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Causes of Delays in Building Construction Projects with Regular Cash Inflow: A Survey of Some Selected Projects in the Accra Metropolis

By

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MASTER OF SCIENCE

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DECLARATION

I hereby declare that no part of this thesis has been submitted for a certificate, diploma or degree elsewhere. References to other published reports have been duly acknowledged.

I also declare that this thesis is a Sole work of mine.

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DEDICATION

I dedicate this work first of all to the Almighty God for shepherding me throughout this program successfully, and also to my entire wonderful family especially to all who encouraged and supported me.

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ABSTRACT

The study was conducted to determine the major factors that cause delays on project with regular cash inflow, know the tools used in addressing the issues of delays in the construction sector, and finally, investigate how project management practices are adopted to help minimize delays in projects with regular cash inflow. Using quantitative research design, questionnaires were issued to collect data from respondents and the data was analyzed using SPSS data analysis software (Version 22.0). results of the analyses were discussed and presented using figures/charts, frequencies and percentages. The study found that there had been delays in project management that affect the execution process. In addition, it was found that efforts are made to address such challenges to reduce their impacts on the overall project success levels. The study recommends that there should be much education and coordination for project parties to achieve the expected objectives.

Keywords: Building construction, projects, regular cash inflow, Accra metropolis

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Physical infrastructural development all over the world is growing so rapidly due to the pace of fiscal and infrastructural growth across the globe nevertheless there has been major hindrances that slow down projects. Construction is mostly defined to include all aspects of human settlements in addition to the extraction of raw materials and its manufacturing, as well as the construction of the project cycle from feasibility of the built environment duPlesis (2002).

A broader idea on construction stipulated that construction needs much more planning and adequate maintenance to improve the life span of constructed facilities. These facilities may include both residential and non-residential and heavy constructions (Moavenzadeh, 1998).

Some studies, especially the one conducted by Miller and Lassard (2001) prove that some aspects of construction risks are associated with project management. Delays have also become a major issue in construction projects (Fugar and Agyakwah-Baah, 2010). They assert that delay begins at the beginning of a project. (Scott et al., 2004) add that sometimes it becomes possible for construction projects to suffer from unnecessary delays which in tend result in loses for all stakeholders including client or owner, the contractor and consultants.

Delays are prevalent in most of the traditional type of contracts where contracts are given to bidders with the lowest cost and its more common in third World countries. However, it is believed that the timeliness of a project matters most (Latham, 1994). This is because it gives information about the sector's efficiency (NEDO, 1988).

Quality, time and cost are of primary importance in construction and that must be catered for before anything else. (Bennett and Grice, 1990). A project with 'good' cash flow has not been clearly operationalized.

1.2 STATEMENT OF THE PROBLEM

Delay in projects execution has been of major concern in past decades. In the effort of governments to expand fiscal development, there is a corresponding increase in cost and expenditure. It is a normal tradition to allocate developmental funds in her yearly Budget (Barber and El-Adaway, 2013). Majority of these funds is set aside for the construction sector. If these projects are delayed, it affects both fiscal growth and government expenditure because the cost of materials may rise and there may be a change in contractors which may come at a high cost. This will be due to procurement of materials at higher price and due to high incurred when there is change of contractors. This leads to inefficient allocation of a country's resources (Fugar and Agyakwah-Baah, 2010).

In addition, business organizations make huge investments on acquiring new facilities or maintaining previously existing ones to allow room for expansion and survive market competition. But in doing so, the companies face threat of over spending which can likely end up in the companies becoming insolvent.

Moreover, contractors are constantly losing contracts due to delays in project execution or sometimes failure to complete projects as planned. It may end up in disputes among stake holders of the project which escalate to face legal battles which consequently increases the overall cost of the project.

Finally, delay results in tarnishing the image of the country's construction sector which makes investors lose confidence and trust in the sector (Sambasivan and Soon, 2007). Therefore, it is it is necessary to carry out such studies to ascertain the factors that cause delay in construction to enhance efficiency and productivity in the construction sector. This will go a long way to benefit all stakeholders in construction in the sense that it helps avoid disputes, litigation and arbitration.

Meanwhile, when there is a regular cash flow in projects, delays cannot be attributed to lack of funds but may be due to several other reasons which would be determined by the end of this study.

1.3 AIM

This main aim of this research is to find out the causes of delays in building construction projects with regular cash inflow and how to minimize it.

1.4 OBJECTIVES

Therefore, the study seeks specifically to;

1. Determine the major factors that cause delays on projects with regular cash inflow
2. Determine the kind of technology used worldwide to handle delays in the construction sector.
3. Investigate how project management practices are adopted to help minimise delays in projects with regular cash inflow

1.5 SIGNIFICANCE OR JUSTIFICATION OF THE STUDIES

The results of the study will serve as a guideline to the construction industry as a whole and the community as well. They will be able to determine the uncertainties that can result to slow down the progress of projects right from initial stages and correct them. The study will be able to expose all the necessary factors that lead to delay and determine the benchmark for future and existing projects. In addition, stakeholders will also generate measures to mitigate or eliminate the consequences of delayed projects. Lastly, the study will add to literature by agreeing with or disagreeing with what previous studies have established.

1.6 SCOPE OF THE STUDY

The study covers a wide range of topics in project management including key definitions, theories, models/concepts, and reviews from empirical studies. Specifically, the study discusses the causes of delays, available technologies in controlling project delays and the type of management practices employed in project execution. The study is specific to major selected projects in Greater Accra region, Ghana.

1.7 OVERVIEW OF RESEARCH METHODOLOGY

The study used quantitative research method of which data was collected through questionnaire administration. A sample of 50 respondents was selected using purposive sampling technique. Data was collected by the researcher through an empirical visit to the study area to meet respondents. The research data was analyzed using SPSS (Version 22). The study results were generated in the form of percentages, means, graphs and tables.

1.8 ORGANIZATION OF THE STUDY

This study is organized in five main chapters, thus from chapter one to chapter five. Chapter one is an introduction of the study. It comprises of the background of the study, problem statement, objectives of the research, justification/significance and organization of the study.

The second chapter is a literature review. It gives an insight of the conceptual framework of the study as well as empirical review. The third chapter describes the research methodology. The fourth chapter is data presentation and analysis. Chapter five provides a summary of the data analyzed in chapter four. It includes Findings, Interpretations, Recommendations and Conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

As stated earlier, the main objective of the study is to determine how application of project management practices would minimize delays in projects with regular cash inflow. In due regards, this chapter reviews studies and theories of previous researchers. Emphasis shall be made on importance of the construction sector, factors causing delays, and the factors that make the construction sector inefficient.

2.2 IMPORTANCE OF CONSTRUCTION SECTOR

The sector is believed to be a major contributor of a country's national income and continues to play a key role in national development especially in the aspect of infrastructural development. In Palestine for instance, it contributes to 33% of GDP which much exceeds the contribution of most sectors (Mahamid 2011, Orozco et al., 2011). Asubay and Mensah (2015) claim that the sector contributes to an average of 10% of GDP in most countries and also provides about 10% contribution to employment. The development industries in general has been growing rapidly with a mean boom price of 7% to 8% yearly. According to Doloi et al. (2012) production industries generate about 6% to 9% of GDP in India which is about 8% to 10% boom prices. Haq et al. (2014) claim that these structures of development have great impact on aggregate national growth.

The Ghanaian creation industries obtained a totally enormous function inside the Ghana economy. It is possible that its impact on the country's financial system is lower compared to the production sector, its contribution cannot be under estimated. The sectors for development helps in diverse ways to enhance the economy of the nation

and improving human resources that aid in an economic boom. This in a way can help to reduce cost for people in the country. A major hindrance to the construction industry of Ghana is the high fee of construction and delays in undertaking their contracts Aibinu and Jagboro (2002). This is in line with Aibinu and Odeyinka (2006) controlling time and value benefits that relate to delays in production brings difficulty and may in a way draw the project back. Although there may be some disagreements that will emerge following causative elements, expatiation and the magnitude of the claims. It is rather unfortunate that in our country, the incidence of creation delay is alarming typically when we consider the features of the situation at hand, based on the fiscal policies of the United States of America.

