industry is due to the inability of project participants to work collaboratively. The on-going development of teams provides a much richer mix of skills in the thinking and processes amongst many of the company management and those holding supervisory roles of employees. According to Cantu (2007), some of the reasons for the reasons for an effective measurement in teams are based on the probability that the more effectively a team functions, the most benefits they are likely to realize from the work team structure. Team structures alone are not sufficient to create successful developments in work place efficacy, quality, productivity, and employee attitudes. In addition, cost related to supporting work team structure would help provide a return on investment (ROI) as viewed by the stakeholders.

Although there are numerous effectiveness measurements for teams, there is not one measurement tailored specifically for construction project teams, especially since construction project teams comprise individuals with diverse backgrounds, each possesses a unique set of requirements he/she wishes to achieve. Cohen and Bailey (1997) indicate it is often impossible for researchers and managers to compare teams in different functional areas, departments, or facilities. Therefore, it is crucial for team leaders to determine the best way to ensure all team players' expectations are aligned with the overall project's goals and objectives. Busseri, Palmer and Martin (2000) suggest it may be useful for team members to reflect on how well they are working together from time-to- time. This can be addressed by conducting assessment and evaluation among team members and by the project owner on what they think is working well, what is not working well, and how it can be improved. By developing sound measurements, it is hoped team effectiveness can assist in quality

improvements (Manz and Sims, 1993) throughout the construction process.

Methods such as cross-functional teams, within functional teams, quality control circles, voluntary teams, and suggestion activities can be used for encouraging employee participation (Zhang, Waszink and Wijngaard, 2000). Each type of team has its advantages and disadvantages, and works best in a particular organizational setting. In his business excellence model, Kanji, (1998) considers teamwork as a core concept to achieve the principle of people based management. In Oakland's (2000) TQM model teams are considered one of the major components of the model. He states that good teams have three main attributes: high task fulfilment, high team maintenance and low self-orientation. Teamwork is universally accepted as the vehicle for change and the organisational mechanism for involving people in quality improvement. According to Gibson and Cohen (2003), an organization's team effectiveness is a key juncture of theory development. A recent report produced by Lowe (2009) indicated that team performance can be increased by keeping basic teamwork principles at the forefront. Naoum (1989) has critically examined the relationship between the building team and procurement method and their effects on project performance. Project performance was also measured subjectively by evaluating the level of satisfaction achieved when the building is completed. In order to address quality related issues, a number of studies have been conducted in different countries. Chua Kog and Loh (1999) have developed a hierarchical model for construction project success for different project objectives. For quality objectives they found that it is influenced by four main project aspects, namely, project characteristics, contractual arrangements, project participants, and interactive processes. Arditi and Gunaydin (1998) found out that management commitment to continuous quality improvement, management leadership in promoting high process

quality; quality training of all personnel; efficient teamwork to promote quality issues at the corporate level; and effective cooperation between parties taking part in the project are generic factors that affect process quality.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Preamble

In this chapter the research design is described, the population frame defined and the sample size as well as the sampling technique adopted for the study is established. The procedures for the administration of the research instrument, methods for data processing and the tools used for data analysis also form part of this chapter. The chapter also shows the conceptualisation of the research variables used in the study.

3.3. Research Design

This research adopted the survey research design approach involving a mixed or triangulated technique which allows the use of both qualitative and quantitative approaches for individual part(s) of a study (Fellows and Liu, 2008). This approach was chosen to aid in the evaluation of quality management practices and determines their level of influence on project performance. The study also employed descriptive and explanatory approaches in proffering answers to the research questions in line with the objectives of the study. The descriptive aspect provides information about conditions, situations and events that occur in the present; while the explanatory was used to establish relationships.

3.4 Population and Population Frame of the Study

The population for this study comprises of stakeholders in the construction industry practicing in Ilorin Kwara state, precisely, Consultants and Contractors. The population is distributed over the three senatorial districts in Ilorin Kwara state. A pilot study was conducted to identify consultants, and contractors. From the pilot study conducted, 135 consultants and 36 contractors were identified. These will be adopted as the study population frame and the

distribution of the population frame over the research area is presented in Table 3.1.

