

EVALUATING THE CAUSES OF DELAY IN BUILDING CONSTRUCTION
PROJECTS IN GHANA

By

Valentine Delalie Korbla Kpodo

(BSc. Real Estate)

A thesis submitted to the Department of Construction Technology and Management,
Kwame Nkrumah University of Science and Technology, Kumasi in partial fulfilment of
the requirements for the award degree of

MASTER OF SCIENCE IN PROJECT MANAGEMENT

November, 2019

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Kwame Nkrumah University of Science and Technology, Kumasi or any other educational institution, except where due acknowledgment is made in the thesis.

.....

Name of Student and ID	Signature	Date
------------------------	-----------	------

Certified by:

.....

Name of Supervisor	Signature	Date
--------------------	-----------	------

Certified by:

.....

Name of Head of Department	Signature	Date
----------------------------	-----------	------

ABSTRACT

Delays in building construction projects has always been a big challenge in the Ghanaian construction industry. The aim of this research was to evaluate the significant causes and effects of delays in building projects in Ghana, using the Ashaiman, Tema and Kpone-Katamanso Districts as case studies. The study was also aimed at identifying some mitigation strategies that can help reduce these delays in the country. As part of the literature reviewed were the conditions of contracts governing Works in Ghana, which has been outlined by the Public Procurement Authority in the Standard Tender Document for Works. Some clauses in the documents suggests what a contractor or client should do when they anticipate delays in the project, or when delays occur. It also includes compensation events which makes contractors eligible to receive compensation from their employers in situations where the actions of the employer cause works to be delayed. However, there is a limit to which the contractor can be compensated, and the interest of the employer is protected. Several causes, as well as effects of delays were identified through literature. Questionnaires were administered to a number of respondents to collate their inputs on the most significant causes of delays of building projects in Ghana. In addition to this, there were one-on-one interactions with some players in the building industry on their views on delays of building projects. It was observed that the most significant causes of delays were related to finance, i.e., inadequate funds and difficulty in paying contractors monthly, improper planning, changes in project scope by the owner, increase in building material and problems related to project management. The significant effects identified were extension of project duration, increased cost of projects and project abandonment (which turns out to put some people out of jobs). As a way of reducing delays in projects, it is recommended that enough funds should be allocated to cover the entire project, an effective project management team should oversee projects, as well as the involvement of a procurement team to oversee all procurement activities.

Keywords: Causes and effects of delays, construction industry, Ghana

TABLE OF CONTENTS

DECLARATION.....	ii
ABSTRACT.....	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
ACKNOWLEDGEMENT.....	x
DEDICATION.....	xi
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 BACKGROUND TO THE STUDY	1
1.2 PROBLEM STATEMENT.....	3
1.3 AIM OF THE STUDY	4
1.4 OBJECTIVES OF THE STUDY	4
1.5 RESEARCH QUESTIONS	5
1.6 RESEARCH METHODOLOGY	5
1.7 SCOPE OF THE STUDY.....	6
1.8 LIMITATIONS OF THE STUDY	6
1.9 SIGNIFICANCE OF THE STUDY	6
1.10 ORGANIZATION OF STUDY	7
CHAPTER TWO	8
LITERATURE REVIEW.....	8
2.1 INTRODUCTION	8

2.2	THE GHANAIAN CONSTRUCTION INDUSTRY	8
2.3	DELAYS	9
2.3.1	Types of delays.....	10
2.3.2	Conditions of Contract that regulates delays of works in Ghana	11
2.3.3	Compensation Events by the Public Procurement Authority	15
2.3.4	Causes of delays	17
2.3.5	Effects of delays	23
2.4	CONSTRUCTION PROJECTS DELIVERY	25
2.4.1	Work processes and stages	25
2.5	OPERATIONS OF TDC DEVELOPMENT COMPANY LTD	27
2.6	SUMMARY	30
	CHAPTER THREE	31
	RESEARCH METHODOLOGY	31
3.1	INTRODUCTION	31
3.2	RESEARCH DESIGN.....	31
3.3	POPULATION OF THE STUDY	31
3.4	SAMPLE SIZE	31
3.5	SAMPLING TECHNIQUE.....	32
3.6	SOURCES OF DATA	32
3.3	DATA COLLECTION INSTRUMENT	32
3.8	DATA COLLECTION PROCEDURES	33
3.9	DATA ANALYSIS	33

CHAPTER FOUR.....	34
DATA PRESENTATION AND DISCUSSION OF RESULTS	34
4.1 INTRODUCTION	34
4.2 BRIEF PROFILE OF STUDY AREAS	34
4.2 DATA ANALYSIS RESULTS	37
4.2.1 Age Distribution of Respondents	37
4.2.2 Gender Distribution of Respondents	38
4.2.3 Highest Level of Education.....	38
4.2.4 Respondent's number of years of experience in the Construction Industry	39
4.2.5 Number of projects worked on by respondents.....	40
4.2.6 Significant causes of delays in Building Construction Projects.....	40
4.2.7 Significant effects of delays in Building Construction Projects.....	44
4.2.8 Summary of significant causes and effects of delays in Building Construction Projects	45
4.3 REVIEW OF BUILDING PROJECTS UNDERTAKEN BY THE ASHAIMAN, TEMA AND KPONE-KATAMANSO ASSEMBLIES	47
CHAPTER FIVE	50
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS.....	50
5.1 INTRODUCTION	50
5.2 SUMMARY OF FINDINGS.....	50
5.3 CONCLUSION	51
5.4 RECOMMENDATIONS.....	52
5.5 DIRECTIONS FOR FURTHER STUDIES	55

REFERENCES.....	56
APPENDIX: QUESTIONNAIRE.....	60

LIST OF TABLES

Table 2.1: Summary of the causes of delays and the effects they have on building projects.....	25
Table 4.1: Age Distribution of Respondents.....	38
Table 4.2: Gender Distribution of Respondents	38
Table 4.3: Highest Level of Education	39
Table 4.4: Number of years of experience in the Construction Industry	39
Table 4.5: Number of projects worked on by respondents	40
Table 4.6: One-Sample Statistics on the significant causes of delays	41
Table 4.7: One-Sample Test on the significant causes of delays.....	42
Table 4.8: One-Sample Statistics on the significant effects of delays	44
Table 4.9: One-Sample Test on the significant effects of delays	45
Table 4.10: Ranks of causes of delays from results.....	46
Table 4.11: Ranks of effects of delays from results.....	46

LIST OF FIGURES

Figure 2.1: TDC Operational Map.....	29
Figure 4.1: Ashaiman District Map	35
Figure 4.2: Tema Metropolis Map	36
Figure 4.3: Kpone-Katamanso District Map.....	37

ACKNOWLEDGEMENT

I wish to acknowledge my profound gratitude to God almighty, for his unfailing love, favor and overwhelming guidance. I would also like to acknowledge my supervisor, Professor Dickson Osei-Asibey, for his guidance and support. God bless you. I wish to also acknowledge the various Works Departments of the Ashaiman Municipal Assembly, Tema Metropolitan Assembly and the Kpone-Katamanso Municipal Assembly. Finally, my sincere thanks to everyone who in one way or the other gave us vital information which helped in the writing of this report. God bless you all.