It was added by Ogunsem and Jagboro (2006) that construction sectors in Ghana is suffering from the fact that a lot of ideas go beyond their stipulated time, a time that exceeds the initial plan as agreed on in the conditions regarding the contract document. Owolabi et al. (2014) had a similar perception that the construction sector of Ghana is battling against a lot of problems with venture execution. Despite numerous studies pointing to the fact that delay in executing a contract is a major hindrance faced by a vast number of construction firms in Ghana. The study by Odusami and Olusanya (2000) based on the customer's attitude that also encourages the draw backs in executing construction works made emphasized that several projects undertaken in Accra suffer an average delay of about 52% of the stipulated duration.

Rashid et al. (2013) had a view that, things and conditions that prolong the contract execution period is a menace faced Internationally by several construction firms in several countries due to wide variety of motives. Aziz (2013) debated that for some time now, there has been a terrifying file in getting rid of the problems that come with

delay by the development industries and the troubles that come with delay in the production sectors have been overlooked. As a norm, they address time in an emergency schedule and therefore are unable to achieve the aim of the finishing touch period. Following the study of Shehu et al. (2015), There have been a notion that, claims pertaining to damages, disagreement and fee overgrow are in most cases forced on assignments that are behind the stipulated time within the construction firms and the additional technique on quality with which it is approached, there are other chances of minimizing the problems of challenges from coming over and over. Ali-Hazim and Salem (2015) had a notion that there are periods where there is high production problems that, changing the plan and not having a good safe guard measure in most cases lead to extending time and increasing price. Despite that fact there have been arguments by Slunke and Patil (2013); Hampton et al. (2012) made some arguments regarding their study pointing out the fact that, challenge delay in the construction firms subsequently lead to terminating the contract, going beyond the usual period, overgrowing price or time, substandard transport, claims or agitations. With the view of Braimah (2013) notwithstanding, the highest tough sort of chaos settlement is the development postponed misunderstandings.

2.3 CONSTRUCTION DELAY

In construction, delay as a term, refers to the maximum largely recognized, cost effective and unsafe issue skilled in a construction work. There is greater danger for construction initiatives during the extended period. These dangers lead to the extension of time and price. Extending the creation initiative sometimes emerge along the way by one or more factors. It is possible to commence with a subtle idea and which will emerge to a greater idea of interrelated integrated question in settlement

comprehension. There are several aspects of postpone that emerge from several factors, as an instance, fantastic settlement length of time and cost, contrasting web page situations, changing requests, effect and gradually increasing the impact of time extension, assessing the quality of work, consumer equipped assets, distinction within the expatiation of plans and designs, unfulfilled duties, rushing, waste and interference (Na Ayudhya 2011).

Tawil set al. (2014), Acharya et al. (2006) and Afshari et al. (2011) termed production postpone as "a state of affairs while the customer and the contractor collectively make a contribution to the past due execution of the work within the time set for completing the project in the terms and conditions." Abdullah et al. (2010) also described creation postpone because the time extension or the extra time added to complete the project. Finally, we can talk of delay as being a situation whilst the actual progress of work is slower as compared to the stipulated plan or the period set up for completing the project. El-razek et al. (2009) and Motaleb and Kishk (2010) changed into the notion that the extension of the project agenda date of entirety as shown in the contract document is a characteristic of delay. Regardless of the fact that, delay in construction can result in the termination of the contract, increase in charges, late task execution (Suresh and Kanchama 2015).

2.4 REASONS OF DELAY IN CONSTRUCTION

In a research conducted by Hampton et al.(2012) highlighted several task-associated variables that can account for delay, in addition to complexity; the environment and the area of focus.(i.e scope). Despite the fact that in the research conducted by Lowsley and Linnett (2006) placed emphasis on different variables including converting weather stations, unanticipated floor conditions, access to resources and incomplete layout

details. In “have a look at one of the reasons of delay on big projects,” said postpone variable is affecting owners and contractors in diverse ways with money being a major aspect. Fugar and Agyakwah-Baah(2010) highlighted several causes of delay in their research conducted on “delay in building production task in Ghana.” They grouped them into nine awesome ways, analyzed them and drew the conclusion that project time may be prolonged due to time wasted in acquiring permit, incorrect calculation of the assignment value, overlooking the actual details of the work, demanding situation from bank transactions, continuously changing the fees of substances among others. In the study conducted by Sweis et al.(2008) on the causes of creation postpone drew the conclusion that problems or hassle faced resulting from money due to the customer’s and the contractor’s inability to settle on their decision is a contributing factor to project postpone.

Ayman’s (2000) study on “take a look at on production postpone,” a quantitative analysis that was aimed at finding out the motives that cause delays on production initiatives. The study finalized that the major factor behind are caused by the engineer for the design, alternate within purpose for the construction, terrifying atmospheric conditions, tools and equipment, monetary and the fluctuation in amount of materials used in construction. The presence of postpone during undertaken has affected its crowning glory date. The study conducted by Doloi at al. (2012) on “analysing factors affecting delays in Indian construction venture” makes the assertion that loss of determination, mediocrity of site manager, inadequate coordination, little or no knowledge of challenge and conversation trouble cause delay.

Eden et al. (2000) asserted that there have been sizeable problems in proofing and indicating the values of this nature and time extension. Chappell et al. (2006) concluded that, it is a bit hard to discover a way to address a postpone hazard looking responsibility and price.

Faridi and El-sayegh (2006) identified the reasons of time wasting and blamed it on different occurrences. Their conclusion was based on their review and the interviews they conducted with individual construction experts inside the UAE. A good number of important causes of delay have been identified to impact the UAE improvement sector. A point by factor survey study instrument has accumulated based on the causes of delay that have been organized and grouped into eight practical lessons. The category for the contractor includes causes of creation postpone which can be constantly coming from contractors. This entails the access to assets, management and revel in three important properties. Al-Kharashi and Sikitmore (2009) also added that the main reasons for project delay fall under seven main categories as; the one doing the undertaken, the engineers, representatives, substances, human resource, agreement and causes related to relationship and extended variety with the people involved. A study conducted on time wasting in construction in Hong Kong showed that construction delay could be grouped into seven classes. Some were based on rank agreement aspect, agreement based on the percentage values and disagreement factors based on the percentage values to obtain the disparities in view of the various stakeholders on reasons of task delay. Creation delay has therefore been grouped as Concurrent delay, delay with excuse and delay with no excuse.

2.4.1 Concurrent Delay

Based on Longf (2015), "concurrent delay" occurs when more than one project events take place at the same time without any extension in the time duration. This is seen as a complex situation and it happens when the delay is because the customer is on the equal pastime course resulting from the one handling the contract. Hamzah et al. (2011) also believes that such delays occur with the effect on more than one component of the finishing date.

2.4.2 Excusable Delay

A delay with excuse is a delay that shows itself because of circumstance that is not yet seen or beyond human immagination, this goes beyond the contractor or the sub contractor's effort. Most of the time, settlement studies that summarized moves as a delay with excuse will in a way pass a warrant that the reason at the back of the postpone usually hard to predict and outdoor the capability of contractors control. Natural occurrences including earth quakes, landslides, severe winds, lightening and surges can also affect the process beyond human imagination. With this type of delay, a reasonable amount is added to the contractor's initial agreement value to cater for the losses and increase the duration of the contract.

2.4.3 Non-Excusable Delays

These types of delays are also above the contractor's effort or occasions which might be foreseeable. It could result from lack of skills of sub-contractors or improper delivery of project materials. It could also be as result of labor unrest. Gardenia et al. (2014) shared a similar opinion on this, he believes that the contractor and other related

issues could cause non-excusable delays. When it happens this way the contractors are not given any form of compensation.

2.5 CAUSES OF DELAY IN CONSTRUCTION

Four main factors are known to be the major causes of delay in projects. One relating to contractors, some from the side of consultants, others are from clients and the remaining factors from other external sources.

2.5.1 Factors Caused by Consultants

Per Enshassi et al. (2009), consultants are not to be left out when determining delay in construction because a significant part come from the side of consultants, this is mostly due to bureaucracy. Some of the delay from consultants is sometimes due to knowledge gap and poor leadership skills Odeh (2002).

2.5.2 Contractors' Related Factors

Odeh and Battaineh (2002) claim that both technological and human errors could sum up to be a major problem on the contractors. Their inability to effectively manage the internet web, incompetency and errors from poor production arrangements could affect the success of a project. It is further believed that anything that causes subcontractor scarcity of materials on websites, coupled with labor and system, logistic, could create problems at the site.

Contractors' financial difficulties was also considered a great challenge. The inability of contractor to mobilize enough funds to pay workers render them unready to execute any function (Zagorsky, 2007).

