IMPACT OF GOVERNMENT POLICY ON THE COST MANAGEMENT OF PUBLIC INFRASTRUCTURE PROJEC

BY

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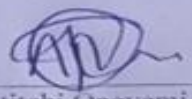
DECLARATION

I hereby do declare that this dissertation is prepared and fully authored by me and that it is a record of my own research work. To the best of my knowledge, it has never been presented in any previous research endeavor. All documented materials used by way of quotations and paraphrasing are duly indicated and their sources specifically acknowledged and referenced.



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CERTIFICATION

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DEDICATION

The project is mostly dedicated to Almighty Allah for his Mercy, protection and guidance towards me, also for keeping me safe during my Higher National Diploma (HND) programme.

It is Also Dedicated to my beloved parents and my entire Family For their Contribution in different ways and for their support in making this programme a successful one. May Almighty Allah Reward Them Abundantly (Amen)

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All praise be with Almighty God for giving me the strength and guidance to complete this project.

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ABSTRACT

Government policies play a significant role in shaping the cost management of public infrastructure projects. This study examines impact of government policies on cost management practices in public infrastructure projects, including budgeting, procurement, and risk management. The research investigates how to identify the factors influencing quality and safety management system on building construction projects delivery; to identify the benefits of quality and safety management system on building construction projects delivery; to identify practices that can be used to promote quality and safety management on building construction projects delivery; To assess the effect of compliance to quality and safety precautions in construction work and project managers to optimize cost management. The findings provide insights into the complex relationships between government policies and project costs, and offer recommendations for policy reforms and project management strategies to enhance the efficiency and effectiveness of public infrastructure projects.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

According to Usmen and Vilnitis (2015), “Engineers, constructors and facility owners are concerned with the safety of buildings and constructed facilities because of the monetary losses and human tragedies resulting in personal injury, death and suffering; Safety issues may arise during construction due to failure to control the existing site hazards, including collapse of structures during the construction process”. In addition, defects in constructed buildings usually lead to problems in its maintenance, while structural failures can bring about terrible results. The effectiveness of quality management in all stages of a construction project has a significant impact on safety (Usmen and Vilnitis, 2015). “It is the goal of the project managers to complete the job by assuring safety and quality, while closely controlling project schedule and cost”; unfortunately, knowledge on the relationship between safety, quality and productivity in construction is limited, and because of that there is wide spread assumption that time and expenditures associated with safety and quality in construction compromises productivity; i.e. they delay schedules and increase project costs (Usmen and Vilnitis, 2015).

Quality management includes processes and activities to establish quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken. (Usmen and Vilnitis, 2015).

China National Standard GB/T19000: 2000 has defined quality management as “the activities of coordination of command and control about the quality”. “From the definition of quality management, it is the sum of all management activities, including planning, organization,

implementation, inspection, monitoring, auditing and others, in order that the quality of product can satisfy the updating quality requirements" (Baidu Library).

Safety is defined as the state of being reasonably free from harm, danger, injury or damage; unsafe conditions in facilities under construction, or in constructed facilities, can be caused by the engineers' failure to develop and implement structurally and environmentally comprehensive designs; performing construction in an unsafe manner on the jobsite; or allowing conditions during service to exceed the structural capacity of the facility (Usmen and Vilnitis, 2015). A safety hazard exists when such circumstances triumph, and the result is an accident leading to jobsite injuries and fatalities during construction; also, if the safety hazard exists in a structure in the form of an overload, it causes the facility in part or as a whole to become unstable and leading to collapse. Loss of lives and property damage are the common consequences; the role of the design and construction engineers is to anticipate and proactively prevent these happenings. (Usmen and Vilnitis, 2015).

The importance of providing safe workplace has been emphasized by various related studies because of the basic hazard and risk factors that undeniably trigger every work situation and their negative impact on a company's overall performance. While risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard, hazard on the other hand refers to the situation or source (which could be biological, chemical, physical or ergonomic) of potential damage to somebody, property or equipment. It is believed that some industries are more hazardous than some others. The construction industry worldwide, is however considered as one of the most hazardous industry. (Olutuase, 2014).

The International Training Centre of the International Labour Organisation (2011) claims that one in six fatal accidents at work occur on a construction site. It further stated that no less than 60,000 fatal accidents occur on construction sites around the world every year.

The idea of not supplying casual workers any personal protective equipment (as noted during interviews with some workers) simply reflects that management's view on and approach to safety is not comprehensive. The same factor may also explain the reason why management of a typical construction company in Nigeria practically show little or no concern when 100 workers under different contractors' staff would not put safety wears while being indirectly engaged on their work sites, ignoring the fact that their presence on site could impact on the safety management system of the company. (Olutuase, 2014).

1.2 Statement of Problem

According to Schaufelberger and Lin (2014), Unsafe work site conditions were main reason of arising 10% of accidents on the construction site, unsafe behavior may arise due to a worker's state of mind, tiredness, stress, or physical condition: some examples of accident causes include: A worker notices a dangerous condition but he/she does not do anything to correct it (e.g. use of defective equipment such as a ladder). An individual performing the work in faulty way or unsafe manner due to lack of proper training. A worker may disregard the safety conditions then an accident may occur.

Ashokkumar (2014) stated that the construction industry in India has been struggling with quality issues for many years and the construction firms have been wasting resources as a result of faulty construction.

The construction industry is known as one of the dangerous industries in the world with wide range of accidents, injuries, fatalities and lost work time; Hence, implementation of safety and health in construction sites is a

necessity (Ali *et.al.,* 2016). Also, Ali *et.al* (2016) stated that, in a market-driven community, it is natural that stakeholders focus particularly on time, cost and quality aspects of the projects and safety is not well-thought-out as a main concern; while, Construction accidents cause many human tragedies, and leads to direct and indirect expenses (Direct Expenses include medical costs and workers' compensation insurance. indirect expenses contain delays and disruptions in construction processes, worker's motivation diminishing and adverse effects on reputation of the construction firms).

In addition, the existing framework is not tailored to meet the immediate need of the industry; there is also a lack of backing from the government, a lack of concern from professional institutions, corruption in the system, and low levels of education of employees (Idubur and Oisamoje 2013; Umeokafor *et al.,* 2014)

Since in developing countries construction safety and health regulations are not adequately powerful, safety rules barely exist and they are not often applicable properly Hence, that the rate of accident reports a need for more attention.

Construction industry has been widely criticized for its low quality of delivery of construction projects (Hoonakker *et al.,* 2010). Ashokkumar (2014) concluded that construction firms need to adopt quality and safety management system in order to solve quality problems and meet the demands of the clients. Ashokkumar (2014) noted that the quality of construction projects is determined by quality management. According to Hoonakker *et al.,* (2010), quality management is important for the delivery of a project with zero defects. Also, Tan and Abdul-Rahman (2011) opined that quality and safety management system is required for a construction firm that seeks to sustain itself in the current construction market which is highly challenging and competitive. Quality and safety management practice can help minimize material wastage, accidents, cost overrun and delay (Ashokkumar, 2014) and can be used to address client's requirements

(Hoonakker *et al.,* 2010). Al-Ani and Al-Adhmani (2011) argued that quality and safety management system is an important management system to be considered by construction firms in order to improve the level of their performance; yet construction firms are not practicing quality and safety management system.

In Nigeria, little is known about quality and safety management system practices among the construction firms. Hence, this study intends to assess the impact of quality and safety management system practices on the construction firms in Niger state.