Table 3.1: Result of pilot study conducted for the determination of the population frame

Population	Ilorin east	Ilorin South	Ilorin west	Total
Consultants	75	32	28	135
Contractors	18	10	8	36
Total	93	42	36	171

Source: Researcher's Field Study, (2025)

3.5 Sample Size /Sample Technique of the Study

The study sample was selected from the study population using the stratified random sampling technique which is applicable, because the target population is broken down into identifiable groups/strata was used in the study. Samples that will adequately represent the population strata are the population sizes for consultants and contractors involved with projects completed between 2009 and 2025, public building projects executed by small and medium sized contractors which were determined for each senatorial district, Ilorin east, Ilorin South and Ilorin west senatorial districts. The sample size for the study was determined using Yaro Yamane formula for finite population (Udofia, 2011) which states:

$$n = \frac{N}{I + N(e)^2}$$

Where n= Sample Size

N = Finite Population

e = Level of Significance (0.05) I = Unity

The distribution of the sample size over the study are is shown in Table 3.2

Table 3.2 Distribution of the Study Sample among the Senatorial Zone in the Study

Area

Population	Ilorin east	Ilorin South	Ilorin west	Total
Consultants	63	30	26	119
Contractors	17	10	8	35
Total	80	40	34	154

Source: Researcher's Field Study, (2025)

The three independent senatorial zones of the population is the distinguishing feature which aids the division of the population into three (3) strata. This explains the choice of stratified random sampling technique for the study. This approach was chosen because though this study is dealing with building projects, they fall under different categories namely, private, public, new work and redevelopment.

3.6 Data for the Study

Data are facts, observations or experiences on which argument, theory, test or hypothesis are based. The nature and type of primary data collected for this empirical study fall mainly under the major classification of qualitative data. Qualitative data based on the opinions of the respondents of the study were collected on the level of use of quality management practices on construction projects at pre-contract and contract stages of construction with respect to selected procurement methods and client types. To achieve this, a structured questionnaire was used to evaluate the opinions, view or the perception of respondents towards achieving the objectives of the study.

3.7 Research Instruments

The research instrument simply refers to the tools used to collect data for the study and it

entails primarily a structured questionnaire.

Structured Questionnaire

Structured questionnaire was designed for the study to collect data for the purpose of achieving the objectives of the study. A sample of the questionnaire used in the study is presented in Appendix 1

Questionnaire Design: The questionnaire used for the study was divided into four major parts namely: Section A, B, C and D. Section A consists of questions on the characteristics of consultants/ contractors and projects that were used for the study. Section B consists of questions on the respondent perception of the project characteristics. Section C consists of questions on the level of use of quality management practices across selected procurement methods used in the construction industry at pre-contract and contract stages of construction. Section D collects information on respondents' perceptions of the level of use of quality management practices between public and private client types at pre-contract and contract stages of construction.

Questionnaire Validation: The questionnaire used in the study was validated by administering it to 20 construction managers with outstanding years of experience and reputation in the construction industry for assessment. Their response was used to assess the validity content for each item on the questionnaire based on the index rating of content validity (CV1) computed by the researcher. The CV1 was determined using a four-point scale namely: 1= not relevant; 2= item need some revision; 3= relevant but need minor revision; 4= very relevant. This agrees with frameworks for previous studies (Al-Moghany, 2006) Inputs obtained from the exercise were used to revise the instrument to achieve the final questionnaire which was administered on the study population.

Questionnaire Distribution: The questionnaires used for the study were personally administered using trained field assistants

3.8 Method of Data Analysis

The data collected were analysed to achieve the objectives of the study bearing in mind also the nature of data collected as described earlier. Statistical Package for the Social Sciences (SPSS version 17) was the software used for data analysis in the study. The various objectives, evaluation of selected factors affecting the performance of construction of project; determining the performance of construction projects and evaluation of the level of use of quality management practices on construction projects were achieved using mean item score (MIS). Kruskal Wallis Test was used to test the relationship between the level of use of quality management practices among selected procurement methods at pre-contract and contract stages of construction projects while Mann-Whitney U test was used to compare the level of use of quality management practices at pre-contract and contract stages of construction projects for selected procurement methods.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Preamble

This chapter contains the result of the data analysis carried out on the data collected for the study using the procedures and statistical tools described in the preceding chapter. Result of the analysis on the data collected on response to questionnaire distributed, respondent's characteristics and project characteristics were first presented. The second section contains the results of the analysis of the data on the selected factors affecting the performance of construction projects. The third section contains the result of the analysis of data on the assessment of performance of the construction projects. The fourth section contains the result of data on the evaluation of the contribution of project team members to quality performance of construction projects. The fifth and last sections present the result of the test of the research hypothesis which has been formulated to achieve the objective of the research. Here the level of use of quality management practices among selected procurement methods at pre-contract and contract stage of construction projects with respect to project client types – public and private projects were compared.