Thornton (2007) in a study claimed that economic difficulties of contractors even affect their emotional makeup and hence results in mismanagement of existing resources. Poor estimation and waste of materials is a big challenge (Arshi and Sameh, 2005). Ali et al. (2010) said material scarcity is mostly encountered as the biggest challenge because without materials no work can progress. Labor shortage, according to Mochal (2003) has been recorded most often and it is as a result of poor remuneration in wages and salary payment to construction workers. Due to the tedious nature of the work most staffs expect a good motivation to be able to work hard and rest afterwards.

2.5.3 Factors Caused by Clients

Gardenia et al. (2014) conducted a study where they listed several factors that cause delay by clients which includes lack of funds, inadequate knowledge, delay in decision making, improper communication with contractors and settlement change. Nevertheless, Odeh and Battaineh (2002) have been of the view that proprietor's own factors include funding of project and bills of excellent debt, owner interfering, making sluggish choice and impracticable agreement duration inflicted with the aid of proprietors.

2.5.4 Factors from External Sources

Lack of substances in the marketplace to purchase, absence of creation device and gear in the marketplace for sale or lease, poor weather conditions, terrible web page situations, terrible economic circumstance including foreign money or inflation charge, changes in legal guidelines and guidelines, shipping and logistics delays, and

outside work because of public groups which include creation of road networks to the site as it may limit the speed of movement.

2.6 TECHNOLOGY USED TO ADDRESS DELAY IN THE CONSTRUCTION SECTOR

Consistent with Albakri (2015), the approach leads to certainty in the completion period irrespective of the cause of the delay. The process is said to defend the organization from shutting down completely. Furthermore, they might be the most minimum bidder. Because of this the contractor most practice control principle all through the assignment execution. alternatively, the awarding organization set a preferred for the business enterprise on getting device and labor to be had to cover 25% of the assignment before the usage of them for other mission and maximum not be used to execute different challenge as at the bid period and a technical assessment of the contractors beyond report on delay challenges stumble upon on one of a kind assignment and weight them accordingly, this are ways of caution contractors that it's far imperative to complete assignment on the stipulated time. nonetheless, after the choice technique, the awarding business enterprise organize a seminar and invite specialists who are expert in creation task control through instructional schooling and studies work to train qualified and eligible contractors on avoiding production postpone to enable them complete the task at a given period of time as agreed within the settlement terms. Those could be a bonus to many contractor who intend to finish on time however don’t recognize how to, so we can learn from this to keep away from any postpone incident that would get up at the system of executing the project.

2.6.1 Applying and Improving Productivity (AIP)

Albakri (2015), argued that most of the challenges of delay occur because management does not conduct productivity assessment which affects their ability to estimate correctly. When these assessments are done, it gives a fair idea about the accurate duration of a project thereby avoiding wrong estimate. Most construction firms have shut down because of poor valuing and poor contract time estimation.

Navon and Goldschmidt (2002), in their research found that the contributions of labor is needed importantly in undertaking tasks in construction projects. BPM as a form of technology has been highly utilized in project management. This item organized BPM version consists of two vital parts: a facts extraction module and a place elucidation module. The facts extraction model breaks down the whole pastime to pending activities that's typically connected to the region of the sports and where the worker is to be engaged. Navon and Shpatnitsky (2005) conducted a study to monitor earthmoving machines at customary interims using the GPS innovation to change over region data into gear efficiency. An early cautioning framework turned into additionally created to realize capacity deviations from the arranged dedication. However, it's miles obvious that looking at statistics from any unmarried supply does not deliver a full ideal of a venture. In this manner, asset data must be gathered from numerous resources all of the while and handled collectively, which might provide greater essential data to distinguish the asset institutions, mainly when dealing with productiveness. Hildreth et al. (2005) combine GPS technology right into a domestically to be had instrumentation framework to display the vicinity statistics and distinguish the begin and prevent of sports for figuring motion lengths of time. Time identification modules (TIMs) had been produced to sifter through the GPS records with both role and velocity standards. Caldas et al. (2005) in their research on pilot

subject check to recognize utility of GPS era to material tracking observed that during finding correct pipe detail the GPS can help employees in saving time and growth their productivity.

Navon and Goldschmidt (2002) the labor input monitoring version additionally known as building project monitoring version is an inbuilt part of an entire approach to automation of the whole constructing method with excessive technology known as pc integrated construction (CIC). The notion here is to utilize records, accumulated automatically—the vicinity and location of worker or organization member—it focus on the duration it takes to complete a selected interest or motion and to compute the work inputs on web page.

The ADC Model utilized two wellsprings of statistics: (1) The 'PM', which offers facts alluding to the arranged inputs, to the calendar, to the physical homes of building substances and to the office's configuration. (2) Data referring to the genuine execution in light of estimation achieved by means of the 'ADC version'. The ADC model distinguishes the laborers and measures her/his region at well-known time interims. Information containing these records are put away within the "areas" report. The version modifications over these regions to real inputs, analyses the latest to the arranged inputs and produces the output. Nonetheless, Sack et al. (2002) had been of the view that, the facts describe the real overall performance pointer as observed automatically. Though, the performance tips may additionally consist of assignment development, work input, fabric utilization, and so forth. inside the specific example of the area manage and monitoring (LCM) an aberrant overall performance pointer is utilized- the placement of every laborers and staffs in a neighborhood constructing coordinate framework, measured at normal time interims. Performance signs on this

context may additionally consist of undertaking progress, labor inputs, fabric intake, and so forth. Within the unique case of the LCM, an indirect performance indicator is used - area of each employee in a local constructing coordinate machine, measured at normal time intervals. All of the work that has been finished and those which might be still underneath execution are recorded, and those which have been affirmed to be finished are excluded. The designed labor price and the quantity of venture needed to execute every hobby are used to compute the likely labor input.

Yi Su (2010) Radio frequency identification (RFID) is a technology used to decide or have a look at a cell tag within the restricted of the effect of a reader. This technology transmits statistics among an RF tag and the receiver at very low frequency transmission (FM band). A distinctive RFID system contains of receivers, antennas and a tag used as communications gadget. RFID era is used in industries in lots of united states of America for monitoring inventories, stopping materials from theft, cost manage, tracking railroad cargos, and pick out automobile and equipment. Jaselskis and El-Misalami (2003) argued that, RFID is an automatic identity technologies used to capture and come across records using radio frequency. The RFID device use transponders or tag and a reader that depend on configuration together with antenna and scanner to capture and manipulate information effortlessly and to speak, course instruction and manipulate equipment, and may withstand harsh weather circumstance.

Ergen et al. (2007) devised a means that is used for following up on parts that have already been cast by using two technologies, that is, RFID combined with GPS technology which caters for the need of fixed work entry and to reduce the period that is required by workers to get a concrete that has already been cast and store them.

Geographical positioning system that is built on one of the bars of the gantry for purpose of moving components that have been made into cast, an RFID detector to facility the process of moving the components. This equipment helps to speed up the overall process.

Sardroud (2012) conducted a study regarding the effect that RFID is having on the automated use of substances that are delivered in the course of construction. This application or procedure is dominant in several areas including hospitals and super markets.

Rebolj et al. (2008) conducted a study looking at production that uses technology and advanced equipment for following up on work progress. Technology that could do RFID and imaging.

The equipment used for doing follow up is the Dynamic Verbal Exchange, this ensures that there is enough know-how to every aspect of the process. The information is delivered by personnel or workers who work on the websites for the firm. Information that is provided by the tracking device helps to know the difference between planned and unplanned works.

These records are being sent to the office with the aid of on-website staff, by speaking undertaking associated topics the usage of cellular tool. The monitoring machine became used automatically to distinguish between planned and as-built systems by means of segmenting and figuring out them from the as-built photo that is performed by using evaluating the on-site photo to the 4D model of the structures. This become in addition included into constructing facts version to monitor the advancement of manufacturing and constructing of structural factors.