1.3 Research Questions

The following are the questions this study is set out to answer;

1. What are the factors influencing quality and safety management system on building construction projects delivery?
2. What are the benefits of quality and safety management system on building construction projects delivery?
3. What practices can be used to promote quality and safety management on building construction projects delivery?
4. What are the effects of compliance to quality and safety precautions in construction work?

1.4 Aim and Objectives

1.4.1 Aim

The aim of this research is to assess impact of quality and safety management system on building construction projects delivery.

1.4.2 Objectives

The objectives of this research are;

1. To identify the factors influencing quality and safety management system on building construction projects delivery.
2. To identify the benefits of quality and safety management system on building construction projects delivery.
3. To identify practices that can be used to promote quality and safety management on building construction projects delivery.
4. To assess the effect of compliance to quality and safety precautions in construction work.

1.5 Scope of the Study

The scope of this research is limited to construction companies in Minna, Niger state.

1.6 Significance of the Study

Although a safety management system has been found to improve safety performance (Bottani *et al.,* 2009), most construction projects do not establish such a system on site (Benjaoran and Bhokha, 2010).

Due to the high incidence of accidents on construction sites (Choundhry *et al.,* 2009) this research is intended to assess the impact of quality and safety management systems in the building construction industry.

The outcome of this research would be useful to construction professionals in the construction industry whereby the impact of quality and safety management on construction projects will be understood and quality and safety management system will be applied adequately to building construction projects.

1.7 Justification of the Study

Though firms had made improvements in construction safety, construction continued to be a hazardous industry (Yakubu & Bakri, 2013) and specialty trade contractors accounted for the largest proportion of construction fatalities (Mroszczyk, 2015). Aside from causing human tragedy and economic loss, injuries and fatalities significantly affect the productivity and reputation of the construction industry; minimizing injuries and fatalities is a major issue that the industry must continue to address (Kivrak & Kia, 2018).

The demand of clients has also advanced towards improving service quality, faster buildings and innovations in technology where quality management practices are designed to meet the clients' views of quality as well as complying with specifications; the integration of safety issues and quality provides a more comprehensive approach to the safety culture whilst at the same time achieving quality in construction (Husin *et al.*, 2009).

The findings will help construction practitioners in understanding the impact of quality and safety management system and in reviewing decisions factors when they consider implementing quality and safety management system during the various stages of the construction process, from feasibility, design, tender and actual construction stage, also for improving their quality and safety management approaches through considerations of the cognitive impacts. More also, this study requires future studies to be carried out periodically to determine present quality and safety management system methods or improvement.

1.8 Definition of Terms

a) Quality management

Quality management is a discipline for ensuring that outputs, benefits and the process by which they are delivered to meet stakeholder requirements and are fit for purpose. It comprises of quality planning, quality assurance and quality control.

b) Safety management

Safety management is managing business activities and applying principles, framework, processes to help prevent accidents, injuries and to minimize other risk.

c) Construction Project

A Construction project sometimes just referred to as 'project' is the organized process of constructing, renovating, refurbishing etc. a building, structure or infrastructure.

d) Construction Industry

Construction industry is the branch of manufacture and trade based on the building, maintaining and repairing structures.

e) Quality Performance (QP)

Quality Performance (QP) is a management tool that is aimed at giving necessary information to identify quality improvement opportunities for better performance and productivity (Abdul, 2011).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction.

Project implementation has documented tremendous success over the years due to the introduction of new technological methods (Ogwueleka, 2010). Notwithstanding, construction projects have also recorded several work- related accidents and injuries; Construction industry is considered as one of the most hazardous industry due to its unique nature. (Aksom and Hadikusumo, 2008). In Nigeria, the statistics reveal that thousands of workers are being injured and even killed annually due to the industrial related accidents, where the construction industry has recorded twenty percent of the occupational injuries and fatalities (Federal Ministry of Works & Housing Development, 2007). It is important to understand that a high proportion of workforce emanates from the construction industry when compared to other industrial sectors (ETA/ Business Relations Group Report, 2004). This implies that a large population of global workforce is prone to occupational injuries and fatalities. Stanley (2010) conveys that "the majority of construction injury cases are simply related to poor decision making, ranging from poor site due to collapse of construction parts or elements, unsafe working areas, human behaviour and misuse of machineries which can be prevented through adequate safety culture". "In this 21st century, the increase in technological and social changes has also altered the pace of construction works where many other management practices are employed to reduce the occupational injuries and fatalities and improve efficiency and effectiveness of construction processes by eliminating waste and increase profit; these management practices are centred on quality and safety management philosophies, for example, CSHM web based system, OSHA VPP, OSHA Construction E- tool, OHSAS 18001 System and ISO 9001" (Ogwueleka, 2013).

2.2 Nigerian construction industry.

"Nigerian construction firms especially the multinationals which seem to have inherited safety policies and systems from their parent companies still record repeated cases of accidents and injuries some of which include falls from height, trapped by something collapsing or overturning, struck by a moving vehicle, contact with electricity or electrical discharge, struck by flying/falling object during machine lifting of materials, contact with operating machinery or material being machined, exposure to hot or harmful substance or fire outbreak that engulfed their entire office premises" (Consultnet Ltd, 2011). "Most often, the problem is not the level of awareness of importance of safety neither is a safety policy absent but it is more related to poor or lack of implementation of safety programmes and systems, as it is with many other key players in the Nigerian Construction Industry" (Olutuase, 2014).

2.2.1 Construction quality and safety practice.

As reported by (Mane & Patil (2015) "Quality is one of the serious issues in the success of construction projects, quality of construction projects, as well as project success, can be regarded as the fulfilment of expectations (i.e. the satisfaction) of the project participants; they also referred to quality management system as quality planning, quality assurance and quality control.

Furthermore, it is alleged that some industries are more dangerous than others; the construction industry world over is however considered as one of the most dangerous industry (Mane & Patil (2015). The International Training Centre of the International Labour Organisation (2011) claims that one in six fatal accidents at work occur on a construction site. It further stated that no less than 60,000 fatal accidents occur on construction sites around the world every year. Similar conclusions were made by Keller & Keller, (2009) and Injuries Board (2009)

Safety management is essential knowledge in a project management area which recognized in

The Guide to the Project Management Body of Knowledge (PMBOK Guide, cited by Saeed, 2017). “Safety management is expected to take account of all risks and accidents that may possibly be expected that put project employees at risk” (Saeed, 2017).

Accordingly, Saeed, (2017) also emphasize that” accidents on the construction sites are principally attributable to hazardous human behaviour (i.e. individual factors) and/or unsafe working conditions (i.e. system factors); Moreover, it is obvious that there is a serious problem with falls, which problem is common throughout the global construction industry”.

Olutuase (2014), stated the fact that “a construction job or work environment is considered as highly risky and hazardous does not mean that its susceptibility to accident is not manageable – this largely depends on “work situation” which is humanly controllable; Safety records in the same construction industry in most advanced countries have proven this to be true”.

2.3 Safety during the construction.

According to Amani (2017), safety during the construction project is also influenced in large part by decisions made during the planning and design process. He also noted that some designs or construction plans are inherently difficult and dangerous to implement, whereas other, comparable plans may considerably reduce the possibility of accidents. For example, clear separation of traffic from construction zones during roadway rehabilitation can greatly reduce the possibility of accidental collisions. Beyond these design decisions, safety largely depends upon education, vigilance and cooperation during the construction process therefore, workers should be constantly alert to the possibilities of accidents and avoid taken unnecessary risks.

2.4 Quality and Safety Practices in the Nigerian Construction Industry.

According to the Safety Management International Collaboration Group, the definition of a safety management system is “a series of defined, organization-wide process that provides for effective risk-based decision-making related to your daily business” (SMIC, 2010).

