FACTOR INFLUENCING CONSTRUCTION TIME AND COST OVERRUN FOR HIGH RISE BUILDING PROJECT IN ABUJA METROPOLIS

BY

AREO DANIEL

2016/1/63792TI

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

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A RESEARCH PROJECT SUBMITTED TO THE

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DECLARATION

I **Areo Daniel** with the matriculation number 2016/1/63792TI an undergraduate student of the Department of Indutrial and Technology Education certify that the work embodied in this project is original and has not been submitted in part or full for any other diploma or degree of this or any other university.

_____ _____

Areo Daniel (2016/1/63792TI) Signature & Date

CERTIFICATION

This project has been read and approved as meeting the requirements for the award of B. Tech degree in Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna.

_____ _____

MR. W.B KAREEM Sign & Date

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DR. T.M. SABA Sign & Date

Head of Department

_____ _____

External Examiner Sign & Date

DEDICATION

I dedicate this researched work to the Almighty God whom has granted me the strength, wisdom and knowledge to carried out this researched work successfully and also to my family Mr and Mrs John Areo for their tremendous support and sprayers all through my academic year.

ACKNOWLEDGMENT

My utmost gratitude goes to God Almighty for his mercy, love, grace, protection, wisdom and understanding and the completion of this degree program.

My thanks also go to the Head of Department, Dr. T.M. Saba and all the entire staff of Industrial Technology Education Department throughout my academic years, the knowledge had an impact on me. I express my sincere appreciation and gratitude to my supervisor W.B. Kareem for his immense support, contribution, counsel, fatherly love, provision of relevant literatures, encouragement and effective supervision of this project work.

My profound appreciation goes to my parents, Mr. and Mrs. John Areo and my siblings for their love, care and support.

ABSTRACT

The study was designed to determine assessment factor influencing construction time and cost overrun for high rise building project in Abuja Metropolis. A description survey design was adopted for the study. Three research questions and two null hypotheses were formulated and tested at 0.05 level of significance. The population of the study were fifty respondents consisting of twenty – five quantity surveyors and twenty – five contractors. Sixty item questionnaires were used to collect data and analyzed using mean, standard deviation and t – test statistics. The finding of the study reviewed among others that inadequate planning, incomplete design at time of tender manpower shortage. Alteration during construction stage , lack of hot planning, additional of owner's request, cashflow issues, poor site management by the contractors, fluctuation in the cost of building material which constitute the causes of construction cost of cost overrun for high rise building in Abuja metropolis. Some effect of construction time and cost overrun for high rise building project in Abuja Metropolis are cost overrun dispute arises, rosed abandonment, projects are delayed, less productivity decreases in quality on construction work, decreases in project cost estimated earlier, loss of efficiency.

The strategies to mitigate construction time and cost overrun for high rise building in Abuja metropolis are as follows;

Honoring of project finance, acceleration site achivers, proper construction planning, provision of adequate technical support, early payment, minimizing some overrun controlled of owner excers alteration. Good workmanship by technical staff, proper preconstruction planning was recommended by others that construction should be effective funding of project owners to avoid unnecessary time overrun with its attendant effect on cost.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

The construction industry is the tool in which society goals of both the rural and urban development can be achieved. The construction industry has a great impact on the economy of all countries (Leibing, 2001). According Takim, (2005). Also stated that construction has becomes an important player in the economy of many countries, especially developed countries. As mentioned by Olawale (2010), this industry contributes to the GDP and employment rate of man nations and for this reason it is considered vital for the economic development of any nation. Moreover, the author also affirmed that construction activities have become a significant market due to the fact that this industry procures products and material from other businesses in other sectors.

However, improving construction efficiency by means of cost effectiveness and time lines would certainly contribute to cost saving for the country as a whole, effort directed to cost and time effectiveness where associated with managing time and cost, which in this study were approached via investigating time and cost various of high-rise construction project.

A high-rise building is essentially building with a small foot print, small root area, and very tall facades. And what differentiate it from the convectional low rise and negation rise building is that it needs special engineering system due to its height (Scott, 1998) later, a better definition was coined “a high-rise is any structure where the height can have significant impact on evacuation”

High-rise buildings are product of our time and cost which has temporary solution for the problem that create. In recall years develop countries have emerged as Centre for new higher-

rise buildings. Land is scarce and expensive particularly in big cities like japan, where tall building represents the best solution for solving problems, as a product of need, while in Egypt the situation differs, only 4% of Egypt terrain, where nearly the entire population has chosen to live where tall buildings used as a tool to achieve high density development.

As the inevitable result of growing population and identifying urbanization, high-rise residential tower has become more prevent in many cities, replacing vast areas of vernacular houses. During the building of these towers, the housing process has been radically, thinking about the low history of Human dwelling. Today, the building of large number of dwelling in high-rise residential tower is controlled by a few parties (architects and developers), which is a drastic charge from tradition.

Essentially, the early high-rise building was on economic phenomenon in which business was the engine that drove innovation design was tied to the business equation and style was secondary to the primary factor of invested and use.

The reason for adopting high-rise building could be solution for density problem and lack of available land for development sometime tell buildings more about power, prestige status, where they play an important role in meting occupied demand for large prestigious headquarters and aesthetic then efficient development.

High-rise building is sometimes solution for urban problems, but if we have to do them, we should agree that we are facing a great challenge to minimize the factor influencing construction time and cost overrun for high rise building if not well taken into consideration.

Time is of essence in the construction industry because a delay in project schedule can possibly delay the project completion date leading to liquidated damage and hence, increasing costs, time overrun (Brainal and Ndekungin 2008), and resulting in serious problem is building projects (Akintoye and Michael 1997). The longer the delay in project completion, the more

significant and the negative effect resulting from it. The time overrun in construction industry has cause multitude of negative effects on the projects and it stakeholders.

Time overrun is defined as the extensive of time beyond planned completion date traceable to the contracting (kaming at 1997) construction time overrun are most serious problems which send bad signal to the foreign investor thereby slowing national development (Niazai and Gidado 2012). Delays in delivery of projects at specified time have potential to result in disputes and claims leading to arbitration litigation.

Time overrun is one of the most significant issues being faced by the construction industry today. Construction time overrun occur when progress of a contract falls behind schedule and this may have been caused by any party to the contract and may be a direct result of one or more circumstance. There is various factor responsible for the time overrun which require serious attention to understand and address in order to achieve successful completion of project on time. This is because time overrun has great impact to construction cost which can never be recovered.

The term ‘cost’ in the construction industries generally refer to the amount that has to (or will have to) be paid to receive good or service. Generally, cost is not fixed. There is uncertainty at the begging of a project about precisely what is required, and whist this is clarified as the project proceeds and more decision are made, even when firm price has been accepted from suppliers, this is likely to change as a result of variation to requirements, events such as exceptionally adverse weather, the rate of influence, inflation amongst others which may lead to cause to cost overrun.

These overruns are considered a critical issue in this business because they represent a loss of money for the contractors and owners. This idea was also suggested by Morris and Hough (1987) who stated that, although the management of projects has been studied for many years,

most projects either failed or present cost and time overruns. The author also affirmed that many projects are cancelled due to the lack of proper management which causes expenditures of significant amount of money over the original budget.

Cost overrun is one of the major problems in the construction. According to Azhar and Farouqui (2008), cost overrun is a very frequent phenomenon and is almost associated with all projects of construction industry. Cost overrun can be defined as the difference between the final actual cost of a construction project at its completion and the contract actual amount, agreed by the contractor and the owner during signing of the contract. According to Ahmed, Azhar, Kappagantula and Gollapudi (2003), cost overrun on construction projects are a universal phenomenon. ‘‘They have a negative effect on clients, contractors, and consultants in terms of growth in adversarial relationships, mistrust, litigation, arbitration, cash- flow problems, and a general feeling of trepidation towards each other’’ (Ahmed *et al.*, 2003). So it is crucial to state the major causes of cost overrun in order to reduced and avoid increasing cost in any construction project and in order to avoid any other negative effects.

Therefore, improving construction productivity by mean of cost-effectiveness and timelines would certainly construction activities in for the country as a whole. However, this work seek to investigate the factor influencing time and cost overrun of construction project in Abuja Metropolis.

1.2 Statement of the problem

Construction industry is a challenging industry where many resources have been combined for the successful completion of any building project. The stages in the construction of building have their own peculiar challenges during execution. Consequently, the manipulation of manpower, inflations, complexity of project, error in design, delay, wrong estimation, additional work or extension of areas of the building, cash flow issues, cost of certain materials

and among others have significant relationship with the time and cost overrun in building projects. Hence the question for this study is investigation factors influencing construction time and cost overrun for high-rise building project in Abuja metropolis.

1.3 Purpose of the Study

The purpose of this study is to determine the factor influencing construction time and cost overrun for high rise building project in Abuja metropolis. To achieve this specifically the study sought to identify:

i. cause of construction time and cost overrun for high-rise building in Abuja metropolis.
ii. effect of construction time and cost overrun for high-rise building in Abuja Metropolis.
iii. Strategies to mitigate construction time and cost overrun for high-rise building in Abuja Metropolis.

1.4 Significance of the Study

The finding of this study will be of incredible help to the building construction industry professionals (such as the builders, site engineers, contractors, architects, civil engineers and quantity surveyors) building construction and consulting firms, federal and state ministry of works and infrastructure, client, policy makers, stakeholders in the building construction industry and the society at large.

The success of this research will be of countless value to the professionals of the building construction industry which include but not limited to Quantity Surveyors, builders, site engineers' contractors, consultant, architects, civil engineers and surveyor etc as it will alert them to the risk of associate to construction time and cost overrun for high- rise building and how to escape.

This study will benefit the quantity surveying and contracting firms as it will enable them adopt strategies to enhance speedy delivery of project to client or owner on the time schedule of the contract to avoid time and cost overrun which may end up to loss of money and also negative impact on the industry.

Client would also benefit from this finding of this study as they would be aware of their own place and contributions in the project process and also equip them with adequate knowledge and understanding

of the project to help them play their own role in financing the project on time to avoid additional cost which results to time and cost overrun.

This study will also be of benefit to state and federal ministry of works and infrastructure as it will enable them to monitor and manage the project in other to find out if the project is going in accordance to schedule to avoid abandonment and additional cost while the project as not reach the completion stage.

