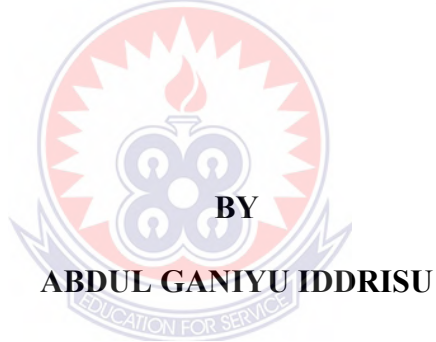


**UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI**

**ASSESSMENT OF CONSTRUCTION PROJECTS IN GHANA: FACTORS AND
CHALLENGES (A CASE STUDY OF THE WA MUNICIPALITY OF THE UPPER
WEST REGION OF GHANA)**



AUGUST, 2017

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WEST REGION OF GHANA)**

**A Project Report in the Department of Construction and Wood Technology Education,
submitted to the School of Graduate Studies, University of Education, Winneba in partial
fulfillment of the requirement for the award of the Master of Technology Degree**

(Construction)

BY

ABDUL GANIYU IDDRISU

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AUGUST, 2017

DECLARATION

STUDENT'S DECLARATION

I Iddrisu Abdul Ganiyu declares that this project report, with the exception of quotations and references contained in published works which have all been identified and acknowledged, is entirely my own original work and it has not been submitted either in part or whole, for another degree elsewhere.

Signature.....

Date.....

ABDUL GANIYU IDDRISU



SUPERVISOR'S DECLARATION

I hereby declare that the preparation of the Project Report was supervised in accordance with the guidelines on supervision of Project Report laid down by the University of Education Winneba.

Signature.....

Date.....

Engr. MICHAEL K.TSORGALI

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Once again I thank the almighty Allah for making it possible for me to reach this far.

DEDICATION

This work is dedicated to the Glory of Almighty Allah, to my beloved wife, Atiatu Yahaya, son Ilan Erasung, uncle Alhaji Haruna Mumuni, mum Hajia Bashirata Iddrisu, grandmother Hajia Salamata Mumuni and all the Iddrisu family, most especially Major Badiradeen Iddrisu.



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ABSTRACT

Construction projects in Ghana suffer from many problems and complex issues such as cost, time and safety. This research sought to identify and evaluate the main factors affecting efficient execution of construction projects in Ghana as well as the major challenges they face with.

The effectiveness of the organization also depends on the ability to integrate the workforce into a well-motivated and productive team, which is committed to the completion of a project and the overall success of the firm. Three different well-structured questionnaires, interview and observations were prepared and evaluated and ranked from clients, consultants and contractors perspectives with an interview schedule with contractors that cannot read and write. Several factors were identified as factors affecting efficient project execution including, conformance to specification, delay in payment of certified certificates, cash flow of the project, projects labor cost, escalation of materials costs, political interferences and leadership skills for project manager. On the part of contractors issues such as inability to use high quality materials to provide correct documentation and invoices, to adapt to changes and meet needs and to keep clients facilities and environment clean are some of the failures resulting in inefficient execution of projects. It was recommended that, clients are to facilitate payment to contractors in order to overcome delay, disputes and claims. A structured methodology and technique should be identified to overcome the effect of local political and economic situations on the performance of construction projects in Ghana. It is necessary for construction organizations in Ghana to evaluate both the market share and liquidity before implementation of any construction project because of difficult economic situation.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The true functional performance of any country is wholly dependent on the provision of standard and adequate infrastructure. Infrastructure thus plays a pivotal role in the development of every nation, of which Ghana is no exception. A critical assessment of the execution of construction projects in Ghana indicates that, substantial funds from the tax payer's money goes in to the construction industry and therefore failure or abandonment of such constructional projects has crippling effect on the capabilities of the financiers or investors because once a decision is taken to execute a project, scarce resources are tied down for long time. The project may be the only future hope of the client and beneficiary; therefore, both expect nothing but project success.

According to Roy (2005), it is evident that noticeable development and the aesthetic transformation of the environment is bound up with, and predicted on the construction industry.

The successful accomplishment of a task reflects on effectiveness; while performing the tasks to produce the best outcomes at the lowest cost from the same resources used is efficiency.

Effectiveness is doing the right things; whereas efficiency is doing these things better. The best performances maximize both effectiveness and efficiency.

The management and performance assessment is fundamental to organizational improvement of which the constructional industry is no exception. The importance of management techniques and performance assessment has increased with the realization that, to be successful in the long-term requires meeting and measuring performance against all stakeholders' needs including

clients, consultants, contractors and beneficiaries. While the importance of management assessment is difficult to quantify, it is evident that assessment and evaluation of construction projects plays a central role in ascertaining value for money (VFM).

The subject of assessment has become more concern to many countries at various levels of socio-economic development which many have realized the need to improve the performance of construction projects. The success of a construction project is judged by meeting the criteria of cost, time, safety, resource allocation, and quality as determined by the client (Muir, 2005). Thus, the purpose of construction project management and assessment is to achieve goals and objectives through planned expenditure of resources.

Construction project management involves numerous parties, various processes, different phases and stages of work and a great deal of inputs from both the public and private sectors with the major aim of bringing the project to a successful conclusion (Akintoye and Takim, 2002). The assessment of construction projects in Ghana brings to the level of success, in carrying out constructional projects depends on the quality of proper management techniques, financial, technical and the organizational performance of the respective parties. The assessment of the execution of various construction projects brings to fore the delay in project execution as major problem facing the Ghanaian construction industry. It is endemic and its economic and social impacts are huge and devastating.

Frimpong and Oluwoye (2003), reported that, to a large extent, consultants, client, and contractors agreed that project financing, economic and natural conditions and material supply were some of the major categories of causes of delay and cost overrun factors.

The construction industry is an important sector of the Ghanaian economy. It contributes an average of 8.5% of the Gross Domestic Product (Ghana Statistical Service, 2007). It employed 2.3% of the economically active population in 2002 (Amankwa,2003). The industry provides many products for other industries or commodities to be consumed. As Ghana aspires to become a middle income nation by 2020, and with the recent discovery of oil in commercial quantities, the role of the construction industry is absolutely important.

Turner (1993), defines project as an endeavor in which human, material and financial resources are organized in a novel, to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change by quantitative and qualitative objectives. His definition of project emphasizes on organization of resources and uniqueness of the scope of work. Hence, it is evident that, assessing and evaluating the management and planning are essential elements that deals with construction risks and devise safe working methods throughout all stages of the construction process from inception through the design, tendering, construction and commissioning stages of the project.

This research is limited to the assessment of both public and private sector construction projects in the Wa Municipality.

The study will further aimed at identifying and analyzing factors and challenges affecting efficient execution of construction projects by contractors within the Wa Municipality. The

analysis will reflect the strength of each factor and rate at which it influence failure and abandonment of construction projects in the Wa municipality.

1.2 Statement of the Problem

The dynamic nature of client, the complexity of construction industry and continuous demand for improved and efficient project delivery have put pressure on construction managers, thereby creating a lot of assessment and management challenges that required high sense of managerial acumen, skills, ability, capabilities and strategies to deal with the challenges.

Assessment has become more necessary because client of the construction industry wants good project which represent value for money.

Therefore, government of Ghana the major client of construction projects preparedness to work in hand with contractors and consultants through assessing and evaluating management methods in order to improve the quality and standard of the construction industry and all sector of the economy is not hatching the required results. It is therefore pressing and compelling for consultant as agents to clients to ensure that, the challenges of assessment in ongoing projects in the Wa municipality are detailed out and enforced to contractors so that they can adapt to a systematic and an organized approach to ensure that there is no significant loss arising from waste, extravagance, inefficient financial administration and poor uses of money, mistakes or other causes.

Notwithstanding the aforementioned points, the challenges of assessment can largely be traced to lack of efficient management, lack of planning, lack of supervision and lack of assessing the

administrative managerial skills adopted by contractor and their personnel's involved in the construction industry within the Wa Municipality far as these research is concerned. However, the success of any project implementation process in the construction industry in the public and private sector depends largely on assessment, monitoring and evaluation of the project and also the project manager's concept on staff appointments and control, strict monitoring of time, cost, material, quality and environmental constraint.

1.3 Aim of the Study

The aim of the study is to assess the efficient execution and managerial skills adopted by contractors in the execution of construction projects in the Wa Municipality.

1.4 Objectives

The objectives of the study are;

- To examine the challenges of construction projects in the Wa municipality.
- Identify the factors affecting construction projects in the Wa municipality.
- To devise effective strategies to enhance the effective execution of construction projects.

1.5 Research Questions

In order to achieve the problems of the study, the following questions have been asked to facilitate the study.

- What are some of the major challenges affecting construction projects in the Wa municipality?
- What are the major factors confronting efficient projects execution in Wa municipality?
- What effective management strategies can be used to overcome problems of execution of construction projects in the Wa Municipality?

1.6 Significance of the Study

The significance of the study are;

- To create the awareness or bring to the fore the major factors affecting successful project execution in the Wa municipality
- The study will also bring into light some of the inherent problems that hinder the smooth functioning of consultants and contractors and propose remedial measures and recommendations to curtail these problems.
- The outcome of the study will also help as a guide to policy makers on what interventions needed to be made to improve efficient project execution in the country.

1.7 Scope of the Study

The study considered Wa municipality and its environs and is also limited to clients, consultants and contractors in the construction industry. The scope of the study also reflects on issues like; the challenges and performance of contractors in construction projects, factors affecting performance of managers, construction projects and performance, financial challenges, benchmarking and performances etc.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section of the study consists of a review of existing literature on the evaluation of construction projects in the Wa municipality. It deals with issues like the challenges and performance of contractors and consultants, the consultant and the role of the consultant in the construction industry, factors affecting the performance of the construction industry, assessing inefficiency in project execution, assessing financial challenges in project execution, political challenges, and effect of weather conditions, workforce considerations and output, measurement of project performance, project success in the construction industry, challenges related to materials supply, information Technology in construction industry and benchmarking and performance indicators.

2.2 Challenges and Performance of Contractors in the Construction Industry

The construction industry in Ghana is characterized by a multiplication of numerous small firms. Out of a total of 7095 construction firms registered in 2002, 90% are small scale contractors who belong to classes D3 and D4 and undertake less complex constructions (Egmond & Erkelens, 2007). The total amount of work executed by these contractors ranged between 10% and 20% of the total construction output (Owusu- Tawiah, 1999). The management of resources such as labor, finances, materials, plants and equipment are carried out haphazardly and therefore does not promote performance and enhance growth. It is also reported that the majority of Ghanaian contractors do not have enough funds and credit facilities and lack appropriate technological capabilities, plants and equipment as well as key personnel to handle projects properly (Owusu-Tawiah, 1999). The Ghana business News (2009), also mention outmoded, low level of trained

personnel, lack of qualified supervision and unused equipment at building sites are some of the nagging problems facing local contractors in Ghana. Such firms cannot compete with foreign contractors who are more able to capture a major share of the local construction market especially when it concerns more complex projects (Egmond and Erkelens, 2007; Owusu Tawiah, 1990).

