

**ASSESSMENT OF QUALITY MANAGEMENT PRACTICES IN BUILDING
CONSTRUCTION FIRMS IN MINNA NIGER STATE**

BY

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2014/1/50048TI**

**DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION
FEDERAL UNIVERSITY OF TECHNOLOGY MINNA**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL
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AWARD OF THE DEGREE OF BACHELOR OF TECHNOLOGY (B.TECH) IN
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DECLARATION

I hereby declare that this project titled: “Assessment of quality management practices in building construction firms in minna Niger State” is a collection of my original research work and it has not been presented for any other qualification anywhere. Information from other sources (published or unpublished) has been duly acknowledged.

INUWA HAMZA MUHAMMAD
2014/1/50048TI

Signature & Date

CERTIFICATION

The project titled: “Assessment of quality management practices in building construction firms in minna Niger State” by INUWA HAMZA MUHAMMAD, Matric number 2014/1/50048TI an undergraduate student of the Department meet the regulations governing the award of the degree of Bachelor of Technology in the Department of Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna and it is approved for its contribution to scientific knowledge and literary presentation.

Dr. Ibrahim Dauda
Supervisor

Signature & Date

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Head of Department

Signature & Date

External Supervisor

Signature & Date

DEDICATION

I dedicate this project to my father Engr. M.I Abdul and my mother Hajiya Hauwa Alhassan Badakoshi for their prayers and motivation which took me to where I am today.

ACKNOWLEDGEMENTS

My profound gratitude goes to almighty Allah for the wisdom guidance protection and strength He bestowed on me throughout my programme in Federal University Of Technology Minna despite all the challenges encountered therein. My special appreciation goes to my able supervisor and project coordinator Dr. Ibrahim Dauda and Dr. A.M. Hassan respectively for their guidance towards successful realization of this project and to all Industrial and technology education department lecturers.

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My course mates, thank you all for making the stay memorable, you guys are the best. I appreciate you all God bless.

ABSTRACT

This study was designed to study the assessment of quality management practices of building construction firms in Minna Niger State. The research questions and three hypotheses were formulated to guide the study. A descriptive survey research design was employed for the study. The study was carried out in four building construction firms in Minna, Niger State. A total of 45 respondents comprising of 39 male professionals and 6 female professional in 4 building construction firms in Minna Niger State were used as population for the study. A well-structured questionnaire developed by the researcher was used to collect data for the study. The instrument was validated by three lecturers from the department of industrial and technology education. Mean and standard deviation were the statistical tools used for answering research question, while t-test statistics was used to test the null hypotheses formulated for the study. The findings of the study among others revealed that most of the factors affecting construction firms are adequate site personal, adequate project control, quality workmanship. The findings also revealed that paying attention to clients need, training staff, quality appraisal compliance to standard of relevant agencies are some of the practices that construction firms conform with in Minna, Niger State. The finding also revealed that there is need for site supervision, adequate training of employees, team work among workers and motivation among workers. Based on the findings, it was recommended that building construction firms should ensure all site personnel are adequately qualified to deliver the task assigned to them, material used on site should be properly certified before usage and all stakeholders on a project should possess adequate information and full knowledge of such project before work commences. It was also recommended that building construction firms need to invest more in the education and training of employees on quality management systems and the need to adhere to suitable quality management practices, also firm need to ensure all employees in charge of supervision on site are adequately qualified for such positions, firms should also embark on frequent quality appraisal of their activities and comply to laid down industry standards and that a frame work needs to be developed for effective quality management to ensure uniformity in Nigerian building construction project delivery by firms.

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CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

The importance of Quality management practices in building construction firms cannot be over emphasized. This is because 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, 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 (Crosby, 2015). Quality management is critically required for a construction company to sustain in current construction market which is highly challenging and competitive (Aina, 2011) explained that quality management 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.

The issue of quality management in construction projects cannot be over emphasised since building facilities contribute the largest to any nations development and economy (Farooqui, Masood and Aziz, 2013). The construction sector is globally considered to be a basic industry on which the development of a country depends. To a great extent, the growth of a country and its development status is generally determined by the quality of its infrastructure and construction projects (Wasiu, Aliyu and Modupe, 2013). The quality movement can trace its roots back to medieval Europe, where workers began organizing into Unions called Guilds in the late 20th century (American Society for Quality, 2010). Manufacturing in the

industrialized world tended to follow this craftsmanship model till the mid- 1950s when the factory system, with its emphasis on product inspection started in Great Britain and developed into the Industrial Revolution in the early 1960s. In the early 20th century manufacturers began to include quality inspection in processes as a general practice, at the beginning of World War 2 quality became a critical component of the war effort as a product manufactured in one of the states had to work consistently with products from other states hence the eventual adoption of sampling techniques for inspection, aided by the introduction of military-specification standards and training courses (British Standard Institution, 2018).

The American Society for Quality (2010) notes that in the few years since the turn of the 21st century, the quality movement matured beyond Total Quality. New quality systems have evolved and quality has moved beyond manufacturing into service, healthcare, education, construction and government sectors. A general decline in performance of the construction industry has been observed in recent past, perhaps exacerbated by the recent rate of collapsed buildings, prevalence of abandoned construction sites and general poor quality of completed projects. In Nigeria, the construction industry has been identified as occupying a significant segment of the capital base of the Nigerian economy and also attracts a significant percentage of the labour force in the economy (Sanni and Windapo, 2011). Due to its prime position within the economy, the successful or non-successful performance of the industry impacts either positively or negatively on the whole economy. The construction industry has been slow to apply total quality management, which is standard for most manufacturing concerns, despite the construction industry's capital requirement being equal to many years of output from a typical manufacturing organisation.

However, expressed, quality is obtained if the stated requirements are adequate, and if the completed project conforms to the requirements (Arditi and Gunaydin, 2010). Arditi (2010)

also defines quality in terms of professional liability, a legal concept that requires all professionals to know their trade and practice it responsibly. Architects, Engineers and Builders who offer his or her expertise to owners is subject to professional liability laws, some design professionals believe that quality is measured by the aesthetics of the facilities they design. According to (Burns, 2013) Cited from (Sanni and Windapo, 2011) this traditional definition of quality is based on such issues as how well a building blends into its surroundings, a building's psychological impact on its inhabitants, the ability of a landscaping design to match the theme of adjacent structures, and the use of bold new design concepts that capture people's imaginations because aesthetic definitions of quality are largely subjective, major disagreements arise as to whether quality has been achieved or not. Since objective definitions of aesthetic quality do not exist, design professionals generally take it upon themselves to define the aesthetic quality of their designs (Aibinu, 2016). Quality can also be defined from the view point of function, by how closely the project conforms to its requirements. Using this definition, a high quality project can be described by such terms as ease in understanding drawings, level of conflict in drawings and specifications, economics of construction, ease of operation, ease of maintenance, and energy efficiency. In the construction industry, quality can be defined as meeting the requirements of the designer, constructor and regulatory agencies as well as the owner. According to (Abdulkareem, 2010), quality can be characterized as follows.