“Safety management is likely to take account of all risks and accidents that may believably be expected that put project employees at risk, to minimize such risks. It is thus important to identify appropriate safety actions and strategies to accommodate potential serious problems”. (Saeed, 2017).

The Movement for Innovation (2010) found that construction industry clients want their projects delivered on time, on budget, free from defects, efficiently, right the first time, safely and by profitable companies. While regular clients expect continuous improvement from their construction team to achieve year on year reductions in project cost and reductions in project time. Therefore, as Seneratne and Jayarathna, (2012) put it, the construction industry needs to move towards higher quality, and contractors need to upgrade the quality of their services. In order to make this move organisations in other industries turned to quality management as a reliable management tool in the competitive market environment that leads to higher project performance (Seneratne and Jayarathna, 2012). Sullivan (2011) describes Quality Management as any approach to achieve and sustain a high quality output by conforming to requirements and meeting customer satisfaction requirements. Much research has been done with regard to the implementation of Quality Management Systems (QMS) and Elwary and Shabayama (2008) believe that an organisation experiences the benefits of higher customer satisfaction, better quality products, and higher market share after the adoption of a QMS. According to Elwary and Shabayama (2008) “a QMS has the single purpose of improving the performance of one’s business. With the changing

construction environment and the reported cases of dissatisfied clients it is necessary that studies be conducted to reveal the importance of Quality Management Systems and how they can not only turn around the trajectory of a single organisation, but that of the industry as a whole. A failure to conduct these investigations presents a risk to business in that it will be difficult to rectify poor quality on projects so that companies can eliminate cost overruns, improve client satisfaction and increase turnover. Thereby making the construction sector a less favourable investment solution for investors". Construction Industry Development Board, (2011) suggests that "industry regulation bodies' and Government advocate for and strengthen the requirements for the appointment of professional services and contractors based on quality criteria".

Because of the construction industry's unique nature, construction is considered one of the most hazardous industries (Fang and Wu, 2013). "It comprises a wide range of activities (both construction and repair) that rely intensively on labourers, heavy machinery and equipment. Construction workers engage in many activities that may expose them to serious hazards, such as falling from rooftops, encountering unguarded machinery, and being struck by heavy construction equipment" (Popov *et al.,* 2016). Therefore, safety procedures related to the construction industry or project sites have been established in different countries (Muiruri and Mulinge, 2014) to ensure that construction sites or the industry are not the cause of immediate danger to the public or workers at a project site. Construction safety regulations are also useful for ensuring that every finished product meets the required safety standards.

In practice (i.e. the actual activity, events or work), quality has become the poor cousin of safety within construction (Love *et al.,* 2015). Both have been subjected to competing demands; a trade-off arises and there is a gradual exchange in which having of one element means less of the other (Gaim *et al.,* 2018). Safety is typically given priority, as it is bound by legislation with

consequences of not adhering to regulations and codes of practice potentially costing and threatening an organization's competitive advantage and repute. While there is a desperate need and desire to improve safety in construction, issues surrounding quality have been overlooked and even denied in some instances (Love *et al.*, 2019).

"Within construction, the notion of error is viewed negatively and there is an overriding assumption that it can be prevented" (Love and Smith, 2016). As a consequence, an error prevention mindset forms an essential part of a practice where people are blamed and/or punished for their errors (Frese and Keith 2015). Moreover, the adoption of an error prevention mindset through the lens of zero vision (i.e. harm and defects), irrespective of the lack of evidence to support levels of performance improvement in quality (Love and Smith 2016) and safety (Sherratt and Dainty 2017), has resulted in many construction organizations inflexibly ascribing to 'bureaucratic entrepreneurialism' (Dekker 2017). In this instance, they lay claim to significant accomplishments in their work, but more is required as zero is not achieved, despite knowing that subconsciously it never will (Dekker 2017). Having in place an error prevention culture hinders the positive engagement of psychological safety in construction projects, which is needed to facilitate learning from errors to occur (Love *et al.*, 2019). The safety management system (SMS) was introduced to mitigate workplace hazards, reduce injuries, and minimize material loss in construction industry in the 1980s (Health and Safety Executive, 1997, as cited by Yiu *et al.*, 2019). Quality management system to encourage the adoption of SMS across the country (Health and Safety Executive, 2017).

2.5 Potential factors that affect quality performance.

Enshassi *et al.*, (2009) highlights that owners and contractors believed that current workload or number of projects at hand hardly affects the performance quality of projects.

Oke *et al.,* (2017) "identified among other factors; lack of management commitment to continual quality improvement; lack of quality training of staff; management leadership; and efficient team work among stakeholders. It was further stated that the rate of material ordered and delivered late to construction sites is also another constraint affecting time performance as it is related to contractual relationships between consultants and contractors" (Enshassi *et al.,* 2009). Factors affecting the quality of construction as studied by Jamaludin, *et al.*, (2014), includes fraudulent practices and kickbacks; incorrect planning; level of competition; number of competitors; lack of coordination between designers and contractors; poor financial control on site; wastage on site; previous experience of contractor and frequent design changes. Mallawaarachchi and Senaratn (2015) identified lack of technical and professional expertise and resources to perform task, lack of employee commitment and understanding and lack of education and training to drive the improvement process.

2.6 Factors affecting quality and safety management system on construction projects.

The issues as follows contribute to the fragmentation of construction activities resulting to Q&S challenges: difficulty in ensuring alliance between major parties in contracts, including subcontractors (Vilacini *et al.,* 2012); differentiation in terms of technology, cultural, organisational grounds and complexity or the uniqueness of construction projects (Lingard, 2013). Indeed, the use of subcontractors has been linked to unsafe construction practices, which may be due to lack of clarity in roles and responsibilities among subcontractors (Vilacini *et al.*, 2012).

According to Lee *et al.,* (2001) as cited by Tan and Syazwan (2016) stated that resistance from employees is the most critical factor that become a barrier for the successful implementation of QMS since the burden of its operation and maintenance will be transferred to the employees who must follow every changes made prior to certification. Tan (2010) observed that many top

management of companies do not place quality as the priority against the factor of time and cost. Tan (2011) "stressed that lack of training as one of the problems in implementing quality management and also explained how low competency among staff has contributed to implementation problems of quality management". Tan *et al.,* (2009) stated that human resources limitation as one of the human related problems in quality management in building construction projects. Human performance is arguably linked with safety (Bottani *et al.,* 2009). Mitropoulos and Cupido (2009) also suggested that production practices can prevent production errors; therefore, it is believed that safety practices can prevent human errors, thereby reducing the likelihood of accidents if these practices were shaped by the guiding principle and its associated strategies focusing on avoiding construction errors and rework.

2.7 Practices that can be used to promote quality and safety management system on construction.

Windapo and Jegede (2013) are of the opinion that fatalities, injuries, and deaths are mainly caused by unsafe and unhealthy practices of contractors and workers. Contractors prefer to spend less on personal protective equipment (PPE), employ less experienced workers for cheap labour and care only for the profits to be made. Similarly, from a qualitative survey, Khosravi *et al.,* (2014) identified 8 main categories of factors that influence workers' unsafe and unhealthy behaviours on construction sites. These factors include society, organisation, project management, supervision, contractor, site conditions, work group, and individual characteristics.