Delayed payment of contracts executed can best be classified as the greatest challenge facing contractors but more worrying is the failure of clients, usually the government, to pay interest or compensation for delayed payment (Daily Graphic, 2009). The construction industry has a special place for the development of human history and has placed an important part in shaping society's physical environment (Moavenzadeh, 1994). The construction firms are responsible for planning, designing and constructing the building used for commerce, shelter, leisure and other activities, as well as for all the infrastructural facilities needed to provide basic services such as water and energy, along with the transportation and communication systems which allow modern society to function. To be successful in the globally competitive market, firms operating in the construction industry more than ever need the full focus of their managers and employees on productivity, profitability and customer satisfaction (Bucks & Sanders, 1998).

The Ministry of Water Resources, Works and Housing must not only be interested in the registration and classification of contractors but perhaps more importantly continue to undertake a physical inspection of the offices and equipment of contractors before and after their registration. The issue of outmoded equipment remains one of the nagging problems confronting local contractors. To help build their capacities and improve delivery, the ministry must, as a

matter of urgency, assist local contractors to procure modern equipment. The plain truth is that, whereas local contractors are afraid to claim interest and fluctuations on delayed payment for fear of victimization, foreign contractors are duly paid interest and fluctuations suffer no victimization.

2.3 The Consultants in the Construction Industry

The major parties involved in the designing, supervision and successful completion of government building projects are the consultants. Building project consultants are made of a team of experts consisting of Architects, Quantity surveyors, Engineers (structural/service) and others tasked or employed by the client to cater for its needs and ensuring that the projects upon completion will have value for money.

According to Kwakye (1997), defines a consultant as a person who knows a lot about a particular subject and is employed to give advice about it to other people. A consultancy is however, a company that gives expert advice on a particular subject to other companies, people or organization. In relating consultants to the building construction industry, Kwakye (1997), further explains consultants as architects, engineers (structural/services) and quantity surveyors who are construction professionals with diverse skills and, hence, offer design and management services for a fee.

Consultants in the building and construction industry comprise of a team of professionals employed by the client to care for his/her needs. It must be noted that, the collective performance of the roles of the individual members in the consultancy will facilitate smooth operations of building construction projects and thereby producing structures that provide value for money (Roger, 1997).

2.4 The Role of Project Consultants in Project Execution

According to Kwakye (1997), construction consultants, also known as “construction professionals” or “the design team” have got general roles to play in ensuring that building projects precede smoothly and efficiently. The general roles that are played by consultants as explained by Kwaky (1997), are:

- To organize the construction process and participate in briefing, design and construction;
- To offer services for design and cost estimates to the client;
- Factor into their processes all matter that affects the quality of the environment from the point of view of the ultimate user and of society as a whole; and
- To ensure that, the design solution gives the client value for money and affords the most economic production process.

He went on to state that, the needs for those professional roles in construction projects are important because client normally require advice since they do not have the expertise to develop the brief, produce a sound design and supervise the construction.

2.5 Factors Affecting the Performance of Managers in the construction Industry

Ogunlana et al. (1996), recommended the need for focused effort by economy managers and construction industry associations to provide the infrastructure needed for efficient project management and performance. Dissanayaka and Kumaraswamy (1999), stated that the knowledge that would influence potential performance enables project managers to pay special attention to control performance more effectively. Chan and Kumaraswamy (2002), remarked that effective communication and fast information transfer between managers and participants help to accelerate the building construction process and performance. Kuprenas (2003), studied the impact of the use of a project management based organizational structure, project manager training, frequency of design meetings, and frequency of design reports on design phase cost

performance. The process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs.

Navon (2005), stated that data are collected and used for construction managers as a basis to evaluate the project performance indicators (PPI) actual value to compare it with the planned value and forecast its future value based on past performance. Pheng and Chuan (2006), identified the importance of the working environment variables for the performance of a project manager in the private and public sectors according to three main groups which are job condition, project characteristic and organizational related categories. The result revealed that working hours, physical condition of project site, complexity of project, material and supplies project size, duration of project and time availability were viewed differently in terms of importance by the contractors and consultants groups. Team relationship was ranked as the most important variable affecting the performance of a project manager. It is obtained that project managers experience do not have much effect on how they perceive their working environment.

2.6 Performance of Construction Projects in the Construction Industry

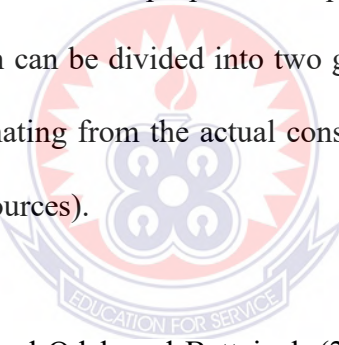
Success of construction projects depends mainly on success of performance. Many previous researches had studied performance of construction projects. Dissanayaka and Kumaraswamy (1999), remarked that one of the principal reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999), remarked three important structures underlying the dynamic of a project performance which are; the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas

(2002), identified the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting. Chan and Kumaraswamy (2002), stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. It is obtained by Navon (2005), that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng and Chuan (2006), obtained that human factors played an important role in determining the performance of a project. Ugwu and Haupt (2007), remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. Ling et al (2007), obtained that the most important of practices -relating to scope management are controlling the quality of the contract document, quality of response to perceived variations and extent of changes to the contract. It was recommended for foreign firms to adopt some of the project management practices highlighted to help them to achieve better project performance in China.

2.7 Assessment of execution inefficiency in the construction industry

Inefficiency in project execution occurs in every construction project and the magnitude of these varies considerably from project to project, so it is important to define the actual causes in order to minimize and avoid inefficiency in any construction project. Thus, exploring the reasons for delays is one of the prerequisites of keeping the cost within budget and of good construction time performance (Alaghbari et al, 2007).

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Ogunlana et al. (1996), stated that the construction industry performance problems in developing economies can be classified in three layers: problems of shortages or inadequacies in industry infrastructure (mainly supply of resources), problems caused by clients and consultants and problems caused by contractor incompetence/inadequacies. Okuwoga (1998), identified that the performance problem is related to poor budgetary and time control. Long et al. (2004), remarked that performance problems arise in large construction projects due to many reasons such as; incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005), stated that the main performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).



Kumaraswamy and Chan (1995), and Odeh and Battaineh (2002), conducted a survey in Hong Kong and Jordan respectively to evaluate the relative importance of delay factors in construction projects. Their findings indicate that, poor risk management and supervision, unforeseen site conditions, slow decision making involving all project teams, client-initiated variations, necessary variations of work, the owner interference, inadequate contractor experience, financing and payments, labour productivity, slow decision making, improper planning, and subcontractors are among the top most important factors contributing to inefficiency in project execution.

Projects customarily measure results by periodically accounting for planned progress and cost. Measuring results is important in that they give the management team confidence that

achievements are made, but they do not identify the factors that cause poor performance. While it is generally recognized that “what gets measured improves”, when it comes to actual efficiency or productivity, most projects end up having difficulty collecting useful metrics that could help project owner and contractor determine how well the execution process is meeting requirements at any time (Jim et al, 2004). The execution process is made up of steps and work activities that take input resources, add value and produce the completed project-value being based on customer willingness to pay for the process step or activity. The execution process provides an excellent base for measurement: an execution process that is in control delivers good performance, and can be improved. Ling et al (2007), remarked that architectural, engineering and construction (AEC) firms may face difficulties managing construction project execution in China because they are unfamiliar with this new operating environment. Kim et al (2008), stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economic, social, and cultural risks, as well as internal risks from within the project. According to Jim et al (2004), Labor is the major cost- and time-variable in project execution. Great value is therefore placed on workforce productivity, on ‘doing more with less’, to stay within budget and schedule, or do better. Efficiency of labor utilization is a key measure of construction productivity.

2.8 Assessment of Factors Affecting Execution of Construction Projects

According to Nkado (2005), Clients or customers are no longer content with minimal cost, adequate functional performance, increasing interest rate, inflation and other commercial. Pressures among other factors but shows concern of shortest possible time of having building projects completed. Morris and Hugh (1980), examine the records of more than 400 construction

projects found that, projects were rarely finished on time. There are a number of unexpected problems and changes from original design arising during the construction phase leading to cost and time overruns.

Chan and Kumaraswamy (1996), stated that a number of unexpected problems and changes from original design arise during the construction phase, leading to problems in cost and time performance. It is found that poor site management, unforeseen ground conditions and low speed of decision making involving all project teams are the three most significant factors causing delays and problems of time performance in local building works. Okuwoga (1998), stated that cost and time performance has been identified as general problems in the construction industry worldwide. Dissanayaka and Kumaraswamy (1999), remarked that project complexity, client type, experience of team and communication are highly correlated with the time performance, whilst project complexity, client characteristics and contractor characteristics are highly correlated with the cost performance. Reichelt and Lyneis (1999), obtained that project schedule and budget performance are controlled by the 'dynamic feedback process. These processes include the rework cycle, feedback loops creating changes in productivity and quality, and effects between work phases. This relationship can serve as a convenient tool for both project managers and clients to predict the average time required for delivery of a construction project.

Kuprenas (2003), stated that process of a design team meeting frequency and the process of written reporting of design phase progress were found to be statistically significant in reducing design phase costs. Otherwise, the use of project manager training and a project management based organizational structure were found to be processes that do not create a statistically

significant in reducing design phase costs. McKinsey & Company (2009), conducted a survey in India and suggested that, on average projects across sectors suffer from time and cost over-runs to the tune of 20 to 25 percent, with some sectors affected by more than 50 per cent. This is based on projects recently completed or, under implementation. Over-runs can be attributed both to customers and providers. Customer driven delays include those in land acquisition, clearances, and frequent changes in the scope of projects. At the providers' end, delays occur due to inadequate manpower, low construction productivity, and insufficient planning. Frequent and long-drawn disputes between customers and providers also slow down the progress of construction work.