1. Meeting the requirements of the owner as to functional adequacy; completion on time and within budget; lifecycle costs; and operation and maintenance.
2. Meeting the requirements of the design professional as to provision of well-defined scope of work; budget to assemble and use qualified, trained and experienced staff; budget to obtain adequate field information prior to design; provisions for timely

decisions by owner and design professional; and contract to perform necessary work at a fair fee with adequate time allowance.

3. Meeting the requirements of the construction as to provision of contract plans, specifications, and other documents prepared in sufficient detail to permit the constructor to prepare priced proposal or competitive bid; timely decisions by the owner and design professional on authorization and processing of change orders; fair and timely interpretation of contract requirements from field design and inspection staff; and contract for performance of work on a reasonable schedule with reasonable profit.
4. Meeting the requirements of regulatory agencies (the public) as to public safety and health; environmental considerations; protection of public property including utilities; and conformance with applicable laws, regulations, codes and policies.

In addition, one should differentiate between 'quality in fact' and 'quality in perception'. The providers of services or goods that meet specifications achieve quality in fact. A service or product that meets the customer's expectations achieves quality in perception (David, 2012). In other words, a product can be of high quality and yet it may not meet customer's needs and vice versa. An example of not meeting customer needs is the prefabricated high-rise apartment buildings that were built in the 1970s using cutting edge technology in low-cost building processes in California, United States of America. The buildings had to be pulled down in the late 1980s because no one wanted to live in these apartments despite the low rents. The buildings failed to meet the tenants' expectations of comfort, aesthetics and function. One should also differentiate between 'product quality', i.e. the quality of elements directly related to the physical product itself, and 'process quality', i.e. the quality of the process that causes the product to be either acceptable or not. For example, 'product quality'

in the construction industry may refer to achieving quality in the materials, equipment and technology that go into the building of a structure, whereas 'process quality' may refer to achieving quality in the way the project is organized and managed in the three phases of planning and design, construction, and operation and maintenance.

1.2 Statement of the Problem

With inefficient or non-existent quality management procedures, significant expenditures of time, money, and resources are wasted on construction projects (Kado, 2010) cited in (Kubal, 2014). In addition, the lack of quality due to deficient construction quality management is detected through non-conformance to established requirements. In construction, non-conformance occurs when the finished state of a project and its components deviates from the established requirements. Quality-related problems during construction can be projected on the operating life of the finished project. To a contractor, non-conformance can yield penalties as well as cost time burdens for re-work, which can convert into productivity loss (Jimoh, 2012).

During the last five years the construction industry has been heavily criticized for its performance and productivity in relation to other industries. With the turn of the new millennium, it appears that the construction industry is going through an intense period of introspection which is exacerbated by increased technological and social change. These changes are altering the tempo of the environment within which construction operates.

According to (Oberlender, 2016) revealed that over the last five years, the incidence of building collapse in Nigeria has become so alarming and does not show any sign of abating.

A Structural Engineer at the Nigeria Institution of Engineers (NIE), in a related development found that a lot of concern has arisen over the quality of construction projects being executed

at the district level in Nigeria, similarly in Minna (Gidan Kwano) Niger State an investigation has established that extremely poor quality construction materials coupled with series of violations caused the collapse of several buildings (Mbambali, 2012).

The aforementioned study and reports clearly demonstrates the value of Quality on the performance of a building/structure.

1.3 Purpose of the Study

The purpose of the study is to assess the quality management practices of building construction firms in Minna, Niger State.

1. To assess factors affecting quality management in building construction firms of Niger State.
2. To assess the conformance of building construction firms in Niger State to quality management practices.
3. To investigate the effect of firm size on conformance to quality management practices of building construction firms in Niger State.

1.4 Significance of the Study

The findings of this research will benefit the builders, site engineers, architects, project managers, and civil engineers in the construction industry, if the findings of this research are fully implemented it will enhance exchange of information between the Professional and their client through the effective practice of quality management.

The findings of the study will also be of benefit to the construction industries, as the findings will enable the construction industries to employ the fastest method of data processing, increase productivity, effective decision making and better service to humanity.

The findings of the study will also be of benefit to the students as the finding will able them use it as a basis for further research; it will serve as board from which further research might take off. The data already gathered and documented in this project will serve as a source of information to students as well serve a reference material in their classroom work.

The client will also benefit from the findings of this study as the finding shows that quality management practice can be done between the clients and the construction industry.

1.5 Scope of the Study

The scope of this study covered quality management practices in building construction firms registered with Niger State ministry of works and infrastructural development. Only quality management practices of the construction processes were assessed, not the quality of the buildings constructed by the building construction firms.

1.6 Research Questions

The following research questions were formulated for the study.

1. What are the factors affecting quality management in the construction firms in Niger State?
2. What are the quality management practices that firms conform with in Niger State?
3. What are the effects of firm size on the practices they conform with to enhance quality management in Niger State?

1.7 Hypothesis

The following null hypothesis was formulated and will be tested at 0.05 level of significance

HO₁: there will be no significant difference in the mean responses on the factors affecting quality management in the construction firms in Niger State?

HO₂: there is no significant difference in the mean responses on the quality management practices that firms conform with in Niger State?

HO₃: there is no significant different in the mean responses on the effects of firm size on the practices they conform with to enhance quality management in Niger State?

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The related literature shall be reviewed under the following sub-heading

1. Overview of Quality Management
2. The Concept Quality Management
3. Quality Management System
4. Project Quality Performance Measurement
5. Quality Planning
6. Quality Assurance
7. Quality Control
8. Quality Improvement
9. Review of Related Empirical Study
10. Summary of literature reviewed

2.1 Overview of Quality Management

Quality is one of the aims of standardization. The quality of a product or a complete building or other constructions is the totality of its attributes that enable it to perform a stated task or to fulfil a given need satisfactorily for an acceptable period of time. For a building and civil engineering work, a satisfactory product, although essential in itself, is not on its own sufficient. It must be incorporated in the design and construction in a correct manner. In buildings, more defects and failures arise from inadequacies in the treatment of products in design and construction than from shortcomings in the products themselves (Burati, 2012). In their work, (Juran, 2016) stated that Quality Management has seen a transition from reacting to the outcome of site production activities to becoming a strategic business function accounting for the existence of construction companies. Unless a construction company can

guarantee its clients a quality product, it cannot compete effectively in the modern construction market.