4.2 Response to Questionnaire Administered

The study was carried out using structured questionnaires administered on the respondents. A total of 271 questionnaires were distributed and there were 73.07, 68.18 and 66.67 percent response rates in Ilorin east, Ilorin west and Ilorin South senatorial districts in Ilorin Kwara State respectively for questionnaire administered to consultants, contractors and site supervisors/ engineer as shown in Table 4.1. The response rate to the questionnaire survey in this study could be said to be high (above 70%). In the same vein the percentage used for the analysis was generally high as a result of high response rates in each of the three senatorial districts (above 80%). The reason for high response and use rates was due to the procedure for administration and collection of questionnaires via the assistance of field assistants.

4.2.1 Characteristics of Respondents of the Study.

This section presents the result of key characteristics of respondents. The selected characteristics are profession/ academic qualification, and years of working experience. Respondents' professional description is classified into four categories namely: Architects; Engineers; Project Managers and Builders. Respondents' qualification consists of Ordinary National Diploma (OND), Higher National Diploma (HND), Bachelors of Science degree (B.Sc.), Master of Science degree (M.Sc.) and Doctor of Philosophy (PhD).

Respondents working experience is classified into five intervals namely: 1-5years, 6-10years, 11-15years, 16-20years and over 20years. The percentages of the respondents' sampled in each of the sub-variables of respondents' characteristics are analysed and presented in Table 4.2.

Data presented in Table 4.2 shows the percentage of respondents who are Architects, Engineers, Project Managers and Builders and majority were Architects, followed by Engineers, Project Managers, and Builders. This result indicates that all disciplines who serve as project leaders in construction projects were covered by the study. On respondents' educational background; Table

4.2 shows the percentage of respondents with OND, HND, B.Sc., M.Sc. and PhD with 35.7 percentages of respondents possessing post graduate educational background. This shows that the respondents of the study possessed qualifications required for management position however; respondents with B.Sc. constituted the majority. On respondents' experience, Table 4.2 reveals that the 91.7 percentage of respondents had above five years of experience. This result of the analysis of the characteristics of respondents used for the study shows that the majority involved in quality management practices in the study area were degree holders (66%) with experience.

Table 4.2: Descriptive result of characteristics of respondents used in the study

Parameter	Sub- Parameter	N	%
Professionals	Architects	57	34.5
Engineers		49	29.8
	Project Managers	35	21.2
Builders		24	14.5
Educational	OND	24	14.5
Background			
HND		32	19.4
BSc/B. Eng		50	30.3
M.Sc.		41	24.8
PhD		18	10.9
Total		165	
Working	1-5	16	9.7
Experience (yrs)			
6-10		22	13.3
11-15		58	35.2
16-20		46	27.9
Over 20		23	13.9
Total		165	100.0

Source: Researcher's Field Study, (2025)

4.2.2 Characteristics of Projects most recently completed by Respondents of the Study

This section presents the result of key characteristics of projects most recently completed by respondents in the study area. The selected characteristics are type of project, contract price and duration of projects, project location, procurement approach employed and designation of respondents in the company that executed the projects.

Project type is classified into four categories namely, public, private, new and redevelopment projects. Contract price is classified into five categories namely: N1-49million, N50-99 million,

N100-199 million N200-499 million and N500 million and above. Project duration is classified into five categories namely: 1-2years, 3-5years, 6-8years, 9-11years and 12-14years. Selected procurement approaches are categorized into six namely, traditional, BOOT, design & build, management contract, partnering and construction management. Designation of respondents' in the companies that executed the projects are categorised into five categories namely: main contractor, subcontractor, project manager, consultant and supplier.