The use of personal protective equipment (PPE) is one of the basic practices required for safety on construction sites; It is a performance issue which belongs to self-protection category and can be used to indicate safety performance levels of firms (Farooqui et al., ibid.; Biggs *et al.,* 2009; Construction Industry Institute (CII), 2014). Workers face bodily harm when they do not wear

(correctly) PPE. For instance, falls from heights could occur with weak scaffolding and lack of safety belts; cement burns could be sustained without protective gloves and boots while cementing; injuries could be sustained on fingers, eyes, head, or feet due to absence of PPE, and so on (Farooqui *et al.,* 2008). Another performance issue which is critical is the assessment of risks involved in a given task before embarking on it; The identification of the tasks, hazards and the risks of a job prior to work enables implementation of protective measures to ensure that work is done safely (Campbell Institute, 2014). Furthermore, near-misses or close calls were shown to be indicators of safety performance (Biggs *et al.,* 2009; Hinze *et al.,* 2013; CII, 2014). Reporting of the near-misses and/or accidents is also crucial in reflecting workers' attitude and commitment to safety at the workplace. However, according to Masood *et al.,* (2014), "the workers may be uncertain about reporting accidents or near-misses because sometimes there is no mechanism for compensation for injuries, and/or they may blame their luck which made them victims of the accident. The above-mentioned indicators relate to construction workers, prior to or after an incident, and were therefore adopted as the indicators of worker safety performance, in the current study". This implies that some indicators may be trailing (also called lagging indicators), providing data about incidents after the fact (Hinze *et al.,* 2013), whereas others may be prevailing (called leading indicators), potentially leading to an injury or incident (Biggs *et al.,* 2009). Both leading and lagging indicators reflect safety performance (Hinze *et al.,* 2013; Lingard *et al.,* 2013). According to Atkins (2011), the use of a set of safety performance indicators provides a greater indication of safety performance than concentrating on one measure in isolation (or indeed a small number of random measures).

2.8 Reasons for a written safety plan.

Rajendran, Clarke, and Andrews (2012) argued that some of the reasons construction firms should develop and maintain written safety plans would be due to ethical factors, regulatory factors, economic factors, and practical factors. From an ethical perspective, it was the right thing to do. From a regulatory perspective, there were government regulations that required construction firms to maintain a safe work environment. In terms of economic factors, an unsafe work environment could be costly. The practical reason for maintaining a written safety plan was that it was the best way to create a high-quality work environment.

Rajendran, Clarke, and Andrews suggested that having a written plan would force construction firms to document their commitment to safety. Bjornsen, Nash, and Jones (2012) also argued that effective planning and implementation of a comprehensive written safety plan were necessary for a safe construction project. Dabbs (2015) found that designing detailed processes was essential, but they must be easy to follow so that every employee would have a clear understanding of expectations. Firms should also use subject-matter experts to design safety policy and procedures to ensure better policy development and compliance. Dabbs also suggested soliciting diverse opinions from employees who built the projects and from in-house safety teams to identify areas of concern and addressed real problems at the project site.

2.9 Elements of a construction safety plan.

The guidelines from federal and state agencies for the construction industry (Goetsch, 2013; Manuele, 2013; Mroszczyk, 2015) "was that a construction safety plan should minimally contain safety and health policy, safety and health goals, roles and responsibilities, discipline policy and standard operating procedures, job site inspections, accident investigations, record keeping, and training. The quality of information with respect to the suggested elements in a safety plan as

measured by the relevance, accuracy, timeliness, and completeness of information might relate to the safety of specialty trade contractors".

2.9.1 Safety policy and safety goals.

Hannan (2015), Manuele (2013), and Mroszczyk (2015) supported Petersen (2003) safety policy hypothesis. The authors argued that management commitment to safe job sites was critical; a written safety plan was evidence of management commitment and the most important component of the plan was the safety policy. Hannan, Manuel, and Mroszczyk did not address how the quality of information in the safety plan might affect safety of specialty trade contractors. Chileshe and Dzisi (2012) argued that a safety policy indicated that a firm was committed to having a safe work environment and such work environment was a high priority; they did not mention how a firm could evaluate the policy for effectiveness. Burns and Conchie (2014) argued that in addition to the safety policy, management should include a set of goals that translate the policy into measurable actions. Garber, Betit, Watters, and Lippy (2014) noted that the safety policy described management's commitment in broad terms but the safety goals were more specific and measurable; they added that the safety goals should be challenging enough to the firm but realistic enough to be credible. The information about safety policy and safety goals should also be of high quality, otherwise, management might send confusing messages (Bahn & Barratt-Pugh, 2014).

2.9.2 Roles and responsibilities.

Cameron et al. (2013) believed that management, supervisors, employees, and safety professionals had roles and responsibilities in maintaining a safe work environment. One of management's responsibilities would be to organize, direct, control, evaluate, and revise the overall safety program. Management should set clear safety expectations and requirements for all job functions. Keeping everyone continuously engaged in the process is important. Understanding the role each

individual played to maintain safe conditions is equally important. Cameron et al. suggested that supervisors would represent management level closest to employees on a daily basis. Employees' responsibilities would involve maintaining a quality work environment by working safely themselves and demanding that their coworkers did the same. Safety professionals would direct, coordinate, and facilitate the company's overall safety program especially in medium-sized and larger construction companies. Specific duties for safety professionals included hazard analysis, safety audits, accident investigations, job-site inspections, record keeping, training, and reporting (Goetsch, 2013; Hannan, 2015)

2.9.3 Discipline policy.

A critical element of a safety plan was accountability because simply developing rules and explaining them to employees were not sufficient; failure to adhere to the rules should result in consequences (Cameron *et al.*, 2013; Mroszczyk, 2015). Sparer and Dennerlein (2017) further argued that consequences should be included in the discipline policy section of a construction safety plan because a safety plan without a section on discipline made the plan worthless. Sparer and Dennerlein suggested that safety professionals should clearly explain in the discipline section of the safety plan that all employees at all levels were required to comply with applicable safety rules and that when in doubt, employees should err on the side of safety.

2.9.4 Job-site inspections.

Another important element of a company's construction safety plan was job-site inspections (Goetsch, 2013; Rebbitt & Erickson, 2016; Yakubu & Bakri, 2013). Job-site inspections were proactive measures that ensured a high-quality workplace because they allowed safety professionals to identify and eliminate potential hazardous conditions that might cause accidents and injuries. Rebbitt and Erickson noted that safety audit, which was the duty of safety

professionals was an effective way to conduct a job-site inspection. Goetsch further argued that a safety audit involved development of a check list that was designed for a specific job site and using it as a guideline when conducting the audit.

2.9.5 Accident investigations.

The construction safety plan should also contain a section that explained how to conduct accident investigations and who would conduct the investigations (Hosseinian & Torghabeh, 2012). Hosseinian and Torghabeh argued that because all hazards in construction jobsites were not always possible to be identified and eliminated, effective accident investigation programs were important for collecting key data. In support of this view, Haupt and Pillay (2016) argued that supervisor's safety training should cover how to conduct comprehensive accident investigation and also how to complete the required form. Karakhan (2017) stated that safety personnel could identify root causes by conducting thorough and effective incident investigations that were both prospective and retrospective; the reason was that lessons learned from investigating incidents would be incorporated into continuous improvement efforts.

2.9.6 Record keeping.

Another suggested element of a construction safety plan was record keeping. Yilmaz and Çelebi (2015) found that minor occupational accidents were neither sufficiently considered nor even recorded. Yilmaz and Çelebi found that these types of minor occupational accidents contributed to major financial losses in workplaces. Cameron *et al.*, (2013) earlier argued that in large companies, safety and health professionals were responsible for record keeping while designated employees were responsible for record keeping in smaller companies. Goetsch suggested that there should be a clear explanation in the comprehensive safety plan who was responsible for record keeping.