1.5 Scope of Study

The scope of the study is delimited to the assessment of factors influencing construction time and cost overrun for high-rise building project. Specifically, the study sought to covers the causes of construction time and cost overrun, identify the effect of time and cost overrun and provides some possible strategies to mitigate the construction time and cost overrun in high-rise building within Abuja metropolis.

1.5 Research Question

The following research question has formulated to guide this study

i. What is the cause of construction time and cost overrun for high-rise building in Abuja metropolis?
ii. What is the effect of construction time and cost overrun for high-rise building in Abuja Metropolis?
iii. What the strategies to mitigate construction time and cost overrun for high-rise building in Abuja Metropolis?

1.6 Hypothesis

H_{01}; There is no significance difference between the mean response quantity surveyors and contractors on the cause of construction time and cost overrun for high-rise building in Abuja metropolis.

H_{02}; There is no significance difference between the mean response of quantity surveyor and contractor on the effect of construction time and cost overrun for high-rise building in Abuja Metropolis.

CHAPTER TWO

2.0 LITERATURE REVIEW

The Review of the related literature for this study is done under the following subheading.

ii. Conceptual Framework.

iii. Theoretical Framework

iv. Construction Industry

v. Building construction

vi. High-rise building project

vii. Time overrun

viii. Cost overrun

ix. Effect of time and cost overrun

x. Type of delay

xi. Delay responsibility

xii. Causes of time and cost overrun

xiii. Way of minimizing time and cost overrun

xiv. Review of empirical Study

xv. Summary of literature review

2.1 Conceptual Framework.

In Malaysia, various studies were conducted to figure out the main causes of time overrun in construction projects. Memon examined the major causative factors of time overrun in building construction projects by conducting a questionnaire survey. Results of the survey revealed that most significant causative factors of time overrun were repeated changes in design, modification in the scope of the project, financial problems of client, delays in process of decisions making, unexpected site conditions, delay in the progress of payment by client,

shortage of site workers, inaccuracies and errors in design, very slow process of preparation and approval of drawing documents, and incapable subcontractors. Mydin et al. investigated the influential causes of time overrun in Malaysian private housing projects through a questionnaire survey. Top 10 common and highly severe factors of cost overrun were unpredictable weather conditions, poor management at the site by contractor, incomplete design documents, and lack of contractor's experience, financial difficulties, slow process of approval of major changes, changes in contract agreement, lack of contractor coordination with other construction stockholders, mistakes in construction, and poor quality works. A questionnaire survey was performed by Azlan et al. among construction practitioners to determine main factors contributing to time overrun construction projects in state of Kedah, Malaysia. Results of the survey showed that top ten root causes of time overruns as observed by the three key construction parties comprises delay in sub contractor's work, improper arrangement and scheduling of project, problems in financing project, shortage of labors, delay in process of decision making, slowness in progress payment by owner, delay in material delivery to site, late procurement of materials, escalation in raw material prices, and delay in process of approving major variations in scope of work. Shehu et al. found out that the main causative factors of time overrun were cash flow and financial problems of contractor, delay in payments by owner, delay in payment from contractor to sub-contractors and materials suppliers, late permits by local government authorities, unproductive planning and scheduling of the project, improper control of the project progress by the contractor, bureaucracy in government organizations and delay in decision making process by the owner. Ramanathan et al examined the factors that causes time overrun in construction projects and identified that key factors of cost overruns were rain effect on construction activities, shortage of labors, contractors' poor site management and control, unqualified workforce, lack of contractor experience, late progress payments by client, lack of communication and coordination of

contractor with other stakeholders, low productivity level of labors, and delay in decision making process by client.

2.2 Theoritical framework

The construction project comprises of many activities which are dependent on numerous element such as material, manpower, environment etc. The construction environment is dynamics in nature due to change of environment and condition while the element are uncertain variables.

According to Glendo (1994), perception of risk is different to different professionals. He illustration risk as a model, which has a multidisciplinary approach comprising. “Three domain” as in the following figure;

i. Sociology, geography, politics (social and political environment)

ii. Psychology, philosophy (perception, cognition, behavior)

iii. Mathematics, economic, engineering (Risk appraisal probabilities, cost and benefit, risk analysis).

From the above, it is evident that the innermost domain is risk appraisal consisting of a benefit and cost analysis. Calculating probabilities and engineering risk fall in this Domain. The construction industry is subject to more risk than many other industries. The process involved in construction from inception stage to service stage is complex. And multitude of people with different skill and interest work there. This completely moreover, is complemented by many external and uncontrollable risks. “No construction project is risk free. Risk can be managed, minimized, shared, transferred or accepted. The construction industry is troubled with risk, risk is inherent in construction projects.

Risk management aims to identify, quantify and predict all the risk that a project can get exposed to so that a conscious decision can be taken as how to manage the risk effectively (kwakye 1997). Many construction projects indicate poor performance in achieving time and cost target with specified quality due to either unforeseen event (which may or may not have been anticipated by an experienced project manager) or foreseen events in which uncertainties were not appropriately accommodated.

Risk management has a powerful impact upon the management. It forces a realization that there is a range of possible outcomes in terms of cost or time for any project, and that the possibility of getting a better outcome can be increased by adopting various response strategies. The better the understanding of possible outcome, the less the size of risk exposure will be and vice versa. We have four basic ways to reduce risk;

i. Providing proper education and training to alert staff to consequence of potential risk.

ii. Providing physical protection to reduce the like hood of risks.

iii. Introducing system to ensure consistency and make people ask ‘what if’ question.

iv. Providing physical protection of people and property.

2.2.1 Concept of construction Industry

The construction is one of the key economic industry of any nation and is the main motivating force in national economy. In many ways the pace of the economic growth of any nation can be measured by the government through physical Infrastructure such as buildings road, and bridge.

According to Wang (1994), construction is becoming more complex, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project. A substantial part of the construction work take place

in the informal sector of industry too. In Accordance with division 41 to 43 of the UK standard Industrial classification of economic activities 2007-SIC (2007). The construction Industry is defined based on the concept of allied construction activities (also known as allied trades) which was introduced in SIC (2007), replacing the division structure of the previous version SIC (2003), which was largely on the stage of the construction process. The Industry definition include general construction and allied construction activities for building and civil engineering works. It includes new work, repair, addition, alteration, the erection of prefabricated building or structure on the site and also construction of a temporary nature. General construction is the of entire dwellings, office buildings, stores and other public and utility buildings, farm building. etc or the construction of civil engineering work such as motorways, streets, bridge, tunnels, railways, airfields, harbours and other water project, irrigation system, sewerage system, industrial facilities, pipelines and electric line, sport facilities etc. This work can be carried out on own account or on a fee or contract basis, portion of the work and sometime even the whole practical work can be subcontracted out. A unit that carries the overall responsibility for a construction project is classified here. The repair of building and civil engineering work is also included, about 80% of the population lives in the rural areas. The building and other small infrastructure facilities for this major part of the population are constructed by the private sector. The private construction sector comprises of unregulated and unprotected individual engaged in economic activities that include the supply of labour, materials, and building component to the government construction sector directly in response to need of clients' .It also include work carried out by individual and groups on a self –help basis without contracting. The majority of enterprises in the construction industry in least developed countries (LDCs) are small with a few of them being in medium category. It is said that world-wide, small and medium enterprises (SMEs) account for 90% of all enterprises and 99% in developing countries.

The construction industry is a sector of the economy that transform various resources into constructed physical economic and social infrastructure necessary for socio economic development. It embraces the process by which the physical infrastructure is planned, designed, procured, constructed or produced, altered, required, maintained, and demolished. The constructed infrastructure includes: building transportation system and facilities which are airports, harbours, highways, subways, bridges, railroads, transit systems, pipelines and transmission and power lines. Structures for fluid containment, control and distribution such water treatment and distribution, sewage collection and treatment distribution system, sedimentation lagoons, dams, and irrigation and canal system. Underground structure, such as tunnels and mines. The industry comprises of organisation and person who include companies, firm and individual working as consultants, main contractor and sub-contractors, material and component producers, plant and equipment suppliers, builders etc. The industry has a close relationship with client and financiers.

The government is involving in the industry as purchaser (client), financier, regulator and operator. Construction industry acquire diversified range of stakeholders like design professionals, architects, engineers, contractors, sub-contractors, supplier and owners. According to Navon (2005) the construction industry is complex in its nature because it comprises large number of parties as owners (client), contractor, consultants, stakeholders, and regulators despite this complexity, the industry plays a major role in the development and achievement of society goals. It is one of the largest industries and contributes 10% of the Gross national product (GNP) in industrialized countries. Nigeria is no exception; the local construction industry is one of the main economic engine sectors, supporting the Nigeria national economy. The construction industry policy aims at creating and enabling environment for the development of vibrant, efficient and sustainable local industry that meets the demand for its service to support sustainable economic and social development objectives. The goal of

the construction industry development is to develop an internationally competitive industry that will be able to undertake most of the construction project. The building construction is faced with numerous challenges such as shortage of manpower, low capacity utilization and poor funding, lack of modern equipment, contractor bankruptcy, and managerial incompetence which often result in the abandonment of project (Dantata, 2008), (Olyiwola, 2008) submit that the Nigeria construction industry is characterized by several incomplete and abandoned major capital project of which are owned by government agencies and public corporations mainly due to lack of continuity in government policy, poor strategic corporate plans, and inefficient use of ICT. According to Dantata (2008), Julius Berger (Nigeria) plc is by for the largest player in the Nigeria building and construction industry with activities spread all over the thirty six states of the Nigerian federation as well as in the Federal Capital Territory. Furthermore, in order to achieve meaningful result within a short timeframe, there is need for total commitment from all stakeholders and that a higher level of collaboration among stakeholder's a prep requites for success. (Ministry of work, 2003).

