

**EFFECT OF COST AND TIME OVERRUN ON BUILDING CONSTRUCTION
PROJECTS IN NIGERIA**

BY

**ADEEYO, Hannah Adebisi
2016/3/64548TI**

**DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION,
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION,
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE.**

AUGUST, 2021

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DECLARATION

I hereby declare that this project titled: “effect of cost and time overrun on building construction projects in Nigeria” is a collection of my original research work and it has not been presented for any other qualification anywhere. Information from other sources (published or unpublished) has been duly acknowledged.

ADEEYO, Hannah Adebisi
2016/3/64548TI

Signature & Date

CERTIFICATION

The project titled: “effect of cost and time overrun on building construction projects in Nigeria ” by Adeeyo Hannah Adebisi with the matric number 2016/3/64548TI meet the regulations governing the award of the degree of bachelor of technology in the Department of Industrial and Technology Education, School of Science and Technology Education, Federal University of Technology, Minna and it is approved for its contribution to scientific knowledge and literary presentation.

Mr. I.K KALAT
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External Examiner

Sign & Date

DEDICATION

This project work is dedicated to God Almighty.

ACKNOWLEDGEMENTS

My profound and unquantifiable gratitude goes to Almighty God for the wisdom guidance protection and strength He bestowed on me throughout my Programme in FUTMINNA despite all the challenges encountered. My special appreciation goes to my able supervisor and project coordinator Mr I. K. Kalat and Dr. A.M. Hassan respectively for their guidance towards successful realization of this project and to all I.T.E department lecturers. Especially the Dean Prof I.A Gambari , Deputy Dean Dr A.M. Idris, H.O.D Dr I.Y. Umar, Prof A.S. Ma'aji, Prof B.N. Atsumbe, Prof. R.O. Okwori, Dr. E. Raymond, Dr. G.A. Usman, Dr R Audu, Dr B.M Mohammed, Dr .I. Dauda, Dr. AbudulKadir M, Dr T.M Saba, Dr. C. O. Igwe, Dr. A.S Owodunni, Dr.A.B Kagara, Mall. S.M. Adamu, Dr W.B. Kareem ,Mr. D.A. Opeyemi, Mr .F. Abutu , Mrs F.C. Nwankwo, Mall. .A. Mustapha, Mr .B.J. Ekhalia, Mr .S.N. Yisa and other staff of ITE department.

My whole hearted gratitude goes to my parents, Mr G.A Adeeyo and Mrs .B.E. Adeeyo for your regular support financially, spiritually and other meaningful aspect, they have all kept me going .

I am also using this medium to appreciate all my brothers and sisters David, Joseph, Samuel, Deborah and Lydia.

Alot of thanks to MWO A. N. Baisa, WO Asandri and other great Airforce family, uncles and aunties you are the best. It is my prayer that God guide, strengthens and grant us success in life and hereafter.(AMEN)

ABSTRACT

The study investigated the effect of cost and time overrun on building construction projects in Nigeria. The approach used in carry out this research is descriptive survey research design with administration of questionnaire to builders and Engineers of selected construction firm within Minna metropolis. Out of one hundred eighty-seven questionnaire distributed, one hundred twenty three (123) were retrieved, this comprises of thirty (38) engineers and eighty five (85) builders. The findings of the study disclosed status of cost and time overruns in building projects execution in Nigeria, among these are; that cost and time overruns occurs when there is underestimation of actual cost and duration during budgeting/planning, cost escalation due to factors such as inflation, when there is extra cost and time beyond the contractual cost and time agreed during the tender stage and so on. The outcome of the study also disclosed the main causes of cost and time overruns on the building construction projects in Nigeria to be lack of detailed designs at the time of tender, poorly drafted Specifications, unavailability of qualified and skillful, estimators/Quantity Surveyor errors in estimating project cost, and so on. The findings of the study also revealed the effect of cost and time overruns to be that cost and time overruns implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans, cost and time overruns bring about fewer returns on investment, the added costs and time are passed on as higher rental/lease costs or prices, cost and time overruns could tarnish reputations and so on. The findings lastly revealed the factors that can help prevent cost and time overruns in public building construction projects in Nigeria. Among these are top management support, taking time to do proper and effective estimations, peer review of designs and tender documents prior to advertising for bids, cutting bureaucracy (simplifying procurement procedures), obtaining sufficient information about projects among others. The researcher thereby recommended that; the use of risk assessment and cost control when estimating construction projects, which will help decision makers to define unforeseen situations more reliably ahead of time, so that corrective measures can be better taken into account in project design and estimations, prioritizing of cost and time overrun factors in projects leads to better risk contingency weightings in budget estimates.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

In today's construction industry, time and cost overrun is a very common phenomenon worldwide. Time overrun is said to be situations where projects goes beyond agreed dates and this situation is typically caused by contractors. A cost overrun, also known as a cost increase or budget overrun, involves unforeseen costs incurred in excess of estimated amount due to an underestimation of the actual cost during budgeting. According to a very comprehensive research done by **Memon** (2014) in global construction, it was found that 9 out of 10 projects had cost overrun. A cost overrun is a major problem in both developed and developing countries (Angelo and Reina 2002). Hence, problem of cost overruns is a critical factor to be studied to alleviate the issue in the future. Time overrun has also been described by Elinwa and Joshua (2011) as the period that goes by between the agreed due date and actual completion date. On the other hand, Bramble and Callahan cited in Santosh (2016) defined time overrun as the period during which a certain aspect of a project is completed clear of the agreed date of completing the project.

In a study conducted by Omoregie and Radford (2006), it was reported that a minimum average of cost escalation in construction projects in Nigeria is 14% every year.

Cost and time overruns in building construction projects can occur due to various causes, and a number of researchers have investigated the various causes of cost overruns. For instance, Ameh *et al.* (2010) in their study investigating 42 cost overrun cases, found that lack of experience of contractors, cost of material, fluctuation in the prices of material, frequent design changes, economic stability, high interest rates charged by banks on loans and mode of financing, bonds and payments as well as

fraudulent practices and kickbacks were dominant factors causing cost overruns in Nigeria. Doloji (2011) found out in his work that factors causing cost overruns in construction projects in Nigeria were increment of materials prices, delay in supply of raw materials and equipment by contractors, fluctuations in the cost of building materials, unsettlement of the local currency in relation to dollar value, project materials monopoly by some suppliers, resources constraint of funds and associated auxiliaries, not being ready, lack of cost planning/monitoring during pre-and post-contract stages, improvements to standard drawings during construction stage, design changes and inaccurate quantity take-off.

The problem of cost overruns is not only a Nigerian thing. It is a problem worldwide for example, Le-Hoai *et al.* (2008) found out that poor site management and supervision, poor project management assistance, financial difficulties of owner, financial difficulties of contractor, design changes were most severe and common causes of cost overrun in Vietnamese construction industry.

Cost and time are the primary measures of a project's success. This is true, especially for public projects in developing countries like Nigeria, because public construction projects in these countries are executed with scarce financial resources. Most literature review on construction projects suggested that the common criteria for project success are generally considered to be cost, time and quality (Frimpong *et al.*, 2003). A project is deemed successful if it was completed on budget, on schedule, conformed to user expectations, met specifications, attained quality of workmanship and minimized construction aggravation (Olawale and Sun, 2010).

Generally, a project is considered successful in Nigeria if the project is completed within a stated cost or budget, getting the project into use by a target date, meets the technical specification, and if there is a high level of satisfaction concerning the project

outcome among the project participants. In Nigeria, the present state of the construction industry falls short of meeting domestic and international quality standards and the performance demand expected from the sector. Construction projects especially building projects have problems with construction techniques and management as well as limitations of funds and time. The critical problems are inability to complete the projects on schedule, low quality work and cost overruns.. In general, most (if not all), construction projects experience time overrun and cost overruns during their execution phase. An examination of the records of more than four thousand construction projects by Morris (1990) cited in Anyanwu (2017), showed that projects were rarely finished on time or within their allocated budgets in Nigeria, issues related to this has serve as major drive for the present study.

1.2 Statement of the Problem

Nigeria's construction sector is fraught with several challenges such as undue delays, going above budget sometimes and total abandonment if projects are mere costly than agreed budget in certain instances. These delays are attributable to causes such as delays in the preparation of technical designs and a rather unbelievably long and winding system of control, long approval procedures and disputes over land ownership. Pre-tendering activities are regarded as highly critical to the success of construction projects. According to Anyanwu *et al.* (2017),

The challenge of inaccurate cost estimate is reflected by rising large numbers of project time and costs overruns. This means that by determining the causes for the inaccuracies in a pre-tender cost and time estimate would lead to the completion of projects on time, within budgets and to specification. This again means that improving upon-pre-tendering cost and time estimate would lead to project success. However, there is a paucity of empirical research on the subject matter from a Nigeria perspective even

though researchers such as Ameh *et al.* (2010) have done some work in the area of study and found that out of the 47 public sector projects surveyed, as many as 33 representing 70% encountered delays and costs overruns.

There is still a dearth of empirical studies from the perspective of Nigeria public sector organizations which is always executing one project after another. The issues are: what are the causes of time and cost overruns? Are they well equipped to overcome these challenges? What can be done to ensure building construction projects in the country? Does the procurement law hinder effective pre-tender stage activities? It was against the foregoing that this study sought to look into the effect of cost and time overrun in building construction in Nigeria.

1.3 Significance of the Study

This research will be of great importance to the following stakeholders; constructors project sponsors, project owners, government, researcher and general public.

The study would bring to the fore insights into the importance of procurement and project management as well as issues associated with the execution of successful projects in the construction sector in the country. It would also create awareness of the need to critically take the unique role of the procurement function seriously.

To the management of the various construction firms in the country, especially those involved in bidding and tendering for government contracts, this study through the findings and the recommendations thereof would put them in a better position to manage effectively their strategies and tactics in such a way as to ensure better implementation of the procurement function and therefore leading to the curtailment of time and costs overruns. As pointed out by AbdMajid and McCaffer (2008), costs and time overruns has negative and undesirable consequences of key project stakeholders such as constructors project sponsors, project owners and other project participants.