Table 4.3 shows that the percentage of Private projects used is quite more than the public projects likewise new works are more than the redevelopment. This result indicates that both private / public and new work/ redevelopment were used although private and new-work constituted the majority. On Contract Price categories, the percentage of 44.9 was within the range of N1-100 million while the rest fell above this. This result indicates that the projects within the range of N101 - 200 million constituted the majority. On Procurement approach, the percentage of project acquired by the traditional approach were more (above 30), followed by design & build procurement method (above 20). This confirms Ojo, Adeyemi and Ikpo (2000) which reports that the most frequently used procurement method in Nigeria is the traditional contract method. Mohsini and Davidson (1992) describe the traditional contract method as the traditional project delivery system whereby the owner contracts separately with a designer and constructor to design and construct a facility separately**.** This result shows that though several procurement approaches were used to procure the sampled projects, traditional approach constituted the majority as indicated on Table 4.3. On the designation of respondents' firms on the projects, 92.2 fell under main-contractor, project manager and consultants while 7.8 fell under subcontractors and suppliers. This result indicates that majority of respondents' firm played primary roles on the projects.

Table 4.4: Respondents perception on the level of use of quality management practices at pre- contract stage of construction projects

Quality Management Practices at Pre–Contract Stage	N	Sum	MIS	Rank
Matching of design with client requirement	165	690	4.18	1
Site visit to obtain information on site conditions before commencement of design	165	686	4.16	2
Checking of drawings before they are issued	165	658	3.99	3
Giving detailed explanation of design to the client	165	649	3.93	4
Seeking approval of the client at every stage of design	165	631	3.82	5
Site inspection to ensure compliance with quality requirements	165	628	3.81	6
Communication of design decision to other consultant	165	599	3.63	7
Use of simple and straight-forward specifications	165	598	3.62	8
Test on new materials and components before specifying them	165	562	3.41	9
Soil investigation to determine bearing capacity of soil before carrying out design	165	550	3.33	10
Co-operation with other design consultants to incorporate quality requirements into design	165	452	2.74	11
Recording of design decision	165	442	2.68	12

1= very low, 2 = low, 3= moderate, 4 = high, 5 = very high. Source: Researcher's Analysis, (2025)

On the contract stage respondents were requested to indicate the rank that represents their assessment on the level of use of each of the quality management practises at the contract stage. The Mean item score (MIS) of the respondents' assessment of the level of use of each quality management practices at contract stage was analysed and ranked. The result is presented in Table 4.5.

Table 4.5: **Respondents perception on the level of use of quality management practices at contract stage of construction projects.**

Quality Management Practices at Contract Stage	N	Sum	MIS	Rank
Use of clear, concise and precise written work instruction	165	631	3.82	1
Monitoring the application of specified site technique	165	577	3.50	2
Test on materials and components before use	165	564	3.42	3
Compliance with manufacturer's instruction on the handling of materials and components	165	564	3.42	3
Compliance with manufacturer's instruction on the handling of materials and components	165	548	3.32	4
Carrying out of quality audit	165	539	3.27	5
Inspection of materials and components before use	165	531	3.22	6
Appraisal of all contract document to establish quality requirements before commencement of work on site	165	531	3.22	6
Safekeeping of quality record	165	520	3.15	7
Compliance of quality of work carried out with quality plan	165	442	2.68	8
Preparation of quality plan	165	442	2.68	8
Analysis of quality audit	165	406	2.46	9

1=Very Low, 2= Low, 3= Moderate, 4 =High, 5= Very High, N= Number of Respondents. Source: Researcher's Analysis, (2025)

The levels of use of other quality management practices at contract stage were ranked as indicated in

Table 4.5. The result indicates that at contract stage ‘use of clear, concise and precise written work instruction’ ranked first, ‘monitoring the application of specified site technique’ ranked second, ‘Test on materials and components before use’ and ‘compliance with manufacturer's instruction on the handling of materials and components’ ranked third. On the other hand, ‘preparation of quality plan’, ‘compliance of quality of work carried out with quality plan’ and ‘analysis of quality audit’ ranked least.