2.2.2 Building construction

Building construction is the process of adding structure to real property or construction of building. The vast majority of building construction job is small renovation ,such as addition of room or renovation of a bathroom, often, the owner of the property act as labourer ,paymaster and design team for the entire project .However all building construction projects include some elements in common design ,financial ,estimating and legal considerations .Many project of varying size reach undesirable end results such as structural collapse ,cost overrun ,time overruns, and litigation for this reason ,those with experience in the field make detailed plans and maintain careful oversight during the project to ensure a positive outcome. Commercial building construction is procured privately or publicly utilizing various delivery methodologies, include cost estimating, hard bid, negotiated price, traditional management

contracting, construction management at risk, design building and design –build bridging. The cost of construction on per square meter (or per square foot), basis for houses can vary dramatically based on site condition and also the time overrun for the successful completion of the project in due time. The problem in building construction include (shortage, low quality, high cost) of housing. According to united nation's estimate (2005) about 1.3 billion urban resident live in an inadequate housing. Nigeria, for instance is faced with the both quantitative (short supply) and qualitative (low quality) problem (federal office of statistics 1997; olatubara,2008; mabogunje2003). The world bank (1998) estimate that Nigeria require 720,000 housing unit to be built annually for the next 20yrear in order to be able to close the housing deficit of about 17 million units that would cost about 35trillion. It is therefore necessary to employ all possible measure including the improvement of tradition and indigenous building materials, construction methods and technologies to ameliorate the situation.

The building construction industry in Nigeria is a fast growing sector of the economy which recorded a growth rate of more than 20% between 2006 and 2007 .This growth however is not equal when compared to the growth of Nigeria's total GDP as the overall contribution of the construction sector to the country ;GDP remain very low at 18.3% in 2008.key factor that have contributed to the growth in the construction and properly sector include high demand for building across all sector of the economy; The focus on infrastructure development by state and federal government ;the adoption of privatization and commercialization of instrument of federal government policy and attempts at controlling regulation relating to how the construction business is carried out in the country grade invest Nigeria 2012. Oke and Abiola (2009) revealed that the quality of material and workmanship in Nigeria building industry is not satisfactory and that the problem lies in the use of inappropriate material supplied to site and inefficient use of workman.

The effective management of human resources is the key towards achieving the higher construction workforce productivity thus accomplishing the construction project within their predefined limit kim et al(2008),stated that international construction project performance is affected by more complex and dynamic factor than domestic project; frequently being exposed to serious external uncertainties such as political economical social and cultural risk ,as well as internal risk from within the project.

2.2.3 High rise building project

High –rise Building is essentially a building with a small footprint, small roof area, and very tall façades. And what differentiate it from the convectional low rise and medium rise building is that it need special engineering system due to its height. (scott,1998). A High rise is any structure where the height can have a significant impact on evacuation.

As the inevitable result of growing population and intensifying urbanization, high rise residential towers have become more prevalent in many cities, replacing vast areas of vernacular houses. During the building of these towers, the housing process has been radically thinking about the long history of human dwelling. Today, the building of large number of dwelling in high rise residential towers is controlled by a few parties (architects and developers), which is a dramatic change from tradition. Essentially, the early high-rise building was an economic phenomenon in which business was engine that drove innovation. Design was tied to the business equation, and styles was secondary to the primary factor of investment and use. The priorities of the men who put these building were economy, efficiency, size, and speed (Huxtible, A and Adal….1992). The reason for adopting high rise building could be solution for density problems and lack of available land for development, sometime tall building more about power, prestige status, where they play an important role in meeting occupier demand for large prestigious headquarter and Aesthetic then efficient development.

A new era is drawing for high-rise buildings, the destination of the world trade centre's 110-storey twin tower on sept 11 2001, sent a chilling message to the world. since that time, a battle has been ranging in engineering code making, fire protection and political circle over whether tall building are safe, and the role of public officials in the process, moving toward an increasingly significant technical sophistication.

High-rise building is built out necessity as one of a wide range of tools to achieve high density development. They provide the opportunity to control urban sprawl with relatively small footprint. Identifying what unique characteristic of high-rise building bring could be represented in the need for a particular built form, the concentration of activity, the proximity to important facilities for large numbers of people which is more than image and being a more sustainable form of development. The positive and negative influence through development by high rise building and tall building could be evaluated within certain factors including (social, environment, economics, and emotional safety. High rise building bring impact at strategic and local levels. The huge people load of a high building particularly at peak times, may overload the cities infrastructure, it public transport, road and utilities. The size of a building has important direct influence on our emotional response. The built environment of a city is this a product of its socio-cultural and political context, which in turn impact both architecture and the planning disciplines.

High-rise building can be equally appropriate grouped in cluster or located alone. The suitability of a particular site for a tall building development will, however, depend on site specific circumstance and proposal question. The approach to the design of tall building has changed rapidly, nowadays the building design has become an integral part of a complex process. In many American and Canadian cities, almost arctic conditions have been created by thoughtless placement and detaining of tall building. In wind and comfort, Peter Bosselmann, apart from pointing to the undesirable shadow effect, give example of climate deterioration due

to wind around free-standing high-rise buildings, among them the channel effect, the corner effect and the gap effect. Many major cities, require every proposal for a new high-rise building to include a sunlight access and shadow impact study: the study guideline state that new building should not cast significant shadow on park, plazas, watering beeches, or playground. Each building is evaluated on its shape, height and orientation, focussing on environmental factors, by creating better relationship and harmony between buildings and their urban and environmental contexts.

2.2.4 Time Overrun

Time overrun is defined as the extension of time beyond planned completion dates traceable to the contractor's (Kaming et al 1997). Delay are incidents that impact a project's progress and postpone project activities, delay causing incident may include weather delays, unavailability of resource, design delays. Etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship. (Vidalis et al 2002).

Choudhry (2004) and Chan (2001), defined the time overrun as the difference between the actual completion time and the estimated completion time. It was measured in number of days. project delays are those that cause the project completion to be delayed (Al-Gahtani and Mohan 2007). from above, time overrun is the time increased to complete the project after planned date which caused by internal and external factor surrounded the project. In this era of industrialization, Malaysia construction industry is key role player for economic and social development of the country (Ibrahim et al..2010). but this industry is continuously facing severe concern of time overrun. In Malaysia construction industry, time overrun is one of the critical problem faced in the construction project. (Memon et al 2011.) Hamazah et al (2011). Mentioned that, time overrun often cause disorder in workflow and reduce productivity. This problem of time overrun is caused by various factor, an d in order to control this problem. It is

very essential to adopt effective management action specially to control the factors causing time overruns (sambas Ivan and soon 2007). of these, cost and time tend to be most important and visible, always considered as very critical because of their direct economic implication of the unnecessarily exceeded. However, Ifte et al (2002) opined that the estimation of time has continued to be a problem of great concern and interest to both researcher and contractors. Mabachu and olaoye (1989) opined that the Nigeria construction industry today is bedevilled by the fact that almost all project is complete after duration much longer than initially planned. This was buttressed by odusami and olusanya (2000). who concluded that project executed in the Lagos metropolis experienced an average delay of 51% of planned duration for most project.

According to Jagboro (1987),the result of a survey conducted by the Nigeria institute of quantity surveyors in 1981 showed that construction cost in Nigeria were about 40% more expensive than the same type of construction in Kenya and brazil, 35% more than in Britain and 30% more as compared with the united states of America .In Nigeria apart from investigating the cause and implications of time overrun, little work is known to have been done to predict time performance, and client are becoming uncomfortable at seeing their project complete after long duration .construction time has always been seen as one of the benchmarks for assessing the performance of a project and the efficiency of the project organization. Timely completion of a construction project is one goal of the client and contractor because each party tends to incur additional cost and lose potential revenue who completion is delayed (Thomas et al 1995),Chan and Kumaraswany (1996) opined that a project is usually regarded as successful if it is complete on time ,within budget and to the level of quality standard specified by the client at the beginning of the project .however ,severe criticism of the industry are generated when project take far longer than planned .The problem of project time overrun is of international concern. Chan and Kuwaraswamy(1996).In Australia ,it was found out that

seven-eighth of building contracts surveyed in the late 1960s were complete after scheduled completion while in Hong Kong 70% of building projects were delayed ,in Saudi Arabia ,AL-Wnalil and AL-Ghafly(1999) confirmed in a study carried out by than In 1995 that contractor agreed that 37% of all their project were subject to delay while consultant admitted that delayed projects accounted for 84% of project under their supervision. They further reported another study, which concluded that 70% of the public project in the same country experienced time overrun. Due to the importance of construction sector to a nation, many researchers have studied this sector's operation and their findings have indicated that most project are never completed on time due to delays. Delays also lead to cost overrun and less work is performed despite the increased in construction budget (ssepuiuge,2008). In Lao people's democratic Republic, the Champassack road improvement project (CRIP) was completed in May 2001 after a delay of 23 months The objective of the project was to rehabilitate and improve the 200-km road with aim to improve transport service in the southern region (African development bank,2005).

In Ghana, the construction industry is an important sector to the economy. This sector contributes an average of 85% of GDP(kessides,1993). The sector has employed about 23% if the economically active population in 2002 (Nehuhu 2006). Unfortunately, the sector faces a major construction delay which is endemic and its economic and social impact is often discussed. These all internal and external factors and actor play a substantial role towards time performance of construction projects.

According to Haseeb (2011), there is an ongoing debate over this retrogressive phenomenon with a purpose to eliminate, deflect or mitigate their effect and occurrence, project management institute's famous project management body of knowledge (PMBOK-4thEDITION) advocate the philosophy of project integration management. The basic aim for project integration management is to synchronize and harness, all the subsidiary plan in order to achieve project

goals on time and within budget. Unfortunately, this aspect is neglect or forgotten, as a result of which projects are subjected or confronted with massive constructability issues, conflicts and clashes, design errors, frequency change order, cost overrun and late completion. In the worst scenario, some project is completely abandoned when contractor dissert out of frustration from jobsite. Over the past decades, construction practitioner has tried to develop and implement the right contractual method which fit the best approach of their needs and minimizing delay in construction project.