The findings of the study is also expected to be of immense benefit to the government as issue regarding the successful complete of the project, proper measure will be suggested which will trigger the success rating of the government on infrastructural the development.

Upon the success of this project the general public will be of great benefit if the proper measure emante form this study are proper taken into consideration by affect stakeholders, since the infrastructural development of the community will directly have impact in their standard of living

As much as possible time and cost overruns should be avoided by project organizations and in fact all stakeholders must guard against them since failure to do so may lead to losses for all parties involved. This study can additionally serve as a source of reference for future academic studies.

1.4 Purpose of the Study

The aim of the study is to assess the effect of cost and time overrun in building construction project in Nigeria.

The objectives of the study are to:-

1. examine the nature of cost and time overruns in building projects execution in Nigeria.
2. identify the main causes of cost and time overruns on the building construction projects in Nigeria.
3. ascertain the effects of cost and time overruns on the building construction industry and on the economy of Nigeria.
4. determine the factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

1.5 Scope of the Study

The study is delimited to assessing the effect of cost and time overrun in building construction in Nigeria. The study is further limited to considering building construction project activities in Minna metropolis Niger State Nigeria. Other areas such as location used of the building will not be studied since they don't have direct influence of cost and time overrun.

1.6 Research Questions

The following are the research question set to achieve the aforementioned objectives:-

1. What are the nature of cost and time overruns in building projects execution in Nigeria?
2. What are the main causes of cost and time overruns on the building construction projects in Nigeria?
3. What are the effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general?
4. What are the factors that can help prevent cost and time overruns in public building construction projects in Nigeria?

1.7 Research Hypothesis

The following hypothesis is to guide the study

1. H₀₁: There is no significant difference in mean response of Engineer and Builder on the nature of cost and time overruns in building projects execution in Nigeria
2. H₀₂: There is no significant difference in mean response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria.
3. H₀₃: There is no significant difference in mean response of Engineer and Builder on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general.
4. H₀₄: There is no significant difference in mean response of Engineer and Builder on factors that can help prevent cost and time overruns in public building construction projects in Nigeria

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Theoretical Background of Cost Overrun

Cost is one of the main considerations throughout a project's lifecycle and can be regarded as a significant parameter of a project and the driving force of project achievement. Despite its proven significance, it is not rare to observe a construction project failing to achieve its objectives within the specified, or even the approximate, estimated cost. Cost overruns vary significantly in scale from project to project. Yet, cost overrun is common to infrastructure projects (Azhar *et al.*, 2010). Understanding the causes of cost overruns is critical to the success of infrastructure projects. Past studies have found significant, yet common cost overrun of infrastructure projects.

Pickrell (1990) carried out a study for the US Department of Transportation covering US rail transit projects with a total value of US\$24.5 billion. The total capital cost overrun for eight of the projects was calculated to be 61% ranging from -10 to +106%. Another study by the Auditor General of Sweden (1994), covering 15 road and rail projects, revealed that the average cost overrun of eight road projects was 86%. The range for road projects was from - 2 to +182%, while the average cost overrun for the seven rail projects was 17%, ranging from -14 to +74%. Another study by Fouracre *et al.* (1990), carried out for the UK Transport and Road Research Laboratory (TRRL), covered 21 metro systems in developing countries.

The outcomes of the study showed that six metro projects had cost overruns above 50%. Two of these projects range up to 500%. Three had cost overruns in the range of up to 100%, and the remaining four ranged up to 50%. Skamris and Flyvbjerg (1996, 1997) conducted a study in Denmark, in which they compared the accuracy of cost estimates

on large-scale infrastructure projects. The study considered cost estimates of seven tunnels and bridges before the decision was made to build. The major conclusion from this study is that cost overrun of 50–100% is common for larger transportation infrastructures, and that overruns above 100% are not unusual. Studies on causes of overrun have identified a wide spectrum of causes.

Frimpong *et al.* (2003) identified 26 factors that cause cost overruns in the construction of ground water projects. They found that, according to the contractors and consultants, monthly payment difficulties were the most important cost-overrun factor. Owners, however, ranked poor contractor-management as the most important factor. Although there were some differences in viewpoints among the three groups surveyed, there was a high degree of agreement among them with respect to their ranking of the factors. The overall ranking results indicated that the three groups felt the major issues which can cause extreme groundwater project cost overruns in developing countries are: monthly payment difficulties; poor contractor management; poor technical performances; material procurement; and escalation of material prices.

In Kuwait, a study was done by Kouski *et al.* (2005) in which cost increases in the construction project was examined. The study found the three most important causes of cost overruns are contractor elide, material related problems and owners' financial constraints. Other studies have identified four of the most important factors that cause cost overruns as: design changes; inadequate planning; unpredictable weather conditions; and fluctuations in the cost of building materials (Kaming *et al.*, 1997; Chimwaso, 2000).

Flyvbjerg *et al.* (2002) carried out a study on the cost overrun of road projects. Based on a sample of 258 infrastructure transportation projects valued at US\$90 billion, they found that cost estimates used to justify the go-ahead of these projects are

systematically misleading. They concluded that the underestimations observed cannot be explained by error, but are best explained by strategic interpretation - which is tantamount to deceitfulness (Flyvbjerg *et al.*, 2002). They thus warn legislators, administrators and those who value honest numbers not to trust cost estimates and benefit-cost analysis produced by project promoters (Flyvbjerg *et al.*, 2002).

Around the globe, many other researchers have been attracted to cost overrun. Asian and African countries have attracted particular attention. In Southeast Asia these researchers are: Kaming *et al.* (1997) in Indonesia; Ogunlana *et al.* (1996) in Thailand, Sambasivan; and in Malaysia, Soon (2007). Chan and Kumaraswamy (1995), Chan and Kumaraswamy (1997) and Lo *et al.* (2006) studied cost overrun in Hong Kong, and Acharya *et al.* (2006) studied it from a Korean perspective. Chang (2002) conducted surveys in the US. In Middle Eastern countries where petroleum and natural gas exports have played an important role in the economy, researchers are: Faridi and El- Sayegh (2006) in UAE, Koushki *et al.* (2005) in Kuwait.

In Africa, Frimpong *et al.* (2003) conducted studies in Ghana, as did Mansfield *et al.* (1994), and Aibinu and Odeyinka (2006) in Nigeria. In Vietnam, large-scale projects were studied by Long *et al.* (2004a) to identify project success factors, and by Long *et al.* (2004b) to identify ordinary and general issues. Regarding these issues, the Vietnamese government declared the infrastructure project cost-overrun issues as the biggest “headache” (Le-Hoai *et al.*, 2008) in recent times, especially with government-related funded-projects (Ministry of Planning and Investment in Vietnam, 2003, as cited in Le-Hoai *et al.*, 2008).

Skamris *et al.* (1996) concluded that in most previous studies, technical factors such as changes in design and technological innovation can be explained as causes of cost overruns. However, there remains a considerable portion of divergence that cannot be

clarified by technological causes alone (Odeck, 2004). In fact, Wachs (1990) pointed out that the probable cause of cost overruns in infrastructure projects is due to the inaccuracy of cost forecasts. On the other hand, Flyvbjerg *et al.* (2004) argues about the main causes of the cost overruns. They postulate that these causes affect projects throughout their life cycle, and are due to misinformation in policy and the management of the project. Why projects experience cost overruns is firstly due to optimism bias that encapsulates the systematic propensity of decision makers to be overoptimistic about outcomes of planned action. Secondly, they relate to the strategic misrepresentation (deceitfulness) that misleads actions used in politicisations and economics, and by planners to ensure the projects proceed (Flyvbjerg, 2006).

Doty and Glick (1994) typologies could constitute theory. Shenhar and Davir (1996) claimed that typologies are complex theories that can be subjected to rigorous empirical testing if typologies are properly developed and fully specified. According to Doty and Glick, “typologies do not provide decision rules for classifying organisations. Instead, typologies identify multiple ideal types, each of which represents a unique combination of the organizational attributes that are believed to determine the relevant outcome(s)”. Construction of a conceptual framework through a typology approach, as outlined by Doty and Glick, are required to meet the following criteria: “(a) constructs must be identified, (b) relationships among these constructs must be specified, and (c) these relationships must be testable”. The theoretical frame of the causes of construction cost overrun is developing from six scholar review (Azhar *et al.*, 2010; Frimpong *et al.*, 2003; Kouski *et al.*, 2005; Flyvbjerg *et al.*, 2002) as presented in the Figure 2.2.