2.2 The Concept of Quality Management

The concept of quality has existed for many years, but its meaning has changed and evolved over time. Before the early twentieth century, quality management meant inspecting products to ensure that they met specifications (Deming, 2011 cited in Lukman 2017). This is evident in the Egyptian wall painting circa of 1450BC which showed evidence of measurement. Stones used in the pyramids which were cut so well that a knife could not go between them (Abdulkareem, 2010 cited in Lee 2016). According to (Rumane, 2011) around 1950s, during World War II, quality became more statistical in nature. Statistical sampling techniques were used to evaluate quality, and quality control charts were used to monitor the production process. In the 1960s, with the help of so-called “quality gurus,” the concept took on a broader meaning. Quality began to be viewed as something that encompassed the entire organization, not only the production process. All functions were responsible for product quality and shared the costs of poor quality. However, in the 1970s and 1980s many U.S. industries had to make changes to their quality policies when they lost market share to foreign competition particularly in the auto industry. Many hired consultants and instituted quality training programs for their employees (Rounds, 2012).

Wasiu, (2013) established in his study that many of the management practices used to support construction organizations are being challenged. The industry’s clients are moving forward. Clients demand improved service quality, faster buildings and innovations in technology. In Yasamis, (2012), Quality Management Concept is said to be structured in general according to the “International Organization for Standardization” ISO 9000-series and the “Plan, Do,

Check, Act” PDCA-cycle. It further illustrated the two main structures stated above as follows;

ISO 9000-series: According to EN ISO 9000 quality management is defined as “coordinated activities to direct and control an organization with regard to quality”. Direction and control with regard to quality generally includes establishment of the quality policy and quality objectives, quality planning, quality control, quality assurance and quality improvement:

1. **Quality planning** is focused on setting quality objectives and specifying necessary operational processes and related resources to fulfil the quality objectives
2. **Quality control** is focused on fulfilling quality requirements
3. **Quality assurance** is focused on providing confidence that quality requirements will be fulfilled
4. **Quality improvement** is focused on increasing the ability to fulfil the quality requirements

PDCA-cycle

An important mind set of quality management is the PDCA-cycle. This cycle including the four components as Plan, Do, Check and Act (PDCA), was originally conceived by (Kado, 2010), and later adopted by W. Edward Deming. The model provides in general a framework for the improvement of a process or system and is an iterative four-step quality strategy cf. (Deming, 2011 as cite in Doyle, 2014).

1. **Plan:** Establish objectives and processes necessary to deliver results in accordance to specification
2. **Do:** implementation of processes

3. **Check:** Monitor and evaluate processes and results against objectives and specifications
4. **Act:** Take actions to the outcome for necessary improvement (e.g. improve, standardize).

2.3 Quality Management Systems

If properly implemented, formal quality management systems provide a vehicle for achieving quality (i.e. conformance to established requirements). As defined by ANSI, a quality system is “the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management” (Perisco, 2018). In other words, Quality management systems refers to the set of quality activities involved in producing a product, process, or service, and encompasses prevention and appraisal (Burati et al., 2012). It is “a management discipline concerned with preventing problems from occurring by creating the attitudes and controls that make prevention possible” (Crosby, 2015). Quality activities include the determination of the quality policy, objectives, and responsibilities and implementing them through quality planning, quality control, quality assurance, and quality improvement, within the quality system (Yunusa, 2013).

Other views expressed by (Willar, 2012), is that, a quality management system is a management technique used to communicate to employees what is required to produce the desired quality of products and services and to influence employee actions to complete tasks according to the quality specifications. In like manner, (Rumane, 2011) also explained quality management system as a set of co-ordinated activities to direct and control an organisation in order to continually improve the effectiveness and efficiency of its performance. These activities interact and are affected by being in the system, so the isolation and study of each one in detail will not necessarily lead to an understanding of the system as a whole. The main

thrust of a QMS is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. The paper continued to say that a fully documented QMS will ensure that two important requirements are met:

1. The customers' requirements – confidence in the ability of the organisation to deliver the desired product and service consistently meeting their needs and expectations.
2. The organisation's requirements – both internally and externally, and at an optimum cost with efficient use of the available resources – materials, human, technology and information.

2.3.1 Purpose of Quality Management in the Construction Industry

The U.S. Army Corps of Engineers, (2014) states that Construction Quality Management “CQM” is the performance of tasks, which ensure that construction is performed according to plans and specifications, on time, within a defined budget, and a safe work environment. According to (Smallwood, 2017), quality is defined as conformance to properly developed requirements. For a construction project, quality begins with requirements carefully developed, reviewed for adherence to existing guidance and ultimately reflected in criteria and design documents which accurately address these needs. Therefore, the designer establishes the quality standards and the contractor in building to the quality standards in the plans and specifications, controls the quality of the work. The purpose of CQM is the Government's efforts, separate from, but in coordination and cooperation with the contractor, assure that the quality set by the plans and specifications is achieved. CQM is the combined effort of the contractor and the Government. The contractor has primary responsibility for producing construction through compliance with plans, specifications, and accepted standards of the industry.

2.3.2 Principles of Quality Management.

Quality Management is based on three fundamental principles (Rounds, 2012); these are:

1. Focus on customer and stakeholders;
2. Participation and teamwork by everyone in the organisation;
3. A process focus supported by continuous improvement and learning.

2.4 Project Quality Performance Measurement

Performance measurement is a fundamental building block of quality management and a total quality organisation. Historically, organisations have always measured performance in some way through the financial performance, be this success by profit or failure through liquidation. However, traditional performance measures, based on cost accounting information, provide little to support organisations on their quality journey because they do not map process performance and improvements seen by the customer. In a successful total quality organisation, performance will be measured by the improvements seen by the customer as well as by the results delivered to the shareholders (Lee, 2016). According to (Wasiu, 2013), performance measurement in the manufacturing and construction industries is used as a systematic way of judging project performance by evaluating the inputs, outputs and the final project outcomes. However, very few companies systematically measure their performance in a holistic way. Moreover, the existing systems tend to focus more on product and less on process and design. This can lead to the suboptimal quality of the performance measurement system, the misjudging of relative performance, complacency and the denying of appropriate rewards to the deserving. Previous studies have revealed that performance can be measured in terms of financial

and non-financial measures, or the combination of both. When measurements are being implemented, contractors, consultants and the management team's performances are blamed as the major reasons for the failure of a particular project. The other project stakeholders such as client, suppliers, trade contractors and the community at large are neglected.

2.5 Quality Planning

Sanni, (2011) defined quality planning as a set of activities whose purpose is to define quality system policies, objectives, and requirements, and to explain how these policies will be applied, how these objectives will be achieved, and how these requirements will be met. Subsequent to this definition, (Burns, 2013) stressed that quality plan is different from a test plan. The study continued that quality plan defines the quality goals, is realistic about where defects come from, selects appropriate detection and prevention methods, and has means not to "go dark". The Project Management Book of Knowledge "PMBOK" 4 also addressed quality planning from a different position to enhance the thoughts earlier expressed. It said that quality planning has a process input generated by predecessor processes referred to as the Project Scope Statement and Project Management Plan. These processes are introduced by external units like Enterprise Environmental Factors and Organizational Process Assets. PMBOK4 further defined quality planning as the process for "identifying which quality standards are relevant to a project and determining how to satisfy them": In other words, it means planning how to fulfil process and product (deliverable) quality requirements: "Quality is the degree to which a set of inherent characteristics fulfil requirements". By planning the quality one has to respect some principles, and these are:

1. **Customer satisfaction comes first:** Quality is defined by the requirements of the customer.