Consistent with Albakri (2015), Beinat et al. (2007) and Fontana (2004) ultra-wideband (UWB) refers back to the partial transmission ability of larger than 20% or a flat out information transmission of no less than 500 MHz The term ultra-wideband alludes to the advancement, transmission and obtaining of highly short term beat of radio frequency strength, extending from a couple of hundred picoseconds to multiple nanoseconds. Beinat et al. (2007) stated that grouping of those extraordinarily brief term durations, the usage of UWB waveforms can provide innate accuracy to time spend on device and fabric arrival and shipping measures. Teizer et al. (2007) finished a studies to demonstrate the software of UWB in the production area and to measure accuracy in production aid tracking, paintings region protection, productiveness and fabric monitoring. They finished an indoor and out of doors test on this research. The indoor test utilized 4 mid gain receivers, one reference tag, and two asset tags at special replace overdue, organized in square form of 6×3meters for tracking -dimensional X and Y coordinates of taking walks persons. The outside experiment turned into advanced for the reason of monitoring the drift of material for the metallic erection in a construction website online. Nine receivers, one reference tag and 6 tracking tags had been utilized to music the person metal beams to determine whether or not those beams had been moved temporarily to a garage yard or immediately lifted and installation in their fixed positions by using a crane as they're added on site through shipping trucks.

2.6.2 Six-Sigma in Construction

In step with Stewart and Spencer (2006) and Marves (2000), Six-sigma are lately evolved technique of administrating business and has grown to be the maximum big technique for administering process effectiveness, no longer simplest in production industries but has additionally multiplied enormously so as regions of challenge control

inclusive of production undertaking management. Six sigma is a properly-controlled manner used to define, degree, examine, enhance and control (DMAIC) approaches. The DMAIC form the foundation of the six sigma methodology and perform on the degree/gate technique that need sure transferable to be met at the gate before the organization can move to the subsequent segment. Antony and Banuelas (2002) asserted that six sigma is a method designed to decorate economic gain, reduce fee and beautify fashionable operation with a view to move past the purchaser anticipations. Six sigma implementers proceed to benefit qualification as a skilled expert in six sigma philosophy and technique and are referred to as the 'black belt'. These professionals are method improvement undertaking leaders they have in-intensity knowledge of the following approaches, method mapping, dimension analysis, evaluation of variance and deliver chain control. Pheng and Hui (2004) have been of the view that proactive management, power for perfection, boundless collaboration; manner attention, management, and development are the topics within which the precept of six sigma is primarily based. Nevertheless, proactive management in production venture implies setting techniques in place to take movements in advance of any prevalence that might result in challenge delay. While boundless collaboration implies working to restraint collective impediment and to enhance teamwork and expands at some point of the corporation line. Six sigma development technique aren't all approximately been completely free from flaw or having every operations and merchandise at six sigma level of production. The exact level will lie on the strategic significance of the technique and the value it takes to develop relative to its gain (Linderman et al., 2003).

2.7 THE THEORETICAL FRAMEWORK USED TO ADDRESS THE ISSUE REGARDING DELAY IN THE CONSTRUCTION SECTOR

These frameworks show the strategies that are employed in dealing with delay on site. It put all the delay types into groups and shows the most occurring ones within each group. It also shows the kind of innovations used and group it under four main categories. The strategies are employed when minimizing time wasting in project management. It categories delay and indicates the forms of delay that take place within the various groups.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The chapter gives a detailed description of the approach and techniques used in the study. It gives a comprehensive analysis of the models and analytical methods used in the survey. The chapter further describes the target population, sampling technique, data collection method and sources of data collected.

3.2 RESEARCH DESIGN

A study's design describes the approach and techniques used in the conduct of a study. The current study has adopted the use of quantitative research design because the study uses numerical data for analysis. Quantitative studies have been proven to be advantageous when a study is conducted to determine relationships between variables unlike qualitative studies that uses non-numerical data. Even though the study could have used qualitative design or mixed research design, the study did not make room for non-numerical data due to the level of precision expected in the analyzed result. Walliman (2011) agrees that the decision to choose a research design is reliant on the nature of the research problem and the aim of the research. Therefore, a quantitative design has ensured that both the problem and the research objectives have been catered for. Greener (2008) argues that using quantitative design makes a study more precise and accurate than the qualitative method. One other justifying reason for using Quantitative method in this study is due to its ability to utilize empirical process and empirical accounts. The empirical accounts focused on issues in real world rather than what ought to be the case. Cresswell 2009; Fellow and Liu 2008; Sukamolson 2007 add that quantitative design makes the use of mathematical analysis very simple and

accurate. Finally, most researchers found it more beneficial using quantitative research in similar study, a typical example is the case of Seboru (2015) who used quantitative method to study the causes of delay in construction project.

3.3 RESEARCH INSTRUMENT DESIGN

The instrument used in this study is a research questionnaire which consists of three main sections, thus section A to C. Each section was designed to reflect at least one of the study's objectives and has been analyzed uniquely and different from the other sections. Nonetheless, the sections have been linked to help collectively in achieving the overall objectives of the study. Section A is the respondent background and section B investigates the major causes of construction delay. Section C covered the causes of construction delay such that the questions were designed on a Likert scale 1-5 (1-very low, 2-low, 3-average, 4 high and 5-very high). Section D was designed on a Likert scale of 1-5 interpreted as (1-very unimportant, 2-unimportant, 3-average, 4-important, 5-very important). Batchelor et al. (1994) argued that using comments produced on a Likert scale results in generating a well- organized and reliable analysis compared to the single measure.

Research instrument comprises of collective question constructed in logical pattern to collect respondents' personal view and behavior. The questions were made very simple and easy to understand by the respondents and instruction was given on how the respective answers would be given without delay. A thorough review was made to gather ideas from previous studies and these ideas were included in the questionnaire construction.

Variables: The independent variable in the study include client related factors, consultant related factors, and contractors related factors and the state-of-the-art technology. The dependent variable is delay of construction projects with regular cash inflow.

3.4 RESEARCH STRATEGY

The research strategy used in data collection was questionnaire administration where samples were selected through purposive sampling. This strategy was useful because it ensured that only respondents who were willing and able to provide accurate responses were included in the survey. The method also helped in the avoidance of waste of time since no time was waste to convince unwilling participants ensuring a very high response and return rate.

3.5 TARGET POPULATION

Data was collected from seven popular construction companies, seven consulting firms, and their respective clients of which all the respondents were sampled from Accra Ghana. The reason for selecting these categories was because they had more experience in major projects executed in Accra and their projects also involve huge sums of capitals with regular cash flow. Also, the selected groups fit very well within the objectives of the study and hence getting data from respondents was well assured. More attention was given to the major participants of a projects which includes engineers, architects, designers, surveyors and project managers. Most of the firms chosen for the survey belonged to well recognized professional bodies such of surveyors, civil engineers and real estate developer's association. Priorities were given to collect data from mostly large building structures that has been associated to the selected

respondents such as malls, building apartments, schools, churches, bridges and stadiums. The structures were either projects that have been neglected for a very long time or still under construction but have been delayed in one way or the other.

3.6 SAMPLING

Samples are chosen to estimate the behaviors of the entire population especially in studies of this nature whereby using the entire population is practically impossible. In this regard, 50 samples were chosen for the survey which included contractors, project managers and clients all in the construction industry. The samples were estimated based on experience gathered from review of previous studies. These were purposively chosen to ensure that all participants engaged in projects with regular cash inflow. According to Foreman 1991 using samples for a study gives a very accurate prediction with minimum errors.

3.6.1 Determination of Sample Size

Choosing a suitable sample size is influenced by the size of the study population, the level of allowable errors, and is most cases the experience of the researcher (Creswell, 2009). In this study, the population size is not easily determined so the researcher based on personal experience thus, experience from previous studies and interaction with the project managers, chose 50 respondents for the study. This sample size is suitable because it is not too large or too small and the relevant features of the study population are not much varied.

3.7 DATA COLLECTION PROCESS

Data was collected by the researcher during an empirical visit to the site of respondents. Prior arrangement was made to seek for the consent and participation before making a final visit to the field. In all, data collection lasted for five working days. During data collection, each item on the questionnaire was explained to respondents and in the case of difficulties, the respondents were given further assistance by the researcher just to ensure that the results did not deviate from expectations. All the data collection was done on construction sites in Accra. Accra was considered as most convenient for this study because it is the most industrialized city in Ghana and lots of major construction works go on every day.

3.8 DATA ANALYSIS STRATEGIES

Data analysis was done and presented in charts and percentages. The study used Statistical Package for Social Science (SPSS 21) for data coding, entry and analysis.