The concept of quality management is to ensure efforts to achieve the required level of quality for the product which are well planned and organized. In construction perspective, quality management in construction projects should mean maintaining the quality of construction works at required standard so as to obtain customers’ satisfaction that will bring long term competitiveness and business survival for companies (Tan and Abdul-Rahman, 2005). On the evaluation of the level of use of quality management practices on construction project, the result on table 4.4 shows that matching of design with clients’ requirement ranked highest in the level of use of quality management practices at pre-contract stage. This shows that the most important aspect is to make sure that the client requirements are properly interpreted. Site visit to obtain information on site conditions before commencement of design also ranked high indicating that the properties of each project site also has impact on the design. Checking of drawings before they are issued was also ranked high. This boils down to proper interpretation of clients’ requirements. At the contract stage shown on table 4.5, the use of clean, concise and precise written work instruction ranked highest in level of use as opined by Egemen and Mohamed (2005) maintaining that completing a project in accordance with the required standards is one of the three major performance elements generally used for evaluation of performance in construction. Lai, Weerakoon and Cheng (2002) noticed weakness in the implementation of quality for construction industry in Hong Kong in respect of the communication of improvement information, and teamwork structures for quality improvement. This emphasizes that proper communication and interpretation of information through laid down organizational culture at pre-

contract and contract stage has great impact on quality output. According to Linklow (1989) all organization with clear quality culture i.e. one having “clear values and beliefs that foster total quality behaviour” will aid proper implementation of quality management. Griffith and Bhutto (2004) discovered that quality standards implementation in the construction industry is more management driven with perceived efficiency gain.

4.3 Evaluation of the contribution of project team members to quality performance of construction projects

The study also sought to evaluate the contribution of project team members to quality performance of construction projects. This was done by assessing and comparing the perception of respondents on the project team members’ contribution to quality performance of construction projects. To achieve this, six (6) selected project team members were presented to the respondents in the study area through structured questionnaire to indicate their contribution to quality performance of construction projects on a five point Likert’s scale. The result in Table 4.6 indicates that ‘project managers’ contribution to quality performance of construction projects’ ranked first, ‘contractor' contribution to quality performance of construction projects’ ranked second, ‘builders'/Engineers' contribution to quality performance of construction projects’ ranked third. On the other hand, ‘architects' 'contribution to quality performance of construction projects’, ‘quantity surveyors' contribution to quality performance of construction projects’ and ‘clients' contribution to quality performance of construction projects’ ranked least.

According to Katzenbach and Smith (2003, p.45), a team can be defined as: “A small number of people with complementary skills, who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable.”

Increasingly, organizations in the construction sector use teams to meet today’s global competition and

clients' expectations, but they need better ways of evaluating the effectiveness of the teams. Moreover, it is imperative for construction teams to know the contributing factors of team effectiveness in construction projects. The nature of the construction industry is fragmented and as such construction teams are usually reorganized and formed for almost every new project.

Griffith (1993) considered quality in construction to be concerned with what a client requires thereby he asserts that quality at the design stage depends on individual consultants' ability to identify, discuss and act professionally as a technical specialist on client's requirements.

Table 4.6: Ranks of project team members' contribution to quality performance of construction projects

Project team members' contribution to quality performance of construction projects	N	Sum	MIS	Rank
Project managers' contribution to quality performance of construction projects	165	623	3.78	1
Contractors' contribution to quality performance of construction projects	165	553	3.35	2
Builders'/Engineers' contribution to quality performance of construction projects	165	545	3.30	3
Architects' contribution to quality performance of construction projects	165	508	3.08	4
Clients' contribution to quality performance of construction projects	165	250	1.52	5
Clients' contribution to quality performance of construction projects	165	250	1.52	5

1= Very Low, 2= Low, 3= Moderate, 4 =High, 5= Very High, N= Number of respondents. Source: Researcher's Analysis, (2025)

As indicated by Cornick and Mather (1999), the construction team is organized around specific trades and functions, with project team members selected on the basis of technical and financial soundness of design and the competitiveness of the tender sum. Focusing on organizations'