2. **Prevention over inspection:** It's better to avoid mistakes than to inspect the result and repair the defects.
3. **Management responsibility:** Costs of quality must be approved by the management.
4. **Continuous improvement:** Becoming better is an iteratively structured process.

These sentences implicate the rule, that gold plating is not an indicator of quality; it has to be avoided.

2.6 Quality Assurance

In recent years, increasing concern has been expressed at the standards of performance and quality achieved in building works. The need for structured and formal systems of construction management to address the aspect of performance, workmanship and quality has arisen as a direct result of deficiencies and problems in design, construction, materials and components. Many of the problems experienced in building appear as a range of inadequacies from minor technical and aesthetic aspects to major building defects. Irrespective of their degree of severity, such problems are known to cost the industry so much annually, yet, many difficulties might be alleviated through greater care and attention to standards of performance and quality at the briefing, design and construction stages of the building process (Oberlender, 2016). If buildings are to be trouble-free, more attention needs to be given to applying quality assurance principles to design and site-work, including project selection and specification, and to supervision of the handling and protection on site (Crosby, 2015).

Aina, (2001) defined quality assurance as a set of activities whose purpose is to demonstrate that an entity meets all quality requirements. Quality Assurance activities are carried out in order to inspire the confidence of both customers and managers, confidence that all quality requirements are being met. According to (Juran, 2016), the main objective of quality

assurance measures in information processes is to fulfil a required quality level. By using described probabilistic model, cause and effect diagram, one is able to analyse existing processes and to detect existing quality gaps within these processes. Reference to (Perisco, 2018), quality requirements should be clear and verifiable so that all parties in the project can understand them for conformance. Deming, (2011) continued that Quality assurance (QA) emphasizes defect prevention, unlike quality control that focuses on defect detection once the item is produced or constructed. It was further established that quality assurance concentrates on the production or construction management methods and procedural approaches to ensure that quality is built into the production system.

2.6.1 Quality Assurance in Construction

The importance of Quality Assurance is based on the principles of getting things right first time. By implementing, maintaining, reviewing and continually improving a Quality Assurance System, a construction company can achieve and reap the benefits of having such a system in place. Quality Assurance exists because of the degree of dissatisfaction experienced by the industry's clients over a long period, combined with a growing impatience by some of their advisers to achieve value for money. An increasing number of building companies are also frustrated by the inadequacy of a system which however valiantly they try, leaves their efforts lacking in some regards. A revolution has occurred in the assembly of buildings from what was a craft process to one where the critical work of connecting interdependent units is done in the main by semi-skilled labour from a multiplicity of separate employers. This makes great demands upon supervision and management systems. (Jimoh, 2012).

A Quality System is designed to provide an assurance to Clients, which can be supported through documented records, that all contracts will be completed in accordance with the

agreed time, cost and specification. It should also further ensure that the company personnel, sub-contractors and key suppliers are aware of customer requirements and that they are fully met. Conformance with requirements of the detailed procedures developed in accordance with the Quality Manual has to be mandatory for all staff employed in the company. It is essential to the system that encouragement is given to each employee to develop and maintain an attitude of continuing quality improvement and customer satisfaction. Quality Assurance is concerned with developing and planning the necessary technical and managerial competence to achieve desired results. It is also about attitudes, both of management and of all those for whom they are responsible. (Doyle, 2014).

2.7 Quality Control

Investopedia explains 'Quality Control' as a process through which a business seeks to ensure that product quality is maintained or improved and manufacturing errors are reduced or eliminated. Quality control requires the business to create an environment in which both management and employees strive for perfection. This is done by training personnel, creating benchmarks for product quality, and testing products to check for statistically significant variations. A major aspect of quality control is the establishment of well-defined controls. These controls help standardize both production and reactions to quality issues. Limiting room for error by specifying which production activities are to be completed by which personnel, reduces the chance that employees will be involved in tasks for which they do not have adequate training. Quality Management Systems, (2013) stated that, quality control is the process of evaluating whether construction projects adhere to specific standards. The main objective of quality control is safety. Additionally, quality control is also meant to ensure that buildings are reliable and sustainable.

The ISO definition also states that quality control is the operational techniques and activities that are used to fulfil requirements for quality. This definition could imply that any activity whether serving the improvement, control, management or assurance of quality could be a quality control activity. What the definition fails to tell us is that controls regulate performance. They prevent change and when applied to quality, it regulates quality performance and prevent undesirable changes in the quality standards. It continued that quality control is a process for maintaining standards and not for creating them. Standards are maintained through a process of selection, measurement and correction of work, so that only those products or services which emerge from the process meet the standards. In simple terms quality control prevents undesirable changes being present in the quality of the product or service being supplied. The simplest form of quality control is illustrated in the Figure below. Quality control can be applied to particular products, to processes which produce the products or to the output of the whole organisation by measuring the overall quality performance of the organisation.

It is often deemed that quality assurance serves prevention and quality control detection but a control installed to detect failure before it occurs serves prevention such as reducing the tolerance band to well within the specification limits. So quality control can prevent failure. Assurance is the result of an examination whereas control produces the result. Quality Assurance does not change the product, Quality Control does. Farooqui, (2013) defined quality control as a set of activities or techniques whose purpose is to ensure that all quality requirements are being met. In order to achieve this purpose, processes are monitored and performance problem are solved. Kubal, (2014) in other words said quality control is critically important to a successful construction project and should be adhered to throughout a project from conception and design to construction and installation. Inspection during construction will prevent costly repairs after the project is completed. The inspector,

engineer, contractor, funding agency, permit agency, and system personnel must work together to inspect, document, and correct deficiencies.

2.7.1 Importance of Quality Control in Construction

Quality Control (QC) in construction is the process of verifying that the project is built to plan, that the tolerances allowable by industry standard and engineering practices have been met or bettered, and that the finished project (and all phases to get there) meet with the quality standards of the architect, engineer, owner, and general contractor. On construction projects there are dozens of subcontractors, all of which have specific responsibilities. Superintendents and project managers try to maintain high quality standards but they can't be everywhere at once. Required inspections by cities and counties (as well as other jurisdictions, depending on the project) help to ensure safety and code issues. In addition, a good general contractor or developer will have on staff a QC person, someone who is responsible for going through the building or project, ensuring compliance, and maintaining an ongoing list of corrective items that must be accomplished before the contractor who installed it is paid or leaves the job. QC technicians generally keep a very detailed binder, separated by areas/rooms/phases of the project with notes of items that must be either verified or corrected, with sign-off as each is accomplished. This binder becomes part of the project record and is an important element to completing the project on time and with expected quality maintained (Wiki.answers.com).