Frimpong, et al. (2003), studied the factors contributing to delay and cost overruns in Ghana groundwater construction projects. The study revealed the main causes of delay and cost overrun as monthly payment difficulties from agencies, poor contractor management, and problem of material procurement, poor technical performances and escalation of material prices. Time as an important indicator of contractor's efficiency, professionalism and competence can be used to evaluate the success of a project and to compare contractors' performance (Sidwell 1982; Ireland, 1985; CIDA, 1993; Naoum & Mustapha, 1995), as cited in (Xiao & Proverbs, 2002). It is universally true of construction management that a project may be regarded as "successful" if it is completed on time Chan & Kumaraswamy (2002): Nevertheless, completing a project on time is even more important than the overall duration of project, and it realistically reflects the contractors ability to organize and control site operations to optimally allocate resources and to manage the flow of information to and from the design team and among the contractors (NED, Lack of monitoring the risk condition of deliverables and activities throughout project execution

increases the chance for a troubled project (Rob, 2009). Since financial resources are the foundation on which any project is based, difficulties in this area can quickly bring the entire project to the brink of disaster.

Chan and Kumaraswamy (2002), proposed specific technological and managerial strategies to increase speed of construction and so to upgrade the construction time performance. It is remarked that effective communication, fast information transfer between project participants, better selection and training of managers, and detailed construction programs with advanced available software can help to accelerate the performance. Jouini et al. (2004), stated that managing speed in engineering, procurement and construction projects is a key factor in the competition between innovative firms. It is found that customers can consider time as a resource and, in that case, they will encourage the contractor to improve the time performance

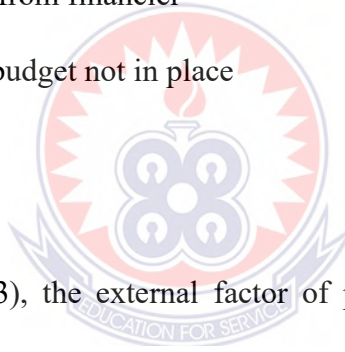
2.8.1 Assessing Financial Challenges in the Execution of Projects in the Construction

Industry

Financial issues in construction projects leads to serious consequences that may retard the development of a project and influence the overall economic condition of a country. Contractor's unstable financial background, client's poor financial and business management, difficulties in getting loan from financiers and inflation were identified as the most significant factors that can lead to inefficiencies in the construction industry. Hamza et al (2011). According to Ahmed et al. (2003), the possible financial-related factors that leads to delay in Malaysian construction projects are financial problems of clients such as delayed payments, financial difficulties and economic problems, financial and cash flow problems of contractors and external factor of poor economic conditions such as currency and inflation rate. Besides, difficulties in getting loans

(Arditi et al, 1985), and short of funding are adverse financial-related factors that were identified in previous work. According to Kaming et al. (1997), one of the most important factors causing inefficiencies and delays of high-rise projects in Indonesia is the shortage of resources. A survey by Ubaid (1991), concluded that the contractor's resources are one of the major measures on the contractors' performance that causes delays. The resources include financial resources, human resources, materials resources and equipment resources. Abdul-Rahman et al (2006), addressed that lack of funds may affect the projects cash flow and lead to delay of site possession which consequently causes delays to projects as a whole. The factors that would cause insufficient financial resources are;

- Difficulties in getting loan from financier
- Allocation of government budget not in place
- Poor payment by client



According to Ahmed et al. (2003), the external factor of poor economic conditions such as currency and inflation rate would significantly give impact to project's cash flow and hence affects the timely performance of the project. The causes to financial market instability which will then lead to cash flow problems in construction project include:

1. Increment of interest rate in repayment of loan,
2. Inflation of material prices, labor wages and transportation costs and
3. Increment of foreign exchange rate for imported materials and plants.

2.8.2 Assessment of Challenges Related to Materials Supply in the construction Industry

Material supply is subject to supply and demand and is affected by many other things including quality, quantity, time, place, buyer and seller. Other factors affecting -material cost include

currency exchange, low or high demand, materials specification, inflation pressure and availability of raw materials. Omorgie and Radfort (2005), surveyed contractors, consultants and public client and revealed price fluctuation as the most severe cost of project escalation. This could be attributed to the limitation in exchange rate which in turn affects construction material prices and the general price levels. Another factor is the unstable inflationary trend in Ghana which is as a result of demand exceeding supply, creating scarcity of goods which can lead to escalation of the goods. Ogunlana et al. (1996), noted that the reason for shortage of materials could be the defective supply of materials occasioned by general shortages in the industry, poor communication amidst sites and head office, poor purchasing planning and materials coordination. According to Manavazhi and Adhikari (2002), the major reasons for supplier manipulation are monopoly, control of the market by some suppliers, work stoppages in factories, lack of industrialized materials, fluctuating demands forcing supplies to wait for accumulation of orders and difficulty in importing raw materials from other countries.

2.8.3 Assessing the Effect of Weather Conditions in construction industry

According to Frimpong, et al. (2003), weather is the most uncontrollable factor amongst the other variables considered. Temperature and humidity affect productivity of workers. If the temperature and humidity are high, workers feel lethargic and lose physical coordination. Even though, with the most sophisticated technology available and a vast array of tools, meteorologist or forecasters are still subject to a wide variability and questionable accuracy. The construction manager remains at the mercy of the weather. This fact is particularly troublesome to those engaged in heavy civil work, site development and activities that involve earthwork or other sensitive operations. Weather related delays or curtailment are especially unwelcome in today's highly time driven construction environment. Weather is one of many variables that the

construction manager cannot control. The construction manager must recognize the impact of the weather and mitigate the effects.

2.8.4. Political Challenges in the Execution and Award of Construction Projects

Omole (1986), reveals that 80% of the contractors in Nigeria are indigenous companies. The government agencies in most cases are guided by the political heavy weight to award contract to party stalwarts at very high prices. The consultants estimates are disregarded in most cases when awarding contract and where possible manipulated. It is- a general knowledge that government and parastatals give a very short time to consultants to prepare contract documents for tender purposes.

Fraudulent practices and kickbacks were the second most important construction cost in Nigeria as stated by Elinwa and Silas (1993). Hussein (1999), also noted that fraudulent practices and kickbacks occasioned by greed are perpetrated by some major players in the construction industry. The perpetrators of this act in the industry are predominantly found within the rank of file of contractors, consultants and clients as evident from the report published by TELL (2002).

2.8.5 Time Constraints in the Implementation of Construction Projects

Time is money to owners, builders, and users of the constructed facility. From the owner's perspective there is lost revenue by not receiving return on investment, cash flow crunch, potential alienation and loss of clients/tenants, extended interest payments, and negative marketing impacts. From the users' perspective, there are financial implications similar to owners. Delays in constructing or rehabilitating infrastructure negatively affect businesses and the public at-large. Time implications from the contractor's perspective include liquidated damages (negative) and incentive/disincentive payments. Delays result in extended overhead

costs and put a crunch on critical cash flow. Extending project durations limits the contractor's bonding capacity and ability to bid more work (opportunity cost). Inefficient time management results in higher labor and equipment costs. A reputation-for late completions is bad for business, especially in negotiated work.

In today's intensely time driven business environment, superior planning, scheduling, and control are vital. The CM is faced with the challenges of completing high volumes of work within tight time frames, and generally finite resources. CMs must comprehensively plan construction operations and closely monitor progress. CPM schedules and Linear schedules are valuable tools that provide several advantages in managing construction operations. Schedule preparation requires managers to think the project through prior starting the work and provides a structured approach to planning. Comprehensive schedules provide a means of communicating the work plan to others. Schedules must be an accurate portrayal of the work plan to realize the full value. A good, regularly updated schedule in the hands of a competent CM is a powerful tool.

2.8.6. Assessment of Work Force Considerations and Output in the Construction Industry

As is the case in any business, people are a construction organization's greatest resource. Construction operations depend on the knowledge and skills of people planning and executing the work. The quality of this most important resource: people, is what distinguishes one team or company from another. Having talented management in place to guide and direct operations is crucial. Obviously, having an adequate number of skilled and unskilled workers to perform the work is a bare necessity. Finding and recruiting sufficient numbers of skilled, talented people is becoming increasingly difficult. There are several factors contributing to this problem.

Construction is typically viewed as being one of the least desirable industries in which to work. Surveys among the nation's youth show construction at the bottom of the list of professions that they would enter. Construction by nature is dangerous, dirty, hard work. The pervasive growth of technology and the associated industries that have followed are attracting the youth away from traditional industries. Consequently, there is a severe shortage of bright, talented people willing to work in construction. However, there are complications involved with employing a foreign workforce, namely language and cultural barriers. The obvious problems in communication can lead to confusion that can hamper productivity and coordination. The language barrier also imposes additional safety risks. Construction managers need to provide solutions to enhance productivity and ensure safety among the workers (Muir, 2005).

This provides the opportunity for upward mobility and gives motivated individuals the chance to advance professionally, Empowerment leads to high levels of commitment, enthusiasm, self-motivation, productivity, and innovation. Benefits to the employee include feelings of appreciation, belonging, and heightened self-worth. Empowerment of the workforce is one of the keys to improving construction performance (Muir, 2005). On the other hand, inadequate technical and managerial skills required in project implementation, lack of continuity in relation to type, scale and location of work. An inadequate approach and insufficient understanding of the contract documentation and the preparation and submission of tenders slow and non-payment by government after completing a government project affects projects performance.

There are many routes to the different careers within the construction industry which vary by country. However, there are three main tiers of careers based on educational background which

are common internationally. Thus; Unskilled and semi-skilled - general site labor with little or no construction qualifications

- Skilled- on-site managers who possess extensive knowledge and experience in their craft or profession.
- Technical and management- personnel with the greatest educational qualifications usually graduate degrees, trained to design, manage and instruct the construction process.

2.8.7 Ensuring Safety of Workforce in the Execution of Constructional Projects

Safety remains an ongoing concern for the construction manager. Construction by nature is inherently dangerous, with a high degree of hazard and risk. The toll of construction accidents is high in terms of both costs and human suffering. Accidents add a tremendous burden of needless and avoidable expense. Financial losses pale when compared to bodily injury and death, and the resulting human, social impacts. According to Muir (2005), Insurance (such as workmen compensation) protects the contractor from certain direct expenses, but accidents also involve substantial costs that are not insurable, referred to as hidden or indirect cost. Direct costs include medical cost and compensation. Indirect or hidden costs include:

- Time lost from work by the injured party
- Diminished quality of life for the injured party
- Loss of efficiency by breaking up crew
- Cost to train new or replacement employees
- Damage to equipment and tools
- Loss of production

The courts charge the employer (management) with the responsibility of providing a safe place to work; safe appliances, tools, and equipment; developing and enforcing safety rules and regulations; and providing instructions regarding employment dangers. Keys to a successful construction safety program includes: support and enforcement from top management, front line management (superintendents & foremen) consistently following and enforcing the safety program, on-going and comprehensive training, and recognition by all employees that safety is everyone's job.