DEDICATION

This thesis is dedicated to God almighty who has enabled me come this far, and to my parents and sister who stood by me throughout this one-year period of the course. They have sacrificed their comfort and resources to assist me have the most needed attention for this Master's programme.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Delays are inherent throughout the construction process and can affect either a single activity in isolation or become the catalyst for delay of a group of activities (Hampton *et al.*, 2012). In order to keep construction projects within their estimated schedules, there must be certain strategies, plans and techniques that are put in place. However, most projects exceed the time and costs that were determined before the start of the project due to the fact that they experience delays.

Delays can be defined as the late start of project activities when carrying out a particular project. These delays can be due risk, which can be analyzed and managed when identified for them to be mitigated, shared or accepted.

Several types of delays have identified by Nagata *et al.* (2009) and they have been classified into four (4) basic groups, which are: (1) critical or non-critical, (2) excusable or non-excusable, (3) compensable or non-compensable and (4) concurrent or non-concurrent. And these will be discussed briefly in the next chapter of this study.

Previous studies have been done by researchers on the causes of delays and their effects, and some of the causes have been identified by Mansfield *et al.* (1994), as finance and payment arrangements, poor contract management, shortages in materials, inaccurate estimation, and overall price fluctuations. Sambasivan and Soon (2007), also in a study on causes and effects of delays in the Malaysian construction industry identified ten (10) most important causes of delays as contractor's improper planning, contractor's poor site

management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labor supply, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage.

The delays have effects on a variety of things, including costs, the parties involved in the project, and as well as the construction industry as a whole. Some of the effects of these delays as identified by Sambasivan and Soon (2007) were time overrun, cost overrun, disputes, arbitration, litigation, and total abandonment of building projects.

The Ghanaian construction industry plays a role in contributing to the national socio-economic development by providing facilities and infrastructure, and employment opportunities, among others. There are many stakeholders in the industry, some of which include the Ministry of Water Resources, Works and Housing responsible for housing infrastructure and construction, and the Ministry of Roads and Highways responsible for roads infrastructure and construction. According to Ofori (2012), despite the strengths the industry has, there are also weaknesses the industry faces which affect project delivery in the country, and these can be based upon in the push to build up the industry's ability and capacity, and improve its performance.

The concept of project management is to apply the knowledge, skills, tools and techniques to project activities in order to meet the project requirements, and as part of the requirements is to finish the project on schedule and within the affirmed spending plan. When these have been achieved, the project is regarded as a successful one.

1.2 PROBLEM STATEMENT

The construction industry in Ghana is faced with a lot of problems, such as delayed payments for work done, inadequate finance and shoddy work. In most parts of Ghana, it is common to see building projects that are being disrupted and left uncompleted. Delays in projects are a common phenomenon in other parts of the world, not just in Ghana. Taking Malaysia for instance, in 2005, about 17.3% (of 417 government contract projects in Malaysia) were considered sick (more than 3 months of delay or abandoned) as revealed by Sambasivan and Soon (2007).

The delays pose several risks to the parties involved in the project. To the clients, the initial finance allocated for the project will increase and also the expected time they intend to use the deliverable will be extended, and that might also lead to other problems. To the contractor or consultant handling the project, it can lead to loss of profit for them, damage to their reputation, among others. The delays can be minimized if the causes are known and steps are taken to address them. This will go a long way to improve project delivery in the country. Normally, when delays occur during a project, the work rate is either accelerated or the schedule is extended. And these come with an increase in the cost involved.

There are adverse effects of the delays on the delivery of the project. Key among them are the time and cost, and in most cases, the quality of the deliverable. Taking time and cost, for instance, knowing how intensive building projects cost are, it is bad to see building projects left uncompleted and abandoned. Using the Asokore Mampong affordable housing project as an example, the project which commenced in the year 2006 and made up of 1,079 housing units, was estimated to cost 300 billion cedis then, which, converted to the

new currency is Gh¢30m. In 2015, when it was handed over to the Social Security and National Insurance Trust (SSNIT) to complete, the project cost about Gh¢319m (Tijani, 2018). This excluded the sum that was spent by the government between 2006 and 2008, before the project was stalled in 2009. The new cost of the project as compared to the old cost was due to the time value of money and other factors. Had this project not been delayed but completed within the initial scheduled time, and the government would not have incurred the cost increase.

Enshassi *et al.* (2003) stated that, “the increasing complexity of infrastructure projects and the environment within which they are constructed place greater demands on construction managers to deliver projects on time, within budget and to high quality”. In spite of the fact that the Ghanaian construction industry is facing several challenges, the onus lies on the stakeholders to come out with programmes that seeks to address and find solutions to them.

There are several other projects in the country which have been delayed and continue to delay, irrespective of the consequences that come with it. This study therefore seeks to critically examine the impacts delays have on building projects, the construction industry and on project delivery in general.

1.3 AIM OF THE STUDY

The aim of the study is to improve on the building construction projects delivery.

1.4 OBJECTIVES OF THE STUDY

The objectives of the research are as follows:

- i. To identify the causes of delays on building construction projects.
- ii. To identify the effects delay have on the Ghanaian construction industry.
- iii. To determine mitigation strategies that can be put in place to improve building construction project delivery.

1.5 RESEARCH QUESTIONS

This research seeks to answer the following questions.

- i. What are the causes of delays on building construction projects?
- ii. What effects do delays have on the Ghanaian construction industry?
- iii. What mitigation strategies should be put in place to improve building construction project delivery?

1.6 RESEARCH METHODOLOGY

In line with achieving the objectives set for the study, the following research methods will be adopted for the study. This study is fact-finding in nature, hence, data will be gathered through surveys to obtain the needed information. Data was gathered from both primary and secondary sources. Questionnaires were distributed and one-on-one interactions with some key players in the construction industry were conducted. The quantitative method of data analysis was implored in this study. The data gathered was analyzed descriptively and presented using tables with the aid of Statistical Package for Social Sciences (SPSS).

1.7 SCOPE OF THE STUDY

The scope of the study was the Ashaiman and Tema area. The study looked at delays that affected some building construction projects in the public sector of the industry. The Ashaiman Municipal Assembly, the Tema Metropolitan Assembly and the Kpone-Katamanso Municipal Assembly, were consulted to obtain data for this research work.

1.8 LIMITATIONS OF THE STUDY

The time dedicated to the project was relatively too small. This was due to the fact that a lot of time had to be devoted to class work during the academic calendar. There was also another problem concerned with finance. The researcher needed to visit organizations a couple of times to gather data and request for information. It was cost intensive considering the fact that the researcher needed to travel quite a long distance and also a couple of times to the organizations to get the necessary information needed.