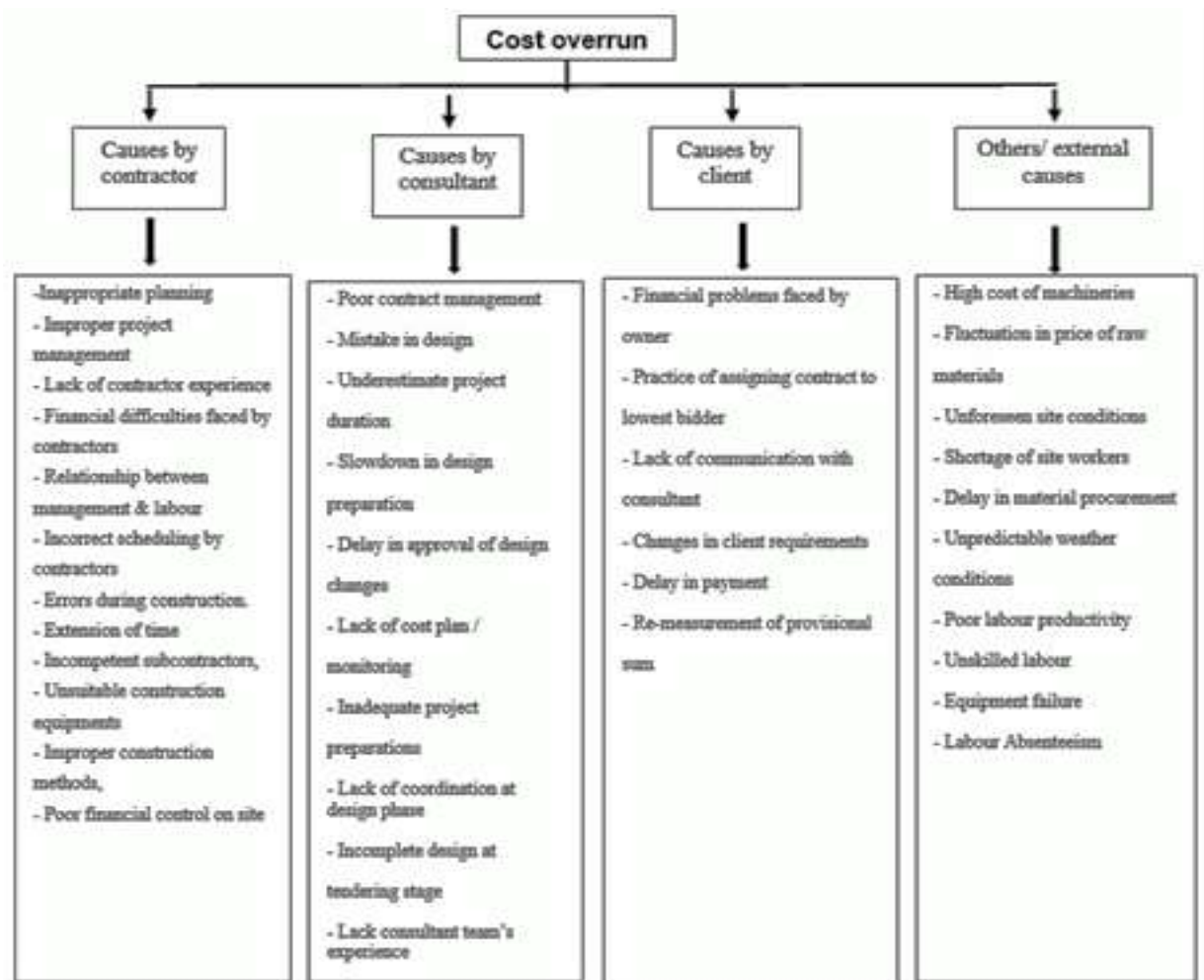


Figure 2.2: Theoretical Framework of Cost Overrun

2.1.2 Theoretical Background of Time Overrun

Mydin *et al.* (2014) 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.* (2014) among construction practitioners to determine main factors contributing to time overrun construction

projects in state of Kedah, Ghana. 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 labours, 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.* (2014) 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.* (2012) examined the factors that cause 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.

Rahman *et al.* (2011) investigated the causative factors of time overrun or schedule overrun in MARA construction projects from perspective of "project management consultant" and found that dominate factors were poor site management by contractor, lack of contractor experience, lack of site labors, escalation of material prices, practice of awarding contract to lowest bidder, problems with subcontractors, lack of communication among parties, and change management. To identify the factors that

affects timely completion of building construction projects, a questionnaire survey was conducted by Alaghbari *et al.* (2010) in Klang Valley, Malaysia. The study found that financial problems and lack of coordination among construction parties are main factors initiating time overrun in construction projects. The theoretical framework of the causes of construction time overrun is developed from seven scholars' research papers (Mydin *et al.*, 2014; Azlan *et al.*, 2014; Shehu *et al.*, 2014; Ramanathan *et al.*, 2012; Rahman *et al.*, 2011; Alaghbari *et al.*, 2010) as shown in Figure 2.3.

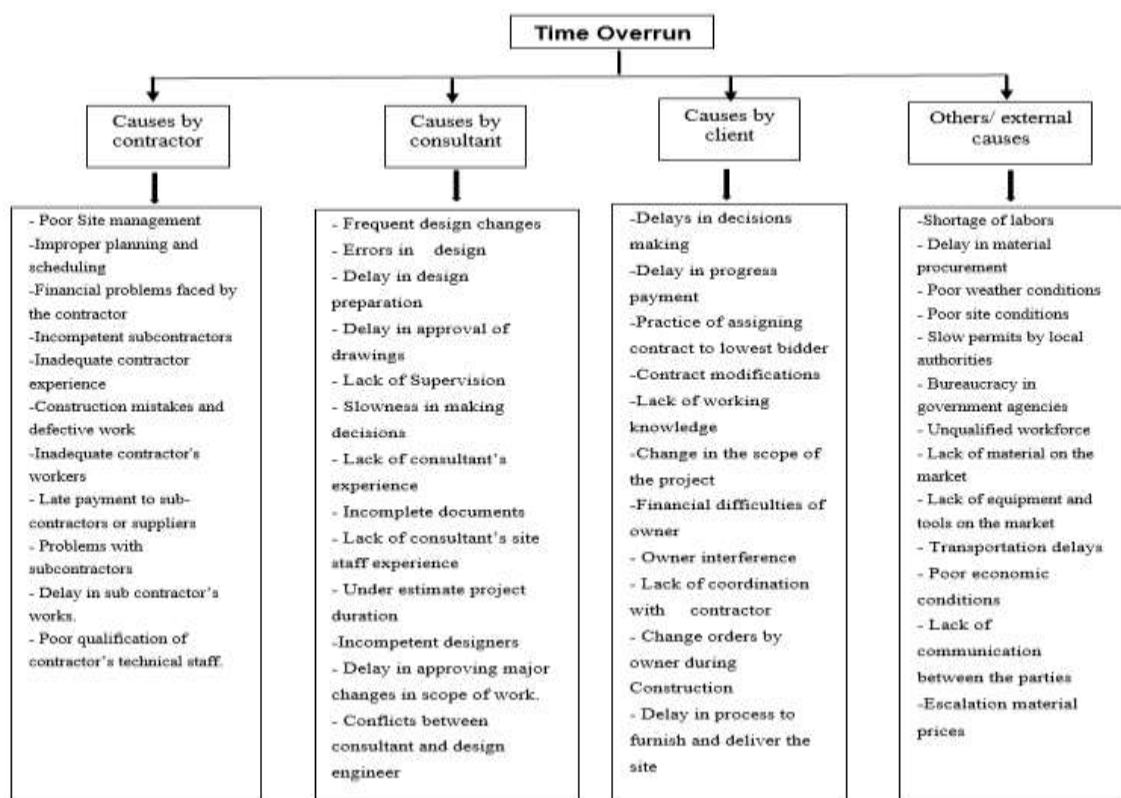


Figure 2.3: Theoretical framework for construction time overrun.

2.2 Conceptual Framework

2.2.1 The Nigerian Building Construction Industry

The building construction industry is an important industry that plays a vital role in the socio-economic growth of Nigeria. Economically, it contributes in significant improvement in the overall GDP of the country. It also improves the quality of life by providing the necessary infrastructure such as roads, hospitals, schools and other basic

and enhanced facilities. Hence, it is fundamentally crucial to get construction projects completed successfully within time, budget and expected quality. However, being a complex, fragmented and schedule driven industry it always faces chronic problems such as low quality of productivity, cost overruns, time overruns, construction waste management and others. Of these, cost overruns is a severe problem (Olawale and Sun, 2010) because it affects the overall development of the country.

Cost and time overruns is a global phenomenon in the construction industry whereby, very rarely, projects are finished within the budgeted cost. In a global study (Flyvbjerg *et al.*, 2003) on construction project performance, cost overrun was identified as the major problem where 9 out of 10 projects faced the overrun in the range of 50 to 100% and these overruns produce immediate effects on construction stakeholders and on the country's economy (Azhar *et al.*, 2010). This is because the construction industry plays a vital role in economic and social growth of any country. To prevent poor cost performance, it is often required to evaluate a project's vulnerability of cost overruns before it is too late (Cha and Shin, 2011). According to Ibrahim *et al.* (2010), in Nigeria very little research has been carried out by academic and practitioners on problems faced by the construction industry; more specifically there is lack of investigation on construction cost factors.

2.2.2 Cost Overruns

The sad truth about construction cost overrun is that it has been a fact of life since Biblical times "For which of you, intending to build a tower, sitteth not down first, and counteth the cost, whether he have sufficient to finish it?" Luke, 14:28; quoted by Arditi *et al.*, (2011). The problem of cost overrun, especially in the construction industry is a worldwide phenomenon and its ripples are normally a source of friction among clients, consultants and contractors on the issue of project cost variation. Project cost overruns

create a significant financial risk to clients. However, in spite of the risks involved, the history of the construction industry is full of projects that were completed with significant cost overruns (Greedy, 2005). Cost overruns have been defined differently by different authors. Some of these include:

- a) Costs overrun is an instance in which the provision of contracted goods or services are claimed to require more financial resources than was originally agreed between a project sponsor and a contractor (Ahuja *et al.*, 2009).
- b) Cost overrun is the amount by which actual costs exceed the baseline or approved costs (Wideman, 2006).
- c) Cost overrun is the difference between the original cost and the actual cost when the project is completed (Avots, 1983). alternatively, Avots, (1983) used the word cost growth instead of cost overrun.

For the purpose of this research cost overrun is defined as the difference between the final actual cost of a construction project at completion and the contract amount, agreed by and between the client (the project owner) and the contractor during signing of the contract.