2.9 Assessment of Construction Management and Performance

There is a strong relation between project management and project performance. Management in construction industry is considered as one of the most important factors affecting performance of works. Lehtonen (2001), obtained a model for performance measurement which assist both firms top management and operational managers for continuous feedback on operational activities. Thomas (2002), stated that documenting and archiving performance data could be useful for future reference, such as for settling disputes on claims, and in maintenance and repair works.

Kuprenas (2003), remarked that quantification of the impacts of the project management processes are identified through three steps of analysis: comparison of summary statistics of design performance, proof of statistical significance of any differences and calculation of a least squares regression line of a plot of design performance measurement versus amount/application of project management as a means to quantify management influence to design phase cost performance.

Cheung et al (2004), studied the project performance related to project managers. It is remarked that development of a Web-based construction Project Performance Monitoring System (PPMS)

can assist project managers in exercising construction project performance indicators and can help senior project management, project directors, project managers, etc., in monitoring and assessing project performance. Pheng and Chuan (2006), stated that while project management is only one of the many criteria upon which project performance is -contingent, it is also arguably the most significant as people formulating the processes and systems who deliver the projects. Ugwu and Haupt (2007), stated that an adequate understanding and knowledge of performance are desirable for achieving managerial goals such as improvement of institutional transformations, and efficient decision.

2.10 Measurement of Project Performance

Tangen (2004), obtained that performance measurement is a complex issue that normally incorporates at least three different disciplines: economics, management and accounting. Measurement of performance has garnered significant interest recently among both academics and practitioners. Tangen (2004), remarked the choice of a suitable measurement technique depends on a number of factors, including the purpose of the measurement; the level of detail required; the time available for the measurement; the existence of available predetermined data; and the cost of measurement. For construction projects, there have been different measurement indicators. The generally perceived factors that influence quality performance can be grouped under the headings of client, project, project environment, project team leaders, project procedures and project management procedures (Chan and Tam, 2000). Research has documented that, sophisticated and specialized clients having a better chance of success are critical variables. The nature of the client (from public or private sector), the clarity of the project mission, their competency in terms of ability to brief, make decisions and define roles, have been found to significantly contribute to a quality of a project Naoum, 1991). Navon (2005), defined

performance measurement as a comparison between the desired and the actual performances. For example, when a deviation is detected, the construction management analyzes the reasons for it. The reasons for deviation can be schematically divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources). Navon (2005), stated that performance measurement is needed not only to control current projects but also to update the historic database. Such updates enable better planning of future projects in terms of costs, schedules, labor allocation, etc. Pheng and Chuan (2006) stated that the measurement of project performance can no longer be restricted to the traditional criteria, which consist of time, cost and quality. There are other measurement criteria such as project management and products.

Cheung et al (2004), stated that New South Wales Public Works Department in Australia launched a Project Performance Evaluation (PPE) framework, which covers a wide range of performance parameters. PPE parameters are communication, time, cost, quality, safety, claims and issues resolution, environment, contract relations. The main purpose of PPE is to extend project performance measures to cover soft parameters such as communication and dispute resolution. In the UK, a project performance measurement tool referred to as the Key Performance Indicators (KPIs) was developed by the KPI working group under the UK Construction Industry Best Practice Programme to include time, cost, quality, client satisfaction, change orders, business performance, health and safety. The three major steps in implementing KPIs are as follows: Decide what to measure, Collect data and calculate the KPIs.

However, both the PPE and KPIs are valuable tools for measuring project performance over a period of time. Anyway, it is obtained from previous study that both methods PPE and KPIs can be used for measuring performance as the indicators are similar in two methods. In this study KPIs method will be used to measure performance.

Iyer and Jha (2005), stated that measuring the performance of any construction project is a very complex process because modern construction projects are generally multidisciplinary in nature and they involve participation of designers, contractors, subcontractors, specialists, construction managers, and consultants. With the increasing size of the project, number of participants in the project also increases. The objectives of all participants need not be the 'same even. in a given project. Hence to measure performance of a project without specifying the participant and without specifying the criteria for judging the performance holds no meaning. Past researchers have employed different criteria such as compliance to schedule, cost and quality to judge the project performance. Lehtonen (2001), proposed a new framework for measuring construction logistics by using two dimensions in order to improve productivity.

The first dimension (use of measures) contains two kinds of measures. One of these kinds is called improvement measures which help construction industry to find out the problems with current practices. These measures are mainly used during development projects. Another kind is called monitoring measures which are used for continuous monitoring of operations. The second dimension of the framework is the focus of measures. It clarifies at which organizational level measures can be used. There should be information available at the company and project level, as well as at the specific supplier or subcontractor level.

Samson and Lema (2002), proposed performance measurement system. The system comprises of construction business perspective including innovation and learning, processes, project, stakeholders, and financial perspective. The indicators developed from perspectives are categorized into three main groups which are drivers' indicators, process indicators and results indicators. The key to the success or failure of the measurement system are leadership commitment; employees' involvement and empowerment; and information coordination and management. Shen et al (2005), presented a method. for measuring the environmental performance of construction activities committed by a contractor through calculating the contractor's environmental performance score (EPS). The level of EPS serves as a simple indicator for measuring and communicating the level of a contractor's environmental performance. According to Kuprenas, (2003), cost performance can be measured through a cost performance index (CPI) computed as:

$$CPI = \frac{BCWP}{ACWP}$$

Where:

- BCWP = budgeted cost of the work performed
- ACWP = actual cost of the work performed

From previous equation:

- If CPI value is one, it means, the cost was as planned at the budget Value)
- If CPI value is above one, the project was below its budget
- If CPI of less than one means, the project exceeded its budget.

Based on previous equation, time performance is measured through a schedule performance index (SPI) computed as:

$$SPI = \frac{BCWP}{BCWS}$$

Where:

- BCWP = budgeted cost of the work performed
- BCWS = budgeted cost of the work scheduled.

From previous equation:

- If SPI value of one means, the time was as planned (at the time Value)
- If SPI value above one means, the project was ahead of schedule
- If SPI of less than one means, the project was behind schedule

2.11 Information Technology and Construction Performance

Information technology technique is very important in the entire world. Information technology (IT) opens new visions in the businesses and industries performance of the world. The construction industry is considered as one of the industries using IT technique such as software management systems, database and communications. For many years, many processes, functions, operations were done difficulty because of absence of IT field. In addition, most of the," work was done manually which lead to more cost, time and poor performance. Furthermore, IT usage in the construction industry leads to many changes, innovations and developing in many aspects which lead finally to good and strong performance. IT affects schedule compression beneficially, and overall project cost savings which lead to a success performance of project (Schwegler et al, 2001).

Nitithamyong et al (2004) remarked that information Technology (IT) is now routinely used in the construction industry as a tool to reduce some of the problems generated by fragmentation. The use of IT improves coordination and collaboration between firms participating in a construction project, leading to better communication practices and so good performance. Its

benefits include an increase in the quality of documents and the speed of the work, better financial control and communications, and simpler and faster access to common data as well as a decrease in documentation errors.

Thomas (2002), proposed contractor Performance Appraisal and Reporting (PAR) system for reviewing contractor performance at an organizational level. Advancements in World Wide Web techniques provide enhanced capacities to collect compile and disseminate performance-related information to various construction stakeholders in a timely and cost-effective manner. Becerik (2004) stated that the rapid advances of web-based project management and collaboration technology offer new opportunities to improve existing' construction project performance.

Cheung et al (2004), obtained framework software to measure project performance based on project performance measurement system (PPMS). The system contains four stages which are data entry, database, reporting and action. This system has eight categories to measure performance which are people, cost, time, quality, safety and health, environment, client satisfaction, and communication. Goh (2005), remarked that information technology management leads to performance improvement in the construction industries. For instance, in Singapore 2003, general administration, design, project management, site management was enhanced by using IT. In addition, there were more advantages as quick working, good quality of work and fast access of information.

2.12· Key Performance Indicators as Means of Reducing Cost in the Construction Industry

According to Karim and Marosszeky (1999), the purpose of KPI's is to enable a comparison between different projects and enterprises to identify the existence of particular patterns. The UK working groups on Key Performance Indicators (KPI), have identify 10 parameters for

benchmarking projects in order to achieve a good performance in response to Egan's report (1998). But most of these indicators such as construction cost, construction time, defects, client satisfaction with the product or services, profitability and productivity, promote result-oriented thinking whereas predictability of design cost and time, predictability of construction cost and time and safety can be regarded as process-oriented thinking. Dissanayaka and Kumaraswamy (1999), used different representation values to evaluate time and cost performance such as project characteristics, procurement system, project team performance, client representation's characteristics, contractor characteristics, design team characteristics and external condition.

Karim and Marosszeky (1999) stated that the development and use of key performance. Indicators (KPI's) can help to identify dysfunctional in the procurement process. Karim and Marosszeky (1999), studied the development of key performance indicators to measure performance such as cost of pricing the tender as a percentage of contract value, number of times base tender price changed, time from the first tender to actual award of contract, average delay in payment of base claim, average delay in payment of agreed variations, average time for approval of agreed variations.

According to Pillar et al (2002), a performance measurement system is required to reflect the needs and expectations of all the stakeholders. Stakeholders' performances need to be measured and assessed throughout the project phases in order to ensure that no tremendous conflicts, disputes and blaming syndromes have occurred by the time the completion stage is reached. Since performance is an individual contribution to the execution of the task required in completing the .construction project, the performance of each participant should be measured, evaluated and prioritized at every stage of the project phase in order to determine the extent to

which a project has been successful (Liu and Walker, 1998). Samson and Lema (2002), remarked that, characteristics of emerging performance measurement indicators need analysis of both the organization and environment such as: nature of work, global competition, quality awards, organizational role, external demands and power of IT. The indicators should be able to identify causes of problems, address all possible performance drivers, and identify potential opportunities for improvement. Cheung et al (2004), remarked seven main key indicators for performance which are: time, cost, quality, client satisfaction, client changes, business performance, and safety and health. Navon (2005), stated that a number of research efforts to fully automate project performance control of various project performance indicators have been carried out in recent years. These are also briefly described together with the concept of measuring direct parameters and converting them into the sought indicators. These are (1) labor and earthmoving productivity based on measuring the location of workers or earthmoving equipment at regular time intervals; (2) progress based on the above data; (3) a comprehensive control of construction materials starting by monitoring orders and purchasing up to the movement of the materials on site.

Pheng and Chuan (2006), stated that project performance can be determined by two common sets of indicators. The first set is related to the owner, users, stakeholders and the general public which are the groups of people who will look at project performance from the macro viewpoint. The second are the developer, a non-operator, and the contractor which are the groups of people who will look at project performance from the micro viewpoint. Jin et al (2006), studied the relationship-based factors that affect performance of general building projects in China. Thirteen performance metrics was used to measure the success level of construction projects. These

factors were categorized into four groups namely cost, schedule, quality and relationship performance. It was recommended that foreign firms that have entered or are going to enter the Chinese construction industry should learn how to build cooperative and harmonious relationships with Chinese partners and finally achieve satisfactory project performance by paying sufficient attention to the aforementioned factors.