2.8 Quality Improvement

Willar, (2012), said there no single definition of quality improvement and no one approach appears to be more successful than another. However, there are a number of definitions that describe quality improvement as a systematic approach that uses specific techniques to improve quality. The most important ingredient in successful and sustained improvement is

the way in which the change is introduced and implemented. According to ISO 9000:2000 Quality improvement is "Part of quality management focused on increasing the ability to fulfil quality requirements."

2.9 Review of Related Empirical Study

Kubal (2014) carried out a research on quality management in construction project: Empirical study of covenant university sport complex. The acceptable level of quality in construction projects has long been a problem. Significant resources are wasted on construction projects because of inefficient or non-existent quality management procedures. Therefore, this study evaluates the quality management and the quality grading practices in the construction project with emphasis on the Covenant University Sports Complex. The quantitative research strategy and questionnaire survey were used as the main data collection instrument for soliciting information from the project participants in order to determine the best key for quality management practice. Moreover, an ultrasonic pulse velocity tester was engaged to assess and evaluate the conditions of concrete structural members. It was found out that management commitment to quality is the most key for effective quality management practices in the construction project. In addition, the ultrasonic pulse velocity (UPV) test carried out on the randomly selected structural members varied in the range 4.2km/sec to 4.6km/sec. From this, it is inferred that the quality grading and homogeneity of concrete in the tested reinforced concrete columns, beams and slabs fall in the range of "good to excellent concrete". The findings would assist project participants in implementing an efficient quality grading and management while executing construction projects.

Keywords: Ultrasonic pulse velocity, Reinforced concrete, Questionnaire, Client, Consultant, Contractor.

Juran (2016) conducted a research on quality management system at construction project. The Quality Management System (QMS) in construction industry refers to quality planning, quality assurance, quality control. The main goal of construction industry is to ensure that construction projects are successfully completed within the constraints of best quality, stated period and at minimum possible cost. The research based on QMS recommended that construction companies should create a flexible and conducive organizational atmosphere which encourages the development of quality management system in all aspects of their work. The questionnaire survey has been carried out in the present study by taking interviews of participants of project. The participants of project include owner/builder, project management consultant, contractor, various consultants and suppliers. The questionnaires have been prepared by authors based on quality aspects in construction project for builder / contractor, consultants and customers / occupants of buildings. This paper describes the analysis of data collected during interviews and questionnaires with builder / contractor.

Keyword: assurance, contractor, expectations, management, quality.

Perisco (2018) conducted a study on quality management practices in construction; A key to successful building project delivery. Quality management plan in construction can be described as a tool that guides construction professionals on the proper execution of construction projects in terms of quality. A finished and acceptable project should be able to meet the required quality standard, provides customer's satisfaction and value for money. This paper explores the factors that positively influence quality in building construction works, the effect of not adhering and the benefits of adhering to quality standard for building construction projects. It was achieved through a review of existing literature and field survey. Survey questionnaires were directed to building construction professionals through convenient sampling technique in Enugu State. Descriptive analysis tools were used for the

analysis. Conclusion was reached and recommendations based on the findings were made in the paper.

Keywords: Building, Construction Project, Quality Management, Project delivery, Quality assurance.

Empirical studies on quality management in construction have shown that various quality improvement practices are common among non-residential builders and developers. Most of these practices have been collectively grouped under a successful management philosophy termed, “Total Quality Management” or TQM.

2.10 Summary of Literature

The Federal Government of Nigeria and States in Nigeria have their various planning regulatory authorities. In federal and state ministry of work and infrastructural development minna Niger State is saddled with the regulatory authorities and it was created under Decree No.6 of February 5, 1976 cited as the Niger State Act. The Decree which vested ownership and control of all land in the area to the Federal Government also gives the ministry the onus of handling the design, planning and construction of Niger state. In 2003 the Development Control Department of the Niger state issued a revised edition of Niger State Development Control Manual'. In which the then Governor Engr A.A KURE, said the overall objective of this document Development Control Manual (2003) is to set out the bases to decide planning application, conditions to planning permission, while Design and Development guide lines and execute the polices by setting out a number of detailed planning and environmental technicalities.

Kado (2010) asserted that, although there are such laws and regulatory organisations and their manuals, yet shortcomings still persist in the construction industry. Also Bamisile (2013)

observed that "in certain instances, unqualified persons prepared both architectural and engineering designs and/or working drawings are poorly prepared even in some cases without drawings number and the name of the designer or drawn by column completed not to talk about name of the person that checked the drawings before they are issued for construction" In addition, some of the drawings are uncoordinated, grossly inadequate for construction, specifications are not used by the design team, in many instances they are left to quantity surveyors to write. References are often made to certain standards and codes of practice without the writer having seen copy of them before. Their current status and relevance to the specific project are also hardly checked. In conclusion, Bamisile (2013) remarked that "one could say that the design team has not yet adopted any quality culture in their contribution to production of buildings in Nigeria.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter describes research design, area of study, population of the study, instrument for data collection, validation of the instrument, administration of the instrument, method of data analysis and decision rules respectively.

3.1 Research Design

The descriptive survey research method with the use of a structured questionnaire was used to collect the required information from the respondents. The survey research was adopted because survey design generally can be used to effectively investigate problems in realistic settings. Nworgu (2012) described survey research as that which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group.

3.2 Area of the Study

This study will be conducted in Niger State, a State in central Nigeria and the largest State in the country which shares boundaries with Kaduna State (North-East), Federal Capital Territory (South-East), Kebbi State (North-West), and Kwara State (South-West).

This study covers four building construction firms in minna, Niger State. The following are the building firms: Niger state ministry of works and infrastructural development; Bamshuk consults limited, M Ali engineering services and WB engineering services company limited.

3.3 Population of the Study

The targeted population for this study comprises of 45 registered project managers, site Engineers and architects practicing with the construction company in 4 construction

companies in minna, Niger State. There was no need of sampling since all the population in their companies were used

The table below shows the distribution of population

S/N	Companies	Male Professionals	Female Professionals
1.	Niger State Ministry of Works and Infrastructural Development	15	2
2.	Bamshuk consults limited	10	2
3.	M Ali engineering services	8	1
4.	WB engineering services company limited	6	1
	Total	39	6 45

3.4 Instrument for Data Collection

The instrument used for data collection is questionnaire. The questionnaire is to determine the opinion of the respondents that comprises of the project managers, site engineers and architects in minna, Niger State. The questionnaire is divided into two parts (i and ii). Part i consist of respondents "personal data", containing information about gender, age, qualification and part ii is grouped into (A,B and C) where question A consist of 15 items which sought to elicit information about the factors affecting quality management in construction firms in minna Niger State, sub-section B consist of 10 items which sought to elicit information about the quality management practices that firms conform with in minna Niger State and sub-section C consist of 8 items which sought to elicit information on the effects of firm size on the practices they conform with to enhance quality management in minna Niger State.