1.9 SIGNIFICANCE OF THE STUDY

Basically, the study assessed the Ghanaian construction industry and identified the causes and effects of delays that projects face. It was an observed fact that, construction projects were not completed on time due to certain factors.

The study will not only contribute to knowledge, but will also be beneficial to the key stakeholders in the industry since the findings will be used by them in their decision-making process. The study will also be beneficial for future reference.

1.10 ORGANIZATION OF STUDY

The study was organized into five chapters. Chapter one covered the background of the study, statement of the problem, the objectives of the study, research methodology adopted, significance of the study and the organization of the study. Chapter two reviewed past studies on the causes of construction delays and also the adverse effects. The Ghanaian construction industry was also reviewed. Chapter three presented the methodology of the study, while results, analyses of data from the survey and discussions were presented in the fourth chapter. Chapter five which is the last chapter presented the findings of the study and also offered some mitigation measures that can be put in place to reduce construction delays.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews the information from other researchers who have carried out their research in this field of study.

2.2 THE GHANAIAN CONSTRUCTION INDUSTRY

In Ghana, the construction industry is one of the very important sectors for development and economic growth. In the September 2015 edition of the annual Gross Domestic Product report by the Ghana Statistical Service, the construction industry was the largest sector in the economy with a growth rate of 30.6% and a GDP share of 14.8% of nominal GDP, and this share of industry sector inched up slightly from 26.6% in 2014 to 26.9% in 2015 (Ghana Statistical Service, 2015).

The construction industry has, over the years, grown consistently. And due to the political stability, many investors are looking forward in carrying out projects in the country. To ensure that there is professionalism in the industry, there must be a regulatory body to oversee the operations in the industry. For a long time, the building industry was operating with no clearly defined standards, and the Ghana Building Code was introduced in 2018 which sets out requirements and recommendations for efficient standards, planning, management and practices in building construction (Akpalu and Kyei, 2018).

In a report by the Oxford Business Group (2017), it was indicated that the industry faces a lot of challenges, which includes land tenure issues, unfavourable foreign exchange rates

and high cost of building materials. Also, it is evident that most construction companies in Ghana are owned by individuals or entrepreneurs, who lack the skills in the field of construction. Due to their affiliation and bond to some societies, they rarely award contracts to the experts in the industry.

The industry also faces challenges with materials. There is often the problem of shortage of materials during construction works, and most of the materials used in the construction are imported. If the construction industry can invest in the local production of building materials, the problem of delivery of ordered materials will be lessened, and shortage of materials will be minimized.

Quality and comprehensive training of the local artisans and tradesmen is imperative to the development of the skilled workforce. However, there is little or no training of the local craftsmen in the industry, and this is resulting in the under-performance and decline of the workforce. Measures must be put in place to provide and well-equip these craftsmen with the necessary skills.

2.3 DELAYS

Delays as defined by Assaf and Al-Hejji (2006), is the time consumed beyond the specified duration in the project contract agreement. Successful projects are those that are completed within or ahead of the scheduled time, within the allocated budget and according to the stakeholders' or client's satisfaction. However, there are conditions that obstruct the success of projects and have made completing projects on time difficult to achieve, hence, delaying the project.

Delay is one of the most frequent problems in the building industry and has negative effects on project success in terms of time, cost, quality and safety (Asnaashari *et al.*, 2009). There are also negative effects on the project parties: the clients, the contractors and the consultants.

In various parts of the world, it is common to see projects not achieving their objectives, i.e., being completed on time, and within the estimated cost. In a survey conducted by Trigunarsyah (2017), in Indonesia, the researcher identified that 47% of contractors completed their projects within the expected time, 15% of them completed their projects ahead of schedule and 38% of them indicated that their projects were completed behind schedule.

2.3.1 Types of delays

Theodore *et al.* (2009) provided four (4) ways to categorize delays, and it is important to understand which categories the various delays fall under before evaluating them.

a. Critical and non-critical

Critical delays are delays affecting the completion date of the projects, while the non-critical delays do not impact the completion date or milestone date. If activities on the critical path delay, the milestone date changes.

b. Concurrent and non-concurrent

Concurrent delays here refer to the circumstances in which two or more simultaneous delays occur on a project, but each affecting the milestone date separately.

c. Compensable and non-compensable

Delays that lead the contractor to receive compensation are compensable delays. The contractor is also entitled to time extension here. The writers indicated that whether or not a delay is compensable mainly depends on the contract terms. Where the delays do not give rise to the payment of compensation, it is known as non-compensable delays. The contractors may be allowed a time extension under this type of delay.

d. Excusable and non-excusable

Excusable delays are those created by unforeseen circumstances such as labour strikes, natural disasters, acts of God, interference by external organizations such as the Environmental Protection Agency and absence of action by some public organizations.

2.3.2 Conditions of Contract that regulates delays of works in Ghana

Contracts are legally binding written or oral agreements, which when entered into, creates a mutual obligation between the parties involved. That is to say, the parties involved are obligated to perform some duties expected of them under the contract. Conditions of a contract set some obligations for the contracting parties when the contract is entered into.

In Ghana, the Public Procurement Act 2003 (Act 663) as amended by the Public Procurement (Amendment) Act 2016 (Act 914) establishes the Public Procurement Authority (PPA), and also, it is the main legislation that regulates and governs public procurement in the country. The Act regulates the procurement of goods, services and works that are financed from the public finances, and all government institutions are mandated to comply with the Act for their procurement process.

Before construction projects are awarded by public institutions to contractors to carry out projects, advertisements are made and potential contractors are invited to bid. The bidders submit their tender documents which include their labour rates, the materials they intend to use, the equipment, proposed sub-contractors, payment schedule and any other information that is vital to enable them win the contract. Each of the tendered documents are later opened and reviewed by the institution's Entity Tender Committee to be sure the bids are complete and conforms to what was advertised. The committee later undertakes a technical and financial assessment of the tenders to evaluate and determine which bidder to award the contract to. Once that is done, the bidder with the highest ranking is awarded the contract for works to be carried out. The

The Public Procurement Authority has come out with Standard Tender Documents (STDs) that regulates minor, medium and major works procured with public funds. With respect to delays of works, the STDs outline the conditions that are present for each nature of work.

a. Major and Medium Works

Major works, as explained by the PPA in the Standard Tender Document for Major Works, are works that are of a complex nature, a high value (i.e. over Gh¢ 5,000,000), lengthy call-off contract period (over 18 months), and high prospective hazards for both the Employer and the Contractor, and medium works are those works that are also of a complex nature and are of a moderately large value (between Gh¢ 50,000 and Gh¢ 5,000,000), with a long contract period of up to 12 months and with moderate magnitude of potential hazards for both the Employer and the Contractor, according the Standard Tender Document for Medium Works

When it comes to delays under these natures of works, the respective Standard Tender Documents highlights some instances which might bring about some delays such as delayed drawings or instructions, delays caused by authorities, delayed payment. Also, it indicates delay damages, whose duty it is to minimize delay, and some claims which are entitled to the party that suffers from the delay.