Ugwu and Haupt (2007), developed and validated key performance indicators (KPI) for sustainability appraisal using South Africa as a case study. It used four main levels in a questionnaire to identify the relative importance of KPI. The main indicators were: economy, environment, society, resource utilization, health and safety and project management and administration. Luu et al (2007), provided nine key performance indicators (KPIs) which can be applied to measure project management performance PMP and evaluate potential contractors as well as their capacity by requesting these indices.

2.13 Benchmarking and Performance Indicators among Construction Firms

Construction Best Practice Programme (CBPP) defines benchmarking as a systematic process of comparing and measuring the performance of the companies (business activities) against others, and using lessons learned from the best to make targeted improvements. Companies that engage in benchmarking do so for two basic reasons. They either are attempting to gauge where they stand against key competitors, or they are looking to learn and incorporate successful ideas from best of class companies. Tolosi (2000), defined benchmarking as a process which continuously measures the products, services and operational practices of a given organization to compare the organization's performance and operational practices with a selected sample group. In addition to create a basis for comparison, benchmarking is a good development tool because it enforces a

self-critical approach, indicating the points of operation the company must improve. Li et al (2001), stated that cooperative benchmarking should be used as a tool for achieving partnering excellence in construction projects. Benchmarking involves a comparative analysis between at least two parties in order to compare the current performance gap. Chan Albert and Chan Daniel (2004), defined benchmarking as the search for the best practices that will lead to superior performance of an organization.

Tolosi (2000), stated that benchmarking is coming into increasing use in telecoms by management regulators and offers potential for many useful applications. However, benchmarking must be used with caution, and its design as a tool of analysis must be thoughtfully considered in order to achieve accurate and meaningful indicators. The specific aspects of production and the companies to be used for benchmarking comparison must be carefully selected. Tolosi (2000), remarked that the term benchmarking is originated from the machine construction industry and refers to grouping technical and financial indicators for comparison amongst companies or across operating units within a company. The output is produced through comparing the key performance indicators of companies operating in comparable environments. Benchmarking helps companies to define the best possible indicators for comparison and to obtain a picture of the company's entire operation. Therefore, benchmarking is a useful tool for evaluating a company.

Li et al (2001), presented an eight-stage process of a cooperative benchmarking approach which can be used to improve the performance of parties entering into partnering agreements. Chan Albert and Chan Daniel (2004) obtained that the accurate construction planning is a key

determinant in ensuring the delivery of a project on schedule and within budget. It is remarked that there is an increasing global concern about benchmarking best practice measures of construction time performance (CTP) for use by clients, consultants and contractors in the construction industry. Gunduz et al (2005), seek to analyze and reduce productivity losses due to change orders by benchmarking change order impacts on productivity for electrical and mechanical projects. Grigoroudis et al (2006), mentioned that benchmarking approach can be used in order to determine the organizational strong and weak points, to evaluate its performance, to identify the competitive advantages and disadvantages and to know the improvement priorities for each performance indicator.

According to Augusto et al (2006), the effective performance cannot be achieved without challenges and obstacles. To meet these challenges and overcome these obstacles, an organization must have a clear understanding of its performance in relation to its competitors. To accomplish this task, an organization must have an organizational benchmarking system which is occupied with analytical models designed to measure multifaceted performance characteristics and parameters. Grigoroudis et al (2006), studied the assessment of user-perceived web quality and used application of a satisfaction benchmarking approach. The benchmarking analysis consists of the following parts:

- The user satisfaction analysis which concerns the identification of customer preferences and includes the estimation of the relative importance, and
- The satisfaction benchmarking analysis which is mainly focused on the performance evaluation of the competitive organizations against the satisfaction criteria.

The results presented how business organizations may locate their position against competition, reduce their weak' points and determine which characteristics will improve their global performance. This gives the ability to identify the most critical improvement actions and adopt the best practices of the industry. Abdel-Razek et al (2007), discussed the improving of construction labor productivity in Egypt by applying benchmarking for labor productivity performance. Labor productivity data was used from masonry activities on eleven building projects in Egypt, several measures of benchmarks of construction labor productivity were demonstrated, calculated, and then used to evaluate the productivity and identify the best and worst performing projects. Monch (2007), presented benchmarking efforts for production control approaches applied to complex manufacturing systems.

Requirements for benchmarking were derived from a modeling and from special software. Cavalieri et al (2007), provided a comprehensive view of benchmarking and performance measurement service for the evaluation and comparison of scheduling techniques. Luu et al (2007), presented how benchmarking approach can be applied to evaluate and improve the construction project management. A conceptual research framework was generally developed to perform a benchmarking study of the project management performance (PMP) from the contractor's viewpoint. It was remarked that benchmarking approach can help construction firms to learn from the best practices of others and carry out continuous improvement.

2.14 Project Success and Project Performance in Construction Industry

Al-Momani (2000), cited in Samirm(2008), stated that the success of any project is related to two important features, which are service quality in construction delivered by contractors and the project owner's expectations. Managing the construction so that all the participants perceive

equity of benefits can be crucial to project success. It is obtained that the complete lack of attention devoted to owner's satisfaction contributes to poor performance. Declining market shares, low efficiency and productivity, and the rapid construction cost escalation also lead to poor performance. Nitithamyong et al (2004), remarked that the success of construction projects depends up on technology, process, people, procurement, legal issues, and knowledge management which must be considered equally.

Pheng and Chuan (2006), defined project success as the completion of a project within acceptable time, cost and quality and achieving client's satisfaction. Project success can be achieved through the good performance of indicators of the project. So, success refers to project success and performance refers to performance of indicators such as project managers. Wang and Huang (2006), stated that Project success has been widely discussed in the project management (PM) literature. The focus of most studies of project success is on dimensions of project success (how to measure it) and factors influencing project success. Wang and Huang (2006), studied that how the engineers evaluate project success and to what extent key project stakeholders' performance correlates with project success. It is obtained that project owners play the most important role in determining project success, and project management organizations' performance as the single point of project responsibility has significant correlations with project success criteria. Lam et al (2007), stated that the allocation of risk among the contracting parties in a construction contract is an important decision leading to the project success.

2.15 Some Approach to Successful Execution of Constructional Projects

Deterioration of a well-planned project during execution can often have its origins traced back to how the plan was managed. Consider the project assumptions and constraints established during

project initiation and planning. A crucial project initiation step is identifying and understanding the assumptions and constraints imposed on a project. Problems can arise when those assumptions and constraints are not revisited during execution to determine whether they remain valid and accurate. Rob (2009), indicated that, changes in assumptions and constraints; once recognized, should be dealt with as part of project performance reporting, a key element of the communications management plan. Project performance reporting can play an important role in team morale and project support by highlighting good project performance; but its real value lies in keeping the project tracking toward its objectives by bringing attention to activities that are off plan. The tendency to minimize or ignore problems in the belief that small inconsistencies won't become significant, is pure folly repeated with alarming regularity.

It is a reality of sound project management that there is no designated cost period during the project life cycle. A well-planned project is always vulnerable to becoming troubled without adequate due diligence in plan execution. The inevitable project pressures and project dynamics will be a source of obstacles that can take the project down a troubled path, But adherence to a sound project management structure and the guidance of a project manager with the necessary skills to apply and implement that structure, provide the basis for consistently meeting project objectives and avoiding troubled project status Rob (2009), and Kumaraswamy (2002), highlight the needs to identify the significant factor containing the success of a project to enhance the performance. The accepted parameters are completion, within budget, compliance with established quality standard, client satisfaction project completion without accident.

Chan and Chan, (2004), emphasizes that accurate construction planning is a key factor in ensuring the delivery of a project on schedule and within budget. The successful execution of construction projects and keeping them within estimated cost and prescribed schedules depends on a methodology that requires sound engineering judgment, Al-Moumani, (2000), cited in (Alaghbari et al, 2007). Aibinu and Jagboro (2002), also identify two basic ways to reduce or if possible eliminate time overrun as acceleration of site activities and contingency allowance Kog et al (1999), cited in (Ying and Wilkson), opine that project management factors, good project planning & scheduling are of equal importance and improving the situation of construction project are also to be considered. These includes developing human resources in the construction industry through proper training & classification, of craftsman, adopting a new approach to contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors, adopting new approaches to contracting (Odeh and Battaineh, 2002).





CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter discusses the methods used in gathering data for the study. It involved the research design, the area of study, the population, the sampling techniques and sample size. It also uses data collection techniques like questionnaires, interviews and observation as well as giving accounts on how the questions were distributed.

3.2 Research Design

The research design used for the study is descriptive survey method, which involves observing and describing the behavior of a subject without influencing it in anyway. But only seeks to gather relevant information pertaining to the subject matter without manipulation and prejudice. Never the less, the choice for the use of the descriptive survey method stems from the fact that, the researcher uses survey as a tool for collection of data. The descriptive survey method is also useful where it is not possible to test and measure a large number of sample needed for more quantitative type of survey. The result of the descriptive survey is a useful tools for many areas of research, hence the choice of the researcher.

3.3 Area of Study

The geographical location covered by the study includes; Wa Township, with specific construction sites like construction of multi-purpose auditorium complex at Jahan College of education, construction of multi-purpose library storey complex at UDS Wa Campus,

construction of lecture hall with offices and the construction of hall of residence at UDS Wa Campus respectively, all within the Wa municipality of the Upper West Region of Ghana.

3.4 Population

The targeted population for the study consists of contractors, consultants and clients within the Wa municipality of the Upper West Region.

3.5 Sampling Techniques and Sampling Size

A non-probability (Judgmental) sampling method was used to determine the sample size for the study. This was because the nature of the study required that only a certain category of the respondents could provide the needed information. The total sampling size for the study comprises of (3) three groups namely clients, consultants and contractors with a total sampling size of (70) seventy with a total respondents of (64) sixty four. In each group, members occupying key management position were selected for both questioning and interviews. This include: the Chief executive or manager, the deputies (if more than one), the works managers, the supervisors among others. Table 3.1 contains the main population of the study.

Table: 3.1 Population Structure of the Study

Group	Sample Size	No. Responded
A. Public Clients		
Wa Municipal Assembly	3	2
Regional Coordinating Council	3	2
Ghana Education Service	2	2
Ghana Health Service	2	2
Community Water and Sanitation	2	2
Total A	12	10
B. Consultant		
Total Number of Consultants from the four major firms in Wa	22	20
C. Contractors		
	36	34
Total	70	64

The researcher is of the view that, these groups of people could provide reliable, factual as well as valid information towards the achievement of the objectives of the study.