2.9.7 Training.

Petersen (2003) argued that deficiencies in training could result in systems failure which in turn could result in an accident. Mroszczyk (2015) supported this view and stated that the training element in construction safety plan was critical because deficiencies in training could result in employees making poor choices such as taking shortcuts to save time and effort, overlooking safety when confronted with a heavy work schedule, and misperception of the risk. All these could result in human error which in turn could result in an accident. Both authors argued that safety training should be compulsory for every new employee as part of the employee's orientation. Ivensky (2015) added that each new employee should receive job-site specific training before that employee would be allowed to resume work. Hannan (2015) added that management should communicate new information to employees while simultaneously refreshing old information through periodic training.

2.9.8 Communicating the safety plan.

Xu and Luo (2014) found that the information flow during the construction phase was different from information flow during the design stage. Information management system was not broadly used on a job site as it was used for design. Xu and Luo reported that only 5% of specialty trade contractors used information technology daily. Because of this, Hannan (2015) suggested that the prime contractors could improve safety performance significantly by using proven communication strategies with specialty trade contractors. Some of these strategies might be face-to-face meetings, bulletin board notices, posters and signs, new employee orientations, and setting positive examples. Hannan noted that the prime contractor was obligated to flow down safety requirements that complemented performance objectives of

the project. The implication was that a safety plan would not be a program until it was implemented and implementing the plan meant that employees had to understand and know the contents of the safety plan.

2.9.9 Evaluating the quality of information in safety plans (the work system).

Guo and Yu (2012) noted that due to the high rate of injuries and deaths in the construction industry, it was urgent and necessary to find ways to improve safety performance of construction workers. The authors suggested evaluating safety related issues such as safety climate, personal issues, and safety behavior. The goal of the overall safety process would be to recognize and eliminate hazards that might lead to injuries. Brooks (2015) found that a job safety analysis provided a method that invited employees to participate in the safety process. Brooks argued that safety professionals should conduct job safety analysis and evaluation in the area in which workers performed the task because it provided a structured opportunity to focus the employees' awareness of potential hazards in relation to the task being performed. Brooks also suggested the use of a checklist for the evaluation.

2.9.10 Benefits of quality and safety management system on construction projects.

The common practicable ways to justify the compliance of legal and contractual requirements are to consider the number and penalties from safety-related prosecutions from the authorities, to count the number of noncompliance items identified from the independent auditor, and to consider the reportable accident rates (Yiu and Chan, 2016; Yiu *et al.*, 2017). In addition, safer working environment could be indirectly quantified and qualified at the construction projects with or without the implemented SMS; with the implemented SMS, projects were found with safer working environment, particularly in the construction stage (Yiu *et al.*, 2019). Behm *et al.*, (2017) stated that hazards could also be eliminated in the design stage and the ability to reduce the hazards

would decrease significantly in the later stages of construction project; thus, additional effort on the innovative design in safety at the project's planning stage should be encouraged in the SMS for the safer and healthier working environment.

Unlike accidents, occupational health hazards could be developed in both the short-term and long-term depending on their exposure levels (Fernández-Muñiz *et al.,* 2009). This supports the proposed theory and critical review by Pillay *et al.,* (2010) and Pillay (2014) respectively. As mentioned by Pillay *et al.,* (2010) and Pillay (2014), the way to reduce the number of accidents, incidents and near miss included the adaptive factors and apply the sophisticated measure to reduce the harm to the workers; thus, harm reduction usually requires construction companies to execute SMS effectively and efficiently. The organization culture, working team, machinery and tools, working environment, procedures and conditions should also be well planned to ensure the workers to be free from potential ill health and risk (Fernández-Muñiz *et al.,* 2009; Pillay *et al.,* (2010); Pillay, 2014).

For integration of SMS to project management, project engineering staff should be of considerable safety awareness and be equipped with knowledge on safety and risk management; thus, they could work together with the safety personnel in identifying the job hazards, assessing the associated risks, and reviewing the implemented safety controls and performance, etc. (MTR Corporation, 2017). Job risks were also found effectively monitored and assessed by the integrated project planning and management on scope and schedule of work, costing and logistic arrangement of site materials and equipment (Papke-Shields and Boyer-Wright, 2017). Thus, a construction project should be implemented with SMS. As recommended by Kontogiannis *et al.,* (2017), the life cycle of a construction project should be incorporated with safety and quality standards to ensure project with higher efficiency and better productivity. In addition, adapting safety management concepts

in construction projects could prevent accidents and thus improve the organisational reputation (Kontogiannis *et al.,* 2017; Yiu *et al.,* 2017).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter contains how the study will be carried out as well as the tools to be used to conduct the research in order to achieve the setout objectives. It also contains the methods of data collection, the application of materials and the population description upon which a reliable conclusion will be drawn. The research will be carried out with the target of assessing the impact of quality and safety management system on building construction industry delivery in Niger state.

3.2 Research Design

Cassim (2014) defines research design as involving a number of considerations, from the use of particular research methods, to data collection an analysis. This study will adopt the quantitative survey approach in the form of a well-structured questionnaire survey which will help assess the impact of quality and safety management system in the construction industry.

3.3 Research Population

Research population is referred to as a collection of all cases that conform to some carefully chosen set of criteria. The population elements are the unit members of a population: for example, people, social situations, social actions, places, events, time or things (Blaikie, 2010).

The research population for this study are construction firms or organizations with at least 10years of existence in the construction industry within Minna, Niger state. The reason for selecting construction firms is because they are directly in charge of construction activities where the implementation of quality and safety is prominent while the reason for the years' mark is to get firms with much experience in the construction industry.

3.4 Sampling Frame

The sufficiency of a sample frame is measured by exactly how fine it represents the whole population of participants from the section is drawn. The sampling frame for this research shall be Construction companies within Minna, Niger state; which consists of professionals such as Architects, Builders, Quantity surveyors, and Project managers.

3.5 Sample Size

Sample size is the number of data sources, actually selected from the target population. ; A total of 90 professionals were identified from the sample frame. The sample size was determined using the formula as follows.

$\mathbf{S} = X^2 N P (1 - P) \div d^2 (N - 1) + X^2 P (1 - P)$

Where S = Required sample size

X^2= The table value of chi-square for 1 degree of freedom at the desired confidence level

N = Population size

P = Population proportion

d = Degree of accuracy

The numbers were subjected to Krejcie and Morgan formula. The formula revealed that the minimum number to be drawn from the sample is seventy-six (76) at five percent (5%) limit of error and at ninety-five percent (95%) confidence level.

19 Architect, 9 Builders, 26 Quantity surveyors, 17 Project managers and 4 Estate surveyors and valuers were selected.

A total of seventy-five (76) questionnaires were distributed from which seventy-five (75) were retrieved respectively.

3.6 Sampling Technique

This is a means or method of drawing a representative sample. According to Microsoft Encarta (2009), sampling is the process of selecting sample group, it's the process of selecting a group of people or products to be used as a representative or random sample.

The goal of sampling is to provide a realistic means of enabling the data collection amd processing component of research to be carried out. Diverse methods can be used to estimate the sample size based on the statistical power required to report significance or non-significance accurately.

For the questionnaire, the researcher will adopt the simple random sampling technique. This is because the research involves just the construction industry.

3.7 Method of Data Collection

Based on the objectives of this research, the method of data collection was through a structured questionnaire.

3.8 Method of Data Analysis

The descriptive analysis was employed to analyze the data using descriptive tools which includes: mean item score (MIS) and ranking methods. The results were presented in tables and charts.