For delayed drawings and instructions, Sub-clause 1.9 of the STDs indicates that the contractor shall notify the engineer whenever the works are likely to be delayed or interrupted, if any required drawing or instructions are not given to the contractor within a specified period of time, which shall be reasonable. And this continues to state that, the notice to be given to the engineer shall include, among others, the details of the nature and delay probable to occur if it is late. The sub-clause goes on to specify the claims that are available to the contractor if the engineer fails to issue the drawing or instruction within a reasonable period of time, which includes an extension of time if the completion of the works is or will be delayed, and also, payment of any costs plus reasonable profit which shall be included in the contract price. However, the contractor shall not be entitled to any of these claims if there was an error or delay by the contractor in the submission of the documents.

When it comes to delays caused by the authorities, Sub-clause 8.5 of both STDs for these nature of works points out if the authorities delay the contractor's work and it was unforeseeable, after the contractor has diligently followed the laid out by the authorities, then there is a cause which is claimable by the extension of time. If the contractor fails to comply with any of the claims he is entitled to when there are delays, then according to Sub-clause 8.7, he shall pay damages to the employer for the default.

In the instance where the contractor suffers delays due to the suspension of works ordered by the employer, then according to Sub-clause 8.9, any time extension and payments of any costs included in the contract price shall be entitled to the contractor. Sub-clause 14.7 outlines the instruction for payment to the contractor, and when there is the occurrence of delayed payment, the contractor is entitled to receive funding fees compounded monthly on the sum unpaid during the delay period (Sub-clause 14.8).

Where the contractor has to suspend works due to circumstances beyond his control or events such as natural catastrophes and civil war, per Sub-clause 19.4 of the STD, he is entitled to an extension of time for such delays and payments of any cost if the events happened in the country where the construction work is taking place. It is however the duty of each party to the contract to minimize delays that occur during the works (Sub-clause 19.3).

b. Minor Works

In the Standard Tender Document for Minor Works, the PPA explains Minor Works to be works that are of a simple nature and a small value (up to Gh¢50,000), with a brief call-off agreement length of less than 4 months and where the potential hazards are low for both the Employer and the Contractor.

For Minor Works, the contractor is entitled to an extension of time to complete the works, if he is and will be delayed by the employer's liabilities such as war within the country the work is taking place, use of any part of the works by the employer and a Force Majeure (Sub-clause 6.1 and 7.3). However Sub-clause 10.3 directs a party to a contract to give an

early notice to the other when there is awareness of any circumstance which may delay the works, and the contractor shall take all the reasonable steps to minimize the effects.

When payment due the contractor is delayed, he is entitled to in the interest at a rate, for each day the employer fails to pay him beyond the prescribed payment period, according to Sub-clause 11.8 of the STD for Minor Works. And where the contractor fails to complete the works within the time given for completion, per Sub-clause 7.4, it shall be the contractor's liability to pay to the employer, an amount stated for each day for which he fails to complete the works.

2.3.3 Compensation Events by the Public Procurement Authority

Compensation events refer to those events which occur in the cause of projects that alter the time needed to complete works and also the cost of the works. These events usually are not the fault of the contractor, and due to this, the contractor is entitled to a compensation of more time or money after reassessments of the completion date and cost are done.

As part of the conditions of contract in the Standard Tender Document for the procurement of works for lump sum contracts, there are some compensation events outlined by the Public Procurement Authority which makes contractors eligible to receive compensation from their employers in situations where the actions of the employer cause works to be delayed. With reference to Clause 44 of the STD for the Procurement of Works of Lump sum contracts, some events that enable the contractor to be entitled to compensation in the events of delays of works are when:

1. Clause 44.1 (b) – “The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.”
2. Clause 44.1 (c) – “The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.”
3. Clause 44.1 (h) – “Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.”

In the case where any of the above events would cause the projects not to be completed on time, Clause 44.2 makes it clear that the intended completion date would be extended and the project manager decides whether to extend the intended completion date and by how much to extend it. When delays occur, or when the contractor anticipates a delay in the works, he must, at the earliest opportunity, provide the project manager with the full information on what caused or what might bring about the delay and its related effects (Clause 32.1). Per Clause 28.2, the project manager shall, within 21 days of receiving such information, decide whether, and by how much to extend the initial completion date.

However, there is a limit to which the contractor can be compensated in such events. Clause 44 does not only serve the interest of the contractor, but also protects the interest of the employer. In the situation where the contractor fails to give an early warning of a delay or fails to cooperate with the project manager which would adversely affect the interest of the employer, Clause 44.4 does not make the contractor entitled to any compensation.

2.3.4 Causes of delays

There are many factors identified by several researchers to be the causes of project delays. In a study on the causes and effects of delays in the Malaysian industry by Sambasivan and Soon (2007), the researchers identified ten (10) most important causes of delays as inadequate contractor experience, contractor's improper planning, and poor site management, inadequate client's finance and payments for completed work. It also included labor supply, problems with subcontractors, lack of communication between parties, shortage in material, equipment availability and failure, and mistakes during the construction stage. These were gathered from questionnaires distributed among 3 major stakeholders in the industry, being the owners, the consultants and the contractors.

Frimpong *et al.* (2003) also identified several important underlying causes of delays in their study on the causes of delay and cost overruns in construction of groundwater projects in Ghana, with the owners, consultants and contractors agreeing that the five most important factors were monthly payment difficulties from agencies, poor contract management, material procurement, poor technical performance and escalation of material prices. With the monthly payment difficulties, the researchers concluded that contractors are not able to meet project objectives due to the financing agencies, i.e., government's failure to regularly provide adequate funding resources. From their study, poor contract management was ranked the second most important cause of project delays. In awarding contracts, the lowest bidders mostly win the contracts due to the low cost they offer to carry out services and other factors the awarding organization deems suitable with them. This has often led to the awarding organization, paying less attention to the plans of the contractors, their cost control, resource allocation and overall site management, as well as the management skills

some of these lowest bidders lack. Several other factors causing the delays were identified in their study, but were not as important as the above-mentioned factors, though of interest. Such factors are labour shortages, delays in work approval, slow decision-making and bad weather, among others.

In a study on the causes of delays and cost overruns in Nigerian construction projects, 16 factors were identified by Mansfield *et al.* (1994), with the four most important factors as agreed by the contractors, consultants and public clients being the financing of and payment for completed works, poor contract management, changes in site conditions and shortages of materials. Changes in site conditions were linked to the inadequacy of technical feasibility studies before authorization of projects.