3.8.1 Descriptive Statistic

Descriptive analysis was done to supplement the analysis. This is very essential because it gives exact description and interpretation of the survey results. (Doloi, 2009; Field, 2005) asserts that it is necessary in most quantitative studies.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

The chapter gives detailed presentation, analysis and discussion of the research data. This has been grouped into two sections. The first section gives the actual statistics of the analyzed data and the second section is a discussion and analysis of the data presented.

4.2 DEMOGRAPHIC VARIABLES

This section describes all the demographic variables of the respondents. It gives information on their age distribution, sex, marital status, education, job title and their years of experience in the construction sector. The results have been presented below:

Sex

Respondent's sex distribution reveals that 72% were males and 28% were females.

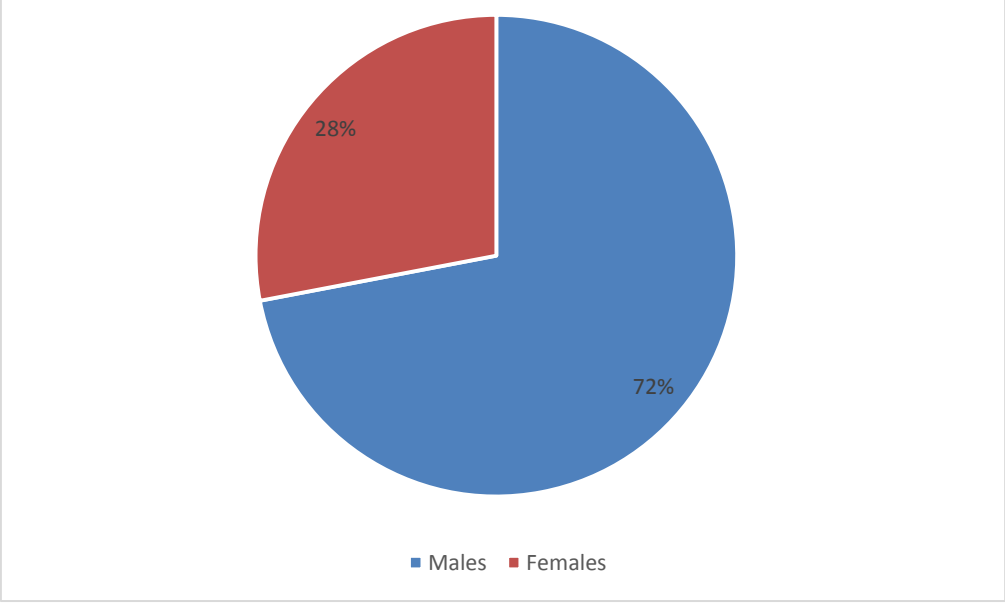

Figure 4.1: Demographic characteristics of respondents

Source (Field Work, 2018)

Age

25% of respondents were aged 30 to 4 0 years, 50% were 41 to 50 years of age, and 25% were above 50 years of age.

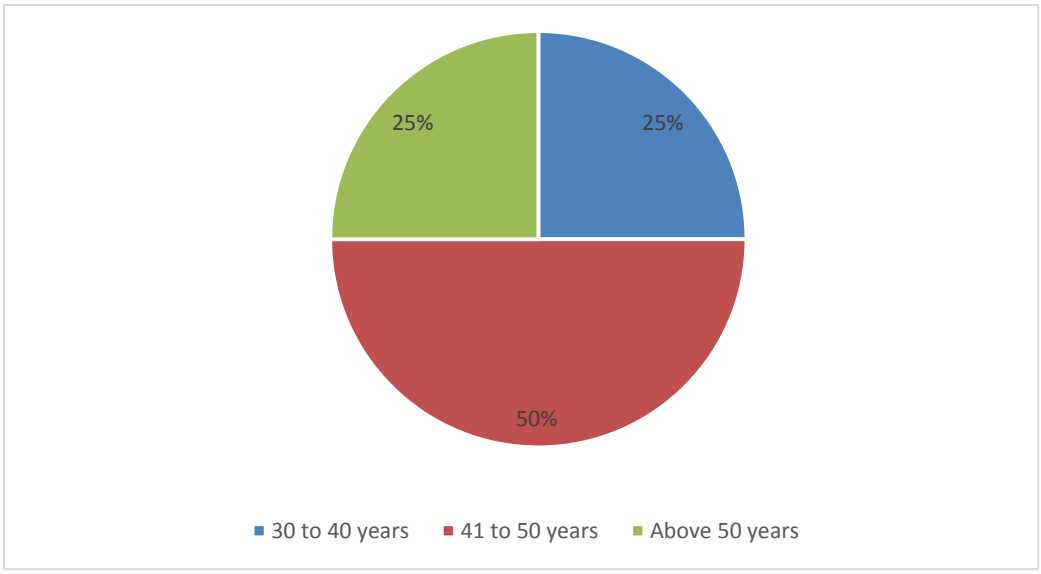

Figure 4.2: Age distribution of respondents

Source (Field Work, 2018)

Marital status

15% of the study respondents were single 65% were married, 10% were divorced and 10% were separated.

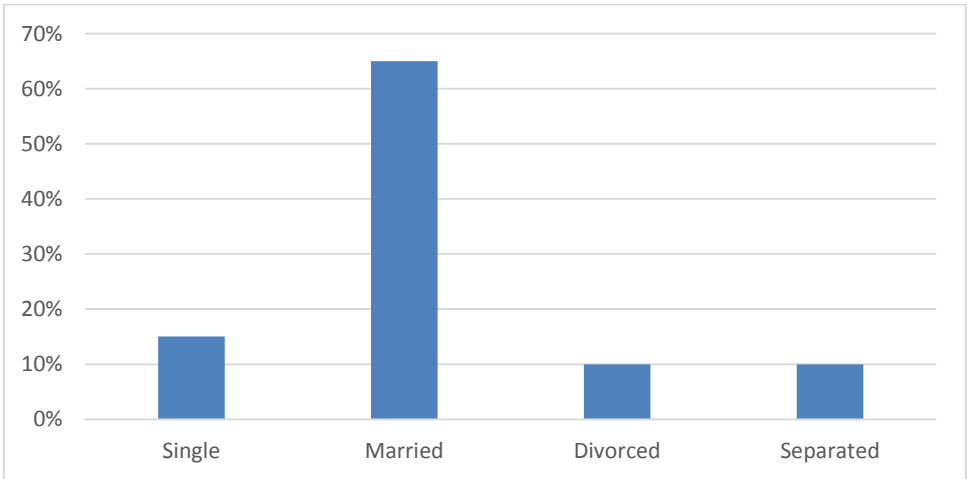

Figure 4.3: Marital status of respondents

Source (Field Work, 2018)

Education

About 40% of the respondents had bachelor's degree, 50% had masters' degree and 10% had PHD.

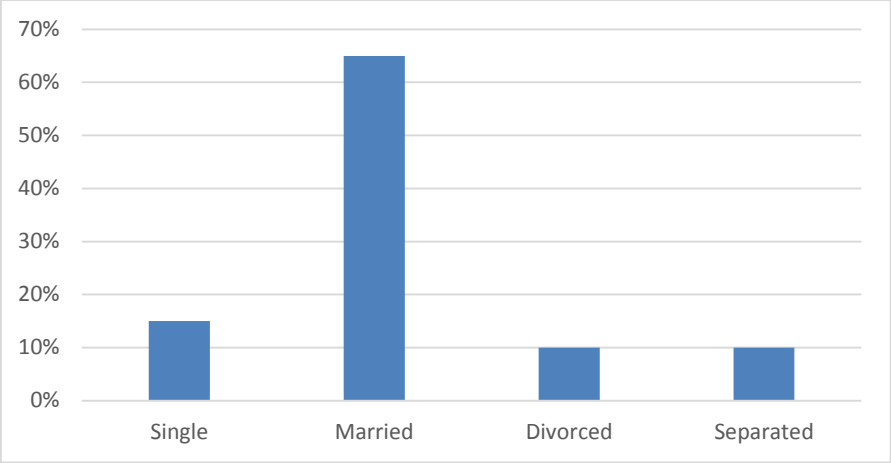

Figure 4.4: Educational characteristics of respondents

Source (Field Work, 2018)

Category of stakeholder

65% of the respondents were contractors, 20% were consultants and the remaining 15% were clients.