The authors further describe cost overrun as the change in contract amount divided by the original contract award amount.

$$\text{Cost overrun} = \text{Final Contract Amount} - \text{Original Contract Amount}$$

2.2.2.1 Factors that Causes Cost Overruns

Several researchers such as Morris (1990); Kaming *et al.* (1997) and Chimwaso (2001) have all attempted to identify the factors that influence projects to go way beyond what they were budgeted for. These authors identified several key factors that potentially lead to cost overruns. Some of these factors are:

1. Changes in designs and drawings.

2. Poor planning.
3. unpredictable changes in the prices of building materials.

Kaming *et al.* (1997) concluded in their study that the major factors that cause cost overruns are

1. Design not finished during tendering period.
2. Supplementary additions requested by the owner.
3. Promoter making changes.
4. Poor planning of cost estimates.
5. Unfavourable conditions at the project site.
6. Re-measuring of temporary tasks.
7. Challenges of getting materials to site due to unfavourable location of the site.
8. Unavailability of information on cost during project execution.

Again, Morris (1990) and Chimwaso (2001) concluded that other equally important determinants of costs overruns are:

1. Not providing information on time to contractor.
2. Serious oversights during the drawing phase.
3. Challenges within the project contract itself.
4. Additions and subtractions to designs.
5. Hesitation in addressing concerns of contractors.
6. Taking too much time putting value on changes to drawings.
7. Oversights and mistakes in the bill of quantities.
8. Not taking into consideration the cost of items with temporary quantities.
9. Overestimation by contractors

Cong *et al.* (2014) summarizes the entire construction cost/tender price influencing factors under six broad categories (Figure 2.1) – project characteristics, client

characteristics, contractors' characteristics, tendering situation, consultant and design, external factors and market conditions, and inaccuracy of cost estimating.

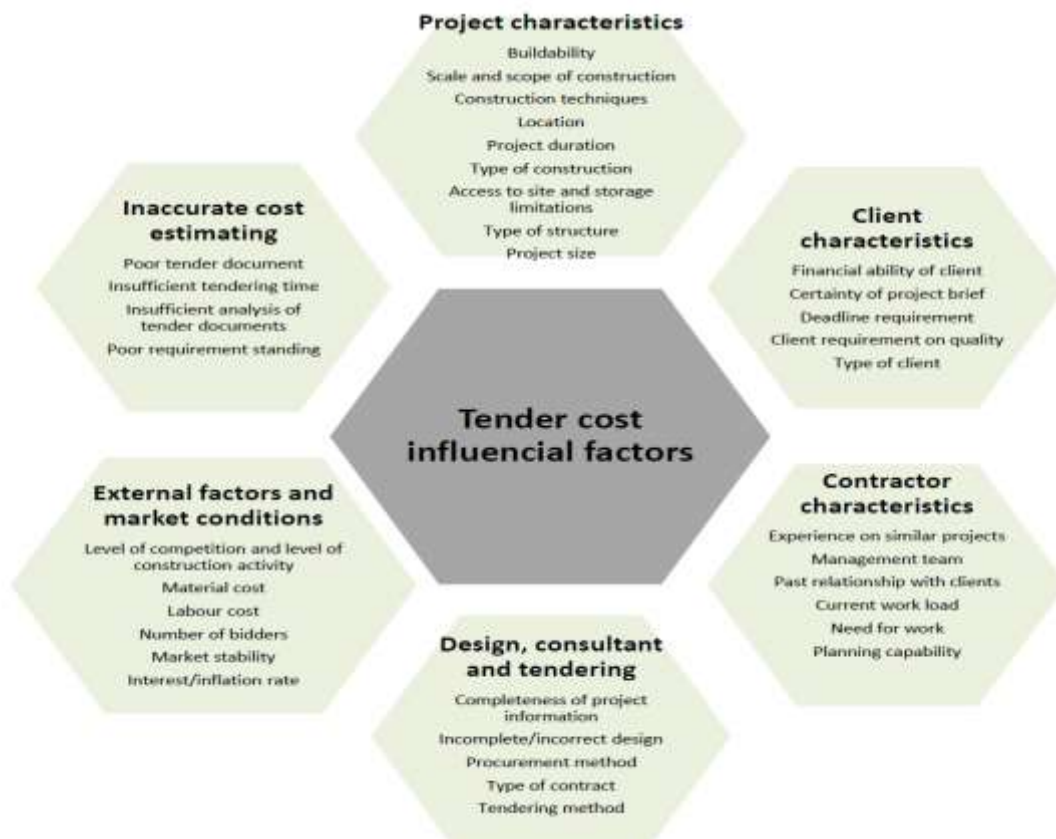


Figure 2.1 A summary of all the construction cost/tender price influencing factors under six broad categories. Source: Cong *et al.* (2014).

2.2.2.2 The impact or Effects of Cost overruns

The effects of cost overruns are the consequences that results from delaying construction projects. Some of the main consequences of cost overruns from the perspective of the client or project owner are the added cost beyond the contract sum and therefore leading to loss of expected revenue or desired benefit. From the view of the final user, cost overrun engenders higher cost such as high rent, higher service, and higher products. The effects of overrun on the project professionals, consultant and experts is the inability to obtain value for money and more importantly, a stain in their reputation and therefore making getting future contracts very difficult.

From the perspective of the project contractor, cost overruns essentially means decreased profits, blacklisting and tarnishment of reputation and eventually, lowering employee morale. Again, the construction industry as a whole is affected negatively since overruns may lead to the abandonment of costly projects, can engender a reduction in construction activities, loss of business, bad reputation and failure to get project finance from financial institutions or where they, do, the risk of abandoning projects midstream may mean higher cost of funds (Nega, 2008).

Additionally, authors such as Nega (2008), Eshofonie (2008) and Baki (1999) have all found out that cost overruns can further lead to undesirable consequences such as delays during projects; additional agreement, additional cost, budget shortfall, acrimonious relationship among parties, loss of reputation to consultants (will be seen as being incompetent) and the industry, higher cost of supervision and contract administration for consultants, payment delays to contractors etc.

Additionally, Eshofonie (2008) in his study identified the following as being the effects of cost overruns:

1. Company liability to insolvency and liability of the contractors to bad debt;
2. Not maximizing the use of labour, plants and equipment;
3. Higher cost of projects due to extension of time and
4. Moreover, delays implies that scarce resources will be have to be assigned to the project and this can lead to higher project cost and even the abandonment of the project.

2.2.3 Time Overrun

Construction projects that are delivered within schedule to the owner is described as projects that have undergone schedule or time overruns. Assaf and Al-Hejji, (2006) have for instance defined time overrun as the time beyond completion date specified in a contract, or beyond the date that the parties to the contract agreed upon for delivery of

a project. To Mohammed *et al.* (2007), time overrun is an act or event that extends the time to complete or perform an act under the contract. According to Kaming *et al.* (1997), time overruns is the extension of time beyond planned completion dates traceable to the contractors. Time overruns as defined by Vidalis and Najafi (2002) are incidents that impact on project's progress and postpone project activities. Again, Chan (2001) has defined time overruns as the difference between the actual completion time and the estimated completion time. It can therefore be surmised that time overruns is characterized as the time extended to finish the project after planned date which is often caused by both internal and external factors (Choudhry and Phatak, 2004).

2.2.3.1 Causes of Time Overruns

There are different types of time and cost overruns. According to Kaming *et al.* (1997) for instance, there are three types of time and cost overruns and these are

1. Time overruns and delays caused by incidents that are uncontrollable.
2. Time overruns and delays caused by incidents that can be controlled by the project owner.
3. Time overruns and delays caused by incidents that can be controlled by the contractor.

Again, Alaghbari *et al.* (2007) in their study identified two main causes of time overruns and which they classified as external and internal. According to the authors, internal factors causing delays originates basically from the owners, designers, contractors and consultants while the external factors causing delays are usually from sources such as government regulations, suppliers of materials or inclement weather conditions. However based on the findings of authors such as Alaghbari *et al.* (2007), the causes of delays can be classified in to the following four categories:

- **Contractors' Obligation**

The main causes of delays basically caused by contractors or for which they have control over are delays in transporting product and materials to project sites; material shortage; errors made at project sites and flawed work; poor worker aptitudes, attitudes and skills, inadequate project hands; money related issues; coordination issues with others; low managerial ability of contractors, poor site management; and equipment and tool shortages on-site (Alaghbari *et al.*, 2007).

- **Consultants' Obligation**

The factors identified with consultants' responsibilities include nonappearance of the staff of consultants; deficiency of experience with respect to the consultant; insufficient experience with respect to employees of consultants (both managerial and supervisory); delayed and poor supervision in decision making; inadequate records; and not quick in providing instructions (Alaghbari *et al.*, 2007).

- **Owner's Obligation**

The factors that relate to owners' responsibilities include inadequate working experience; slow decision making; absence of coordination with builders; contract adjustments (especially additions and change of designs); and money related issues (delayed payments, financial difficulties and economic challenges) (Choudhry, 2004).

- **External Components**

The components that identified with external variables are; unavailability of materials; shortage of equipment, tools and facilities urgently needed for construction projects; poor climate conditions; poor site conditions (area, ground, and so forth.); weak economic conditions (unstable currency, high interest rates); changes in laws and regulations; transportation delays; and external work due to major government services (such as roads, utilities and public services) (Alghbari *et al.*, 2007).

2.2.3.2 The Impact or Effects of Time Overruns

Assaf and Al-Hejji (2006) have also pointed out that from the perspective of the project owner, time overrun implies loss of revenue through lack of production facilities and rent-able space or a dependence on present facilities; while from the view of the contractor, time overrun means higher overhead cost, penalties, loss of favour with clients, higher material costs as a result of inflation and not being able to take on new projects. According to Pourroostam and Ismail (2011), the main effects of time overruns are:

1. Time overrun.
2. Cost overrun.
3. Dispute.
4. Arbitration.
5. Litigation.
6. Client dissatisfaction.
7. Bad reputation
8. Abandonment of construction projects.