individual professional capabilities has resulted in construction team members. Additionally, Evbuonwan and Anumba (1998) indicated that part of the reasons for poor performance of product delivery in the construction industry is due to the inability of the project participants to work collaboratively. According to Kanji and Wong (1998), the industry is characterised by confrontational instead of cooperative relationship between the different parties involved, with claims by different parties as a result. As indicated by Alshawi and Faraj (2002), a typical construction project is a collaborative venture that involves a number of different organizations brought together to form "the construction project team." The basic function of a construction's project phases is significant for forming a construction team and defining its roles and responsibilities, not essentially according to contractual roles. This complies with Hendrickson and Au (1988), which states that the project manager can be considered as the most important person for the success or failure of a project. As previously mentioned, the delivery method adopted for a construction project only changes the context and relationship in time. For the traditional design-bid-build, the construction manager would be replaced with a general contractor with subcontractors still there. As for the design-build project delivery approach the construction manager would have the role of design/build contractor and designer, if not 'in-house', the role of subcontractor designer (Cornick and Mather, 1999). This shows that the various level of impact of each party's contribution is influenced by the procurement method of the project and as such each have a place of importance in achieving the best possible project outcome. Bubshait and Al-Atiq (1999) observed that a contractor's quality assurance system, which ensures consistent quality, is essential in preventing problems and the reoccurrence of problems. A Swedish study (Josephson, 1994) confirmed that the main source of defects was lack of individual motivation and conflicts between members of an organization. Wells (2006) discovered that the source of labour, the basis on which it is employed and the way it is treated have profound implications on the quality among other things.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary

The construction industry has numerous problems in getting the best performance as a result of the complicated nature of the industry. The aim of this research is to investigate the quality management practices of construction companies with a view to ascertaining their influences on project performance in Ilorin Kwara State. To help achieve this end, a number of objectives were put forward. The summary presented here outlines how these objectives were achieved.

The level of use of quality management practices of construction companies is not significantly different across selected procurement methods at pre-contract stage but is significantly different at contract stage. This is so because at the pre-contract stage all procurement methods have similar procedures' in quality management practices right from the drawing board to the tender but at the contract stage where construction actually takes place each parties perform different roles according to the diverse procurement methods and the success or failure depends on the implementation of the right quality management practices for the specific project with respect to its procurement method. The level of use of quality management practices at pre-contract and contract stages does not differ significantly between public and private client types because the implementation of quality management practice is for all projects no matter the client type.

5.2 Conclusion

The study has established that construction project requires adequate quality management practices and that quality management practices at both pre-contract and contract stage have

significant influence on performance of construction projects. The proper interpretation of clients' requirements and the use of clean, concise and precise written work instruction is of great importance on project performance. Completing a project in accordance with the required standards is one of the three major performance elements generally used for evaluation of performance in construction. The study has also established that the nature of the construction industry though fragmented needs every team member's effort in the delivery of projects in time, within cost and in the best quality. The efforts of each of the team members have also been deduced from the study to be influenced by the procurement methods. These findings show that the delivery method adopted for each construction project only changes the context and the relationship of team members in time and the various level of impact of each team members' contribution which is influenced by the procurement method of the project is important in achieving the best possible project outcome. These findings show that no matter the procurement methods the level of use of quality management practices do not differ at pre-contract stage but does at the contract stage. These findings also show that the client type cannot affect the level of use of the quality management practices, no matter the client the outcome should be same and as such the level of use should not differ due to the diverse client type. These findings show that, there is need for more attention to be put into quality management practices in the Nigerian construction industry. This is essential for the long awaited turnaround in the performance of the projects dished-out into the built environment of Nigeria.

5.3 Recommendations

This study focuses on assessing quality management practices of construction companies on different procurement methods, client types and construction stages so as to enable project

stakeholders to be aware of their effects on project performance. Arising from the findings and conclusions of the study it is recommended that:

Proper interpretation and use of quality management practices should be enforced by the stakeholders in the building industry.

All team members should collaborate with each other to achieve the goal which is to have the best outcome.

Concerted efforts should be directed towards improving the use of quality management practices at the contract stage of construction work across the procurement methods used in the study area.

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A QUESTIONNAIRE ON THE ASSESSMENT OF QUALITY MANAGEMENT PRACTICES OF CONSTRUCTION COMPAN IN ILORIN-KWARA STATE

I am carrying out a study on the Assessment of Quality Management Practices of Construction Companies in Ilorin-Kwara State. I therefore request your kind assistance in providing responses to the following questions. The questionnaire comprises of four (4) sections. The questionnaire used for the study was divided into four major parts namely: Section A, B, C and D. Section A consists of questions on the characteristics of consultants/ contractors and projects they were involved in, are used for the study. Section B consists of questions on the respondent perception of the project characteristics. Section C consists of questions on the importance attached to the use of quality management practices and their level of usage. Section D collects information on respondents' perception on the rate at which the level of usage of the following quality management practices at Pre-Contract and Contract Stages as it affects the project performance.