2.2.5 Cost overrun

Cost overrun is defined as excess of actual cost over budget. Cost overrun is also sometime called ‘’cost escalation, cost increase’’, or ‘’budget overrun’’ (Zhun et al 2004). Cost overrun is the change in contract amount divided by the original contract award amount. This calculation can be converted to a percentage for ease of comparison (Jackson 1990).

$$\text{Cost overrun} = \frac{\text{final contract amount} - \text{original contract amount}}{\text{Origin contract amount.}}$$

Choudhry (2004) define the cost overrun as the difference between the original cost estimate of project and actual construction cost on completion of works of a commercial sector construction project. cost overrun is an instance in which the provision of constructed goods or service are claimed to require more financial resources then was originally agreed between a project sponsor and a contractor. The difference between the original cost and actual cost when the project is completed (AVOTS,1983). Actually, Avots (1983) used the word cost growth instead of cost overrun.

2.2.6 Effect of Time and cost overrun

Effect are the penalty that will be encountered when cost overrun and time occur on a construction project. According to Nega (2008), cost overrun have evident effect on the key stakeholder in particular and generally on the construction industry. Time overrun have obvious effect which implies added cost over and above those initially agreed upon at the onset, resulting in less return on investment. To the end user, the added cost is passed on higher rental and lease cost or price. To the professional's time overrun implies inability to deliver value for money and could well tarnish their reputations and result in loss of confidence reposed in them by client. Some effect of time and cost overrun are stated below;

i. To the client time and cost overrun implies additional costs over and time above those originally agreed upon at the inception, resulting in less return on investment.
ii. To the end user the added costs and time are passed on as higher rental on lease cost or price.
iii. To the contractor, it implies loss of profit for non-completion and deformation that could jeopardize his or her chance of winning future jobs, if at fault.
iv. To the industry as a whole, cost overrun could bring about project abandonment and a drop in building activities, bad reputation, and inability to secure project finance or securing it at higher costs due to added risk.

The study of Nega (2008) further identified the following as major effect of cost overruns.

v. Budget short fall
vi. Additional cost
vii. Loss of reputation to the consultant
viii. Delayed payments to contractors
ix. High cost of supervision and contract administration for consultant.

x. The contractor suffers from budget shortfall of the client and poor quality work-ship

xi. Additional money for contractor

xii. Decrease in quality

xiii. Increase in project cost

xiv. Demolition and rework

xv. Increase project cost due to extension of time; longer project duration means than more resources will need to be allocated to the project, which then increase the project costs and project abandonment.

2.2.7 Type of delay

The main type of delay has been stated by a number of researchers (Vidahs etal 2002), Ahmed et al (2003), Alaghabri et al (2007) and Al-Gahtani and mohan (2007). These types are excusable delay, concurrent delay, compensable delay, and critical delay.

The type of delays above internal and external impact on project process. Internal causes of delay include causes that come from the owner, designers, contractors and consultants. External cause of delay is originated from outside of construction projects such as utility companies, governments, sub-contractors, suppliers, labour unions, nature etc.

2.2.8 Excusable delay

Excusable delay is unforeseeable event beyond anyone's control. They are broken down further into compensable or non-compensable delays. If the delay is considered compressible, then the contractor is entitled to additional financial compensation as well as extra project time. Under certain circumstance where non-compensated excusable delay occurs the contractor receive extra-time but non extra money for the additional completed work. Excusable delays, known as "force majeure" delays and commonly call "act of God" because they are not the

responsibility or fault of any particular party. Most contrasts allow for the contractor to obtain an extension of time for excusable delays but not additional money (Alaghbari et al 2007).

Owner – issued contract specifically address some potential compensable delays and provide equitable adjustments. The change is owner-issued contrast provides that equitable adjustment may be considered as follows:

I. Changes

With the help of a written change notice, the owner may without my notice to the sureties (if any) unilaterally make any change, at any time in the work within the general scope of the contract, including but not limited to change:

i. In the drawings, design or specifications
ii. In method, manner or sequence of contractor's work
iii. In customer or owner furnished facilities, equipment, material, service or site
iv. Directing acceleration or deceleration in the performance of the work
v. Modifying the contract schedule or contract milestones.

If at any time contractor believe that act or omission of customer or owner constitute a change to the work not covered by a change notice, contractor shall within ten (10) calendar days of discovery of such act or omission, submit a written change notice request, explaining in details, the basis for the request. Owner may either issue a change notice or deny the request in writing. If any change under this clause causes directly or indirectly an increase or decrease in the cost or the time required for the performance of any part of the work weather or not changed by any order, an adjustment shall be made and the contract will be modified accordingly (Ahmed et al 2003).

II. Differing site conditions

The portion of the clause addressing cost or time adjustment for differing site condition provided. If such condition is differing in material and thus cause on increase/decrease in the contractors cost or time required for performance of the work an equitable adjustment will be made pursuant to the general condition titled “changes”. No claim of the contractor under this clause will be flowered unless the contractor has given the given the required noticed. The main intention is to leave the contractor neither damaged nor enriched because of the resultant delay (Al-Gahtni and mohen 2007). This differing site condition change in owner issued contracts, the so-called “Exculpatory” change. The exception is limited to these condition defined in the differing site condition change (Ahmed et al 2003).

2.2.9 Concurrent delays

If only one factor is delaying construction, it is usually fairly easy to calculate both the time and money resulting from that single issue. A more complicated but also more typical situation is one in which more than one factor delays then project at the same time or in overlapping period of time. These are called concurrent delay (Alaghbari et al 2007) concurrent delay occur when both owner and the contractor are responsible for the delay. The sophisticated computerized technique concurrent owner and contractor delays. (Alwni et al 2002).

In analysing a delay claims, an analysis based on a comparison of the contractor’s approved CPM schedule with the as built CPM schedule should be performed to apportion proper responsibility for delay. because the critical path may shift as the job progress, it is updated based upon contractually required input from the construction.

2.2.9.1 Compensable delays

Compensable delay is those that are generally caused by the owner or its agents. The most common form of compensable delay is inadequate drawings and specification, but

compensable delay can also arise from the owner's failure to respond in a timely fashion to request for information or shop drawing owner's change in design or materials and owner's disruption and or change in the sequence of the work. The contractor is entitled to both additional money and additional time resulting from compensable delay. (Alaghbari et al 2007). In addition to the compensable delay that result from contract charges by change notice, there are excusable delays, suspension or interruptions, to all or part of the work caused by an act or failure to act by the owner resulting from owner's breech of an obligation, stated or implied, in the contract.

If the delay is compensable, then the contractor is entitled not only to an extension of time but also to an adjustment for any increase in cost caused by the delay. (AL-Gahtani and mohan 2007).

2.2.9.2 Critical delays.

Critical delays are delay claim that affect the progress, time and compensation. Non-critical delay does not affect the completion date of the project. They affect the succeeding activities that are not on the critical path of the schedule. This can set back activities if they do not have a float in the schedule. (Abudul –Rahman et al 2006).

2.2.9.3 Delays Responsibility

Ahmed et al 2003 claimed that the issue of responsibility for delay is related to whether the contractor is awarded or is liable for cost and additional time to complete the project. The categories of responsibilities;

i. Owner (or agent) responsible –contractor will be granted a time extension and additional cost (indirect), where warranted.
ii. Contractor (or subcontractor) responsible –contractor will not have granted time or costs and may have to pay damage or penalties.

iii. Neither party (e.g''act of God'') responsible –contractor will receive additional time to complete the project but no cost will be granted and no damage or penalties assessed.

iv. Both parties responsible –contractor will receive additional time to complete the project but no cost will be granted and no damage or penalties assessed.

2.2.9.4 Causes of Time and Cost Overrun

Assaf and Al-whali 1995 found extensive of 56 causes of disputes over delay identified and reported that the contract disagreement was one of their main delay causes in large building project. Ayman 2000 conducted a survey on causes of delay on public project in Jordan. The result indicated that designing, change order, weather, site condition, late deliveries, economic condition and increase in quantity were the main causes of dispute and consequently delay construction schedule. Similarly, Odeh and Battaineth 2002 reported that interference, inadequate contractor experience, financing and payment, labor productivity, show decision making were five most important causes of disputes and delay in construction project with traditional contract.

Accordig to fandi and El-sayegh 2006, delay is considered one of the most frequent problems in the construction industry and these delay have an adverse impact on project completion in terms of time, cost, quality and safety. factor contributing to these delays have internal cause of delay includes the causes arising from four parties involved in the project. These parties include the owner, designer, contractors and consultants. Other delays, which do not arise from these four parties, are based on external cause for example from the government, material supplier or the weather.

2.2.9.5 Causes of time overruns (delay)

Time overrun (delays) can be divide into three categories;

i. Those over which neither party to the contract has any control
ii. Those over which the owner (or his/her representative) has control
iii. Those over which the contractor (or any subcontractor) has control.

Ahamed et al 2003 studied two kinds of cause for delay in construction project, external causes and internal causes. A number of researcher have categorized the factors that causing delays in the four categories, those are;

2.2.9.6 Contractor's Responsibility

The factor that related to contractor's responsibility are; delay in delivery of material to site; shortage of material on site; construction mistakes and defective work; poor skills and experience of labour; shortage of site labour; low productivity of labour; financial problem; co-ordination problem with others; lack of subcontractor's skill, lack of site contractor 's staff; poor site management and equipment and tool shortage on site.

2.2.9.7 Consultant 's responsibility

The factor that related to consultant responsibility are; absence of consultant 's site staff, lack of experience on the part of the consultant; lack of experience on the part of the consultant's site staff;(managerial and supervisory personnel); delayed and slow supervision in making decision; incomplete documents; and slowness in giving instruction.

2.2.9.8 Owner's Responsibility

The factor that related to owner's responsibility are; lack of working knowledge; slowness in making decision; lack of co-ordination with contractor contract modification (replacement and

addition of new work to the project and change in specification); and financial problems. (delayed payment, financial difficulties and economic problem).