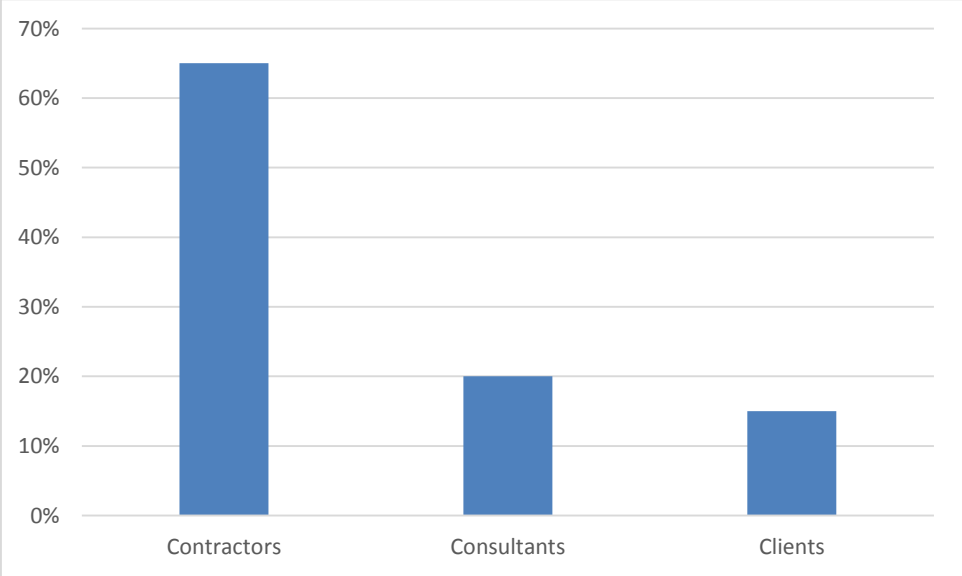

Figure 4.5: Work categories of respondents

Source (Field Work, 2018)

Years of experience

3% had less than 5 years of experience in the construction industry, 70% had 5 to 10 years of experience and 27% had more than 10 years of experience.

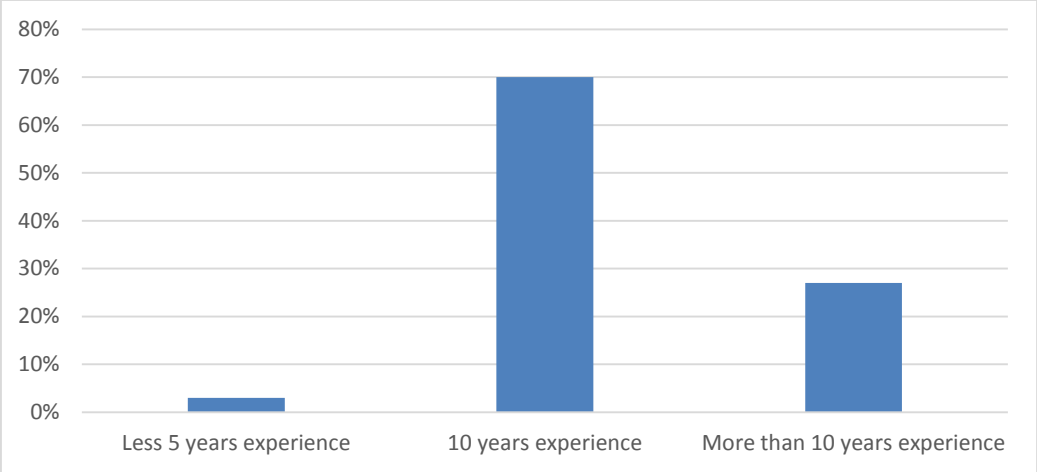

Figure 4.6: Respondents' work experience

Source (Field Work, 2018)

Types of delay

About 45% of respondents confirmed that the delays were concurrent, 35% said it was excusable-compensable delays, 5% were as a result of excusable- non compensable delays and 15% were non excusable delays.

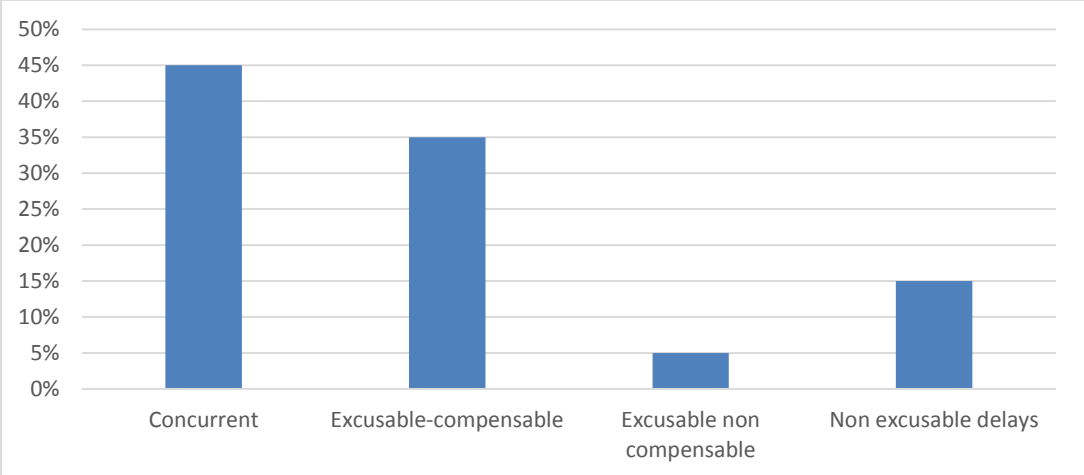

Figure 4.7: Types of delay

Source (Field Work, 2018)

4.3 DETERMINE THE MAJOR FACTORS THAT CAUSE DELAYS ON PROJECTS WITH REGULAR CASH INFLOW

This section presents information on the opinions expressed by respondents on what they have identified as being the most relevant causes of delays as experienced in projects with regular cash inflow. The survey results have been presented below:

Respondents' knowledge on construction delay in large structural projects

20% of respondents said there had very low familiarity with construction delay in large structural projects, 30% said their level of familiarity was low, 10% were averagely familiar with such delays, 25% were highly familiar and 15% were very highly familiar.

Respondents' experience and involvement in delayed project

In order to know respondent's involvement in delayed projects, the result showed that 18% of respondents said their involvement has been very low, 25% said it was low, 10% were averagely involved, 30% were highly involved and 17% said their involvement has been very high.

Lack of working knowledge

28% of the respondents thought there could me other variables and hence had a very low agreement that it could be lack of capital, 12% had low agreement, 10% had an average opinion, 30% had a high agreement and the remaining 30% had a very high agreement that lack of working knowledge was a major challenge.

Slowness in decision making

15% of respondents consented to it that slowness in decision making had very low impact on project delays, 10% said the impact was low, 40% said it had high impact on project delay and 25% said the impact was very high.

Slowness in making choice of material design

Another problem was identified as the time taken to choose the suitable material for design. However, 15% said the impact was very low, 5% said the impact was low, 5% said it was average, 40% said it was very impactful and 35% said it was very impactful.

Lack of coordination with contractors

Also, 20% agreed lowly to it that poor coordination could result in project delays, 50% said it was high and 30% said it was very highly considered as a key factor of delays when executing projects.

Contract modification

Modification of contracts have been proved to have slowed down progress in projects. This was agreed by 15% of respondents who were of the view that its effects were very low, 17% said it was low, 3% said it was average, 60% said the impacts were high and 5% said the impact is very high.

Owners interfering

22% were of very low view that sometimes owners' interference slow down projects, 10% had a low opinion, 60% had a high opinion and 28% said their views were very high.

Suspension of work by the owner

Another problem encountered is how work get suspended by owners. 20% said such suspensions had very low influence on the project, 15% said it was low, 25% said it was high and 40%said the impact was very high.

Inadequate basis for project

20% of respondents were of very low believe that inadequate basis for projects was a contributing factor to project delays, 20% said it was low, 25% said it was high and 35% said it was very high.

Wrong person as project manager

The personality of project managers was said to have impacted on project delays. In due regard, 15% of respondents said it was a very low contributing factor, 15% said it was low, 10% said it had an average impact, 30% said it was high and 30% said it was very high.

Top management unsupportive

Some respondents believed that the level and nature of support from top management influences the likelihood of delay during projects. Therefore, 10% of respondents were of the view that the influence was very low, 15% said it had a high influence and 75% said the influence was very high.

Inadequately defined task

In addition, 20% had a very low support that when task is not well or properly defined it may contribute to delay, 15% said the impact was low,10% said it was average, 20% said it was high and 35% said it was very high.