3.6 Data Collection Techniques

The data collection techniques for the study involved: questionnaires, interviews and observation.

3.6.1 Questionnaires

Questionnaires were developed and distributed to consultants, client, and contractors who can read and write within Wa municipality within the study area. The issues involved in the questionnaires focused on the following;

- Type of services provided by organizations (contractors and consultants)
- Academic Qualifications of parties
- Years of Experience in the job
- Formal meetings with project team
- Incentive System to employees and workforce
- Source of funding
- Effects of irregular funding

3.6.2 Interviews

Interviews were conducted on the population in the study; notable among them are contractors who cannot read and write within the framework in the municipality. The interview involved issues regarding to factors affecting the performance of contractors, cost factor, time factor, quality factor, environmental factors, challenges affecting execution of construction projects, client related challenges, political related challenges, and delay in payments.

3.6.3 Observation

In order to support the data gathered for the research work, a number of visits were made to selected project sites in the municipal notable among them are the construction of multi-purpose auditorium complex at N.J Ahmadiyya College of Education, the construction of a multi-purpose storey library block at UDS Wa Campus, construction of Hall of Residence and the construction of multi-storey lecture theatre at UDS, Wa Campus respectively.

The researcher observed various features of the projects and the terminologies used in executing them.

3.7 Distribution and Collection of Questionnaires

The questionnaires were personally distributed by the researcher and research assistants.

The detailed statistics of the questionnaires distributed and those returned are provided in Table 3.2

Table:3.2 Distribution and Return Rate of Questionnaire

Respondents	No. Administered	No. Returned	% Returned
Contractors	36	34	94.4
Consultants	22	20	90.9
Clients	12	10	83.3

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals with the results and discussion from the questionnaires, interviews and observations.

4.2 Results and Discussion of Questionnaires

Results of questionnaires were obtained from consultants, clients and contractors who can read and write. These categories of persons were the targeted population and know the insight of the construction industry.

4.2.1 Result and Discussion of Questionnaire from Consultants

As to the type of services provided by organizations, 5 consultants representing 25% undertake building construction only. While 15 consultants representing 75% undertake building and civil works,

The details of the type of services provided by organizations are presented in table 4.1

Table 4.1: Services Provided in the Organization from Consultants

Services provided	Consultants	
	Response	Per. %
Building only	5	25
Building and civil works	15	75
Road construction only	-	-
Water and sewerage	-	-

4.2.2 Result and Discussion of Questionnaire of Academic Qualification from Consultants

This sought to find out about the academic qualification of consultants team. From the response it can be deduced that 7 consultants representing 35% are HND/Diploma, 10 consultants representing 50% are bachelor degree holders, 2 consultants represents 10% are master degree holders with 1 consultant representing 5% have other qualification and are presented in table 4.2.

Table 4.2: Academic Qualification of Consultants

Qualification	Consultants	Percentage (%)
	Response	
HND/Diploma	7	35
Bachelor degree	10	50
Master Degree	2	10
Others	1	5

4.2.3 Results and Discussion of Questionnaire of Years of Experience on the Job from Consultants

This is intended to find out the number of years of experience consultants have. The response indicated that 4 consultants representing 20% have between 1-5 years working experience. 6 consultants representing 30% have between 6-10 years working experience whilst 10 (50%) consultants have between 11-15. Only. Table 4.3 presents the findings of years of experience of consultants on the job.

Table 4.3: Years of Experience on the job from Consultants

Years of Experience	Consultants	
	Response	Per. %
1 – 5	4	20
6 – 10	6	30
11 – 15	10	50
16 and above	-	-

4.2.4 Results and Discussion of Questionnaire of Formal meeting with project team from Consultants

The questionnaire is intended to find out how often firms project team members formally meet to monitor, update and control the project. The findings presented indicated that only 1 consultants representing 15% organize formal meetings with their project team daily. As many as 15 consultants representing 75% meet formally with their project team weekly. 4 (20%) consultants organize formal meetings with project team. It can be deduced that consultants do organize formal meetings with their project team at one period or the other.

Table 4.4: Formal Meeting with Project Team from Consultants

Formal meetings	Consultants	
	Response	Per. %
Daily	1	5
Weekly	15	75
Monthly	4	20
None	-	-

4.2.5 Results and Discussion of Questionnaire Incentive System to Employees from Consultants

The researcher wants to identify how respondents supply incentive system to stimulate their consultancy firm. It was clearly shows that, 8 consultants representing 40% increase salary as a way of incentives to motivate their employees. 5 consultants with 25% give bonus as a way of incentives to workforce. 7 (35%) consultants provide training to their employees as way of incentive to them. Table 4.5 presents the findings.

Table 4.5: Supplying Incentive System to Employees by Consultants

Supplying incentive system	Response	Per. %
Increase salary	8	40
Bonus in position	5	25
Training	7	35
Others	-	-

4.3.1 Result and Discussion of Questionnaire from Contractors

The type of services provided by construction firms, 17 contractors representing 50% undertake building construction only. While 8 contractors representing 23.5% undertake building and civil works and only 6 contractors representing 17.6 undertake road construction only while 5 contractors are into water and sewerage.

The details of the type of services provided by organizations are show in table 4.2

Table 4.6: Services Provided in the Organization from Contractors

Services provided	Contractors	
	Response	Per. %
Building only	17	50
Building and civil works	11	23.5
Road construction only	6	17.4
Water and sewerage	5	14.7

4.3.2 Results and Discussion of Questionnaire of Academic Qualification from Contractors

This sought find out about the academic qualification of contractors who can read and write. From the response it can be deduced that 16 contractors representing 47.05% as HND/Diploma holders, with 11 constructors representing 32.35% are bachelor degree holders while 5 contractors representing 14.70 holds master degree, with only 2 contractors having other qualifications. Table 4.7 presents the findings.

Table 4.7: Academic Qualification from Contractors

Qualification	Contractors	
	Response	Per. %
HND/Diploma	16	47.05
Bachelor degree	11	32.35
Master Degree	5	14.70
Others	2	5.88

4.3.3 Results and Discussion of Questionnaire of Years of Experience on the Job from

Contractors

This questionnaire is intended to find out number of years contractors have. The response indicated that 11 contractors which represent 32.35% have between 1-5 years working experience. 15 contractors have between 6-10 years working experience representing 44.12% while 11.76 representing 4 contractors that are having between 11-15 years working experience. Only 4 contractors representing 11.76 have between 16 and above years of experience. Table 4.8 shows the findings of years of experience of contractors.

Table 4.8: Years of Experience of Contractors

Years of Experience	Response	Per. %
1 – 5	11	32.35
6 – 10	15	44.12
11 – 15	4	11.76
16 and above	4	11.76

4.3.4 Results and Discussion of Questionnaire of Formal Meetings with project team from contractors

This item is intended to find out how regular contractors in construction firms have formal meetings to update monitor and control the execution of projects. The finding revealed that 3 contractors with 8.82% organize formal meetings with their construction team daily, As many 25 contractors representing 73.53% meet formally with construction team weekly. 6 contractors organize meeting monthly with their team. Table 4.9 presents the findings.

Table 4.9: Formal Meeting with Project Team from Contractors

Formal meetings	Contractors	
	Response	Per. %
Daily	3	8.82
Weekly	25	73.53
Monthly	6	17.65
None	-	-

4.3.5 Results and Discussion of Questionnaire Incentive System to Workforce from Contractors

The researcher wants to find out how respondents give incentive packages to their workforce in order to stimulate the construction productivity in the firms. 12 contractors representing 35.29% increase salary as a way of incentive to motivate their workforce. 35.29% out of 12 contractors represents gives bonuses as way of motivating workforce in their firms. 9 contractors representing 26.47 provide training for workforce, while only 1 contractor find other means of motivation. Table 4.10 presents the findings.

Table 4.10: Supplying Incentive System to Workforce from Contractors

Supplying incentive system	Contractors	
	Response	Per. %
Increase salary	12	35.29
Bonus in position	12	35.29
Training	9	26.47
Others	1	2.9

4.4.1 Results and Discussion of Questionnaire from Clients

This questionnaire is meant to identify the sources clients obtain their funding. From the findings, as many as 90% of clients get their funding for their projects from the government (GoG) of Ghana. 60% receive their funding from GETfund and the World Bank while 30% get their funds from the common fund. Only 10% get their funding from European Union. Table 4.11 presents the findings.

Table 4.11: Source of funding from Client

Source	Response	Percentage
Government of Ghana (GoG)	9	90
Get fund	6	60
World bank	6	60
Common fund	3	30
European union (EU)	1	10

4.4.2 Results and Discussion of the Effects of irregular funding from Clients

This item is meant to find out the effects of irregular funding. The results obtained shown that 7 clients representing 70% indicated Cost overrun and time overrun as major effects while 2 clients representing 20% indicated shoddy work and abandonment of projects. Only 1 client representing 30% indicated inadequate supervision.

Table 4.12: Effects of Irregular Funding from Clients

Effects	Percentage	Position
Costs overcome	70	1 st
Time overruns	70	2 nd
Shoddy works	20	3 rd
Abandonment of projects	20	4 th
Inadequate supervision	1s0	5 th

4.5 Results and Discussion of Interviews

The research also employed interview as data collect techniques to solicit for data from Contractors who cannot read write but were within the targeted population of the framework which were captured by the researcher on the field.

4.5.1 Results and Discussion of Interview from Contractors who cannot Read and Write

The interview with contractors who cannot read and write revealed that, 3 contractors representing 30% were factors' affecting the performance of contractors is project labor cost which is one of main components in project cost. The labor cost to the project is always hugged as revealed by the team most especially when there is delay in payment of work done hence increase in project duration

It was also revealed that, 2 contractors representing 20% assertedthat, cash flow affects the performance of projects these is because cash flow determines the peace at which the project can either be on schedule or behind schedule and it was determine as an irregularity in the Wa Municipality.

It was further revealed through the responses from 2 contractors with 20% revealed that, time factor of the project depends on the availability of resource as planned in the project life cycle. Time factor affects directly and practically on projects performance thereby increasing the duration of the project as well as increase in initial contract sum.

It was also revealed that, 1 contractor representing 10% indicated that environmental conditions also affect the performance of projects because climate condition determines the delivery of construction projects.

Also, the in financial related challenges affects construction projects since lack of capital and difficulties in accessing loan for contractor comes with stuffer conditions. The causes to financial market instability which will then leads to cash flow problems in construction project include increment of interest rate in repayment of loans, inflation of material prices, labor wages and transportation cost and increment in foreign exchange for imported materials. Poor payment by clients was also predominant in the interview as both contractors and consultants mentioned that delay in payment for physical work done hamper the delivery of projects in the Wa municipality.