External Factor

The factor that related to external factor are; lack of materials on the market; lack of equipment and tools on the market; poor weather condition; poor site condition (location ground etc) poor economic condition (currency, inflation rate etc.) change of laws and regulation; transportation delays; and external work due to public agencies. (road, utilities and public service) (Alghbari et al 2007). Some factor causing cost overrun;

i. Incomplete design at the time of tender
ii. Addition work at owner's request
iii. Change in owner's brief
iv. Lack of cost planning and monitoring during pre and post contract stage
v. Site and poor soil condition
vi. Adjustment of prime cost and provisional sum
vii. Logistic due to site location
viii. Lack of cost report during construction stage
ix. Omission and error in the bill of quantities
x. Technical omission at design stage
xi. Indecision by supervising team in dealing with the contractor's queries in delay.
xii. Delay in costing variation and additional work

The following are major categories of causes of time overrun

- Policy- Related causes

Essential, public sector project are sponsored or endorsed by the government. The implementation of this type of project must be in line with governmental policy. On the other

hand, governmental policy has to incorporate multiple dimensional interests, in particular, the public interest. These interest are multiple dynamic and complicated, and in order to satisfy these interests, changes in policy are unavoidable. A typical example is the existence of many prolonged office building project in a number of cities in china, mainly due to the change of governmental financing policy in late 1990.

The government either postponed or reduced the financial commitment to many building project in an attempt to depress the 'over-heated' construction market. As a result, many projects were delayed. New policies are often introduced in the middle of a project; construction process. For example, additional safety measures, or new quality monitoring system. The implementation of new policies will normally involve investment from the project parties. The process of identifying who should take what responsibility in order to implement these policies can substantially delay project progress (Moungrous et al 2003).

2.2.9.9 Owner –Related causes.

A public sector project generally involves more change, thus inducing delays in the process of implementing the project. The public sector owner in general, is less active in pushing project progress when compared with a private sector owner. There is a lack of skill in controlling construction programming.

2.9.1.2 Design –Related causes

The discussion show that insufficient or incorrect design data is a major reason contributing to project delays. The problem happens because of the owner's poor briefing, insufficient time allowed for design, the architect's, poor skill and owner's quest for changes during the construction process (viddis al 2002).

2.2.9.9.1 Contractor –Related causes

There are many ways in which a contractor's performance can delay a construction project. For typical example, main contractor often has various disputes with subcontractors and materials suppliers, which can cause major delays, in fact, such disputes are considered a major cause for project delay. Other factors such as the contractor's insufficient financial resources, mistake in making decision on progress control and several inabilities when performing management functions, are also possible reason for causing project delays. It is interesting to note that, a main contractor will sometime deliberately demand an unreasonably short contract period although the contract understand that completion contract time is impossible. In this situation, the contractor only wants to secure a contract and thus agrees with an unrealistic contract period imposed by a project owner. Consequently, project delay cannot be avoided. (Takim et al 2004).

2.2.9.9.2 Consultant –Related cause

The consultant –related engaged in a building project can affect the progress of construction programming through various monitoring measure such as issuing certificate and endorsing the satisfaction of certain activities in the construction process. Progress delay can happen if those monitoring measures are not implemented properly. It has been found that supervision engineer often cannot endorse these procedures in time, thus construction delay is caused. (wang et al 2003).

2.2.9.9.3 Way of minimizing time and cost Overrun

An analysis is needed to identify the impact on time and cost followed by taking the appropriate action to mitigate delay and minimize the cost required. It important to improve the estimated activity duration according to the actual skill levels, unexpected events, efficiency of work time, and mistake and misunderstanding. mitigation effort is to minimize losses and this can

be achieved by many procedures such protection of uncompleted work, timely and reasonable re-procurement and timely changing or cancellation of purchase order. It is important to predict and identify the problems in the early stage of construction and diagnose the cause to find and implement the most appropriate and economical solution. (Abudul- Raham et al 2006).

It was indicating from the survey finding derived from different levels of management that the major causes of time and cost overrun is due to financial problem followed by manpower shortage and change in the project management. All parties involved in the project also agreed that time and cost overrun occur mostly during the construction phase. Therefore, in releasing these problem, the units of analysis suggested to increase the construction productivity, followed by increase the expertise and skill of human resources, and conducted site meeting more frequently. A strategic view of solving time and cost overrun problems should consider the important of the management aspect, the effect of knowledge and information flow between the organization levels and the importance of top management contribution solving problem.

According to him a careful examination of costs, material accessibility, construction system, procurement costs, organization and management cost and benefit values and related cost affecting items, if properly monitored the overall cost of project will improve. Secondly is the provision of complete error free design and specification to reduce the case of mix-up and delays as a result of omitted information. As stated by cooke and William 2003. Time and cost overrun reduction measures the elimination or minimization of design specification, delivery and site waste through the formulation and implementation of effective material policy and material management.

Ashworth (2000) commented that money making firm may be creating their income from the reduction of waste of both skilled and craft practice levels. Different strategies for minimizing time and cost overrun includes; firmly setting up necessities and characteristics of the project at the one before beginning ,organize the project group to try its hardest by getting part to

approve proficiencies and obligation ,successful human asset administration through viable inspiration and project following including observing early what region are deadlock and applying early corrective action and staying determined about keeping the project on the right way through contract clauses that forbid critical changes once the project is under way.

Below are some identified ways that time and cost overrun can be reduce.

i. Contract and specification knowledge
ii. Minimizing time overrun
iii. Finalization of drawing and specification
iv. Proper management of material on site
v. Reduction in conflict with local communities
vi. Proper analysis of project finance
vii. Proper management of material on site
viii. Ensuring financial budget correlated with estimated cost
ix. Enhanced site survey for better understanding of site condition
x. Enhanced training for personnel in project management.

2.3 Review of Empirical Study

Odediran (2012) conducted a study on factors influencing overruns of construction projects in Nigeria. The impact of cost and time overruns on construction projects is an undesirable experience both to the clients and stakeholders in the industry. This has regularly led to dispute, unfriendly working relationship, abandonment, low quality, and environmental nuisances. This paper evaluated factors contributing to overruns of construction projects and their impact on projects performance in Nigeria. Data were collected through questionnaire administration on professionals in the industry. Mean Item Score (MIS) and Relative Significant Index (RSI) were employed to analyse data collected. Increase in material cost, inaccurate materials estimation and underestimating of project costs among others are the most significant cost

factors while the most significant time factors include unexpected site condition, increase in project scope, lack of timely progress payment and inadequate planning. It becomes obvious that considering factors contributing to construction overruns would minimize their ugly consequences on project performance and efficiency. Among recommendations made are that cost estimators should improve on methods of cost determination, designers to make the full designs available at every stage in construction process and contractors should also carry out adequate site visit for better understanding of site conditions before pricing and cost forecasting.

The similarities between the study and the present study are that both studies focus on factors affecting overruns in construction project. Also, the study adopted survey research design.

Ibrahim (2017) conducted research on an investigation into cost overruns for ongoing building projects in Abuja, Nigeria. The total amount of cost overruns for any construction project can be fully determined once the project is completed. Estimating the amount of cost overruns at different stages of ongoing construction projects is important for project success. There is, however, a dearth of research for this exercise. This article reports the results of an investigative study on cost overruns for ongoing building projects in Abuja. The quantitative technique was adopted in this study. The investigation included ongoing building construction projects within Abuja, from which a sample of 30 building projects (public and private) was purposively selected (project value of ZAR100 million and above). The data were sourced from the archival records (drawings, bills of quantities, project progress reports, and specifications) on the issues relating to the costs and duration of building projects. The data were analysed using descriptive (percentages) and inferential methods. The results revealed that the percentage of cost overruns ranged from a minimum of 5.56% with 90% project completion, and within 88% of the estimated time limit, to a maximum of 216.08% with merely 5% project completion, and within 8.3% of the estimated time limit. The entire projects had average cost overruns of 44.46%, with

an average project completion of 52.4%, and within 91.4% of the average estimated time limit. Based on these findings, it can be concluded that continuous investigation into, and analyses of cost overruns at stages of building projects would encourage professionals to apply the best mitigation measures, to achieve a significant reduction in the total cost overrun at the completion of a project. Construction professionals should be well informed of these consequences (cost overruns) at an early stage, to evaluate the extent to which these consequences could be minimised

The similarities between the study and the present study are that the two study are both carried out in Abuja and both studies focus on cost overruns in building construction. The differences between the study and the present study are that the study adopted a quantitative research design for the study while the present study adopted a survey research design.

Oluyemi-Ayibiowu (2019) conducted research on Most Critical Factors Responsible for Cost Overruns in Nigeria Building Construction Industry. Cost overruns are major problems that face the Nigeria construction industry. Cost overruns can lead to numerous negative effects such as project delay, abandonment and poor-quality delivery. It's of high concern to those who are involved in the construction industry. This study was carried out to identify the major causes of cost overruns in Nigeria building construction industry, by means of a literature review and a questionnaire survey. A total of twenty (20) cost overrun causative factors were obtained from literature. The questionnaire survey was distributed to randomly selected respondents from a combination of clients, consultants, contractors, site-engineers, project-managers, and subcontractors. In all, one hundred and forty-one (141) questionnaires were distributed to randomly selected respondents (clients, consultants, contractors, site-engineers, project-managers and sub-contractors), one hundred and thirty-two (132) questionnaires were returned out of which three (3) questionnaires were found incomplete and invalid. Only one hundred and twenty-nine (129) questionnaires were found consistent and valid for use in this

research. Relative importance index (RII) and severity index were used to carry outranking and severity analysis. Based on the data received, six (6) most severe factors of construction cost overrun were identified as: risk and uncertainty related factors (89.5%); lack of financial power by clients (88.5%); weak regulation and control (88.2%); project fraud and corruption (82.6%); variation of prices (81.3%) and indiscriminate change in design/works (80.1%).

The similarities between the study and the present study is that the two study adopted a survey research design for the study and the both study focus on cost overruns in building construction. The differences between the study and the present study is that the study area for this study is Nigeria while the present study is carried out in Abuja.

Dorcas (2020) carried out a study on critical factors responsible for time overruns in Nigeria building construction industry. Time overruns are major problems facing the Nigerian construction industry. It's of high concern to those who are involved in the construction industry. This study was carried out to identify the major causes of time overruns in the Nigerian building construction industry, by means of a literature review and a questionnaire survey. A total of twenty (20) time overrun causative factors were obtained from the literature. The questionnaire survey was distributed to randomly selected respondents from a combination of clients, consultants, contractors, site engineers, project managers and sub-contractors. In all, one hundred and forty-one (141) questionnaires were distributed to randomly selected respondents (clients, consultants, contractors, site-engineers, project-managers and subcontractors), one hundred and thirty-two (132) questionnaires were returned out of which three (3) questionnaires were found incomplete and invalid. Only one hundred and twenty-nine (129) questionnaires were found consistent and valid for use in this research. Relative Importance Index (RII) and Severity Index were used to carry out a ranking analysis. Based on the data received, the five (5) most severe factors influencing project handling overtime in Nigeria construction industries are Inaccurate evaluation of projects time/duration (91.9%),

Risk and uncertainty associated with projects (91.6%), Complexity of works (87.6%), Weak regulation and control (86.8%) and Lack of financial power with severity (86.3%).