2.2.3.3 Factors within Pre-Tender Activities That Causes Time And Cost Overrun During Project Execution

There are numerous factors within the pre-tender activities that cause time and cost overruns and there is the need to take these factors into consideration as early as possible during the estimation stage. According to Elhag *et al.* (2005), taking care of these factors is rather important considering that they can increase costs and the probability of disputes among parties to the contract and also wrongly lead to the Estimator decreasing the cost of an item for successful tendering in a very competitive market. The tendering process is a highly complex one because it usually entails the

assessment of unidentified and undisclosed scenarios, issues bottlenecks and so forth. This therefore requires experienced and knowledgeable personnel to handle this process (Elhag *et al.* 2005).

According to Hendrickson (2000), there are three types of cost estimates and these are – Design estimate; bid estimate and control estimate and all these must be carefully considered before the final bid is made. The initial stages of a project sometimes see Estimators hurrying into making estimations without the advantage of reliable and accurate information about the scope of the project. This means that Estimators at this stage have to bring their experience to bear and also fall on their past experiences, records and other unorthodox means that will enable them obtain sufficient information required to do their estimates.

As pointed out by Hendrickson (2000), the estimates would have been refined and made accurate before the tendering process itself commences. It has been established that the accuracy and precision of estimates have an inverse proportionality to the time between which the estimates are created and the actual event. Moreover, the accuracy of construction cost estimates is highly reliant on the availability of subjective and personal information of Estimators and consultants. This means that the lack of sufficient information during the incipient phase of the project, Estimators/Quantity Surveyors may be forced to make certain assumptions with respect to the specification of the project and this may or may not happen as the design, planning and construction progresses. According to Liu and Zhu (2007), accuracy of estimates is measured by the extent to which the estimated cost compares to the actual total cost.

According to Oberlender and Trost (2011), there four main factors that determine the accuracy of early estimates and these are:

1. The person preparing the estimate (Estimator/Quantity Surveyor).

2. The manner in which the estimate was prepared.
3. The information about the project available.
4. Other factors that were considered while preparing the estimate.

According to Dysert (2006), the factors affecting pre-tender estimate accuracy are:

1. The scope and definition of the project.
2. The availability and quality of historical data on cost estimates.
3. The reliability and accuracy of postulations which forms the basis of the estimates;
4. The innovativeness of processes and the how technologically advanced equipment available are;
5. The level of expertise of the Estimator.
6. The kind of estimating method used.
7. The usefulness and how effective the estimates are used.
8. The time, energy and resources channeled into the estimation process.
9. The seriousness of the external factors that impact on the project

Odusami and Onukwube (2008) found the following factors as having strong impact on –pre-tender cost estimate:

1. The knowledge, skills and experiences of consultants and estimators.
2. The availability of sufficient information and the ability to disseminate this information to all stakeholders in a timely fashion.
3. The familiarity of the project members with the type of construction in question;
4. The duration for the tender as well as prevailing market conditions;
5. How far advanced the completion of the drawing is;
6. The level of sophistication of project drawings.
7. How readily available project materials are.

2.3 Related Empirical Studies

Anyanwu *et al.* (2017) examined the causes and effects of cost overruns in public building construction project delivery in Imo State, Nigeria. Specifically, the study examined the profile characteristics of the building construction project workers, examined also the nature of cost overruns in building projects execution in Nigeria, identified the main causes of cost overruns on building construction projects in Nigeria, ascertained the effects of cost overruns on building construction industry and on the economy of Nigeria, in general and determined the factors that can prevent cost overruns in public building construction projects in Nigeria. Multistage sampling technique was used to select a sample of 100 building construction project workers. Data were collected using structured questionnaire and were analysed using mean, frequency counts and percentages. Results showed that 80% of the workers were males, 54% were between the ages of 26 – 35, and 80% were married, 85% had secondary and tertiary education. The result also showed that cost overruns occur when there is an underestimation of actual cost during the budgeting of the building construction project ($\bar{X}= 2.19$), when cost escalation occurs due to factors such as inflation ($\bar{X} = 2.28$), when construction projects are not completed on time, within budget and with the appropriate technical or quality performance ($\bar{X} = 2.46$), and when there is an extra cost incurred beyond the contractual cost agreed during the tender stage of the project ($\bar{X} = 2.23$). Further, the results showed that the main causes of cost overruns in building construction projects in Nigeria include difficulty in obtaining construction materials ($\bar{X} = 2.19$), deficiencies in prepared cost estimates ($\bar{X} = 2.11$), unexpected subsoil conditions ($\bar{X}= 2.08$), problems in finance and payment arrangements ($\bar{X} = 2.09$), design changes ($\bar{X} = 2.72$) and availability of skilled labour ($\bar{X} = 2.24$). The results also showed that the effects of cost overruns on the building construction and on the Nigerian

economy in general include added cost over and above those initially agreed upon by the client ($\bar{X} = 2.40$), less returns on investment on the part of the contractor ($\bar{X} = 2.39$), higher prices to the end user ($\bar{X} = 2.38$), tarnishing of the reputations of the professionals ($\bar{X} = 2.15$), and loss of profits for the contractor ($\bar{X} = 2.40$).

The effects on the construction industry is project abandonment and drop in building activities ($\bar{X} = 2.48$), and also decrease in property and service production for the nation ($\bar{X} = 2.45$); also decrease in the rate of national growth ($\bar{X} = 2.10$). The results also showed that the factors that can help reduced or prevent cost overruns in public building construction projects in Nigeria include the application of project management scheduling tools ($\bar{X} = 2.68$), working strictly within the scope originally planned for a project ($\bar{X} = 2.60$), planning projects properly before the commencement of project execution ($\bar{X} = 2.58$), selection of contractors with adequate experience/ the financial ability to handle building construction projects contract ($\bar{X} = 2.33$) and ensuring that communication gaps do not exist between the stakeholders of the building construction projects ($\bar{X} = 2.35$).

The study therefore, recommends that building construction projects delivery decision makers should endeavour to implement the findings of research in order to encourage project execution success. The study is similar, to the present study with it's the purpose of examining the cost overrun of construction project, research design adopted (survey) and it is conducted in Nigeria. However, the study those not examine the time overrun which the present study does and the research is conducted in different State.

Paul and Oluseye (2017), Conduct a researcher on Effects of Project Cost Overruns and Schedule Delays in Sub-Saharan Africa. This study provides conceptual insights on the economic impact of project cost overrun and schedule delays on infrastructure procurement in developing countries with huge infrastructure deficit in Sub-Saharan

Africa. Projects cost overruns and schedule delay are a major and widespread problem in infrastructure procurement the world over. It has received a lot of attention in the recent past. However, the literature reveals that extant studies on project overruns are heavily skewed towards causative factors, with little or no attention to the effects it has on the economy as a whole. The paucity of studies on the effects of project cost overrun and schedule delay will further reinforce the imperative to reacquaint policymakers and infrastructure developers, as well as project financiers with the gravity and import of the problem for infrastructural development in particular and the wider economy in general. The study undertakes an exploratory approach drawing from a wide range of secondary information and materials obtained from policy documents, study reports and peer-reviewed articles. The findings show that cost overrun and schedule delay in infrastructure procurement can have a damaging economic effect ranging from allocative inefficiency of scarce resources, further delays, contractual disputes, claims and litigation to project failure and total abandonment. The study recommends project management capacity-building for infrastructure developers, project managers as well as a number of innovative control mechanisms such as reference class forecasting, public-private partnership and computer-aided cost estimating tools including artificial neural networks, data mining, building information modelling as well as fuzzy neural inference model, genetic algorithms, and stochastic simulation to curb the menace of the problem. The study is also similar to the present study in terms of its purpose of study. The study differ from the present study, in terms of location where the research is being conducted, research design adopted (explanatory approach while the present adopted survey design).

Hedaya and Saad (2017) investigate Causes and Effects of Cost Overrun on Construction Project in Bahrain: Part I (Ranking of Cost Overrun Factors and Risk

Mapping). The Cost performance is one of the basic criteria for measuring construction project success. Despite its proven importance it is not uncommon to see a construction project failing to achieve its objectives within the specified cost. The study attempts to identify the major causes of cost overrun in Bahrain construction sector, and to assess the effect of these causes on cost overrun. A list of these causes was collected through an extensive literature review, historical construction projects records and expert opinions. In total 45 factors were short-listed to be made part of questionnaire used in a survey conducted with representatives from local contracting, consulting, and client firms. Findings are presented in form of tables that classify cost overrun factors, and their ranking. The overall results showed that frequent design changes, mistakes during construction, and schedule delay were considered as the most important factors of cost overrun causes in Bahrain construction industry. The study is found to be very similar to be present study in its purpose as well as the adoption of survey design approach, however the study differ to the present by not considering time overrun in its purpose, also the location as well target population.

Santosh *et al.* (2016), also carried out a research on Impact of Cost and Time Overrun on Building Construction Projects. The study made emphasis on causes, effects and controls of change orders in large building construction in Morena city. To achieve the study objective, the researcher carried a literature review of the subject covering periodicals, dissertations, previous research studies and books written on the subject of change orders. In light of the literature study the researcher developed a survey questionnaire. Response from 50 consultants and contractors working in the field of large building construction were analyzed. Time and Cost overrun was reported of the original contract duration. The study also concluded that the owner is the major source of changes and that most changes are architectural. Change of plans and material

substitution are first causes of change in large buildings. The study also concluded that responses from contractors and consultants agree about the causes, effects and controls of change orders and recommended to include the owner in future studies to verify the reasons behind changes made by the owners. The study is found to be very similar to be present study in its purpose as well as the adoption of survey design approach, however the study differ to the present by not considering time overrun in its purpose, also the location as well target population.

2.5 Summary of Literature Review

The various concept regarding the cost and time overrun were reviewed. The cause and effect of cost and time overrun were also checkmated. Numerous researches conducted by different authors (Paul and Oluseye 2017; Hedaya *et al.*, 2017; Santosh *et al.*, 2016 and so on) alongside their findings gives a direct and focus need for this study to investigate into the effect of cost and time overrun in building construction project in Nigeria.