Mezher and Tawil (1998) conducted an investigation on the causes of delays in the construction industry in Lebanon and identified sixty-four (64) causes of delays. They categorized them into 10 main groups: [1] materials, [2] manpower, [3] equipment, [4] financing, [5] changes, [6] government relations, [7] project management, [8] site conditions, [9] environment and [10] contractual relationships. Analyzing the data from questionnaires they distributed among owners, contractors and architect-engineer firms, they were able to deduce the most important causes being financing, project management, contractual relationships and changes. Financing was ranked one of the most important causes because of owners delaying in the progress payments to contractors, varying costs of materials and the financing problems of contractors. Project management problems included lack of staff training and support for management poor initial site planning, poor judgement in estimating time and resources, and ignoring critical tasks, among others, hence it being one of the most important causes of delays. For contractual relationships as

one of the most important causes of delays, some factors leading to that were identified to be conflicts between the contractor and the consultant, the uncooperativeness of the owners, poor communication between the owner and the designer in the design phase, legal disputes and the type of contract (whether design-build or turnkey). Changes, as one of the most important factors, had to do with the design changes and errors by the owners the architect-engineer firms respectively, unexpected site conditions and inaccuracy of initial project estimates by the owners.

In Hong Kong, Chan and Kumaraswamy (1997) carried out a comparative study to analyze the causes of time overruns in Hong Kong construction projects. The researchers categorized 83 delay factors they identified in early 1994, when a pilot survey was conducted to explore the main causes of delays in both building and civil engineering projects completed in Hong Kong between the years 1990 and 1993, into 8 major categories. From the data gathered by them from the three major groups in the construction industry, i.e., clients, contractors and consultants, poor site management and supervision, unforeseen ground conditions and low speed of decision making involving all projects teams were identified as some of the five (5) most important sources of time overruns in projects, with the remaining ones being client-initiated variations and necessary variations of works.

Also, in Nigeria, Owolabi *et al.* (2014) did a survey on the causes and effects of delays on project construction delivery time and identified 15 factors causing delays in construction projects. Key causes amongst them are lack of funding to finance the completion of the project, fluctuation of construction materials prices, labour strike, lack of adequate information from consultants and project management problem. The responses they had

from 90 respondents indicated that most of the causes of delays are from the clients, followed by the contractor.

Ten (10) critical delay factors were identified by Amoatey and Ankrah (2017) when they explored critical road project delay factors in Ghana, from the perceptions of clients, consultants, contractors and donors. From their study, the top five cause of delays were the delays in the payment of finished work by the owner, insufficient experience of the contractor, changes in scope by the owner during construction, delays in furnishing and delivering the site to the contractor, and inflexible allocation of funds for project items, which was donor-related.

In Oman, 60 causes of delays were identified during the analysis of the causes of delays in dam projects by Alamri *et al.* (2017) and grouped into client, contractor, consultant and external factors. These causes were ranked, with the help of the Pareto principle, based on the responses received from their survey to determine the top 12 significant causes. It was realized that severe weather conditions ranked the first, whilst land acquisition ranked the twelfth most significant cause of delays. Ranked second to eleventh are change orders, uncertainty in ground conditions, poor site management, executive bureaucracy in client organization, feasibility study did not cover all aspects, mistakes in soil investigation, natural effects during construction work, difficulty of defining project requirement, slowness of decision-making process and delay of obtaining approval from the different government authorities. From the 12 significant causes, it was realized that 41.7% were caused by external factors, while 33.3%, 16.7% and 8.3% were related to client, consultant and contractor factors respectively. For bad weather being the most significant cause of delays, Alamri *et al.* (2017) cited an example that, there were heavy rains which the dams

were exposed to in the construction phases between the years 2007 to 2010. They were of the view that the “absence of responsibilities assigned in contract bonds from all project parties” was the reason this type of external factor mostly occurred.

In a time performance survey carried out by Assaf and Al-Hejji (2006) on construction projects in Saudi Arabia to determine the causes of delays and their importance according to each project participant, i.e., the owner, the consultant and the contractor, 73 causes of delays were identified and they were categorized into nine (9) groups, namely project, owner, contractor, consultant, design, materials, labours, equipment and external groups. From their study, the owners were of the view that, shortage of labours, unqualified workforce and inadequate contractor experience were some of the most severe cause of delays, while the consultants indicated that the type of project bidding and award, shortage of labour and delay in progress payments by the owners were the most severe causes of delays. As part of the least important delays causes, as agreed by the three parties were changes in government regulations and laws, effect of social and cultural factors, traffic control and restrictions at job site and accidents during construction.

Ogunlana *et al.* (1996) surveyed 12 high-rise projects in Thailand, and came to a conclusion that change orders by owners of construction projects are the most frequently cited causes of delays. This was due to the fact that, in their quest to meet the customer demands and for marketing reasons, they have the habit of changing their plans to suit the changing economic climate. Slow decision making by the owners was also attributed to the causes of delays. Also, from their study, design-originated causes of delays included incomplete drawings and slow responses. 75% of the projects surveyed were delayed due to incomplete drawings. Shortage of construction materials, late delivery of supplies, price escalation,

shortage of site workers and insufficient equipment were cited to be resources related causes of delays. With the shortage of construction materials on site, Fugar and Agyakwah-Baah (2010) were not surprised, stating that “barring the shortage of material on the market, the availability of materials on site at the right time and in the right quantities is directly related to the ability of the client to honour certificates as and when they are due.”. The shortages may be due to several factors such as the origin and availability of the materials. Most of the materials used for building construction are imported, with very few which are locally manufactured and available. For imported materials, Rahman *et al.* (2017) highlighted the fact that, it takes a longer time for sourcing, procuring and transporting of materials. This leads to the late delivery of the materials. For the quality of the materials used for the construction. If the materials are not of standard quality, their usage on the projects can be delayed, because it takes some time for compensation to be made if a report is made to the supplier. In each economy, over a period of time, there are changes in the price of materials, goods and services. Due to demand and supply imbalances, especially when demand exceeds supply, the prices of materials increase. According to Sambasivan and Soon (2007), in Malaysia, some contractors even postpone the purchase of materials until the prices decrease, thereby delaying the construction works.

With their focus on educational sector projects in Ghana, Famiyeh *et al.* (2016) identified several factors and classified them into seven categories. The researchers found out that the key client-related factors that contribute to delays in school infrastructure projects were delays in payments, unrealistic contract durations imposed by the owner, poorly defined scope and owner-initiated interference. Under-estimation of project cost, poor inspections and supervisions, poor contract management and instructions delays were the consultant-

related factors, while underestimation of project complexity, difficulty in accessing credit shortage of equipment and tools on site, and insufficient staff were some of the contractor-related factors identified. The slowness of government in issuing permits was the key government-related action that leads to project delays. Procurement and materials delivery factors were also identified as having high impact on project delays due to shortage of materials, escalation of prices of materials and delays in the delivery of materials to the site. Two other categories, contractual and external factors were found out to have little or no major impact in project delays in the of government school projects.

2.3.5 Effects of delays

While some researchers investigated the various factors that cause delays, others also went beyond that to analyze the effects these delays have on the project.