Further responses from the interviews from contractors suggest that, 2 contractors representing 20% asserted that human resource challenges also hinder smooth project delivery since shortage of skills of manpower. Poor supervision and poor site management, unsuitable leadership and breakdown of equipment's were some of the challenges affecting efficient project execution in the Wa municipality.

Finally, the responses from the contractors indicates that political interference causes great challenge in the construction field, this results in delay of works and the awarding of unnecessary judgment debt. Table 4.13 presents the findings.

Table 4.13: Interview on Causes of Delay in Project Completion from Contractors

Causes	Response	Percentage
Labour cost	3	30%
Delay in payment of certificates ²		20%
Cash flow on performance ²		20%
Environmental conditions	1	10%
Human resources	2	20%

4.6 Results and Discussion from Observations

The results of the observation made by the researcher, from selected project sites within the Wa municipality in order to solicit and ascertain the true state and terminologies used in the execution of the selected projects. Among the project sites visited were, N.J.A College of Education and University of Development Studies (U.D.S).

4.6.1 Results and Discussion of Observation at N.J.A College of Education

At N.J Ahmadiyya College of Education –Wa, upon the assessment of the researcher to ascertain both human resource, materials, methodology and terminologies used in the construction of a One Million, Four Hundred and Ninety Thousand, Three Ghana Cedis (GH¢ 1,490,003.00) Multi-Purpose Auditorium Complex by Messrs Bunas Company Limited which is to be completion in Twelve (12) calendar month with A.E.S.L being the consultants, it was observed that, reinforcement iron bars for both the lintel and the tie beam which was supposed to be four bars of iron rods in the formwork box was three without any concrete cover to prevent the bars of iron rods from exposing after the striking and easing of the formwork. It was also observed that iron straps used was not the actual size with wider intervals. The diagram of figures 4.1 presents the reinforcement in the lintel and the props used.



Fig 4.1 Reinforcement bars in lintel formwork at N.J Ahmadiyya College of Education on-going Multi-Purpose Auditorium Complex

It was also observed that, construction works was in progress without regards to the safety of workforce since scaffolds was used for the construction of an arch without guard rails and personnel's working on site without safety helmets and boots as well as the disposal of waste materials and construction debris on site shown in figures 4.2 and 4.3 respectively associated with the risk involved.



Fig 4.2 scaffold constructed for formwork without guard rails and sole plates at N.J.A College of Education-Wa



Fig 4.3 Pieces of Iron Rods and Waste Debris On Site At N.J.A College Of Education-Wa Auditorium Complex

4.6.2 Results and Discussion of Observation of Library Block Complex at U.D.S

Observation from Wa University for Development Studies (UDS) in the Municipality on the construction of an on-going library block complex with a contract sum Twelve Million Six and Twenty Three Thousand Three and Forty Four Ghana cedis Thirty Five Pesewas only (Gh¢ 12,623,344.35) being executed by Q3 Limited and funded by GETFund with A&QS Consortium being the consultants.

It was observed that, wooden props with butt joints was used to join the boards to support both the dead and imposed loads of the slabs and beams instead of metal adjustable props for such a high raise structure, scaffoldings which served as a working platform for supervisors and operatives was also made of woods instead of tubular moveable metals scaffolds. The diagram of figures 4.4 showed the methods used to support both the slabs and operatives as observed.



Fig 4.4: Wooden props used to support slabs at U.D.S Wa campus on-going library block complex

It was also realized from the observation at the UDS library block complex that safety of machines and equipment at site was not preserved but was at mercy of the vagaries of the weather with a concrete mixer machine and other materials not left out. The diagram of figures 4.5 and 4.6 presents equipment's which was at the mercy of the weather as observed.



Fig 4.5 concrete mixer machine being exposed to weather without



Fig 4.6 wheelbarrows and reinforcement iron rods at the vagaries of the weather at library block complex at UDS Wa Campus

4.6.3 Results and Discussion of Observation of Hall of Residence at U.D.S

Observation made at the same UDS Wa campus but different project site on the Construction of Hall of Residence at UDS, Wa with an initial contract sum of Thirteen Million Seven Hundred Eighty Four Thousand Six Hundred and Ninety Nine Ghana Cedis Seventy Three Pesewas (GH¢13,784,699.73) being executed Chen Overseas Limited and A&QS Consortium Ltd being the project consultants.

It was observed that, work was going on without the presence of the site engineer and that clearly shows in the assessment of the researcher that, the causes of failure in structure due to non-adherence to specifications arising out of poor and non-supervision of work force on sites. It was also realized that safety precaution on site was not enforced since operative was casting reinforced concrete slab on a first floor without regards to safety equipment. Further observation shows that cements that was meant to be used to cast the slab was left on the damped floor without pallets, equipment was left at the mercy of the weather with wooden props being used without sole plates. The diagram of figures 4.7, 4.8, 4.9 and 4.10 as observed and presented.



Fig 4.7 Construction in process without regards to operatives safety at UDS Wa Hall of Residence construction site



Fig 4.8 Cement Bags Left On Damped Ground without Pallets at On-Going Hall Of Residence At UDS Wa



Fig 4.9 As observed props used without sole plates to prevent movement and easy easing of formwork



Fig 4.10 A concrete hoist mechanical used to pour concrete mixture on a slab

4.6.4 Results and Discussion of Observation on 3-Storey Lecture Hall Complex at U.D.S

Further observations on the selected projects by researcher at UDS-Wa Campus concluded on an on-going construction of a 3-storey lecture hall complex at the campus with an initial contract sum of Five Million Eighty Eight Thousand Nine Hundred and Sixty Ghana Cedis Sixty Three

Pesewas (GHC5,882,960.63) with Chen Overseas Limited being the contractor and A&QS Consortium Ltd being the project consultants.

It was observed by the researcher through the assessment of the project site that, poor supervision, non-adherence to project specification, storage of construction materials and equipment's on site and the construction methods used was poor. With rain water stuck on decked concrete slabs, timber for props packed without wooden sticker for free circulation of air to ensure proper seasoning of the boards, purlins hooked on metal trusses left to the weather and finally materials and equipment at the mercy of the weather as observed. The diagram of figure 4.11 to 4.12 shows the various observations made.



Fig 4.11 water stacked on a decked slab due to uneven surface at the on-going construction of 3-storey lecture hall complex at UDS-Wa



Fig 4.12 Timber purlins exposed to the vagaries of the weather of on-going lecture hall complex

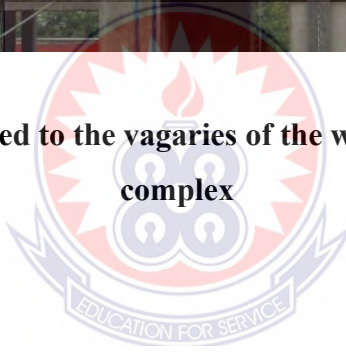




Fig 4.13: As observed, timber packed in dampness and not on wooden stickers



Fig 4.14: A tipper truck and other equipment at mercy of the weather at the project site

CHAPTER FIVE

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the summary of the findings, conclusions and recommendations of the study.

5.2 Summary of Findings

The following are the summary of findings

- The study revealed that, most of the contractors lack the requisite technical knowledge and capacity, therefore find it difficult to interpret drawings and other specifications given to them by project consultants.
- The study also revealed that, most contractors were only interested in winning contracts, and therefore do everything possible to win a bid without necessarily taking into consideration the performance measurement of the contract they are bidding. As a result, perform poorly due to non-adherence of performance measurement.
- It was clear from the study that, delay payment of contract executed was the greatest challenges fronting contractors but more worrying is the failure of clients, usually the government Ghana, to pay interest or compensation for delayed payments.
- It was revealed that, most of the firms lack effective communication link between the contractors and consultants in the coordination of projects since most of the contractors cannot read to interpret specifications.
- It was realized from the results that material storage and equipment's management on site with regards to its utilization was not the best since timber was kept un-stacked on floor and wheelbarrows and other equipment at the mercy of the weather.

- From the study it was noticed that, most of the contractors cannot self-finance projects they have bided/ tendered for, and therefore depend on bank loans and credit facilities as external source of funding the projects which attracts higher interest.
- The analysis from the Survey showed that government award a lot projects during election periods and put pressure on most contractors to hasten work on their hands for political advantage which leads to shoddy work.

5.3 Conclusions

From the study, it can be adduced from the assessment of construction projects that, contractors executing various projects in Ghana for that matter Wa municipality lack the necessary administrative and managerial knowledge in the execution of their projects and should therefore be given a periodic training and orientation in order to increase their administrative and management techniques of such contractors and their firms to enhance value for money

The ministry of Finance and Economic Planning must be fast in honouring payment certificate on financing the various projects executed by contractors and the professional fees for consultants must be paid prompt in order to prevent the effects on the completion time and quality of projects executed.

The contractor's unstable financial background, client's poor financial and difficulties in getting loan from financial institution and couple with high inflation were identified as most significant that leads to inefficiencies in the construction industry.

Lastly, it can be concluded that, major challenges affecting the efficient execution of construction projects in Ghana is financial inadequacies, political interferences in award of contract to deserving contractors, high interest rate, price fluctuations lack of qualified

personnel's, inadequate equipment's, poor payments as important challenges affecting the execution of construction projects.

5.4 Recommendations

The recommendations are made to address the findings;

- The study recommends that, professional bodies such as Building and Road Research Institute (BRRI) that regulate the construction industry should organize in-service training for construction companies to sharpen and enhance upon their management styles on site and further update their knowledge to be more familiar with project management techniques and processes.
- The study recommended that, a new approach to contract award procedure be instituted by giving less weight to prices and more weight to the capacity, past performance and adherence of performance measurement of contractors bidding for projects.
- The study also recommends that; client should ensure that there are available funds for a project before it is awarded in order to avoid prolonged delay in payment of certified certificates for work done by contractors.
- The study recommends that, effective and efficient communication and coordination link should exist between contractors; project consultants and client to ensure free flow of information among all parties concerned, most importantly contractors that cannot read to interpret drawings and specifications.
- The study also recommends that, contractors making requisition of materials to project site should put into consideration the availability of storage facilities that will receive such materials

- Furthermore, the study recommended that, contractors bidding for work should assess their financial capacity, putting into consideration the financial burden that will be on them out of bank loans and other credit facilities due to accumulated interests caused by delay payments of certified work done.
- Lastly, the study recommended that, government of Ghana who is the major clients of many projects should be advised by the consultants of that project to adhere to the time period of completion of projects and specified to pay certified certificates as stipulated in the conditions of contract for proper execution of project.