CHAPTER FOUR

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION RESULTS

4.1 Introduction

This chapter deals with the presentation and analyses of data collected through structured questionnaire gotten from construction professionals within Minna, Niger state.

The results of the data were discussed and a summary of findings were provided at the end of the chapter.

4.5 Research Data

The research data includes demographic information on the questionnaire respondents, and information on the impact of quality and safety management system on building construction projects delivery.

4.3 Data Presentation and Analysis

The research data was subject to descriptive analysis primarily to reveal variations in demographic attributes of the respondents.

4.3.1 Demographics

The structured questionnaire administered to professionals involved in the research were shown in the chart below.

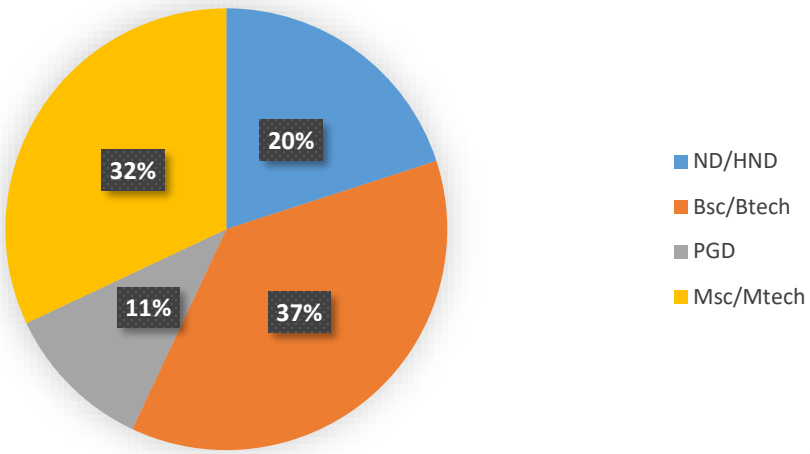

Figure 4.1: Pie chart showing Qualification of respondents

Source: Researcher's own field survey (2019).

From Figure 4.1, we can deduce that 37% were Bsc/Btech holders, 32% were Msc/MTech holders, while 20% of respondent were ND/HND holders and 11% were PGD holders.

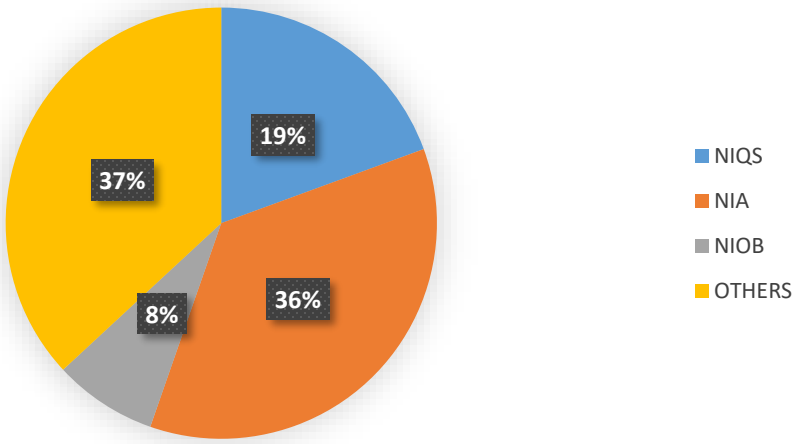

Figure 4.2: Pie chart showing Professional qualification of respondents

Source: Researcher's own field survey (2019).

From Figure 4.2, we can deduce that 37% were not in any of the specified bodies 36% were NIA members, while 19% of respondent were NIQS members and 8% were NIOB members.

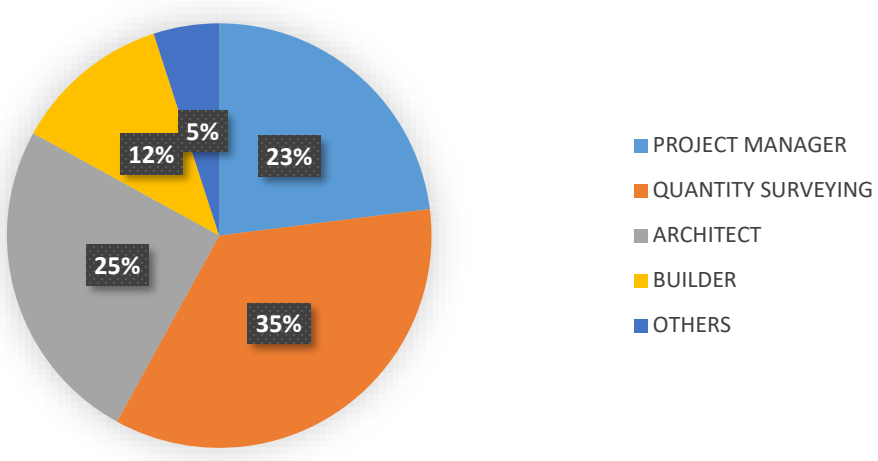

Figure 4.3: Pie chart showing designation of respondent

Source: Researcher's own field survey (2019).

From Figure 4.3, we can deduce that 35% were Quantity surveyors, 25% were Architect, 23% of the respondent are project managers, while 12% were Builders and 5% were other professionals in the construction industry.

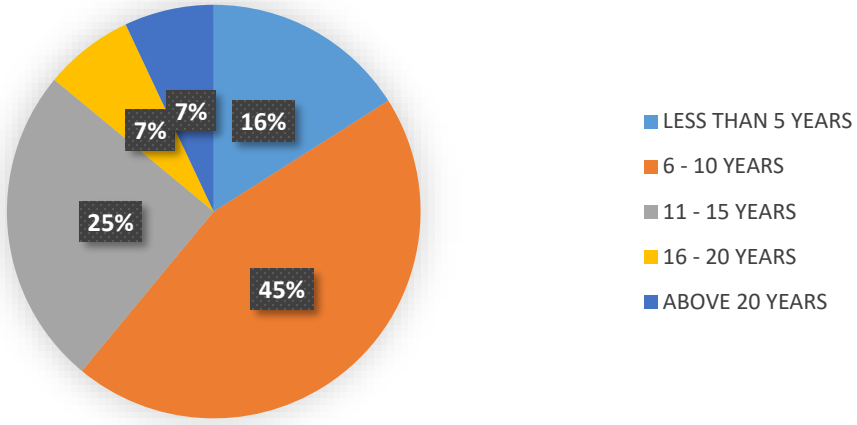

Figure 4.4: Pie chart showing experience of respondents

Source: Researcher's own field survey (2019).

From Figure 4.4, we can deduce that 45% of respondent have 6 – 10years experience, 25% have 11-15 years' experience, 16% have less than 5 years' experience, while 7% have 16-20 years' experience and 7% have above 20 years of experience.

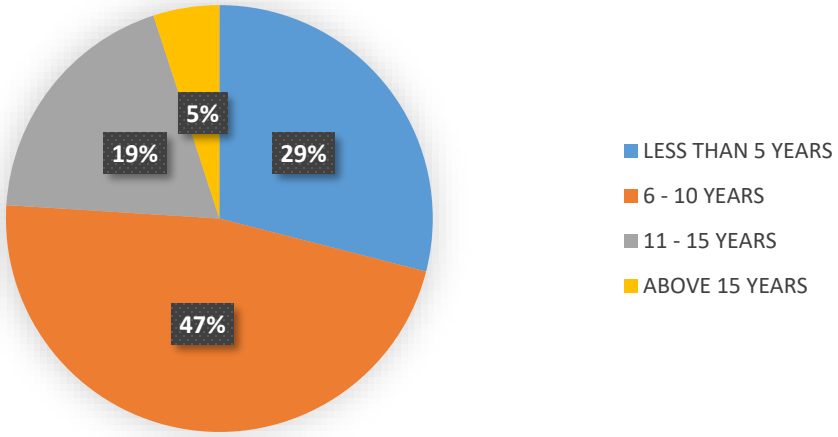

Figure 4.5: Pie chart showing respondents years of experience in their present organization

Source: Researcher's own field survey (2019).