3.5 Validation of the Instrument

The instrument for the data collection was designed by the researcher and was validated by three lecturers in the Department of Industrial and Technology Education, The validators were requested to check the suitability and clarity of the items and found it appropriate for the study before administering.

3.6 Administration of the Instrument

The instrument used for data collection was administered to 4 construction companies in minna Niger State. The instrument was retrieved after a week for computation. The instrument for the data collection was administered by the researcher and one research assistant.

3.7 Method of Data Analysis

The data collected by the researcher was analyzed using mean, standard deviation and t-test as statistical tools. A four-point rating scale was employed with the following response.

Alternative value		Abbreviation	Rating
Strongly Agree	=	“SA”	4
Agree	=	“A”	3
Disagree	=	“D”	2
Strongly Disagree	=	“SD”	1

$$\frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$$

4 4

The mean response of each item was obtained by using the following formula

Where

Σ = Summation of

\bar{X} = normal value of option (mean)

N = number of response of an item

F = frequency of response of each option

= Grand mean of each item

Decision Rule

To determine the level of acceptance, mean response. 2.50 And above was considered agreed or accepted. While mean response of 2.49 and below was equally considered disagreed or rejected. For testing hypothesis ± 1.68 will be the critical value, any item that has its t- value equal or less than t- critical was considered not significant, and any item that has its calculated t- value above t-critical was considered significant.

CHAPTER FOUR

4.0 PRESENTATION AND DATA ANALYSIS

This chapter deals with the presentation and analysis of data with respect to the research questions formulated for this study, the result of this data analysis for the research questions are presented first, followed by those of the hypotheses tested for the study.

4.1 Research Question 1

What are the factors affecting quality management in the construction firms in Niger State?

Table 4.1.1: mean response on the factors affecting quality management in the construction firms in minna, Niger State. N1=36, N2=9.

S/N	ITEMS	\bar{x}_1	\bar{x}_2	\bar{x}_t	Remark
1	adequacy of project control	2.7	2.8	2.8	Agreed
2	knowledge of project	2.5	1.7	2.1	Disagreed
3	quality of workmanship	2.8	3.3	3.1	agreed
4	project quality	2.8	3.0	2.9	agreed
5	adequacy of job site personnel	3.3	3.2	3.2	agreed
6	material quality	3.4	3.1	3.3	agreed
7	site safety	3.1	3.0	3.1	agreed
8	adequate securities	2.7	3.1	2.9	agreed
9	adequate storages	2.5	3.0	2.8	agreed
10	adequacy of delivery	2.7	2.8	2.8	agreed
11	estimating	2.7	3.7	3.2	agreed
12	scheduling	3.1	3.8	3.5	agreed
13	certification of material	2.5	3.6	3.1	agreed
14	risk assessment	2.4	2.7	2.6	agreed
15	progress review meetings	2.3	2.2	2.3	disagreed

KEY: X1= average mean responses of male professional in construction firms, X2= average mean responses of female professional in the construction firms, N1= number

of number of male professionals in construction firms, N2= number of female professionals in construction firms.

Table 4.1.1 reviews that the respondents agreed with item 1,3,4,5,6,7,8,9,10,11,12,13 and 14 with a mean score above 2.50 respectively. While item 2 and 15 disagreed with a mean score below 2.50. This means that item 1,3,4,5,6,7,8,9,10,11,12,13 and 14 agreed to the factors affecting quality management in the construction firms in Minna, Niger State.

4.2 Research Question 2:

What are quality management practices that firms conform with in Minna, Niger State?

Table 4.2.1 Mean responses of the respondents on the quality management practice that firms conform with in minna, Niger State. N1= 36, N2=9

S/N	ITEMS	\bar{x}_1	\bar{x}_2	\bar{x}_t	Remark
1	attention to needs of clients	2.6	3.4	3.0	agreed
2	administrations of changed order	2.3	2.8	2.6	agreed
3	education of employees on the need for quality	3.2	3.4	3.3	agreed
4	qualification of employees	3.3	3.4	3.4	agreed
5	staff training	3.4	3.7	3.6	agreed
6	quality appraisal	2.8	2.9	2.9	agreed
7	personnel management on site	2.9	3.2	3.1	agreed
8	proper planning	2.8	3.3	3.1	agreed
9	customer satisfaction	2.4	3.0	2.7	agreed
10	compliances to standard of relevant agencies	2.8	2.6	2.7	agreed

KEY: X1= average mean responses of male professionals in construction firms, X2= average mean responses of female professional in construction firms, N1= number of male professional in construction firms, N2= number female professionals in construction firms.

Table 4.2.1 shows that both respondents agreed on the quality management practices that firms conform with in Minna, Niger State, item 1,2,3,4,5,6,7,8,9 and 10 as reflected by their own mean score greater than 2.50 respectively. While none disagreed.

4.3 Research Question 3

What are the effects of firm size on the practices they conform with to enhance quality management in Minna, Niger State?

Table 4.3.1 Mean responses of the respondents on the effects of firm size on the practices they conform with to enhance quality management in Minna, Niger State. N1= 36, N2=9

S/N	ITEMS	\bar{x}_1	\bar{x}_2	\bar{x}_t	Remark
1	on-site supervision	3.1	3.0	3.1	agreed
2	adequacy of employee training	2.7	2.6	2.7	agreed
3	team work among workers	2.9	3.0	3.0	agreed
4	motivations among workers	2.5	3.5	3.0	agreed
5	budgetary allocations	2.6	2.3	2.5	agreed
6	qualification of employees	3.0	2.1	2.5	agreed
7	attentions to needs of clients	1.9	2.4	2.2	disagreed
8	personnel management on site	2.8	2.9	2.9	agreed

KEY: X1= average mean responses of male professionals in construction firms, X2= average mean responses of female professional in construction firms, N1= number of male professional in construction firms, N2= number female professionals in construction firms.

Table 4.3.1 shows that both respondents agreed on the effect of firm size on the practices they conform with to enhance quality management in Minna, Niger State, item 1,2,3,4,5,6 and 8 as reflected by their own mean score greater than 2.50 respectively. While item 7 disagreed with the mean score below 2.50.

4.4 Testing of Hypotheses

Hypotheses 1:

There will be no significant difference in the mean response of male and female professionals in the construction firms on the factors affecting quality management in construction firms in Minna, Niger State.

Table 4.4.1 : t-test analysis of the response of male and female professionals in construction firms on the factors affecting quality management in construction firms in Minna, Niger State.