The similarities between the study and the present study is that the two study adopted a survey research design for the study and the both study focus on time overruns in building construction. The differences between the study and the present study is that the study area for this study is Nigeria while the present study is carried out in Abuja.

2.4 Summary of Review of Related literature

The review of the literature presented for this study began with concept of construction industry in which a vivid explanation of the concept of construction industry outlined, varities of definition were given by different writers, based on the different perception of the writers; the importance of construction industry to nation's economy was explained. Building construction is the process of adding structure to real property or construction of building. The vast majority of building construction jobs is small renovation such as addition of room, or renovation of bathroom. Often the owner of the property act as labourer, paymaster, and design team for the entire project.

The concept of high-rise building project examined, in which, it is a building with a small footprint, small roof area and very tall façades. And what differentiated it from the convectional low rise and medium rise building is that it needs special engineering system due to its height. High rise –building is also very importance for the inevitable result of growing population and intensifying urbanization, high-rise residential towers have become more prevalent in many cities, replacing vast areas of vernacular houses. The need to drastically reduce the time overrun in high-rise building construction cannot be over emphasized. Time overrun is define as the extension of time beyond planned completion date traceable to the contractors. cost overrun in building of high –rise project is the excess of actual cost over budget or called cost escalation

or cost increase. Some of these costs overrun in building project are fluctuation in foreign exchange, inflation, delay in payment, lack of financial management and planning, high loan interest charges levied by banks. The following were identified as the major effect of time and cost overrun which delays during construction, supplementary agreement, additional cost, budget shortfall, under-utilization of manpower, increased project cost, decrease in quality, decrease in productivity, product abandonment, demolition, and rework lead to effect of time and cost overruns. The type of delay experienced by several researchers. These types of delay are excusable delay, concurrent delay, compensable delay, and critical delay. The following causes of time and cost overrun are categorized into internal and external causes while some researcher also categorized into four categorized; contractor responsibility, consultant responsibility, owner responsibility, external factor which consist of incomplete design at time of tender, addition work at owner, request change in owner's brief, logistic due to site location. The way of minimizing time and cost overrun is importance so as to improve the estimated activity duration according to the actual skill levels, unexpected events, efficiency of work time. Minimizing time and cost is necessary to minimizing losses and this can be achieved by many procedures such as protection of uncompleted work, timely and reasonable re-procurement are timely changing or cancellation of purchase order. Furthermore, they postulated that a construction project is commonly acknowledge as successful when the aim of the project is achieved in terms of predetermined objective that mainly complete the project on time within budget cost and specific quality in accordance with the specification and to stakeholder satisfaction.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

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

3.1 Research Design

To achieve the stated objectives of this research study, descriptive survey is adopted because it involves the use of questionnaires and interviews to determine the views of the respondents who cut across various categories such as client, quantity surveyor, contractors, builders, and others etc. Survey research design is a proposal or plan which specifies how data relating to a given problem should be collected and analyse. Therefore, descriptive survey design is considered the best for this study because of the type of information needed for this investigation.

3.2 Area of the Study

The study is carried out in Abuja metropolis (Federal Capital Territory) which is formed in 1976 from part of former Nassarawa, Niger and Kogi state. The territory is bordered by the states of Niger to the west and north, Kaduna to the northeast, Nassawara to the east and southwest. It lies between latitudes 8.25º and 9.20º north of the equator and longitude of 6.45º and 7.39ºeast of the Greenwich meridian, Abuja is geographically located in the North Central Region of Nigeria.

3.3 Population of the Study

The target population for this study is made up of 50 respondents comprising of 25 quantity surveyors and 25 contractors within the construction industry in Abuja metropolis.

3.5 Sample and Sampling Techniques

The total population of 50 respondents consisting of 25 quantity surveyors and 25 contractors is used. Hence, there will be no need for sampling or adopting any special sampling technique.

3.6 Instrument for Data Collection

The instrument that is used for data collection is structure questionnaire developed by the researcher for this study. It consists of two (2) parts. Part I consists of introduction and Part II consist of instructions to guide the respondents on how to complete the questionnaire and contains section (A-C) of according to the research question. Section A dealt with the cause of construction time and cost overrun for high-rise building in Abuja metropolis. While section B dealt with the effect of construction time and cost overrun for high-rise building in Abuja Metropolis. Also, section C dealt with the Strategies to mitigate construction time and cost overrun for high-rise building in Abuja Metropolis. All the items are to be completed by indicating the proper respondent's best perception using four-point rating scale. Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

3.6 Validation of the Instrument

To ensure validity of the instrument a draft copy of the questionnaire will be submitted to three Lecturers in the Department of Industrial and Technology Education of Federal University of Technology, Minna. So, validations' suggestion will use to modify produced the final copy of the instrument before the administration of the instrument. This is to ensure that the instrument can elicit essential information desired for the study.

3.7 Administration of the Instrument.

The instrument that will use for the data collection will be administer to the respondent by the researcher and a researcher assistant for the study area selected for this research.

3.8 Method of data collection

All the 50 respondents (quantity surveyors and contractors) will be administered with the questionnaire. A research assistant also assisted during the administration of the instrument. The researcher will administer the questionnaire to the respondents and the completed questionnaires will be collected from the respondents. The researcher will study the respondent's response to the items to obtain a satisfactory data.

3.9 Method of data analysis

Data collected will be analyse using mean and t-test for the research questions. A four (4) point rating scale is used to analyse the data as shown below.

Strongly Agree	(SA)	=	4points
Agree	(A)	=	3points
Disagree	(D)	=	2points
Strongly Disagree	(SD)	=	1point

The formula below was used to calculate the mean.

$$\bar{X} = \frac{\sum FX}{N}$$

Where:

$\bar{X}$	=	mean
Σ	=	sum of normal value (summation)
X	=	weight of the response
F	=	frequency
N	=	number of respondents to the items

Therefore, the mean value of the 4-point scale is:

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

3.9.1 Decision Rule

The level of the mean score of 2.50 will be chosen as the agreed. This is interpreted relatively according to the 4-point rating adopted for this study. In view of the latter items with a calculated mean of 2.50 and above was target as agreed. Meanwhile, any item with a mean of 2.49 and below is disagreed. Also, the statistics t-test is used to test the hypothesis at 0.05 level of significance to compare the mean response of the two group. A critical value of ±1.960 is selected based on the on the degree of freedom at 0.05 significance. Therefore, every item with t-calculated value less than the critical value will be consider as insignificance while every item with t-calculated value equal or greater than the critical value will be regarded as significance.

CHAPTER FOUR

4.0 PRESENTATION AND ANALYSIS OF DATA

4.1 Research Question 1

What are the causes of construction time and cost overrun for high rise building project in Abuja metropolis?

Table 4.1: Mean response of quantity surveyor and contractor on the causes of construction time and cost overrun for high rise building project in Abuja metropolis.

$N_1 = 25$ $N_2 = 25$

S/N	ITEMS	$\bar{X}$	SD	Remark
	Time Overrun			
1	Bad weather condition (Rainy weather).	3.64	.563	Agreed
2	Manpower shortage.	3.76	.657	Agreed
3	Unrealistic contract direction imposed by the owner.	3.68	.653	Agreed
4	Alteration during construction stage.	3.46	.613	Agreed
5	Construction mistakes made by workers during construction work.	3.20	1.178	Agreed
6	Material and equipment shortage.	3.22	.708	Agreed
7	Obtaining permit from relevant authorities.	3.76	.555	Agreed
8	Cash flow issues.	2.86	1.195	Agreed
9	Poor site management by the contractor.	3.52	.646	Agreed
10	Delay and damage in delivery of material.	3.60	.535	Agreed
	Cost Overrun			
11	Inadequate planning.	3.74	.633	Agreed
12	Incomplete design at time tender.	3.76	.625	Agreed
13	Lack of coordinator of design stage.	3.74	.527	Agreed
14	Technical omission at design stage.	3.60	.571	Agreed
15	Ignoring items with abnormal rates during tender Evaluation especially item with provisional qualities.	3.60	.670	Agreed
16	Additional work at owner's request.	3.40	.639	Agreed

17	Contractor's unstable financial management knowledge.	3.38	.635	Agreed
18	Fluctuation in the cost of building materials.	3.44	.577	Agreed
19	Lack of cost planning/monitoring during.	3.64	.563	Agreed
20	Change made due to modification by stakeholder and others.	3.68	.513	Agreed

N=50

$\bar{X}$**=** mean of the respondents

N_1 = Quantity surveyors

N_2= contractors

SD = standard deviation of the respondents

Table 1 showed that both the Quantity surveyors and contractors agreed on all items from 1 to 20. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.513 and 1.195. This showed that the responses of the Quantity surveyors and contractors on the items were not divergent.

4.2 Research Question 2

What are the effects of construction time and cost overrun for high-rise building project in Abuja metropolis?