From Figure 4.5, we can deduce that 47% have 6-10 years' experience in their present organization, 29% have less than 5 years' experience while 19% of the respondents have 11-15 experience and 5% have above 15 years' experience.

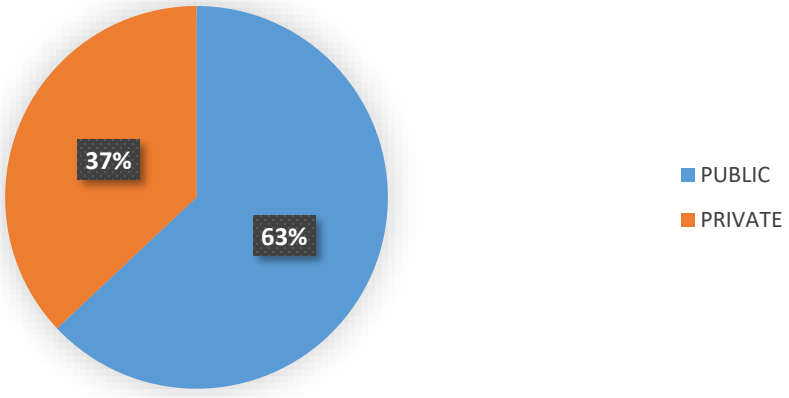

Figure 4.6: Pie chart showing Type of organization

Source: Researcher's own field survey (2019).

From Figure 4.6, we can deduce that 63% of respondent work in the public organization and 37% work in the private organization.

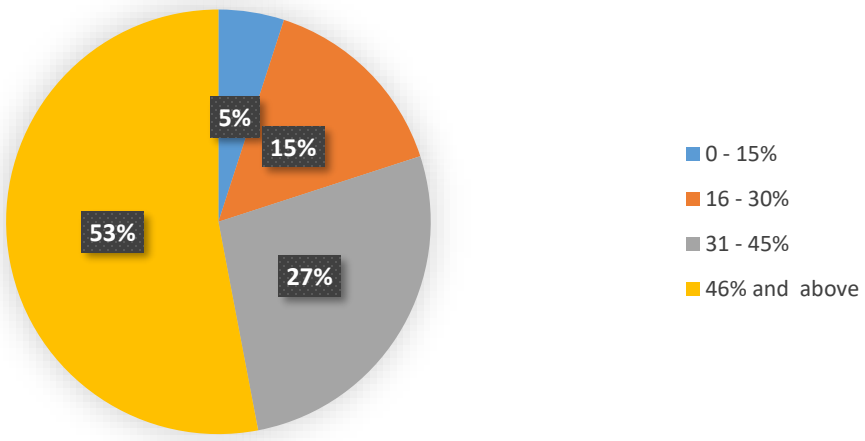

Figure 4.7: Pie chart showing percentage of compliance to quality and safety management system in the respondents' organization.

Source: Researcher's own field survey (2019).

From Figure 4.7, we can deduce that 53% of the respondents agreed to 46% and above, 27% to 31 – 45% while 15% to 16 – 30% and 5% to 0 – 15%.

Table 4.1: FACTORS INFLUENCING QUALITY AND SAFETY MANAGEMENT SYSTEM ON BUILDING CONSTRUCTION PROJECTS DELIVERY.

S/n	FACTORS	TOTAL	MIS	RANK
1	Lack of awareness	75	3.88	10th
2	Lack of communication	75	3.83	11th
3	Lack of employees' commitment	75	3.89	9th
4	Difficult to monitor quality system at remote site	75	4.12	7th
5	Poor planning of the system	75	4.31	3rd

6	Lack of co-operation of parties	75	4.32	2nd
7	Financial issues	75	4.25	4th
8	Equipment (lack and management)	75	4.32	2nd
9	Material (availability and management)	75	4.41	1st
10	Complex design	75	3.96	8th
11	Labour (lack of technical know-how in execution)	75	4.19	6th
12	Conformance to codes and standards	75	4.24	5th
13	Reckless operations (lack of top management support)	75	4.25	4th
14	Lack of personal protective equipment	75	4.12	7th

Source: Researcher's analysis (2019).

The first objective of the study assessed respondents' level of agreement on factors influencing quality and safety management system on building construction projects delivery using some selected criteria on a Likert scale 1 – 5 (1=, (SD) STRONGLY DISAGREE, 2= (D) DISAGREE, 3=(N) NEUTRAL, 4= (A) AGREE, 5=(SA) STRONGLY AGREE).

From Table 4.1, the first three ranked were observed to be: Material (availability and management) was ranked first with a mean score of 4.41 among the factors influencing quality and safety management system on building construction projects delivery while Lack of co-operation of parties was ranked second with a mean score of 4.32, Poor planning of the system was ranked third with a mean score of 4.31, while the following factors were ranked the least three; Lack of employees' commitment was ranked ninth with a mean score of 3.89, Lack of awareness was ranked tenth with a means score of 3.88 and Lack of communication was ranked the least, eleventh with a mean score of 3.83. Therefore, it was concluded that Material (availability and management) and Equipment (lack and management) were the factors influencing quality and safety management system on building construction projects delivery.

Table 4.2: BENEFITS OF QUALITY AND SAFETY MANAGEMENT SYSTEM ON BUILDING CONSTRUCTION PROJECTS DELIVERY.

S/n	BENEFITS	TOTAL	MIS	RANK
1	Improved company's management & work efficiency (clear job description)	75	4.63	1st
2	Improved communication	75	4.43	4th
3	Better documentation control	75	4.36	5th
4	Increase client satisfaction	75	4.31	7th
5	Enhanced company's corporate image	75	4.27	8th
6	Improved quality of work done (reduce wastage and less defects)	75	4.27	8th
7	On time project completion	75	4.32	6th
8	Increased number of projects undertaken (operational efficiency)	75	4.36	5th
9	Cost and time saving through avoidance of mistakes and reworks	75	4.49	2nd
10	Safety awareness and perceptions	75	4.47	3rd

Source: Researcher's analysis (2019).

The second objective of the study assessed respondents' level of agreement on the benefits of quality and safety management system on building construction projects delivery using some selected criteria on a Likert scale 1 – 5 (1=, (SD) STRONGLY DISAGREE, 2= (D) DISAGREE, 3= (N) NEUTRAL, 4= (A) AGREE, 5= (SA) STRONGLY AGREE)

From Table 4.2, the first three ranked were observed to be: Improved company's management & work efficiency (clear job description) was ranked first with a mean score of 4.63 among the benefits of quality and safety management system on building construction projects delivery, while Cost and time saving through avoidance of mistakes and reworks was ranked second with a mean score of 4.49, Safety awareness and perceptions was ranked third with a mean score of 4.47, while

the following benefits were ranked the least three; Increase client satisfaction was ranked seventh with a mean score of 4.31, Enhanced company's corporate image was ranked eight with a means score of 4.27 and Improved quality of work done (reduce wastage and less defects) was also ranked eight with a mean score of 4.27. Therefore, it was concluded that Improved company's management & work efficiency (clear job description) and Cost and time saving through avoidance of mistakes and reworks are the main benefits of quality and safety management system on building construction projects delivery.