Lack of project management technique

Also, another contributing factor was identified as poor technique of project managers. With this, 20% said it had low impact, 10%said the impact was high and 70% said its impact on the delay of projects was very high.

Misuse of management technique

30% of respondents were having a very low support of the view that technique being misused contribute to project delay, 30% said they supported that its impact was high and 40% said its impact was very high.

Lack of consultant's

A couple of respondents, thus 30% agreed lowly to it that consultants played a key role in projects and hence their absence had high impact on project delays, 20% said it had high impact and 50% said the impact was very high.

Inexperience on the part of the consultant's site staff

Inexperience of consultant's staff played a key role in project management and 10% of respondents lowly believed that it impacts on project delay, 15% said their believe for it as a delay factor was low, 30% accepted that it had a high impact and 45% said it had a very high impact.

Delay in making decisions

The decision-making process was critical in project delays. Therefore, 20% of respondents believed that it lowly contributes to the delay process, 40% said it contributed highly to most of the delays and 40% said its contribution to delays was very high.

Incomplete documents

When documents are not accurate it impacts on project delays. This was lowly agreed by 15% of respondents, 30% said they agree that its impact was high and 55% said the impact was very high.

Slowness in giving instructions

20% lowly believed that when instructions are slow, it may contribute to project delay, 30% had an average support to it, 40% had a high support to it and 10% said it had a very high impact on the delay of projects.

Table 4.1: Factors that cause delays on projects with regular cash inflow

	RATING									
CAUSES	**1**	**2**	**3**	**4**	**5**	**Total**	**∑W**	**Mean**	**RII**	**Rank**
Incomplete documents	0	2	4	18	26	50	218	4.36	0.87	1st
Lack of working knowledge	1	3	2	17	27	50	216	4.32	0.86	2nd
Slowness in decision making	1	0	4	25	20	50	216	4.32	0.86	3rd
Lack of project management technique	1	1	6	18	24	50	213	4.26	0.85	4th
Top management unsupportive	0	3	5	23	19	50	208	4.16	0.83	5th
Suspension of work by the owner	1	6	7	11	25	50	203	4.06	0.81	6th
Misuse of management technique	2	3	5	20	20	50	203	4.06	0.81	7th
Slowness in making choice of material design	2	3	5	23	17	50	200	4	0.80	8th
Inadequately define task	1	5	7	17	20	50	200	4	0.80	9th
Lack of consultant's site staff	4	4	4	16	22	50	198	3.96	0.79	10th
Inexperience on the part of the consultant	3	4	6	18	19	50	196	3.92	0.78	11th
Wrong person as project manager	2	4	10	15	19	50	195	3.9	0.78	12th
Lack of coordination with contractors	0	6	12	16	16	50	192	3.84	0.77	13th
Delay in making decisions	3	5	10	10	22	50	193	3.86	0.77	14th
Owners interfering	4	6	3	20	17	50	190	3.8	0.76	15th
Slowness in giving instructions	5	5	5	17	18	50	188	3.76	0.75	16th
Contract modification	3	7	10	15	15	50	182	3.64	0.73	17th
Inexperience on the part of the consultant's site staff	4	7	10	15	14	50	178	3.56	0.71	18th
Inadequate basis for project	5	7	10	15	13	50	174	3.48	0.70	19th

4.4 STATE-OF-THE-ART TECHNOLOGY USED GLOBALLY TO ADDRESS THE ISSUE OF DELAYS IN THE CONSTRUCTION SECTOR

This section presents empirical results on delays are managed on site in the case of projects having regular cash inflow. The views of respondents were analyzed on each management practice as presented below:

Directing a project

This management technique was considered by 10% of respondents as not critical, 20% said it was less critical, 10% were not certain about it, 40% said it was critical and 20% said it was very critical.

Starting up a project

This technique was considered by 15% of respondents as not critical, 30% said it was less critical, 5% were not certain about it, 25% said it was critical and 25% said it was very critical.

Initiating a project

Project initiation technique was considered to be a key requirement which 5% of respondents said it was not critical to avoid delays in projects, 25% said it was less critical, 10% were not certain about it, 50% said it was critical and 10% said it was very critical.

Managing stage boundary

This management technique was considered by 20% of respondents as not critical, 10% said it was less critical, 5% were not certain about it, 50% said it was critical and 15% said it was very critical.

Controlling stage

This management technique was considered by 15% of respondents as not critical, 10% said it was less critical, 10% were not certain about it, 45% said it was critical and 10% said it was very critical.

Managing product delivery

Product delivery was necessary to project success this but a couple of the respondents, thus 10% were of the view that its role was not critical, 20% said it was less critical, 10% were not certain about it, 40% said it was critical and 20% said it was very critical.

Closing a project

Finally, project closure was also factored by some respondents to be necessary. In this view, 15% said it was not, 15% said it was less critical, 5% were not certain about it, 40% said it was critical and 25% said it was very critical.

Table 4.2: To investigate the level of adoption of project management practices in the attempt to minimise delays in projects with regular cash inflow.

PRACTICES	**RATING**									
	1	**2**	**3**	**4**	**5**	**Total**	**∑W**	**Mean**	**RII**	**Rank**
Closing a project	6	8	3	20	13	50	176	3.52	0.70	1st
Directing a project	5	5	10	20	10	50	175	3.5	0.70	2nd
Starting up a project	7	14	3	13	13	50	175	3.5	0.70	3rd
Controlling stage	8	5	5	23	9	50	170	3.4	0.68	4th
Managing product delivery	5	10	5	20	10	50	170	3.4	0.68	5th
Initiating a project	3	12	5	25	5	50	167	3.34	0.67	6th
Managing stage boundary	10	5	2	25	8	50	166	3.32	0.66	7th

Source (Field Work, 2018)

4.5 HOW PROJECT MANAGEMENT PRACTICES ARE ADOPTED TO HELP MINIMIZE DELAYS IN PROJECTS WITH REGULAR CASH INFLOW

The section presents information on how delays are minimized on site during projects.

Global positioning system

20% of respondents believed that this practice was very unimportant, 10% said it was unimportant, 5% were not certain about it, 50% said it was important and 15% said it was very import to be used as a tool to help minimize delays.

Labor input tracking model

15% of respondents believed that this practice was very unimportant, 10% said it was unimportant, 10% were not certain about it, 50% said it was important and 15% said it was very import to be used as a tool to help minimize delays.

Radio frequency identification

20% of respondents believed that this practice was very unimportant, 10% said it was unimportant, 10% were not certain about it, 45% said it was important and 15% said it was very import to be used as a tool to help minimize delays.

Ultra-Wideband positioning system

20% of respondents believed that this practice was very unimportant, 10% said it was unimportant, 10% were not certain about it, 40% said it was important and 20% said it was very import to be used as a tool to help minimize delays.

Six-sigma

5% of respondents believed that this practice was very unimportant, 10% said it was unimportant, 15% were not certain about it, 40% said it was important and 30% said it was very import to be used as a tool to help minimize delays.

Table 4.3: State of the art technology used globally to address the issue of delays in the construction sector.

	RATING									
TECHNOLOGY	**1**	**2**	**3**	**4**	**5**	**Total**	**∑W**	**Mean**	**RII**	**Rank**
Six-sigma	2	5	8	20	15	50	191	3.82	0.8	1st
Global Positioning System	9	5	3	25	8	50	168	3.36	0.7	2nd
Labor Input Tracking Model	7	5	5	25	8	50	168	3.36	0.7	3rd
Radio Frequency Identification	9	5	5	23	8	50	166	3.32	0.7	4th
Ultra-Wideband Positioning System	10	5	5	20	10	50	165	3.3	0.7	5th

Source (Field Work, 2018)

4.6 DISCUSSION

This section discusses the data presented above from the survey results. The study sought to achieve three main objectives as discussed earlier. Results of the survey from the various themes have been elaborated as follows:

The survey results indicate that majority of the respondents were males thus 68% with modal age of 31 to 40 years. Most of them were married with just a few being either single, divorced or separated. The educational level of each respondents was very encouraging with majority of them having master's degree. The lowest educational level was first degree showing a high level of literacy among respondents. Respondents were sampled from key players of project management of which majority of them were project managers. The results further indicate that about 60% of the respondents had at least 10 years of experience on projects. Therefore, the analyzed results from respondents' demographic features indicate that respondents were much suited to

participate in the study. The main reason for presenting the demographic characteristics is to give readers a clear understanding of the nature and competence of the people who participated in the survey since demographic features can clearly speak to convince readers that the respondents were well suited for the study.