Table 2: **Mean response of Quantity surveyors and contractors on the effect of construction time and cost overrun for high rise building project in Abuja metropolis.**

N_1 =25 N_2 =25

S/N	ITEMS	$\bar{X}$	**SD**	Remark
	Time Overrun			
1	Cost overrun.	3.66	.557	Agreed
2	Dispute arises.	3.70	.580	Agreed
3	Total abandonment.	3.72	.536	Agreed
4	Project are delayed.	3.48	.580	Agreed
5	Rescheduling of project delivery period.	3.70	.647	Agreed

6	Bad contractor relationship.	3.54	.503	Agreed
7	Loss of productivity.	3.72	.607	Agreed
8	Loss of efficiency.	3.02	1.253	Agreed
9	Supervision of project.	3.32	.794	Agreed
10	Extension of time is granted.	3.56	.541	Agreed
	Cost Overrun			
11	Company liability to insolvency and liability of the companies to bad debt.	3.54	.813	Agreed
12	Dubious arrangement among the contractor and consultant.	3.48	.886	Agreed
13	Budget shortfall and increase in construction expenses.	3.72	.497	Agreed
14	Supplementary agreement that may be costly.	3.60	.535	Agreed
15	Loss of reputation to the consultant and contractor.	3.36	.827	Agreed
16	High cost of supervision and contract administration for consultant.	3.60	.606	Agreed
17	Delay completion schedules for building project.	3.50	.614	Agreed
18	Dispute between client and contractor.	3.28	.882	Agreed
19	Decrease in quality on construction work.	3.52	.614	Agreed
20	Increase in project cost estimated earlier.	3.26	.694	Agreed

N=50

$\bar{X}$= mean of the respondents

N_1 = Quantity surveyors

N_2= contractors

SD = standard deviation of the respondents

Table 4.2 showed that both the Quantity surveyors and contractors agreed on all items from 1 to 20. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.497 and 1.253. This showed that the responses of the Quantity surveyors and contractors on the items were not divergent.

4.3 Research Question 3

What are the strategies to mitigate construction time and cost overrun for high-rise building project in Abuja metropolis?

Table 4.3: **Mean responses of Quantity Surveyors and Contractors on the strategies to mitigate construction time and cost overrun for high-rise building project in Abuja metropolis.**

		N_1= 25		N_2=25
S/N	ITEMS	$\bar{X}$	**SD**	Remark
	Time Overrun			
1	Honoring of project finance.	3.82	.629	Agreed
2	Acceleration of site activities.	3.70	.647	Agreed
3	Proper preconstruction planning.	3.48	.614	Agreed
4	Using appropriate communication system.	2.92	1.322	Agreed
5	Effective management during construction.	3.06	.767	Agreed
6	Provision of adequate technical support.	3.78	.545	Agreed
7	Obtaining necessary information about the site and material as at when done.	2.76	1.135	Agreed
8	Use of contingency allowance to minimize the effect of delay.	3.54	.646	Agreed
9	Selection of experience contractor and sub-contractor.	3.58	.538	Agreed
10	Early payment.	3.76	.625	Agreed
	Cost Overrun			
11	Timely solving of disputes among stakeholders.	3.06	.767	Agreed
12	Adequate project preparation planning.	3.78	.545	Agreed
13	Completed design at time of tender.	2.76	1.135	Agreed
14	Minimum changes at design stage.	3.50	.678	Agreed
15	Minimizing time overrun.	3.58	.538	Agreed
16	Proper management of material on site.	3.76	.625	Agreed
17	Controlled of owners excers alteration.	3.70	.678	Agreed

18	Good workmanship by technical staff.	3.70	.580	Agreed
19	Proper analysis of project finance and implication.	3.56	.611	Agreed
20	Enhanced site survey for better understanding of sites condition.	3.60	.670	Agreed

N=50

$\bar{X}$= mean of the respondents

N_1 = Quantity surveyors

N_2= contractors

SD = standard deviation of the respondents

Table 4.3 showed that both the Quantity surveyors and contractors agreed on all items from 1 to 20. This is because none of the mean response was below 2.50 which was the beach mark of agreed on the 4-points response options. The standard deviation score ranged between 0.538 and 1.322. This showed that the responses of the Quantity surveyors and contractors on the items were not divergent.

4.4 Hypothesis 1

There is no significance difference between the mean response quantity surveyor and contractor on the cause of construction time and cost overrun for high-rise building in Abuja metropolis.

Table 4.4 T-test Analysis of the respondent regarding the causes of construction time and cost overrun for high-rise building project in Abuja metropolis.

$N_1 = 25$ AND $N_2 = 25$

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Quantity surveyors	25	3.84	.554	48	2.665	0.04	NS
Contractors	25	3.44	.507				

N=50

$\bar{X}_1$**=** mean of Quantity surveyors

$\bar{X}_2$ = mean of contractors

N_1 = Quantity surveyors

N_2= Contractors

SD_1 = standard deviation of Quantity surveyors

SD_2 **=** standard deviation of contractors

NS=Not Significant

Table 4.4 showed that there was no significant difference in the responses of Quantity surveyors and contractors on all the items as cause of construction time and cost overrun for high-rise building in Abuja metropolis; therefore, the null hypothesis of no significant difference was upheld at 0.05 level of significance.

4.5 Hypothesis 2

There is no significant difference between the mean responses of Quantity Surveyors and Contractors on the effect of construction time and cost overrun for high-rise building project in Abuja metropolis.

Table 4.5 T-test on effect of construction time and cost overrun for high-rise building project in Abuja metropolis **$N_1 = 25$ AND $N_2 = 25$**

Respondents	N	X	SD	Df	Tcal	P-value	Remark
Quantity surveyors	25	3.60	.816	48	1.095	0.017	NS
Contractors	25	3.80	.408				

N=50

$\bar{X}_1$**=** mean of Quantity surveyors

$\bar{X}_2$ = mean of contractors

N_1 = Quantity surveyors

N_2= Contractors

SD_1 = standard deviation of Quantity surveyors

SD_2 **=** standard deviation of contractors

NS=Not Significant

Table 4.5 showed that there was no significant difference in the responses of Quantity Surveyors and Contractors on all the items as effect of construction time and cost overrun for high-rise building project in Abuja metropolis; therefore the null hypothesis of no significant difference was upheld at 0.05 level of significance.

Findings of the study

The following are the main findings of the study. They are prepared based on the research question and hypothesis tested.

The causes of construction time and cost overrun for high-rise building project in Abuja metropolis include the following.

i. Bad weather condition (Rainy weather).
ii. Manpower shortage.
iii. Unrealistic contract direction imposed by the owner.
iv. Alteration during construction stage.
v. Construction mistakes made by workers during construction work.
vi. Material and equipment shortage.
vii. Obtaining permit from relevant authorities.
viii. Cash flow issues.
ix. Poor site management by the contractor.

x. Delay and damage in delivery of material.

xi. Inadequate planning.

xii. Incomplete design at time tender.

xiii. Lack of coordinator of design stage

xiv. Technical omission at design stage

xv. Ignoring items with abnormal rates during tender Evaluation especially item with provisional qualities.

xvi. Additional work at owner's request.

xvii. Contractor's unstable financial management knowledge.

xviii. Fluctuation in the cost of building materials.

xix. Lack of cost planning/monitoring during.

xx. Change made due to modification by stakeholder and others

The effect of construction time and cost overrun for high-rise building in Abuja Metropolis.

i. Cost overrun

ii. Dispute arises

iii. Total abandonment

iv. Project are delayed

v. Rescheduling of project delivery period

vi. Bad contractor relationship

vii. Loss of productivity

viii. Loss of efficiency

ix. Supervision of project

x. Extension of time is granted

xi. Company liability to insolvency and liability of the companies to bad debt

xii. Dubious arrangement among the contractor and consultant

xiii. Budget shortfall and increase in construction expenses

xiv. Supplementary agreement that may be costly

xv. Loss of reputation to the consultant and contractor

xvi. High cost of supervision and contract administration for consultant

xvii. Delay completion schedules for building project

xviii. Dispute between client and contractor

xix. Decrease in quality on construction work

xx. Increase in project cost estimated earlier

The strategies to mitigate construction time and cost overrun for high-rise building project in Abuja metropolis

i. Honoring of project finance.

ii. Acceleration of site activities

iii. Proper preconstruction planning

iv. Using appropriate communication system

v. Effective management during construction

vi. Provision of adequate technical support

vii. Obtaining necessary information about the site and material as at when done

viii. Use of contingency allowance to minimize the effect of delay

ix. Selection of experience contractor and sub-contractor

x. Early payment

xi. Timely solving of disputes among stakeholders

xii. Adequate project preparation planning

xiii. Completed design at time of tender

xiv. Minimum changes at design stage

xv. Minimizing time overrun

xvi. Proper management of material on site

xvii. Controlled of owners exerts alteration

xviii. Good workmanship by technical staff

xix. Proper analysis of project finance and implication

xx. Enhanced site survey for better understanding of sites condition

Discussion of findings.

The result from table 4.1 shows the findings on the causes of construction time and cost overrun for high-rise building project in Abuja metropolis. The findings of the study among others reveal that Bad weather condition (Rainy weather), Manpower shortage, Unrealistic contract direction imposed by the owner, Alteration during construction stage, Construction mistakes made by workers during construction work, Material and equipment shortage, Obtaining permit from relevant authorities, cash flow issues, Poor site management by the contractor, Delay and damage in delivery of material, Inadequate planning, Incomplete design at time tender, Lack of coordinator of design stage, Technical omission at design stage, Ignoring items with abnormal rates during tender Evaluation especially item with provisional qualities, Additional work at owner's request, Contractor's unstable financial management knowledge, Fluctuation in the cost of building materials, Change made due to modification by stakeholder and others. The findings of the study is in line with Saidu (2017) who noted that cost overruns have been attributed to a number of sources, including technical errors in design or estimation; managerial incompetence; risks and uncertainties; suspicions of foul play; deception and delusion, and even corruption. Saidu also that causes of cost overruns are the lack of experience among the project team; contract size/complexity, and design error. Adefin *et al.* (2016) also opined that design error at the pre-contract stage of a project is the major cause of cost overruns for hospital and school buildings

The result of the hypothesis on the causes of construction time and cost overrun for high-rise building project in Abuja metropolis shows that there was no significant difference in the responses of Quantity Surveyors and Contractors on all the items as causes of construction time and cost overrun for high-rise building project in Abuja metropolis.