Time overrun, cost overrun, disputes, arbitration, litigation, and total abandonment of building projects were the effects identified by Sambasivan and Soon (2007). Time overrun can be defined as the non-completion of works or project within the agreed period in the contract. Simply put, the late completion of projects. Time affects cost, and hence there is cost overrun. This is when the amount budgeted for a project is exceeded by the actual cost incurred. The delays of a project can lead to disputes between the owner, consultant or the contractor. Lack of finance, late payments, and change orders all brings about a relationship breakdown between the project parties and leads to further delays and claims, and also affects the interests of the stakeholders, as stated by Aryal and Dahal (2018). These disputes can come up at any point in time the project, from the design stage to the construction stage. According to Sambasivan and Soon (2007), the disputes often lead to

arbitration, an alternative dispute resolution method where a third party comes in to amicably settle the project disputes without going to the courts. When this method fails, it leads to litigation, where the courts decide on the issues between the parties. One major effect the delays can have on the project is the lack of continuity of the project by the client or total abandonment, and this is a common phenomenon here in Ghana, as well as in other parts of the world.

Since there is delay in the project, the resources assigned to the project are not utilized to their fullest capacity, hence there is frustration among the workers, low productivity and lack of commitment to the project. There is wastage of materials and the equipment and machines are also left idle in the case where the project is totally abandoned. The human resources are also put out of jobs, i.e. no income for them because there is no work to be done for them to be paid. There is also disruption of work, third party claims and termination of contracts.

Below is a summary of the causes of delays and the effects of the causes identified from literature.

Table 2.1: Summary of the causes of delays and the effects they have on building projects.

CAUSES OF DELAYS	EFFECTS OF DELAYS
1. Improper planning 2. Inadequate funds to finance project till completion 3. Material procurement 4. Poor contract management 5. Lack of communication between parties 6. Inadequate contractor experience 7. Increasing prices of materials 8. Changes in site conditions 9. Poor site management and supervision 10. Project management problems 11. Changes in scope by the owner during construction 12. Monthly payment difficulties 13. Delay to furnish and deliver the site to the contractor 14. Severe weather conditions 15. Land acquisition 16. Difficulty in defining project requirements 17. Slowness in decision making process 18. Shortage of labour 19. Type of project bidding and award 20. Unqualified workforce 21. Changes in government regulations 22. Incomplete drawings 23. Shortage of materials 24. Late delivery of materials to site 25. Poorly defined scope	1. Total abandonment of project 2. Time extension 3. Increased cost of project 4. Disputes 5. Wastage of materials 6. Termination of contracts 7. Lack of commitment to the project

Source: Literature Review

2.4 CONSTRUCTION PROJECTS DELIVERY

2.4.1 Work processes and stages

a. Design

The design stage is the first stage in the construction process. In this stage, the feasibility studies are done to by the engineer to assess the viability of the project, taking into

consideration the required regulations. The owner of the project, together with the stakeholders discuss the project into details, including the material to use, the equipment and the estimated cost of the entire project. This stage also includes the bidding process, where the contractor to work on the project is selected, the selection can be done based on the lowest bidder, the qualifications of the bidder or based on the best value.

b. Pre-construction

The contractor assembles the team he will be working with on the project and conduct a site inspection and begin preparations for the project. It is imperative to obtain the necessary permitting from the authorities for the proposed scheme. These permits include building permit, fire permit, and Environmental Protection Agency permit.

c. Procurement

The resources to be used to undertake and complete the project are procured under this stage. There are various procurement methods to be implored here based on the contract value thresholds allocated.

d. Construction

This is where the construction phase begins. The project team meets to brief themselves about the project and draw out plans to execute the work smoothly. The team sets up the temporal offices and storage facilities to store the materials and equipment and more. When all is set, the construction begins. During the construction phase, the project manager must consistently monitor and measure and report the progress of work. This is key in ensuring that the objectives of the project are met.

e. Commissioning

When the construction is completed, it is commissioned. This is done by planning, documenting, scheduling, testing and providing training, to provide a deliverable that is fully functional, as per the owner's requirements.

f. Closing

This stage signifies the end of the project. This is when the project is formally closed by the project manager and involves handing over all the deliverables to the client and collecting and finalizing all paper work, with the client verifying that product is acceptable and it is transferred, the resources are returned to the original sources and historical records are updated.

2.5 OPERATIONS OF TDC DEVELOPMENT COMPANY LTD

In 1952, the TDC Development Company Limited was set up to house low-income industrial employees in a New Town around the newly developed Tema Port. The activities of the TDC led to the establishment of communities 1 to 25 in Tema, and contributing to over 2,255 units (Kwofie *et al.*, 2011). The plan attributed the housing shortage in the country to: In 1965, TDC was provided the additional obligation of planning and developing the Tema Acquisition Area through a parliamentary Instrument (L.I. 469). This was later revised in 1989 by a parliamentary Instrument (L.I 1468) setting out the current functions of Tema Development Corporation (TDC) as follows;

- a) To plan, layout and develop the Tema acquisition area.
- b) Without prejudice to the general effect of paragraph (a) of this part the Corporation may for the purpose of the attainment of its objective described in

that paragraph and with the prior approval of the Tema District Assembly undertake the following core functions:

- i. Prepare and execute housing schemes;
- ii. Develop industrial and commercial sites
- iii. Carry on such other activities as are conducive to the attainment of its objective