Also, the review empirical study as shown that few research has been conducted on causes and effect of cost and time overrun in building construction in Nigeria, particularly in Niger State. The present study wanted to fill the gap by investigating into the effect of cost and time overrun in building construction project in Niger State, Nigeria.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter describes Research Design, Area of the Study, population of the Study, Sample and Sampling Technique, Research Instrument, Validity of the Instrument, Reliability of the Instrument, Method of Data Collection, and Method of Data Analysis. Out of one hundred and eighty-five (185) administered to building professionals in Minna, one hundred and twenty-three (123) were returned which comprises of eighty-five (85) questionnaires builders and thirty-eight (38) Engineers/contractor in construction industries in Minna Niger State.

3.1 Research Design

The research design that will be adopted for the study is descriptive survey. This design is considered apt because it enables the researcher to generate data through the standardized collection procedures based on highly structured research instrument(s) and well defined study concepts and related variables.

3.2 Area of the Study

This study will be carried out in Minna, Niger State. Minna has a population of 291,905 as at 2006 population census count making it the biggest city in Niger State. Minna is about 135km away from the Federal Capital Territory and 300km away from Kaduna city.

3.3 Population of the Study

The population of the study consist of one hundred and eighty-five (185) building professionals in Minna, which comprises of one hundred and eight (108) builders and seventy (77) Engineers/contractor in construction industries in Minna Niger State.

3.4 Sample and Sampling Technique

Since the population is of considerable size the entire population will be used for the study. A simple random sampling techniques will be used to sampled out the targeted respondent.

3.5 Instrument of Data Collection

A constructed four – point questionnaire titled “Effect of Cost and Time Overrun in Building Construction Project in Nigeria Questionnaire (ECTOBCPNQ)” was used to elicit the desired data from the builder/contractors. The questionnaire was divided into two parts (A and B). Part A will be for collection of information on personal data of respondents while Part B which consist of the sections (A - C), Section A will address research question one, Section B will address research question two, Section C will address research question three and finally Section D will address research question four.

The questionnaire was structured in form of four–point scale coded as follows:

Strongly agree (SA)--- 4

Agree (A)----3

Disagree (D)---2

Strongly disagree (SD)----1

The benchmark for decision making is calculated as follows:

$$\frac{\sum x_i}{n} = \frac{4+3+2+1}{4}$$
$$= 10/4 = 2.5$$

3.6 Validation of the Instrument

The designed questionnaire will be validated by three (3) experts from the Department of Industrial and Technology Education (ITE), Federal University of Technology Minna

Niger State. Their inputs will be used to improve the instrument before serving it to the respondents.

3.7 Reliability of the Instrument

The reliability of the research instrument will be determine by administering Thirty two (32) questionnaires which is 20 percent sampled population to (builders and engineer) which are not part of the earlier sampled population to serve as pilot testing. The Conbach alpha test will used to determine the reliability index of the instrument.

3.8 Method of Data Collection

The researcher will collect the needed data through the use of questionnaire and its administration to building professionals in selected construction firm in Minna Niger State. The administration of the questionnaire will be carried out by the researcher and two other research assistant. A total of one hundred and eighty-five (185) copies of the questionnaire will be distributed to obtain responses from the builders and engineers and retrieved on the spot by the researcher and research assistant.

3.9 Method of Data Analysis

Responses from the respondent will be analyzed using the descriptive statistics of frequency counts, percentage, mean and standard deviation. Descriptive statistics of frequency counts and percentages will be used in analyzing demographic variables and mean and standard deviation will be used for the research questions. The Statistical Package for Social Sciences (SPSS 25) will be used to process the data. 2.50 cut-off point will be calculated and used as the criteria for decision making on the responses of each questionnaire items. While t-test will be used to test the hypothesis at 0.05 level of significance.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the analysis of results for data collected from the responses of respondent on the administered questionnaire. The bio-data of the respondent were analyzed using frequency and percentage, and research question using mean and standard deviation while the hypotheses are analyzed t- test.

Table 4.1: Cadre Distribution of Respondents

Sex	Frequency	Percentage (%)
Engineers	38	30.9
Builders	85	69.1
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.1 shows that 38 (30.9%) of the respondents were Engineer while 85(69.1%) were builder. This implies there are more responses were gathered from the builder.

4.2 Analysis of Demographic Information of Respondents

Table 4.1: Sex distribution of Respondents

Sex	Frequency	Percentage (%)
Male	92	74.8
Female	31	25.2
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.1 shows that 92 (74.8%) of the respondents were male while their female counterparts were 31 (25.2%). This implies there are more male respondent than their female counterparts in the construction industry.

Table 4.2: Age distribution of Respondents

Age	Frequency	Percentage (%)
23 – 32	19	15.4
33 - 42	66	53.7
43 and above	38	30.9
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.2 shows that 19 (15.4%) of the respondents are within the age range of 23 -34, 66(53.7%) were within age range of 33 – 42 and finally38(30.9%) are within the age range of 43 and above. Hence most of the respondent are within the age range of 33 – 42.

Table 4.3: Education Qualification

Education Qualification	Frequency	Percentage (%)
OND	12	9.8
HND/Bsc.	73	59.3
MSc/M.Tech	34	27.6
PhD	4	3.3
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.3 shows that 12(9.8%) had OND, 73(59.3%) had HND/Bsc, also 34(27.6%) had MSc/M.Tech and finally 4(3.3%) had PhD.

Table 4.5: Job tenure of the respondent

Job tenure	Frequency	Percentage (%)
Permanent	79	64.2
Contract	30	24.4
Casual workers	14	11.4
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.5 shows that 79(64.2%) are permanent workers while 30(24.4%) are on contract basis and finally 14(11.43%) are casual workers. This implies that most responses are gotten from permanent professional of the construct industry.

MSc/M.Tech and finally 4(3.3%) had PhD.

Table 4.6: Experience of the respondent

Experience	Frequency	Percentage (%)
1 – 23 month	29	23.6
2-5 years	50	40.7
6-10 years	43	35.0
11- 15 years	1	0.8
.> 15 years	0	0.0
Total	123	100.0

(Source: Author, Field survey, 2020)

Table 4.6 reveals that 29(23.6%) had 1 – 23month experience, 50(40.7%) had 2-5 years of experience, 43(35.0%) had 6-10 years of experience, also 2(0.8%) had 11- 15 years and finally none has more than 5 years of experience/ this implies that most of the respondent had 2 – 20years experience.

4.3 Analysis Research Questions One

Research Question One

What are the status of cost and time overruns in building projects execution in Nigeria?

Table 4.7 Mean and Standard Deviation of Responses of Engineers and Builders on the status of cost and time overruns in building projects execution in Nigeria

Status of cost and time overruns	Engineers (N1 = 38)		Builders (N2= 85)		\bar{X}_{AV}	Remarks
	\bar{X}_E	SD _E	\bar{X}_B	SD _B		
Occurs when there is underestimation of actual cost and duration during budgeting/planning	3.47	0.51	3.65	0.43	3.56	A
Cost escalation due to factors such as inflation	2.68	0.46	3.13	0.42	2.91	A
When construction projects are not completed on time, within budget and with appropriate quality performance	2.67	0.51	2.54	0.5	2.61	D
When there is extra cost and time beyond the contractual cost	3.73	0.72	2.79	0.7	3.26	A

and time agreed during the tender stage

Impromptu change in plan on project execution triggered cost and time overrun in construction project in Nigeria.

Occur when is lack of foresight on weather condition that may hinder project execution

It is more of lack of basis for planning and control by defining the scope of work and its associated estimated costs and schedules

Cost and time overrun is 70percent probable in projects execution in Nigeria.

Grand Total of \bar{X}_T and SD_T

3.89	0.82	3.03	0.56	3.46	A
2.53	0.51	3.51	0.51	3.02	A
2.53	0.97	2.69	0.92	2.61	A
3.56	0.5	3.35	0.47	3.46	A
3.13	0.63	3.09	0.56	3.11	A

N1=Number of Engineers N=2 Number of Builder, \bar{X}_E = Mean response of Engineer, \bar{X}_B = Mean response of Builders, SD_E = Standard Deviation of Responses of Engineers SD_B = Standard Deviation of Responses of Builder, \bar{X}_{AV} = Average Mean response, SD_{AV} = Standard deviation, A =Agree, D= Disagree

Table 4.7 shows the respondent responses on the status of cost and time overruns in building projects execution in Nigeria. The result depicts the mean and standard deviation of the responses of the engineers and builder; that cost and time overruns occurs when there is underestimation of actual cost and duration during budgeting/planning, cost escalation due to factors such as inflation, when there is extra cost and time beyond the contractual cost and time agreed during the tender stage, impromptu change in plan on project execution triggered cost and time overrun in construction project in Nigeria and lack of foresight on weather condition that may hinder project execution among others with $\bar{X}_{AV} > 2.50$ (3.56, 2.91, 3.26, 3.46 and 3.02 respectively).

The standard deviation of 0.63 and 0,56 also shows that respondent responses are not far from their mean responses on status of cost and time overruns in building projects execution in Nigeria.

Research Question Two

What are the main causes of cost and time overruns on the building construction projects in Nigeria?