S/N	ITEMS	SD1	SD2	t-test	Remark
1	adequacy of project control	1.06	0.93	-2.80	NA
2	knowledge of project	1.08	0.87	2.34	NA
3	quality of workmanship	0.99	0.50	-2.13	NA
4	project quality	0.88	1.00	-0.55	A
5	adequacy of job site personnel	1.01	0.72	0.34	A
6	material quality	0.74	0.93	0.90	A
7	site safety	1.15	0.50	0.39	A
8	adequate securities	1.09	0.60	-1.48	A
9	adequate storages	1.21	0.71	-1.61	A
10	adequacy of delivery	1.11	1.13	-0.23	A
11	estimating	1.04	0.50	-4.16	NA
12	scheduling	0.83	0.44	-3.47	NA
13	certification of material	1.08	0.53	-4.36	NA
14	risk assessment	1.21	1.00	-0.77	A
15	progress review meetings	1.12	0.97	0.27	A

table 4.4.1: presents test of this hypotheses

Key

SD1= Standard deviation of male professionals in construction firms

SD2= Standard deviation of female professionals in construction firms

A= Accepted

NA= Not Accepted

The result shown in table 4.4.1 above indicates the comparism between the male and female professionals in construction firms. Data revealed that item 4,5,6,7,8,9,10,14 and 15 has a calculated t-value less than the t-critical ± 1.68 , hence hypothesis for these item were upheld at 0.05 level of significance. Expect for item 1,2,3,11,12 and 13 which has a t-calculated value above the t-critical value +1.68, thus HO was not accepted for this items

Hypothesis 2

There will be no significant difference in the mean response of male and female professionals in construction firms on the quality management practices that firms conform with in Minna, Niger State.

Table 4.4.2: t-test analysis of the response of male and female professionals in construction firms on the quality management practices that firms conform with in Minna, Niger State.

S/N	ITEMS	SD1	SD2	t-test	Remark
1	attention to needs of clients	1.07	0.73	-2.65	NA
2	administrations of changed order	1.16	0.97	-1.33	A
3	education of employees on the need for quality	0.62	0.53	-0.99	A
4	qualification of employees	0.61	0.73	-0.38	A
5	staff training	0.50	0.50	-1.61	A
6	quality appraisal	0.99	0.98	-0.27	A
7	personnel management on site	0.99	0.67	-1.08	A
8	proper planning	0.88	0.71	-1.80	NA
9	customer satisfaction	0.94	1.32	-1.28	A
10	compliances to standard of relevant agencies	0.85	1.13	0.50	A

Table 4.4.2: Present test of this hypotheses

Key

SD1= standard deviation of teachers in technical colleges

SD2= standard deviation of students in technical colleges

A= accepted

NA= not accepted

The result shown in table 4.4.2 above indicates the comparison between the male and female professionals in construction firms in Minna, Niger State. Data revealed that item 2,3,4,5,6,7,9 and 10 has a calculated t-value less than the t-critical value of ± 1.68 , hence the hypothesis for this items were upheld at 0.05 level of significance. While item 1 and 8 has a t-

calculated value above the t-critical value of +1.68, thus the null hypothesis for this items were not accepted.

Hypothesis 3

There will be no significant difference in the mean response of male and female professionals in confirms on the effect of firm size on the practices they are conform with to enhance quality management in Minna, Niger State.

Table 4.4.3: t-test Analysis on the Response of male and female professionals in construction firms on the effect of firm size on the practices they conform with to enhance quality management in Minna, Niger state.

S/N	ITEMS	SD1	SD2	t-test	Remark
1	on-site supervision	0.71	1.00	0.28	A
2	adequacy of employee training	0.99	1.23	0.23	A
3	team work among workers	1.07	0.94	-0.28	A
4	motivations among workers	0.97	0.53	-3.76	NA
5	budgetary allocations	0.97	1.22	0.69	A
6	qualification of employees	0.65	1.05	2.46	NA
7	attentions to needs of clients	0.99	1.33	-1.06	A
8	personnel management on site	1.11	0.93	-0.28	A

Table 4.1.6: Present test of this hypotheses

Key

SD1= standard deviation of teachers in technical colleges

SD2= standard deviation of students in technical colleges

A= accepted

NA= not accepted

The result shown in table 4.4.3 above indicates the comparism between the male and female professionals in construction firms in Minna, Niger State. Data revealed that item 1,2,3,5,7 and 8 has a calculated t-value less than t-critical value of +1.68, hence the hypothesis for these items were upheld at 0.05 level of significant, expect for item 4 and 6 which has a t-

calculated value above the t- critical value of ± 1.68 , thus the null hypothesis for these items were not accepted.

Findings of the Study

the following are the principle findings of the study, they are organized based on the research questions and hypotheses.

The findings related to the factors affecting quality management in the construction firms in Minna, Niger State:

1. Adequacy of project control
2. Knowledge of project
3. Project quality
4. Adequacy of job site personnel
5. Material quality
6. Site safety
7. Adequacy of security
8. Adequacy of storage
9. Adequacy of delivery
10. Estimating
11. Scheduling
12. Certification of material
13. Risk assessment.

Findings related to the quality management practices that firms conform with in Minna, Niger State.

1. Attention to needs of clients
2. Administration of change order
3. Education of employees on the need for quality

4. Qualification of employees
5. Staff training
6. Quality appraisal
7. Personnel management on site
8. Proper planning
9. Customer satisfaction
10. Compliance to standard of relevant agencies.

Findings related to the effects of firm size on the practices they conform with to enhance quality management in Minna, Niger State.

1. On-site supervision
2. Adequacy of employee training
3. Team work among workers
4. Motivation among workers
5. Budgetary allocation
6. Qualification of employees
7. Personnel management on site

Discussion of the findings

The discussion of findings is based on the research questions posed for the study and the hypothesis. The findings in table 1 related to research question 1 shows the majority of items as regard the factors affecting quality management in the construction firms in Minna, Niger State. The findings revealed that the most of the factors affecting construction firms are Adequate site personal, adequate project control, quality workmanship and Certification of material as these factors tend to decrease the quality management of construction firms.

The implication of the finding discovered that when there are adequate site personnel, quality workmanship, and site safety respectively, it will improve the quality management of the firm.

The findings in table 2 related to research question 2 revealed that respondents agreed with the majority of items on the quality management practices that firms conform with in Minna Niger State. The findings revealed that paying attention to clients need, training of staff, quality appraisal compliance to standard of relevant agencies are some of the practices that construction firms conform with in Minna, Niger State. According to (Aina, 2011) described the Japanese approach to quality management as a thought revolution in management. Such revolution needs to be adopted in minna Niger State to improve the quality management of construction firms.

The implications of the findings revealed that quality management in construction firms can improve if their staff are well trained, if they pay good attention to the needs of clients and if they comply to the standard of relevant agencies.