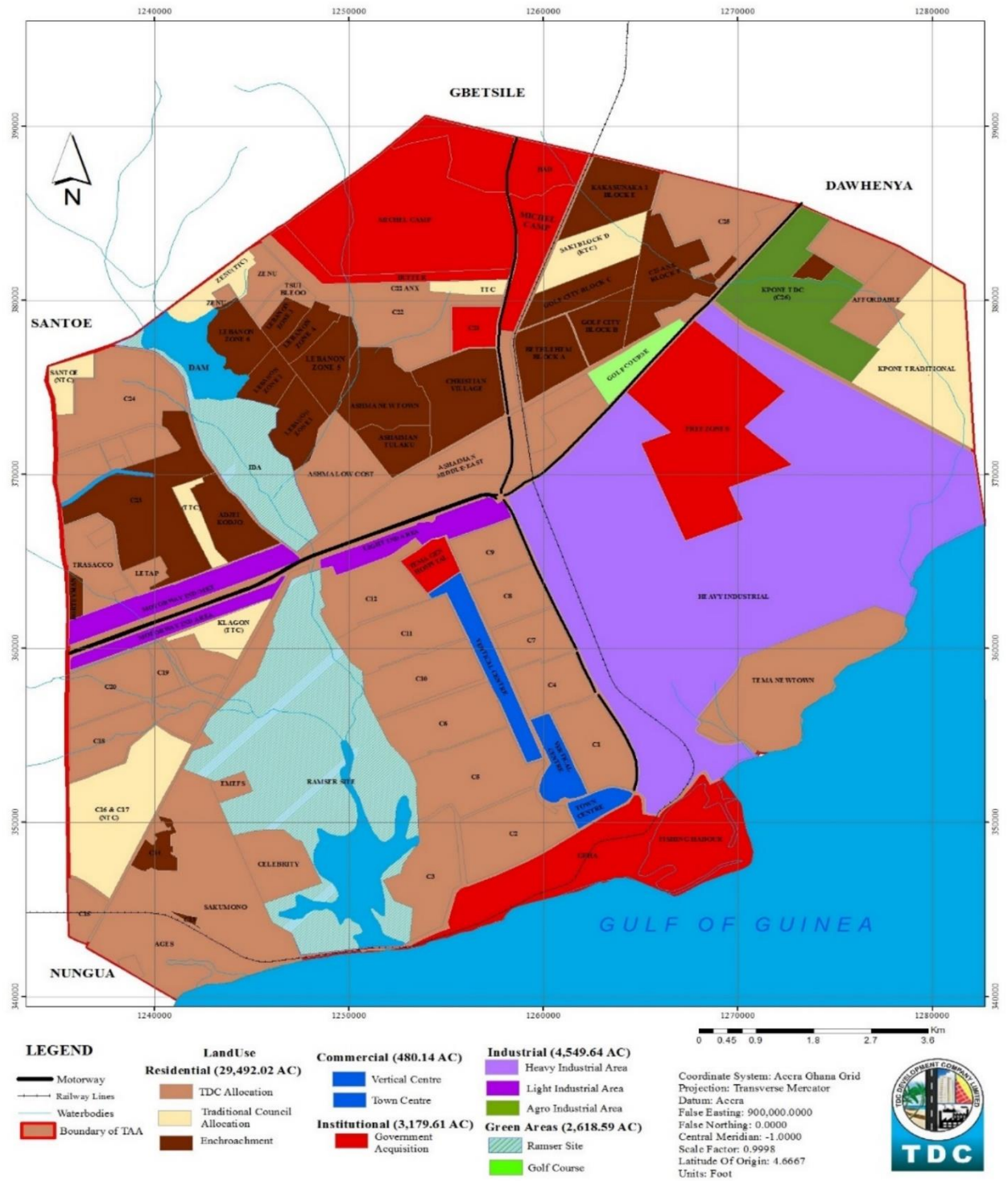


Figure 2.1: TDC Operational Map

Source: TDC Development Company, August 2019

2.6 SUMMARY

This chapter touched on the Ghanaian construction industry, delays as a problem and its types. The conditions of contract that has been set out by the Public Procurement Authority in Ghana when it comes to works was also reviewed, with focus on what constitutes delays and also what should be done when a contractor faces the problem of delays. References were made to the Standard Tender Documents for Works by the Public Procurement Authority. Also, the Standard Tender Documents sets out some conditions that makes the contractor eligible to receive compensation from the employer should delays happen due to the actions of the employer and Force Majeure. But the employer's interest is also taken into consideration so that he is not affected adversely when the contractor fails to give him early notification of any delays.

The chapter also reviewed the significant causes of delays in building projects and the effects they have on the projects. Research papers and articles from other researchers were referred to for information. Twenty-five (25) significant causes of delays and seven (7) effects of the causes were identified, as shown in Table 2.1.

The work processes and stages in construction (from the design stage to the closing stage) were also included in this chapter, as well as the TDC Development Company and its operational area in Tema.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In order to arrive at the desired goals of the research, research tools and techniques need to be designed to capture effectively and measure some key characteristics. This chapter also discusses how the fieldwork was structured and the methods used to gather the appropriate information for the research as well as the methods used to analyze the information.

3.2 RESEARCH DESIGN

The quantitative research approach and descriptive design were adopted for this study. The intention was to gather data and use it to describe existing conditions at a particular point in time. With this approach, it is easy to measure and analyze data.

3.3 POPULATION OF THE STUDY

Polit and Hungler (1999) refer to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. The population of the study constituted consultants in the Ashaiman Municipal Assembly, Tema Metropolitan Assembly and Kpone-Katamanso Municipal Assembly.

3.4 SAMPLE SIZE

The sample size allows the researchers to conduct the study to individuals from the population and conclusions that apply to the entire population can be derived from the results. The sample size selected for this study was 100 respondents. The size is to enable

researcher save time and resources. The basis for the selection of these respondents was to get wide-ranging thoughts and ideas from them.

3.5 SAMPLING TECHNIQUE

The non-probability sampling approach was adopted as it is preferred where the population is indefinite and undefined. The researcher used snowball sampling technique of getting respondents who are well-informed and well abreast with the subject matter of interest, and also to help the researcher reduce the difficulty in locating respondents and speed up the duration in getting the responses. According to Norusis (2006), it is fast in its approach and has relatively cheap cost associated with its gathering method.

3.6 SOURCES OF DATA

Data came from both primary and secondary sources. Primary sources of data were through questionnaires and one-on-one interactions from some respondents. And the secondary sources of data through published reports and other past research papers and articles on the topic of the study.

3.3 DATA COLLECTION INSTRUMENT

Questionnaires were the main data collection instruments used. This was because, it was considered to be the best method for collecting data. Different views and perceptions from different respondents were gathered through this instrument. In order to address the objectives and research questions of the study, each item in the questionnaire were

developed to in line with that. The questionnaire consisted of both open and closed-ended questions.

3.8 DATA COLLECTION PROCEDURES

Given the nature of the study, the approach was to collaborate with key stakeholders involved through the use of quantitative data collection approach. The questionnaires were administered to the respondents in the District Assemblies of the study areas personally as this method encouraged prompt responses from them and also, they were asked to recommend other respondents who were in the same field as them to also respond to the questionnaires. It was recommended to the respondents to complete the questionnaires as honestly as possible and to give response to every question on the questionnaire. They were informed that the information they provide would remain confidential and were to be used only for research and academic purpose.

3.9 DATA ANALYSIS

The data gathered was analyzed descriptively and presented using tables with the aid of Statistical Package for Social Sciences (SPSS). The primary data obtained were edited and coded before analysis. Analysis were descriptive constituting frequencies and percentages, which were based on the respondent's answers to the research questionnaire.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter presents the research findings and discusses in detail the responses from the questionnaires administered by the researcher. The various responses from the questionnaires have been presented in tabular form and also in pie charts and graphs. The chapter therefore, presents and discusses the data gathered from the field and this also served as input to the conclusions and recommendations of the research. Data was also gathered on building projects that have been undertaken by the Ashaiman Municipal Assembly, the Tema Metropolitan Assembly and the Kpone-Katamanso Municipal Assembly in the last ten (10) years, with focus on the start and finish dates, and the reasons for delays of the projects that were not completed on schedule.