Types and causes of delay

Project delays has been a canker hanging on the neck of the construction industry. Most of the delay factors were identified and each factor had a significant influence on projects delay which could determine its success or failure. Even though, not all respondents were able to have a compromised view on the degree to which each factor was significant, they all argued differently to indicate that whether significantly or insignificantly the impact of each of the challenges could affect the efficiency and productivity during project execution. This means that each factor needs to be tackled effectively to reduce its impact.

The views expressed here are similar to what Enshassi et al. (2009); Thornton (2007); Mochal (2003) and several others who discussed all the major factors that cause delays in construction.

Technologies used in addressing delays

In the event of project delays, some efforts are made by stakeholders to minimize its impact on the overall project and for that matter, empirical evidence shows clearly that various means are adopted. However, respondents had divergent opinion on how critical each of those factors were considered. Nonetheless, a significant fraction of respondents was very consistent on their views that each of the state-of-the art technologies mentioned were critical. This gives an indication that project management could concentrate on the way of making each of implementations effective because it

could help control the level of delays. The analysis corresponds with the views of Albakri (2015); Navon and sacks (2007); and Hildreth et al. (2005)

Further project management practices were considered to include global positioning system, labor input tracking model, radio frequency identification, ultra-wideband positioning system, and six-sigma. Despite the fact that each respondent had a different opinion on the level of importance they attach to each approach, only few did not regard those mechanisms as important. Majority agreed that such practices are important and relevant to project execution. The same strategies were emphasized by Behm (2005); Aziz and Hafez (2013); Koskela et al. (2002) as being key to project management.

CHAPTER FIVE

RESEARCH CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter discusses the findings, conclusion and recommendations of the entire study. The findings were gathered based on analysis of the empirical data collected from the survey. This is followed by recommendation and conclusion.

5.2 SUMMARY OF FINDINGS

As discussed earlier, the study was conducted to determine the major factors that cause delays on project with regular cash inflow, investigate the state-of-of the-art technology used globally to address the issue of delays in the construction sector, and finally, investigate how project management practices are adopted to help minimize delays in projects with regular cash inflow. In due regards, the various findings on each objective have been summarized below:

5.2.1 Major Factors that Cause Delays on Projects with Regular Cash Inflow

The study found that delay in project management has been caused by several factors that were discussed in chapter four of this study. In addition, it was found that each of the delay factors had a significant influence on the success or failure of projects. Even though, not all respondents were able to have a compromised view on the degree to which each factor was significant, they all argued differently to indicate that whether significantly or insignificantly the impact of each of the challenges could affect the efficiency and productivity during project execution.

5.2.2 State of the Art Technology used Globally to Address Delays in Construction Sector

Another finding indicates that even though delay has mostly been a challenge in project management, efforts are made to address such challenges to reduce their impacts on the overall project success levels. The views expressed by respondents indicate that even though they did not all share a common view, majority supported that the challenges were critical and hence needed to be given maximum attention. A significant fraction of respondents was very consistent on their views that each of the state-of-the art technologies mentioned was critical.

5.2.3 How Project Management Practices are adopted to Minimize Delays in Projects with Regular Cash Inflow

Based on the third research objective, the findings indicate that project management practices were considered to include global positioning system, labor input tracking model, radio frequency identification, ultra wideband positioning system, and six-sigma. Even though each respondent had a different opinion on the level of importance they attach to each approach, only few did not regard those mechanisms as important. Majority agreed that such practices are important and relevant to project execution.

5.3 RECOMMENDATIONS

The study recommends that the various stakeholders in the construction industry should make a committed effort to tackle all the factors identified as causing delays in project management much more commitment and resources should be allocated in handling these specific problems that have to do with; knowledge and skills acquisition, accuracy and speed, effective communication, division of labor, and good managerial

strategies. There should be more and frequent education to refresh stakeholders on the ethics of work as well as engaging in training programs that increase productivity and efficiency. This will help reduce the various challenges to the barest minimum and enhance successes in project management.

5.4 CONCLUSION

The findings of the study show that project management is a vital part of a country's growth as it helps to determine the pace and quality of infrastructural development. Also, investing in projects is associated with high cost of which any problem encountered could result in delay, or failure to accomplish project's objectives. In such cases, there is a waste of resources, which makes the construction industry inefficient. Therefore, it is in the best interest of all stakeholders to join forces together to cooperate during project execution to ensure that every project is executed with little or no difficulties.

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APPENDICES

SURVEY QUESTIONNAIRE

RESEARCH QUESTIONNAIRE

This research questionnaire seeks to gather responses in order to determine the major causes of delays in building construction projects with regular cash inflow; the kind of technologies used worldwide to handle delays in the construction sector; and to investigate how project management practices are adopted to help minimize delays in projects with regular cash inflow. You are kindly required to provide your honest responses to all the questions in this questionnaire with the assurance that every information provided will not in any way be linked to you or your position and would be treated with utmost confidentiality.

Instruction: you are kindly required to tick your options in the boxes provided, where applicable. Where spaces are provided, please fill them.

SECTION A- Background and Knowledge of Respondents on construction delay

1. Which of the stakeholder are you? (Please choose one).

[ ] Contractor

[ ] Consultant

[ ] Client

Please use the following table to answer question 2 and 3.

Using the following scale: 1 very low; 2 Low; 3 Average; 4 High and 5 very high

		1	**2**	**3**	**4**	**5**
2	How familiar are you with construction delay in large structural project?					
3	To what level have you been involved in building projects that was delayed?					

Please use the following table to answer question 4 and 5.

Using the following scale:

1 = 1– 5 yr, **2** = 6 - 10 yrs, **3** = 11-15 yrs, **4** = 16 – 20 yrs, **5** = 21 yrs or above

		1	2	3	4	5
4	What is your length of experience in construction?					
5	How long was the projects delayed?					

6. What type of construction delay did you experience?

[ ] Concurrent

[ ] Excusable-compensable

[ ] Excusable-non compensable

[ ] Non excusable

SECTION B – TO DETERMINE THE CAUSES OF DELAYS ON PROJECTS WITH REGULAR CASH INFLOW.

7.) Please tick the extent to which you believe that the following client related factors can contribute to construction delay.

Using the following scale: 1 very low; 2 Low; 3 Average; 4 High and 5 very high

	Causes of Delays	**1**	**2**	**3**	**4**	**5**
a	Lack of working knowledge					
b	Slowness in decision making					
c	Slowness in making choice of material design					
d	Lack of coordination with contractors					
e	Contract modification					
f	Owners interfering					
g	Suspension of work by the owner					
h	Inadequate basis for project					
i	Wrong person as project manager					
j	Top management unsupportive					
k	Inadequately define task					
l	Lack of project management technique					
m	Misuse of management technique					
n	Lack of consultant's site staff					
o	Inexperience on the part of the consultant					
p	Inexperience on the part of the consultant's site staff					
q	Delay in making decisions					
r	Incomplete documents					
s	Slowness in giving instructions					
Others (Please specify)						

SECTION C: TO INVESTIGATE THE LEVEL OF ADOPTION OF PROJECT MANAGEMENT PRACTICES IN THE ATTEMPT TO MINIMISE DELAYS IN PROJECTS WITH REGULAR CASH INFLOW

8.) Please indicate the level with which you think your firm adopts the following management practices in the attempt to minimize delays in projects with regular cash inflow:

1 – Not critical, 2 – Less critical, 3 – Neutral, 4 – critical, 5 – Very critical

	Project Management Practices	**1**	**2**	**3**	**4**	**5**
a	Directing a project					
b	Starting up a project					
c	Initiating a project					
d	Managing stage boundary					
e	Controlling stage					
f	Managing product delivery					
g	Closing a project					

SECTION C – THE STATE OF THE ART TECHNOLOGY USED IN ADDRESSING THE ISSUE OF DELAY

9. Please tick the extent to which you believe that the following statement can contribute in reducing construction delay. Using the following scale:

1 = Very unimportant **2** = Unimportant **3** = Average **4** = Important **5** = Very important

	State of the Art Technology	**1**	**2**	**3**	**4**	**5**
a	Global Positioning System					
b	Labor Input Tracking Model					
c	Radio Frequency Identification					
d	Ultra-Wideband Positioning System					
e	Six-sigma					