Table 4.2 shows the result of the findings on the effect of construction time and cost overrun for high-rise building in Abuja Metropolis. The finding of the study among others review that effect of construction time and cost overrun are Cost overrun, Dispute arises, Total abandonment, Project are delayed, Rescheduling of project delivery period, Bad contractor relationship, Loss of productivity, Loss of efficiency , Supervision of project, Extension of time is granted, Company liability to insolvency and liability of the companies to bad debt, Dubious arrangement among the contractor and consultant, Budget shortfall and increase in construction expenses, Supplementary agreement that may be costly, Loss of reputation to the consultant and contractor, High cost of supervision and contract administration for consultant, Delay completion schedules for building project, Dispute between client and contractor, Decrease in quality on construction work, Increase in project cost estimated earlier. The findings of the study is in line with Nega (2008) in Mukuka (2016) noted that cost overruns could bring about project abandonment and a drop in building activities, bad reputation, and inability to secure project finance or securing It at higher costs due to added risks. Eshofonie (2008) in Mukuka (2016) also identifies four effects of cost overruns as follows: company or firm liability to insolvency and liability of the companies or firms to bad debt; under-utilization of man-power resources, plants and equipment; increased project cost due to extension of time: Longer project duration means that more resources will need to be allocated to the project, which then increases the project costs and project abandonment.

The result of the hypothesis on the effect of construction time and cost overrun for high-rise building in Abuja Metropolis shows that there was no significant difference in the responses

of Quantity Surveyors and Contractors on all the items as effect of construction time and cost overrun for high-rise building in Abuja Metropolis.

The result from table 4.3 reveal the findings on strategies to mitigate construction time and cost overrun for high-rise building project in Abuja metropolis. The findings of the study revealed the Honoring of project finance, Acceleration of site activities, Proper preconstruction planning, Using appropriate communication system, Effective management during construction, Provision of adequate technical support, Obtaining necessary information about the site and material as at when done, Use of contingency allowance to minimize the effect of delay, Selection of experience contractor and sub-contractor, Early payment, Timely solving of disputes among stakeholders, Adequate project preparation planning, Completed design at time of tender, Minimum changes at design stage, Minimizing time overrun, Proper management of material on site, Controlled of owners exerts alteration, Good workmanship by technical staff, Proper analysis of project finance and implication, Enhanced site survey for better understanding of sites condition. The findings of the study is inline with Saidu (2017) who stated that the two main concepts for minimising the cost overruns on construction projects, namely reference-class forecasting and increased public sector accountability through more involvement by the private parties. Also Brunes & Lind (2014) in Saidu (2017) suggested three key areas on how cost overruns could be reduced in a project: decentralization of budgets, where cost overruns in one project in a region lead to less cost overruns in other projects in the specific region. It should be easy to see when and where cost overruns occur, and who was primarily responsible, ensuring a systematic use of external reviewers at the different stages of a project.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Study

The main focus of this research study was to find out the factor influencing construction time and cost overrun for high rise building project in Abuja metropolis.

Chapter one of the study discussed the background of the study, the statement of problem, purpose, significance, scope and the research questions were all stated and discussed for the conduct of this research.

The review of related literature looked into Construction Industry, Building construction, High-rise building project, Time overrun, Cost overrun, Effect of time and cost overrun, Type of delay, Delay responsibility, Causes of time and cost overrun, Way of minimizing time and cost overrun. Various views of different authors concerning the topic were harmonized in a comprehensive literature review and empirical studies.

A survey approach was used to developed instrument for the study; the respondents identified as the population of the study were the Quantity Surveyors and Contractors. The entire respondents were used. A number of 50 questionnaires were administered. The instrument used was analysed using frequency count, and mean scores. The research questions were discussed base on the findings from the responses and results of the instrument used.

Implication of the study and conclusions were also drawn from the findings discussed. Recommendations and suggestions for further study were formulated and stated according to the findings of the study.

5.2 Implication of the Study

The findings of the study had implications for government, construction industries, Quantity Surveyors and Contractors. From the outcome of the study, it implies that every construction

team should be well equipped with adequate skills in construction in order to be able to minizing time and cost overrun in building construction projects. Good skills within and among the workers would exert reasonable quantum of positive influence on labour productivity more especially when backed by adequate supervision of operatives. Contractors and sub-contractors should as a matter of policy train and retrain skilled and semi-skilled workers to enhance their skills which will eventually improve on the labour productivity

5.3Contribution to Knowledge: government should be able to train competent contractor in the 1. construction industry to reduce the factor influence contractor construction and cost overrun in high rise building

2. the project manager should ensure that both nominated and domestic sub-contractor on any project have adequate experience

3. it helps in the generation of revenue to the Government.

Conclusion

Based on the findings of the study, the study concludes that among the various factors that causes time overrun, inadequate fund for the project, inadequate planning of project before take-off, inadequate tools and equipment, delay in delivery of materials, subcontractors' incompetency and design changes during project execution top the list. Adequate funding guarantees reasonable cash flow while good planning ensures uninterrupted progress of work and these are basic ingredients for the realisation of key objectives of any project. The project owner and project manager should keep their eyes on these key factors during project execution as these factors could result in reasonable time overrun on projects

Recommendations

Based on the findings of the study, the following recommendations were made:

1. There should be effective funding of project by project owners to avoid unnecessary time overrun with its attendant effect on cost. To guarantee achievement of the

construction programme, the project owner could engage the service of a project manager to manage the project from the design stage through tendering to completion.

2. Contractors and subcontractors should provide adequate and functional working tools/equipment for their workers to enable timely completion of projects. Equally, in every medium to large scale projects, the project team composition should include a dedicated staff trained on materials management and store keeping to ensure effective and efficient management of construction materials. The contractor or sub-contractor could establish a maintenance department that is managed by experienced technician on construction sites to ensure prompt repair of any damaged tools/equipment.
3. The project manager should ensure that both nominated and domestic sub-contractors on any project have the requisite experience and work plan to meet the requirements of the main contractor. Pre-qualification of these sub-contractors would ensure that the ones engaged have sufficient experience, proficiency and capacity to deliver not only quality work but on time. The project owner (or project manager) must ensure completion of all design documentation with any associated value engineering analysis and buildability reports before tendering, so that design changes during project execution is minimised.

Suggestion for Further Study

The following are suggested for further studies:

1. Factor influencing construction time and cost overrun for high rise building project in other locations.
2. Modelling of cost overruns in building projects in Abuja.

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ASSESMENT FACTOR INFLUENCING CONSTRUCTION TIME AND COST OVERRUN FOR HIGH RISE BUILDING PROJECT IN ABUJA METROPOLIS.

Dear Respondent.

I am by name Areo Daniel with matric number 2016/1/63792TI. A final year student of the Department of Industrial and Technology Education F.U.T Minna. I am conducting a research on the topic**: "assessment factor influencing construction time and cost overrun for high rise building project in Abuja metropolis."** I therefore plead that you provide sincere and accurate answers to the questions below, as all information will be treated confidentially.

Thanks for your cooperation.

Yours sincerely

Areo Daniel

(Researcher)

APPENDIX

QUESTIONNAIRE

ASSESMENT OF FACTORS INFLUENCING CONSTRUCTION TIME AND COST OVERRUN FOR HIGH RISE BULDING PROJECT IN ABUJA METROPOLIS.

PART I
Personal Data

Please kindly fill in the blanks or tick (√) in the options as provided in the information required below. All information and responses supplied to the item of this questionnaire will be used particularly for the purpose of this research work and will be used confidentially.

The response categories are;

Strongly Agree	(SA)	=	4points
Agree	(A)	=	3points
Disagree	(D)	=	2points
Strongly Disagree	(SD)	=	1point

Please read the questionnaire items carefully and tick (√) the response appropriately in each item.

Quantity Surveyor ( ) Contractor ( )

PART II

SECTION A: What are the causes of construction time and cost overrun for high-rise building project in Abuja metropolis?

S/N	Time Overrun	SA	A	D	SD
1	Bad weather condition (Rainy weather).				
2	Manpower shortage.				
3	Unrealistic contract direction imposed by the owner.				
4	Alteration during construction stage.				
5	Construction mistakes made by workers during construction work.				
6	Material and equipment shortage.				
7	Obtaining permit from relevant authorities.				
8	Cash flow issues.				
9	Poor site management by the contractor.				
10	Delay and damage in delivery of material.				
	Cost Overrun				
11	Inadequate planning.				

12	Incomplete design at time tender.				
13	Lack of coordinator of design stage.				
14	Technical omission at design stage.				
15	Ignoring items with abnormal rates during tender Evaluation especially item with provisional qualities.				
16	Additional work at owner's request.				
17	Contractor's unstable financial management knowledge.				
18	Fluctuation in the cost of building materials.				
19	Lack of cost planning/monitoring during.				
20	Change made due to modification by stakeholder and others.				

SECTION B: What are the effect of construction time and cost overrun for high-rise building project in Abuja Metropolis?

S/N	**Time Overrun**	**SA**	**A**	**D**	**SD**
1	Cost overrun.				
2	Dispute arises.				
3	Total abandonment.				
4	Project are delayed.				
5	Rescheduling of project delivery period.				
6	Bad contractor relationship.				
7	Loss of productivity.				
8	Loss of efficiency.				
9	Supervision of project.				
10	Extension of time is granted.				

	Cost Overrun				
11	Company liability to insolvency and liability of the companies to bad debt.				
12	Dubious arrangement among the contractor and consultant.				
13	Budget shortfall and increase in construction expenses.				
14	Supplementary agreement that may be costly.				
15	Loss of reputation to the consultant and contractor.				
16	High cost of supervision and contract administration for consultant.				
17	Delay completion schedules for building project.				
18	Dispute between client and contractor.				
19	Decrease in quality on construction work.				
20	Increase in project cost estimated earlier.				

SECTION C: What are the strategies to mitigate construction time and cost overrun for high-rise building project in Abuja metropolis?

S/N	**Time Overrun**	**SA**	**A**	**D**	**SD**
1	Honoring of project finance.				
2	Acceleration of site activities.				
3	Proper preconstruction planning.				
4	Using appropriate communication system.				
5	Effective management during construction.				
6	Provision of adequate technical support.				
7	Obtaining necessary information about the site and material as at when done.				

8	Use of contingency allowance to minimize the effect of delay.				
9	Selection of experience contractor and sub-contractor.				
10	Early payment.				
	Cost Overrun				
11	Timely solving of disputes among stakeholders.				
12	Adequate project preparation planning.				
13	Completed design at time of tender.				
14	Minimum changes at design stage.				
15	Minimizing time overrun.				
16	Proper management of material on site.				
17	Controlled of owners excers alteration.				
18	Good workmanship by technical staff.				
19	Proper analysis of project finance and implication.				
20	Enhanced site survey for better understanding of sites condition.				