Table 4.8 Mean and Standard Deviation of Responses of Engineers and Builders on the main causes of cost and time overruns in building projects execution in Nigeria

causes of cost and time overruns	Engineers (N1 = 38)		Builders (N2= 85)		\bar{X}_{AV}	Remarks
	\bar{X}_E	SD_E	\bar{X}_B	SD_B		
Lack of Detailed designs at the time of tender	3.33	0.51	3.54	0.43	3.44	Agree
Poorly drafted Specifications	3.56	0.46	3.13	0.42	3.35	Agree
Slow and bureaucratic tendering processes	2.47	0.51	2.46	0.5	2.47	Disagree
Unavailability of qualified and skillful Estimators/Quantity Surveyor	3.61	0.72	2.99	0.7	3.30	Agree
Errors in estimating project cost	2.59	0.82	3.33	0.56	2.96	Agree
Poorly Defined Project Scope	3.79	0.97	3.43	0.92	3.61	Agree
Lack of project site visit by design team prior to and during Designing	3.33	0.51	3.54	0.43	3.44	Agree
Poor communication and co-ordination among design team Members	3.56	0.46	3.13	0.42	3.35	Agree
Poor risk identification and mitigation at pre-tender stage	2.17	0.51	2.46	0.5	2.32	Disagree
Insufficient time to prepare detailed designs	3.61	0.72	2.99	0.7	3.30	Agree
Insufficient time in preparing detailed bills of quantities	2.59	0.82	3.33	0.56	2.96	Agree
Poorly drafted Tender instructions and Contract conditions	3.79	0.97	3.43	0.92	3.61	Agree
Poor quality of assumptions from which the estimate are Prepare	3.33	0.51	3.54	0.43	3.44	Agree
Outmoded estimating techniques employed	3.56	0.46	3.13	0.42	3.35	Agree
Inadequate employees with requisite knowledge	2.14	0.51	2.46	0.5	2.30	Disagree
Grand Total of \bar{X}_T and SD_{AV}	3.16	0.62	3.13	0.57	3.14	Agree

N1=Number of Engineers N=2 Number of Builder, \bar{X}_E = Mean response of Engineer, \bar{X}_B = Mean response of Builders, SD_E = Standard Deviation of Responses of Engineers

SD_B = Standard Deviation of Responses of Builder, \bar{X}_{AV} = Average Mean response, SD_{AV} = Standard deviation, A = Agree, D = Disagree

Table 4.8 shows the respondent responses on main causes of cost and time overruns on the building construction projects in Nigeria. The result revealed that 12 items on the main causes of cost and time overrun are agreed on upon by both Engineers and Builders among these are lack of Detailed designs at the time of tender, poorly drafted Specifications, unavailability of qualified and skillful, estimators/Quantity Surveyor errors in estimating project cost, poorly Defined Project Scope, lack of project site visit by design team prior to and during Designing, poor communication and co-ordination among design team Members among others with $\bar{X}_{AV} > 2.50$ (3.44, 3.35, 3.30, 2.96, 3.61, 3.44 and 3.35 respectively).

Meanwhile the slow and bureaucratic tendering processes, poor risk identification and mitigation at pre-tender stage and inadequate employees with requisite knowledge were disagreed upon by the respondent with $\bar{X}_{AV} < 2.50$ (2.47, 2.32 and 2.30 respectively)

The standard deviation of 0.62 and 0.57 also shows that respondent responses are not far from their mean responses main causes of cost and time overruns on the building construction projects in Nigeria.

Research Question Three

What are the effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general?

Table 4.9 Mean and Standard Deviation of Responses of Engineers and Builders on the effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in General

Effect of cost and time overruns	Engineers (N1 = 38)		Builders (N2= 85)		\bar{X}_{AV}	Remarks
	\bar{X}_E	SD _E	\bar{X}_B	SD _B		
To the client, cost and time overruns implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans.	3.61	0.72	2.99	0.70	3.30	Agree
Cost and time overruns bring about fewer returns on investment.	2.59	0.82	3.33	0.56	2.96	Agree
To the end users, the added costs and time are passed on as higher rental/lease costs or prices.	3.79	0.97	3.43	0.92	3.61	Agree
To the professionals, cost and time overruns could tarnish reputations.	3.33	0.51	3.54	0.43	3.44	Agree
To the construction industry, cost and time overruns could lead to loss of profits.	3.56	0.46	3.13	0.42	3.35	Agree
The construction industry cost and time overruns brings about project abandonment and a drop in building activities	2.81	0.59	2.81	0.27	2.81	Agree
Cost and time overruns prevents planned increase in property and service production from taking place	3.31	0.39	3.76	0.68	3.54	Agree
Cost and time overruns affects the rate of national growth	3.26	0.28	3.52	0.26	3.39	Agree
Grand Total of \bar{X}_T and SD_{AV}	3.28	0.59	3.31	0.53	3.30	Agree

N1=Number of Engineers N=2 Number of Builder, \bar{X}_E = Mean response of Engineer, \bar{X}_B = Mean response of Builders, SD_E = Standard Deviation of Responses of Engineers SD_B= = Standard Deviation of Responses of Builder, \bar{X}_{AV} = Average Mean response, SD_{AV}= Standard deviation, A =Agree, D= Disagree

Table 4.9 reveals the respondent responses on the effect of cost and time overruns in building projects execution in Nigeria. The result depicts the mean and standard deviation of the responses of the engineers and builder; that cost and time overruns implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans, cost and time overruns bring about fewer returns on

investment, the added costs and time are passed on as higher rental/lease costs or prices, cost and time overruns could tarnish reputations, cost and time overruns could lead to loss of profits, cost and time overruns brings about project abandonment and a drop in building activities, cost and time overruns prevents planned increase in property and service production from taking place and finally cost and time overruns affects the rate of national growth with average mean value of 3.30, 2.96, 3.61, 3.44, 3.35, 2.81, 3.54 and 3.39 respectively.

The standard deviation of 0.59 and 0.53 also shows that respondent responses are not far from their mean responses on effects of cost and time overruns in building projects execution in Nigeria.

Research Question Four

What are the factors that can help prevent cost and time overruns in public building construction projects in Nigeria?

Table 4.10 Mean and Standard Deviation of Responses of Engineers and Builders on the factors that can help prevent cost and time overruns in public building construction projects in Nigeria

prevention cost and time overruns	Engineers (N1 = 38)		Builders (N2= 85)		\bar{X}_{AV}	Remark
	\bar{X}_E	SD _E	\bar{X}_B	SD _B		
Top management support	3.22	0.7	3.38	0.73	3.3	Agree
Taking time to do proper and effective estimations	3.53	0.56	3.15	1.24	3.34	Agree
Peer review of designs and tender documents prior to advertising for bids	3.34	1.59	3.63	0.62	3.49	Agree
Cutting bureaucracy (simplifying procurement procedures)	3.63	0.49	3.78	0.42	3.71	Agree
Obtaining sufficient information about projects	3.72	0.45	3.25	1.12	3.49	Agree
Using modern and current estimation techniques	3.03	1.37	3.29	0.82	3.16	Agree
Making designs and specifications simple	3.47	0.76	3.77	0.44	3.62	Agree
Ensuring the availability and supplies of labour and materials	3.75	0.44	3.69	0.46	3.72	Agree
Hiring consultants with the requisite experience and	3.33	0.51	3.54	0.43	3.44	Agree

knowledge about procurement laws and practices							
Closer and improved co-ordination between Engineering Services Department and Client Department	3.56	0.46	3.13	0.42	3.35	Agree	
Co-ordination between project team members at design stage	2.57	0.51	2.46	0.5	2.52	Agree	
Effective risk identification and allocation at pre-tender stage	3.61	0.72	2.99	0.7	3.3	Agree	
Ensuring Tender documents are drafted and well packaged to meet the specific project objective	3.31	0.39	3.76	0.68	3.54	Agree	
Grand Total of \bar{X}_T and SD_T	3.39	0.69	3.37	0.66	3.38	Agree	

N1=Number of Engineers N=2 Number of Builder, \bar{X}_E = Mean response of Engineer, \bar{X}_B = Mean response of Builders, SD_E = Standard Deviation of Responses of Engineers SD_B = = Standard Deviation of Responses of Builder, \bar{X}_{AV} = Average Mean response, SD_{AV} = Standard deviation, A =Agree, D= Disagree

Table 4.10 reveals the respondent responses on the factors that can help prevent cost and time overruns in public building construction projects. The result depicts the mean and standard deviation of the responses of the engineers and builder; that top management support, taking time to do proper and effective estimations, peer review of designs and tender documents prior to advertising for bids, cutting bureaucracy (simplifying procurement procedures), obtaining sufficient information about projects, using modern and current estimation techniques, making designs and specifications simple, ensuring the availability and supplies of labour and materials, hiring consultants with the requisite experience and knowledge about procurement laws and practices, closer and improved co-ordination between Engineering Services Department and Client Department among others with average mean value of 3.30, 3.34, 3.49, 3.71, 3.49, 3.16, 3.62, 3.72, 3.44 and 3.35 respectively.

The standard deviation of 0.69 and 0.66 also shows that respondent responses factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

4.4 Analysis of Research Hypothesis One

Research Hypothesis One

H₀₁: There is no significant difference in mean response of Engineer and Builder on the status of cost and time overruns in building projects execution in Nigeria

Table 4.11: Summary t- test analysis on difference in the mean response of Engineer and Builder on the status of cost and time overruns in building projects execution in Nigeria

Variable	N	Mean	SD	Df	P	T	Decision
Engineer	38	3.13	0.63	121	0.19	2.165	NS
Builder	85	3.09	0.56				

At 0.05 level of significance SD =Standard Deviation *NS= Not Significant

Table 4.11 shows that the p - value of 0.19 was obtained at 0.05 level of significance and 121 degree of freedom for the 8 items (research question one items) with t-test value (2.165), the p (0.17) > 0.05 indicate that null hypothesis must be accepted for these items. This shows that there is no significant difference between response of Engineer and Builder on the status of cost and time overruns in building projects execution in Nigeria

Research Hypothesis Two

H₀₂: There is no significant difference in mean response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria.

Table 4.12: Summary t- test analysis on difference in the mean response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria

Variable	N	Mean	SD	Df	P	T	Decision
Engineer	38	3.16	0.62	121	0.17	1.15	NS
Builder	85	3.13	0.57				

At 0.05 level of significance *NS= Not Significant

Result in Table 4.12 above unveils that the significance value of 0.17 was obtained at 0.05 level of significance and 121 degree of freedom for the 15 items (research question

2 items) with the t-table value of 1.15. Since ρ is (0.15); the null hypothesis is therefore not rejected for these items. This implies that a significant difference does not exist between response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria.