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APPENDIX A

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION – KUMASI
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF CONSTRUCTION TECHNOLOGY

QUESTIONNAIRE FOR CONTRACTORS

This questionnaire is part of a study aimed at: **Assessing Construction Projects in the Wa municipality, Factors and Challenges. This study is solely for academic purpose.** Please your time and energy used in responding to this questionnaire are highly appreciated. Please you are assured that any information given shall be treated with confidentiality and anonymity.

Background Information: Please tick [√] as appropriate:

Please tick [√] the most appropriate answer to the questions. Tick as many as possible

1. Which type of firm or organization do you work with?
 - (a) Consultant []
 - (b) Client []
 - (c) Contractor []

2. What services does your organization or firm provide?
 - (a) Building only []
 - (b) Building and Civil works []
 - (c) Road construction only water and sewage []

3. What is your academic qualification?

(a) HND/Diploma []

(b) Bachelor Degree []

(c) Master Degree []

(d) Other specify

4. How many years of experience do you have?

(a) 1-5years []

(b) 6-10years []

(c) 11-15years []

(d) 16years and above []

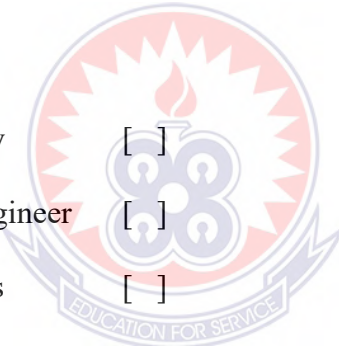
5. What is your Job title?

(a) Project Manager/Deputy []

(b) Site Engineer/Office engineer []

(c) Foreman/Clerk of works []

(d) Others specify



6. How many projects has your firm executed in the last five years?

(a) 1 to 10 []

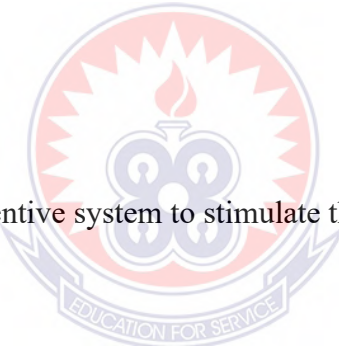
(b) 11 to 20 []

(c) 21 to 30 []

(d) More than 30 []

Planning Challenges

7. How often does your project team formally meet for discussion on monitoring, updating and controlling the progress?
- (a) Daily
 - (b) Weekly
 - (c) Monthly
 - (d) None
8. How often do you coordinate your schedule with master schedule of the project owner?
- (a) Daily
 - (b) Weekly
 - (c) Monthly
 - (d) None
9. How do you supply the incentive system to stimulate the construction time?
- (a) Increase salary
 - (b) Bonus in position
 - (c) Training
 - (d) Others specify
10. How often do you organize meeting for safety issue?
- (a) Monthly
 - (b) Weekly
 - (c) Daily
 - (d) None



Challenges Affecting Efficient Execution of Construction Projects

Please rank in order of importance the factors affecting the efficient execution of construction projects

	Challenges	Not important	Less important	Important	Very important	Highly important
11. Equipment Related	Inadequate equipment					
	Lack of plants and equipment					
	High cost of hiring/leasing					
	Lack of good quality equipment					
	Constant breakdown of machine and equipment					
	Use of old equipment and lack of maintenance					
	12. Financial Related	Financial inadequacies				
High interest rate						
Poor payment by client						
Performance guarantees						
Lack of resources to mobilize requirement on site						
Lack of capital						
13. Human Resources Challenges						

	Lack of qualified personnel					
	Insufficient skilled labour					
	Lack of technical expertise					
	Poor programming of job execution					
	Delay in delivery of services					
	Lack of benefit for their employees					
14.	Client Related Challenges					
	Unrealistic specification for goods, works and services					
	Poor designs by clients					
	Poor bid evaluation					
	Changing specification and other statement of requirement					
	Urgent and emergency deadlines for delivery					
15.	Procurement Related Challenges					
	Delayed procurement procedures					
	Material sourcing					
	Limited supply of raw materials					
	Contract management challenges					
	Failure to give correct information on firms capability					

	statements					
16.	Political Related Challenges					
	Political interferences in contract activities					
	Lack of government support to groom local contractors					
	Discrimination amongst bidders					
	Influence of other organizations demanding tips before awarding contracts					
17.	Other Challenges					
	Price fluctuations					
	Weather unpredictability					
	Language barrier					
	Contractors always bids low to get contracts					
	Low interest in the activities of professional association					

APPENDIX B

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION – KUMASI
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF CONSTRUCTION TECHNOLOGY

QUESTIONNAIRE FOR CONSULTANTS

This questionnaire is part of a study aimed at: **Assessing Construction Projects in the Wa municipality, Factors and Challenges. This study is solely for academic purpose.** Please your time and energy used in responding to this questionnaire are highly appreciated. Please you are assured that any information given shall be treated with confidentiality and anonymity.

Please tick [$\sqrt{\quad}$] the most appropriate answer to the questions. Tick as many as possible

Factors Affecting the Performance of Construction Projects

Below are a number of factors affecting the performance of construction projects? From your experience, please express your opinion on the importance of the following factors as key performance indicators of construction projects in Ghana (please tick [$\sqrt{\quad}$] the appropriate box).

No.	Groups/Factors	Not important	Less important	Important	Very important
1.	Cost Factors				
	Escalation of materials cost				
	Project labour cost				
	Project overtime cost				
	Motivation cost				
	Cost of variation orders				

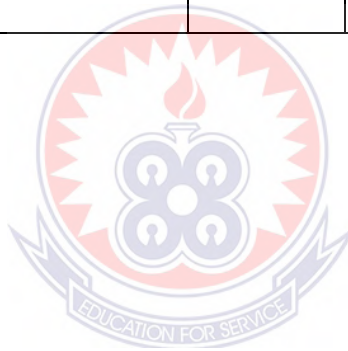
	Waste rate of materials				
	Liquidity of the organization				
	Cash flow of the project				
	Profit rate of the project				
	Overhead cost				
2.	Time Factors				
	Planned time for project construction				
	Site preparation time				
	Time needed to rectify defect				
	Average delay in payment from owner to contractor				
	Availability of resources as planned through project duration				
3.	Quality Factors				
	Conformance to specification				
	Availability of personnel with high experience and qualification				
	Quality of equipment and raw materials in project				

	Quality training/meeting				
4.	Productivity Factors				
	Project complexity				
	Number of new projects/ year				
	Management-labour relationship				
	Absenteeism rate through project				
	Sequencing of work according to schedule				
5.	Client Satisfaction Factors				
	Information coordination between owner and project parties				
	Leadership skills for project manager				
	Number of disputes between owner and project parties				
6.	Innovation and learning factors				
	Learning from own experience and past history				
	Learning from best practice and experience of others				
	Training the human resources in the skill demanded by the project				

	Review of failures and solve them				
7.	Environment Factors				
	Climate conditions in the site				
	Air quality				
	Noise level				
	Wastes around the site				

8. Performance Measurement Indicators				
Groups/Factors	Not important	Less important	Important	Very important
Contractors' ability to do the right job first time				
Contractors' providing adequate training to their employees				
Contractors' ability to provide their own resources				
Contractors' ability to identify problems and deficiencies				
Contractors' ability to complete work on time				
Contractors' ability to quickly correct deficiencies				
Contractors' ability to keep the environment clean				

Contractors' ability to keep clients' facilities clean				
Contractors' ability to use high quality material				
Contractors' ability to work as team players				
Contractors' ability to minimize interruptions of operations				
Contractors' ability to provide correct documentation & invoices				
Contractors' ability to adapt to changes and meet needs				



APPENDIX C

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION – KUMASI
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF CONSTRUCTION TECHNOLOGY

QUESTIONNAIRE FOR CLIENTS

This questionnaire is part of a study aimed at: **Assessing Construction Projects in the Wa municipality, Factors and Challenges. This study is solely for academic purpose.** Please your time and energy used in responding to this questionnaire are highly appreciated. Please you are assured that any information given shall be treated with confidentiality and anonymity.

Please tick [] the most appropriate answer to the questions. Tick as many as possible

1. What has been your area of development?
 - (a) Building
 - (b) Roads
 - (c) Sanitation (toilets & drainage)
 - (d) Estate/residential

2. What has been the source of funding for such projects?
 - (a) Get fund
 - (b) Government of Ghana
 - (c) Common fund
 - (d) European Union
 - (e) World Bank

(f) Danida []

(g) Others specify

3. How regular is the funding?

(a) Annually []

(b) Semi-annually []

(c) Quarterly []

(d) Bi-annually []

4. What are the effects of irregular/delay in funding?

(a) Inadequate supervision []

(b) Abandonment of projects []

(c) Shoddy works []

(d) Cost overrun []

(e) Time overrun []

(f) Others specify



5. Do your consultants invite you to site meetings?

(a) Yes []

(b) No []

6. If YES how often

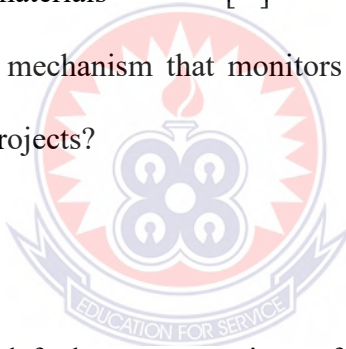
(a) Weekly []

(b) 2 weeks []

(c) Monthly []

(d) Others specify

7. Have you experience any inefficiency in the part of working on your project?
- (a) Yes
- (b) No
8. If YES, what was the cause(s)?
- (a) Delay in payment
- (b) Inadequate supervision
- (c) Lack of qualified personnel
- (d) Lack of good quality equipment
- (e) Limited supply of raw materials
9. Do you have any internal mechanism that monitors and report directly to you on the progress of work on your projects?
- (a) Yes
- (b) No
10. Have you experienced any default on your projects after practical completion and defects liability periods have expired?
- (a) Yes
- (b) No
11. If YES, what was the period?
- (a) 6-12 months
- (b) 13-18 months
- (c) 19-24 months
- (d) 25-32 months



INTERVIEW GUIDE

INTERVIEW GUIDE FOR CONTRACTORS WHO CAN NOT READ AND WRITE IN CONSTRUCTION FIRMS IN THE WA MUNICIPALITY

QUESTIONS	RESPONSES
1. What category of registration does your firm belong?	
2. How long has the construction firm existed?	
3. How many people are employed by the company?	
4. What is your source of funding?	
5. How are contracts signed within your firm?	
6. How many projects have you executed in the past 5 years?	
7. What are the factors that lead to poor performance?	
8. Does your firm do performance analysis?	
9. What performance analysis does your firm do frequently?	
10. Do you have a well-planned document for execution of projects?	
11. Who designs the prototypes or plans for projects?	