Table 4.3: PRACTICES THAT CAN BE USED TO PROMOTE QUALITY AND SAFETY MANAGEMENT SYSTEM ON BUILDING CONSTRUCTION PROJECTS DELIVERY.

S/n	PRACTICES	TOTAL	MIS	RANK
1	Training of employees	75	4.61	1st
2	High participation of top management	75	4.48	2nd
3	Internal and external audit	75	4.40	3rd
4	Strict supervision on site	75	4.36	5th
5	Establish feedback system	75	4.25	7th
6	Frequent steering committee meeting	75	4.24	8th
7	Team-working approach	75	4.39	4th
8	Involvement of all employees in the documentation process	75	4.11	9th
9	Launch quality campaign	75	4.35	6th
10	Use of personal protective equipment (PPE)	75	4.36	5th

Source: Researcher's analysis (2019).

The third objective of the study assessed respondents' level of agreement on the practices that can be used to promote quality and safety management system on building construction projects

delivery using some selected criteria on a Likert scale 1 – 5 (1=, (SD) STRONGLY DISAGREE, 2= (D) DISAGREE, 3=(N) NEUTRAL, 4= (A) AGREE, 5=(SA) STRONGLY AGREE).

From Table 4.3, the first three ranked were observed to be: Training of employees was ranked first with a mean score of 4.61 among the practices that can be used to promote quality and safety management system on building construction projects delivery, while High participation of top management was ranked second with a mean score of 4.48, Internal and external audit was ranked third with a mean score of 4.40, while the following practices were ranked the least three; Establish feedback system was ranked seventh with a mean score of 4.25, Frequent steering committee meeting was ranked eight with a means score of 4.24 and Involvement of all employees in the documentation process was ranked the least, ninth with a mean score of 4.11. Therefore, it was concluded that Training of employees and high participation of top management are the practices that can be used to promote quality and safety management system on building construction projects delivery.

4.4 Discussion of Findings

From the analysis carried out, it was assessed that the factor influencing quality and safety management system on building construction projects delivery mostly is Material (availability and management) including lack of co-operation of parties. This result is similar to the findings of Jiang *et al.,* (2014) who stated that the factors influencing quality and safety include materials, and facilities on site. Jamaludin, *et al.,* (2014), also stated that the factors influencing quality and safety include lack of coordination or cooperation between designers and contractors. Mane and Patil (2015) also revealed that low quality and scarcity/ poor availability of resources majorly affect quality performance to a very large extent.

It was also assessed that the benefits of quality and safety management system on construction projects delivery are mostly improved company's management & work efficiency (clear job description), and cost and time saving through avoidance of mistakes and reworks. Most of these results supports the findings of Hoonakker *et al.,* (2010) who highlighted that Contractors do see obvious benefits of quality and safety management system through reduced rework; costs associated with rework (having to redo a step or portion of construction due to poor craftsmanship or change in plan) were as high as 12% of the total project costs and required as much as 11% of the total project working hours

In addition, it was evaluated that the top practices that can be used to promote quality and safety management system in building construction projects delivery are: training of employees and high participation of top management. In agreement with the study, Nursyamimi *et al.,* (2015) recognized the necessity of proper training and knowledge in delivering quality and safety for the construction project; therefore, proper training for all level of workers to make them know the needed quality and safety system requirements. Mallawaarachchi and Senaratn, (2015) as well as Jamaludin, *et al.,* (2014) noted that high experience and qualifications of personnel involved in a construction project will assist the project parties to implement their project goals professionally leading to better performance of quality, time, cost, productivity and safety of the project. Successful implementation of a Quality and Safety Management System, according to the Government of Alberta (2012) requires amongst other factors, management commitment to the system and effective allocation of resources. Furthermore, this study found that though improved company's management and work efficiency (clear job description) came top of the benefits considered, improved quality of work done still came as the last benefit.

4.5 Summary of Findings

By the data presentation and analysis of the questionnaires administered, the following findings were deduced.

1. This study found that the major factors influencing quality and safety management system on building construction projects are Material (availability and management) including lack of co-operation of parties.
2. This study also found that the main benefits of quality and safety management system on construction projects delivery are improved company's management and work efficiency (clear job description), cost and time saving through avoidance of mistakes and reworks
3. The study also discovered that the top practices that can be used to promote quality and safety management system in building construction projects delivery are: training of employees and high participation of top management.
4. It was however found that the following practices will help to promote quality and safety management system in building construction projects delivery: a) Proper inspection in the work phase. b) Quality of raw materials and equipment and its timely availability will affect the quality and safety of work. c) Availability of labors with high experience and qualification helps to complete the projects with a successful and suitable performance.
5. This study found out that Quality and safety systems are averagely implemented in our construction sites in Niger state.
6. Lastly, this study found that the unavailability of fund may lead to the delay in work or poor quality.

CHAPTER FIVE

5.0 CONCLUSION, RECOMMENDATIONS AND AREA FOR FURTHER STUDIES

5.1 Conclusion

This study concludes that the major factors influencing quality and safety management system on building construction projects delivery are Material (availability and management) including lack of co-operation of parties. The main benefits of quality and safety management system on construction projects delivery are improved company's management and work efficiency (clear job description), and cost and time saving through avoidance of mistakes and reworks. The top practices that can be used to promote quality and safety management system in building construction projects delivery are: training of employees and high participation of top management. The following practices will help to promote quality and safety management system in building construction projects delivery: a) Proper inspection in the work phase. b) Quality of raw materials and equipment and its timely availability will affect the quality and safety of work. c) Availability of labors with high experience and qualification helps to complete the projects with a successful and suitable performance. Quality and safety systems are averagely implemented in our construction sites in Niger state. The unavailability of fund may lead to the delay in work or poor quality.

5.2 Recommendations

The following recommendations were put forward in this research as proposed remedy to the factors influencing quality and safety management system on building construction projects.

1. Construction firms should provide adequate training for all their employees including new recruits on the benefits of quality and safety management system in construction.

2. The top management of each firm should be fully involved in the implementation and monitoring of quality and safety management systems in all their construction activities.

3. Regular internal and external audit should be part of the firm's / organization's plan so as to make sure the organization keeps up with standard in the construction industry.

4. Team-working should be encouraged because construction professionals are somewhat dependent on one another to achieve building construction goals.

5.3 Contribution to Knowledge

This research has contributed to the quantity surveying profession. The study has been able to assess impact of quality and safety management system on construction projects delivery in Niger state and also contributed more on the insight on the possible practices that can be used to promote quality and safety management system on construction projects in Niger state.

5.4 Role of the Quantity Surveyor in the Study

A quantity surveyor is a trained professional who is involved in the construction team. He is responsible for preparing all costs to be incurred for the project from inception to completion. He is also concerned with the supervision of the work, in order to ensure that all the factors affecting the proper implementation of quality and safety management systems is identified. He also makes sure that all construction activities carried out are in line with the program of work. In every bill of quantities, there is usually a segment allocated to preliminaries. It is the role of the quantity surveyor to ensure that all necessary facilities required for daily site running be provided and made available to uninterrupted work flow. He is to also ensure that materials and facilities supplied to

site for building construction meet the required standard that has been requested or ordered an make sure safety practices are upheld during construction.

5.5 Area for Further Studies

1. Further research should be conducted to assess the impact of quality and safety management system on building construction projects delivery in Nigeria.
2. More insight on the possible practices that can be used to promote quality and safety management system on building construction projects delivery in Nigeria.

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