Research Hypothesis Three

H₀₃: There is no significant difference in mean response of Engineer and Builder on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general.

Table 4.6: Summary t- test analysis on difference in the mean response between of Engineer and Builder on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general.

Variable	N	Mean	SD	Df	P	T	Decision
Engineer	38	3.28	0.59	121	0.25	1.19	NS
Builder	85	3.31	0.53				

At 0.05 level of significance *NS= Not Significant

Result in Table 4.6 above unveils that the significance value of 0.25 was obtained at 0.05 level of significance and 121 degree of freedom for the 8 items (research question 3 items) with the t-table value of 1.19. Since ρ is (0.25); the null hypothesis is therefore not rejected for these items. This implies that a significant difference does not exist between response between of Engineer and Builder on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general.

Research Hypothesis Four

H₀₄: There is no significant difference in mean response of Engineer and Builder on factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

Table 4.14: Summary t- test analysis on difference in the mean response between l Engineer and Builder on factors that can help prevent cost and time overruns in public building construction projects in Nigeria

Variable	N	Mean	SD	Df	P	T	Decision
Engineer	38	3.39	0.69				
Builder	85	3.37	0.66	121	0.13	.145	NS

At 0.05 level of significance SD =Standard Deviation *NS= Not Significant

Table 4.10 shows that the ρ - value of 0.13 was obtained at 0.05 level of significance and 121 degree of freedom for the 13 items (research question 4 items) with t-test value (0.145), the ρ (0.13) > 0.05 indicate that null hypothesis must be accepted for these items. This shows that there is no significant difference between the mean response of Engineer and Builder on factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

4.5 Summary of Findings

1. The findings on research question one revealed that cost and time overruns occurs when there is underestimation of actual cost and duration during budgeting/planning, cost escalation due to factors such as inflation, cost and time overrun is 70percent probable in projects execution in Nigeria among others are the status of cost and time overruns in building projects execution in Nigeria.
2. The findings on research question two revealed that lack of Detailed designs at the time of tender, poorly drafted Specifications, unavailability of qualified and skillful, estimators/Quantity Surveyor errors in estimating project cost main causes of cost and time overrun.
3. The findings on research question three revealed the main effect of cost and time overruns to implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans, its bring about fewer returns on

investment, the added costs and time are passed on as higher rental/lease costs or prices and so on.

4. The findings on research question four revealed that top management support, taking time to do proper and effective estimations, peer review of designs and tender documents prior to advertising for bids, among others are the factors that can help prevent cost and time overruns in public building construction projects.
5. The findings on research hypothesis one revealed that significant difference does not exist between response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria.
6. The findings on research hypothesis two revealed that significant difference does not exist between response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria.
7. The findings on research hypothesis three revealed that significant difference does not exist between response between of Engineer and Builder on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general.
8. The findings on research hypothesis four revealed that there is no significant difference between the mean response of Engineer and Builder on factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

4.6 Discussion of Findings

The findings of the study revealed the status of cost and time overruns in building projects execution in Nigeria, among these are; that cost and time overruns occurs when there is underestimation of actual cost and duration during budgeting/planning, cost escalation due to factors such as inflation, when there is extra cost and time beyond the

contractual cost and time agreed during the tender stage, impromptu change in plan on project execution triggered cost and time overrun in construction project in Nigeria and lack of foresight on weather condition that may hinder project execution. This is findings is found similar to that of Anyanwu et al. (2017), where it is categorical stated that the main status of cost and time overrun in project execution in Nigeria occurs when there is extra cost and time beyond the contractual cost and time agreed during the tender stage, impromptu change in plan on project execution triggered cost and time overrun in construction project in Nigeria.

The outcome of the study also disclosed the main causes of cost and time overruns on the building construction projects in Nigeria. The result revealed that 12 items on the main causes of cost and time overrun are agreed on upon by both Engineers and Builders among these are lack of Detailed designs at the time of tender, poorly drafted Specifications, unavailability of qualified and skillful, estimators/Quantity Surveyor errors in estimating project cost, poorly Defined Project Scope, lack of project site visit by design team prior to and during Designing, poor communication and co-ordination among design team Members among others. This in line with the finding of Anyanwu et al. 2017; Paul and Oluseye, 2017 and Santosh, 2016).

The findings of the study also revealed the effect of cost and time overruns in building projects execution in Nigeria. The result depicted that cost and time overruns implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans, cost and time overruns bring about fewer returns on investment, the added costs and time are passed on as higher rental/lease costs or prices, cost and time overruns could tarnish reputations, cost and time overruns could lead to loss of profits, cost and time overruns brings about project abandonment and a drop in building activities, cost and time overruns prevents planned increase in property and service

production from taking place and finally cost and time overruns affects the rate of national growth. The outcome is also backed with Anyanwu et al. 2017 and Hedaya and Saad, 2017)

The findings of the study also revealed the factors that can help prevent cost and time overruns in public building construction projects in Nigeria. Among these are top management support, taking time to do proper and effective estimations, peer review of designs and tender documents prior to advertising for bids, cutting bureaucracy (simplifying procurement procedures), obtaining sufficient information about projects, using modern and current estimation techniques, making designs and specifications simple, ensuring the availability and supplies of labour and materials, hiring consultants with the requisite experience and knowledge about procurement laws and practices. This assertion is in vein the that of Anyanwu et al. 2017; Paul and Oluseye, 2017 and Hedaya and Saad, 2017).

The findings on the analysis of research hypotheses revealed that there is no significant difference between response of Engineer and Builder on the status of cost and time overruns in building projects execution in Nigeria. This revealed that both Engineers and Builder do not share different opinion on the status of cost and time overrun in building projects execution in Nigeria. The finding of the study that a significant difference does not exist between response of Engineer and Builder causes of cost and time overruns on the building construction projects in Nigeria as well share similar opinion on effects of cost and time overruns on the building construction industry and on the economy of Nigeria, in general and finally on the factors that can help prevent cost and time overruns in public building construction projects in Nigeria.

CHAPTE FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study investigated the effect of cost and time overrun in building construction project in Nigeria. The study is limited to considering building construction project activities in Minna metropolis of Niger State. Numerous studies reviewed so far also backed the need to conduct this research especially among construction industries in Minna metropolis of Niger State. The approach used in carry out this research is descriptive survey research design with administration of questionnaire to builders and Engineers of selected construction firm within Minna metropolis. The findings of the study disclosed status of cost and time overruns in building projects execution in Nigeria, among these are; that cost and time overruns occurs when there is underestimation of actual cost and duration during budgeting/planning, cost escalation due to factors such as inflation, when there is extra cost and time beyond the contractual cost and time agreed during the tender stage and so on. The outcome of the study also disclosed the main causes of cost and time overruns on the building construction projects in Nigeria to be lack of detailed designs at the time of tender, poorly drafted Specifications, unavailability of qualified and skillful, estimators/Quantity Surveyor errors in estimating project cost, and so on. The findings of the study also revealed the effect of cost and time overruns to be that cost and time overruns implies added costs over and above those initially agreed upon at the onset, which directly affect the client plans, cost and time overruns bring about fewer returns on investment, the added costs and time are passed on as higher rental/lease costs or prices, cost and time overruns could tarnish reputations and so on. The findings lastly revealed the factors that can help prevent cost and time overruns in public building construction projects in Nigeria. Among these are top management support, taking time to do proper and effective

estimations, peer review of designs and tender documents prior to advertising for bids, cutting bureaucracy (simplifying procurement procedures), obtaining sufficient information about projects among others.

5.2 Implication of the Study

The findings of the study so far would serves has insights into the importance of procurement and project management as well as issues associated with the execution of successful projects in the construction sector in the country. It has also created awareness of the need to critically take the unique role of the procurement function seriously.

To the management of the various construction firms in the country, especially those involved in bidding and tendering for government contracts, this study through the findings and the recommendations thereof has placed them in a better position to manage effectively their strategies and tactics in such a way as to ensure better implementation of the procurement function and therefore leading to the curtailment of time and costs overruns.

The findings of the study are also beneficial to the government as issue regarding the successful complete of the project, proper measure suggested will trigger the success rating of the government on infrastructural the development if implemented.

5.3 Contribution to the knowledge

The study has immensely help to the find out various strategies required for avoid cost and time overrun in construction industry.

5.4 Conclusion

Based on the findings of the study it could be concluded that there is occurrence of cost and time overrun, the study found that the frequent design changes and lack of project site visit by design team prior to and during designing were the highest contributing risk factor to project cost overrun in construction projects. The main effect of these cost

and time overrun cost and time overruns bring about fewer returns on investment, the added costs and time are passed on as higher rental/lease costs or prices, cost and time overruns could tarnish reputations. It could be further concluded that top management support, taking time to do proper and effective estimations, peer review of designs and tender documents prior to advertising for bids, cutting bureaucracy (simplifying procurement procedures), obtaining sufficient information about projects among others are measures needed for prevention of cost and time overrun in project execution.

5.5 Recommendations

Based on the findings of the study the following recommendations are made: -

1. The use of Risk Assessment and cost control when estimating construction projects, which will help decision makers to define unforeseen situations more reliably ahead of time, so that corrective measures can be better taken into account in project design and estimations.
2. Prioritizing of cost and time overrun factors in projects leads to better risk contingency weightings in budget estimates.
3. Total cost should be carefully evaluated before undertaking a construction project contract. A contract price should not be over the financial ability of the company.
4. Any financial problem in the project expenditures and payments will cause delay and cost overrun accordingly.
5. Finally, the tight control of any construction project can limit variation in works during construction, and this is absolutely necessary for successful financial outcomes of projects.

5.6 Suggestion for Further Study

Based on the findings of the study the following are suggestions for further studies: -

1. An investigative study on Consequences of Cost and Time overrun in construction industry in Niger State.

2. An investigative study on Cost and Time overrun as Major Factors Affecting Infrastructural Growth in Minna Metropolis.

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