The findings in table 3 related to research question 3 revealed that the respondents agreed with the majority of items on the effects of firm size on the practices they conform with to enhance quality management in Minna, Niger State. The findings revealed that there is need for site supervision, adequate training of employees, team work among workers and motivation among works.

The implication of this findings revealed that when there is proper site supervision, adequate training of employees and motivation among workers, it will help improve the quality management of construction firms.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter deals with summary, conclusion and recommendations based on the findings. Suggestions for further studies were also highlighted.

5.1 Summary of the Study

This study is on the assessment of quality management practices in building Construction firms in Minna Niger state. The chapter one of the study discuss a lot of issues concerning quality management practices in building construction firms in the background of the study, the statement of the problem was well stated, which has to do with the lack of quality due to deficient construction quality management through non-conformance to established requirements. Quality related problems during construction can be projected on the operating life of the finish project, this is as a result of inefficient or non-existent quality management procedures, significant expenditures of time, money, and resources are wasted on construction projects. Purpose of the study, significance of the study, scope of the study, the research questions and hypotheses were all formulated to guide the study.

The review of related literature looked at the overview of quality management, the concept of quality management, quality management system, project quality performance measurement, quality planning, quality assurance, quality control quality improvement and review of related empirical study are the sub-headings that were discussed and different views concerning the topic which was harmonized in a comprehensive literature review.

A survey research design where questionnaire was used as a source for opinions from respondents on the assessment of quality management practices in building construction firms. The targeted population for the study is 45 respondents which are male and female

professionals in the construction firms in Minna Niger state. The instrument was validated by three lecturers from the department of industrial and technology education, federal university of technology Minna. The data collected was analyzed using mean standard deviation and t-test. A mean response of 2.50 was used as cut-off point, t-test however was employed to test the null hypotheses at 0.05 level of significance.

5.2 Implication of the Study

The findings of the study as far having implications on the quality management practices of firms, professionals, the construction industry and the society at large. The findings of the study regard the assessment of quality management practices in building construction firms in Minna Niger state. The implication of this study will help to establish that there are some variations with regards to firm size in conformity with quality management practices. From the research findings, it was concluded that inadequate on site supervision, quality appraisal and education of employees on the need for quality management are the major practices that firms need to conform with to ensure quality management in building construction firms. The research recommends building construction firms to conform strictly to quality management practices.

It will also help construction companies to create a flexible and conducive organizational atmosphere which encourages the development of quality management practices in all aspect of their work. Further, construction firms should be encouraged to apply quality management techniques during the execution of project and engage/include personnel in charge of Quality as part of an integrated team in the Project Management and Delivery process. In addition, training programs and refresher courses in Quality Management should be instituted among construction firms to broaden the knowledge of their employees in this regard and also enhance timely delivery of projects.

5.3 Conclusion

The study tends to assess the Quality Management Practices of construction firms with emphases on construction firms and the objectives set for this purpose were to determine whether the construction firms are committed to Quality Management Planning in the delivery of construction projects, determine the challenges encountered by contractors while implementing Quality Assurance during the execution of projects and proposing measures for effective quality assurance practice leading to a higher levels of satisfaction in the Construction Industry.

The main findings of the study revealed that meeting project deadline and quality were the two key factors considered to be the most relevant in project performance measurement. In addition, indicators for Quality were discovered as getting more jobs as a result of previous good works done, management commitment to quality and the overall client or customer satisfaction. The findings further revealed some challenges encountered during the implementation of Quality management and these are; lack of effective supervision, lack of effective communication, lack of management's commitment to quality assurance, lack of proper equipment available for use and lack of a quality assurance team to lead.

Quality Management practices remain optimum for achieving effective project performance in all types of infrastructural development, both in developed and developing countries. To this end, the commendations submitted in this research would assist Nigerian construction firms in practicing effective quality management during the execution of their projects.

5.4 Recommendations

Based on the findings of this study, the following recommendations were made;

1. Firms should ensure all site personal are adequately qualified to delivery on the tasks assigned to them, materials used on site should be properly certified before usage and all

stakeholders on a project should possess adequate information and full knowledge of such project before work commences.

2. Firms need to invest more in the education and training of employees on quality management systems and the need to adhere to suitable quality management practices, also firm need to ensure all employees in charge of supervision on site are adequately qualified for such positions, firms should also embark on frequent quality appraisal of their activities and comply to laid down industry standards.

3. A frame work needs to be developed for effective quality management to ensure uniformity in Nigerian building construction project delivery by firms.

5.5 Suggestions for Further Research

1. A frame work needs to be developed for quality management practices that suits building construction projects in Nigeria.
2. The impact of quality management practices in the Nigerian construction industry.
3. The framework for predicting the failure and success of quality management innovation in the Nigerian construction industry.

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RESEARCH QUESTIONNAIRE

ON

ASSESSMENT OF QUALITY MANAGEMENT PRACTICES IN BUILDING CONSTRUCTION FIRMS IN MINNA, NIGER STATE.

PART ONE

Please, complete the questionnaire as faithfully and sincerely as possible by ticking the column that best represent your perception about the above topic: the questionnaire is for research purpose and your view will be treated confidently.

Gender: Male Female

AGE: 26-30 30-35 35-40 40-45 45-50 50-55

Guide on how to respond to the questionnaire: use the following rating scale to indicate your opinion by ticking the phase that best describe your level of agreement to the items

Strongly Agree = SA

Agree = A

Disagree = D

Strongly Disagree = SD

PART TWO

SECTION A

RESEARCH QUESTION 1

What are the factors affecting quality management in the construction firms in minna, Niger state?

S/N0	ITEMS STATEMENT	SA	A	D	SD
1	Adequacy of project control				
2	Knowledge of project				
3	Quality of workmanship				
4	Project quality				
5	Adequacy of job site personnel				
6	Material quality				
7	Site safety				
8	Adequacy of security				
9	Adequacy of storage				
10	Adequacy of delivery				
11	Estimating				
12	Scheduling				
13	Certification of material				
14	Risk assessment				
15	Progress review meetings				

SECTION B
RESEARCH QUESTION 2

What are quality management practices that firms conform with in minna, Niger State?

S/N0	ITEM STATEMENT	SA	A	D	SD
1	Attention to needs of clients				
2	Administration of change order				
3	Education of employees on the need for quality				
4	Qualification of employees				
5	Staff training				
6	Quality appraisal				
7	Personnel management on site				
8	Proper planning				
9	Customer satisfaction				
10	Compliance to standard of relevant agencies				

SECTION C

RESEARCH QUESTION 3

What are the effects of firm size on the practices they conform with to enhance quality management in minna, Niger State?

S/N0	ITEM STATEMENT	SA	A	D	SD
1	On-site supervision				
2	Adequacy of employee training				
3	Team work among workers				
4	Motivation among workers				
5	Budgetary allocation				
6	Qualification of employees				
7	Attention to needs of clients				
8	Personnel management on site				