All information would be handled confidentially and strictly for academic purposes.

Thank you

RESEARCH QUESTIONNAIRE

SECTION A.

Name of respondent: (Optional)…….……

Profession: Architect ☐ Engineer ☐ Project Manager ☐ Builder ☐

Highest Academic Qualification: ND ☐ HND ☐ BSc/B.Eng ☐ MSc ☐ Phd ☐

Position of Respondent: Project Manager ☐ Contractor ☐ Site Supervisor ☐ Sub Contractor ☐

Years of Construction Experience (Please Tick): 1-5 years. ☐ 6-10 years ☐ 11-15years ☐ 16-20 years ☐Over 20years ☐

Name of company: (Optional) …….

Address (Optional.)……..

Telephone: …… E-mail: ……

SECTION B – Project Characteristics (most recently completed project)

Please provide a description of the most recently completed project on which you were personally involved, by providing appropriate answers to the question below.

Type of project(please tick √ one applicable options) Public ☐ New Work ☐ Private☐ Redevelopment ☐

What was the contract price? 0-49M ☐ 50-99M ☐ 100-199M ☐ 200-499M ☐ 500M & Above ☐

What was the proposed project duration? 1-2yrs ☐ 3-5yrs☐ 6-8yrs☐ 9-11yrs ☐ 12-14yrs ☐

Where was the project located? Ilorin east ☐ Ilorin west ☐ Ilorin South ☐

Have you worked with the client on other projects prior to this project? Yes □ No □

Please indicate the procurement approach employed for this project (please tick √)

Traditional □ □

BOOT Design & Build □ Management Contracting □ Partnering □ Other approach (please specify) □ Construction Management□

SECTION C - Company/Firm Characteristics

Please give an indication of project performance by providing appropriate answers below.

What was the designation of your company on this project? (please tick)

Main Contractor □ Subcontractor □ Project Manager □

Consultant □ Supplier □ Others (please state) _____

Does your company have a quality management policy? Yes □No □

		Very Low(1)	Low (2)	Moderate(3)	High (4)	Very High (5)
9	How will you rate the quality management policies enforced on projects in your company					
10.	How will you rate the level of influence that quality management practices have on project quality performance					

For each of the following participants, indicate how much influence they had on the quality performance of project during construction?

	Very Low(1)	Low (2)	Moderate(3)	High (4)	Very High (5)
Architect					
Civil Engineer					
Quantity -Surveyor					
Client					
Main Contractor					
Project Manager					

Please rank the following performance objectives from 1to 3 in order of priority for your company/firm (3 for most important)

Cost Time Quality

Section D - Project Performance with respect to selected quality management practices in construction

Please give an indication of project performance by providing appropriate answers below.

Please rate the level of use of the following quality management practices (Pre-Contract Stage):

	Quality Management Practices	Very Low(1)	Low (2)	Moderate (3)	High (4)	Very High(5)
a.	Matching of design with client requirements					
b.	Checking of drawings before they are issued					

c.	Site visit to obtain information on site conditions before commencement of design				
d.	Site inspection to ensure compliance with quality requirements.				
e.	Seeking approval of the client at every stage of design				
f.	Communication of design decision to other consultant				
g.	Giving detailed explanation of design to the client				
h.	Use of simple and straight-forward specifications				
i.	Soil investigation to determine bearing capacity of soil before carrying out design				
j.	Co-operation with other design consultants to incorporate quality requirements into				

	design				
k.	Test on new materials and components before specifying them				
l.	Recording of design decision				

Please rate the level of use of the following quality management practices (Contract Stage):

	Quality Management Practices	Very Low(1)	Low (2)	Moderate (3)	High (4)	Very High(5)
a.	Preparation of quality plan					
b.	Test on materials and components before use					
c.	Monitoring the application of specified site techniques					
d.	Use of clear, concise and precise written work instruction					

e.	Compliance with manufacturer's instruction on storage of materials and components					
f.	Compliance with manufacturer's instruction on the handling of materials and components					
g.	Analysis of quality audit					
h.	Compliance of quality of work carried out with quality plan					
i.	Inspection of materials and components before use					
j.	Appraisal of all contract document to establish quality requirements before commencement of work on site					
k.	Carrying out of quality audit					
l.	Safekeeping of quality record					