4.2 BRIEF PROFILE OF STUDY AREAS

4.2.1 ASHAIMAN DISTRICT

Ashaiman is a large town located in the Greater Accra Region which is about 30km from Accra and 4km to the north of Tema. With an area of about 45km², it is bordered on the north and east by the Kpone-Katamanso District, and on the west by the Adjei Kojo Township. The Ashaiman district was carved out of the Tema Metropolitan, as one of the newly created districts in 2008 by LI 1889 and Local Government Act of 1993 (Act 462). (Credit: Ghana Statistical Service)

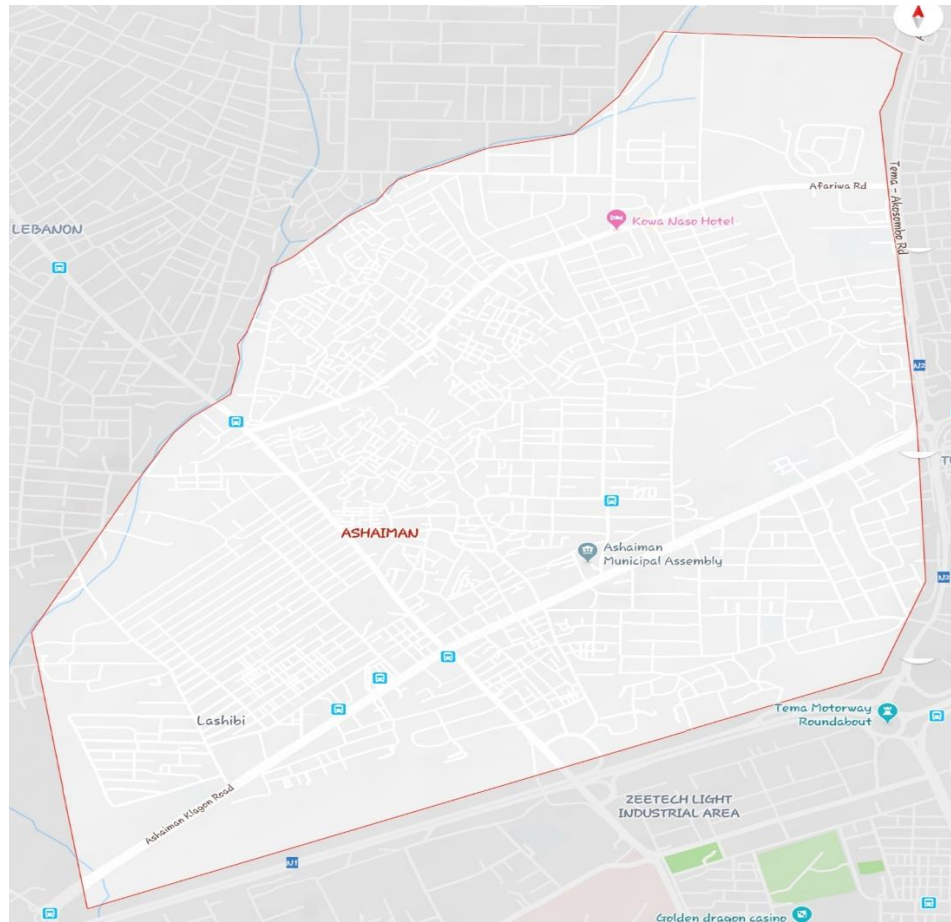


Figure 4.1: Ashaiman District Map
Source: Google Maps, August 2019

4.2.2 TEMA METROPOLIS

The Tema Metropolis is a coastal district located about 30km from Accra. With an area of about 88km², it is bordered by the Dangme West District at the north-east, by the Ledzokuku Krowor Municipal at the south-west, by the Adentan Municipal and the Ga East Municipal at the north-west, and by the Gulf of Guinea at the south. The Metropolis proximity to the sea informed the decision to construct the Tema Harbour in 1957. (Credit: Ghana Statistical Service)

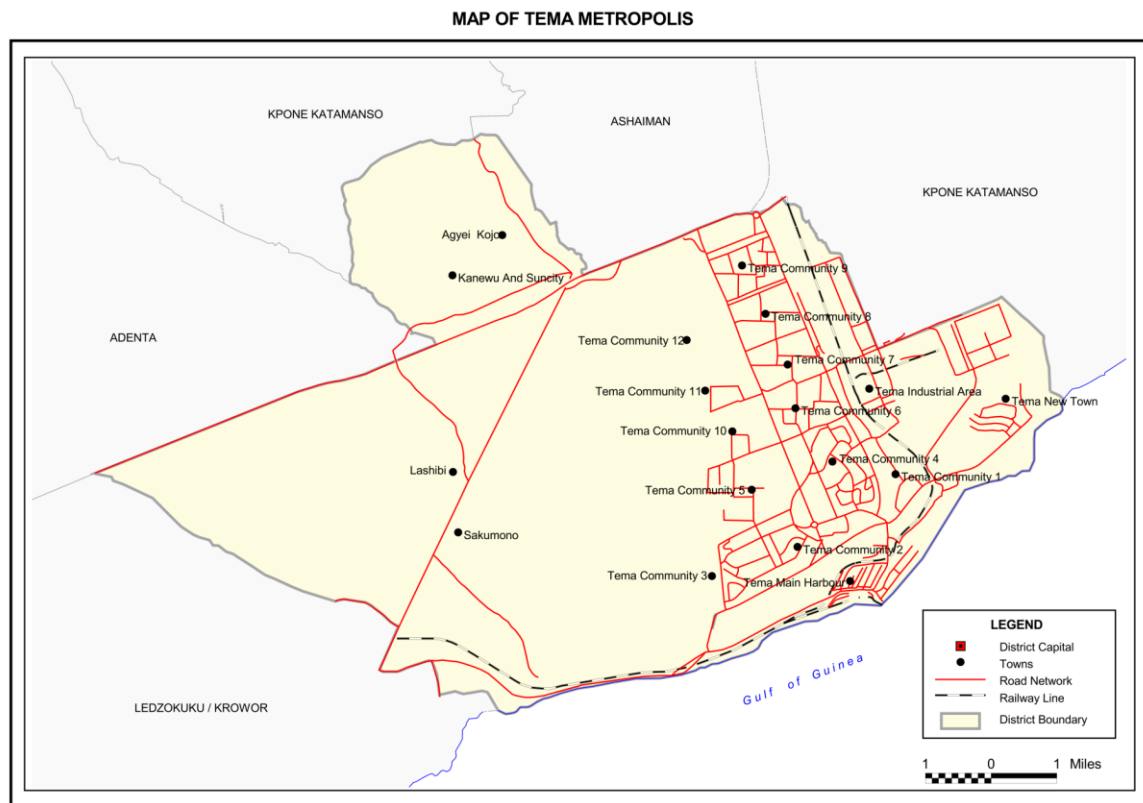


Figure 4.2: Tema Metropolis Map

Source: Ghana Statistical Service, August 2019

4.2.3 KPONE-KATAMANSO DISTRICT

The Kpone-Katamanso district was carved out from the Tema Metropolis in 2012, and it is located along the coastal part of Tema. It is also bordered to the west by Tema, to the east by Dangme West, to the north and the south by Akuapem South and Gulf of Guinea, respectively. (Credit: Ghana Statistical Service)

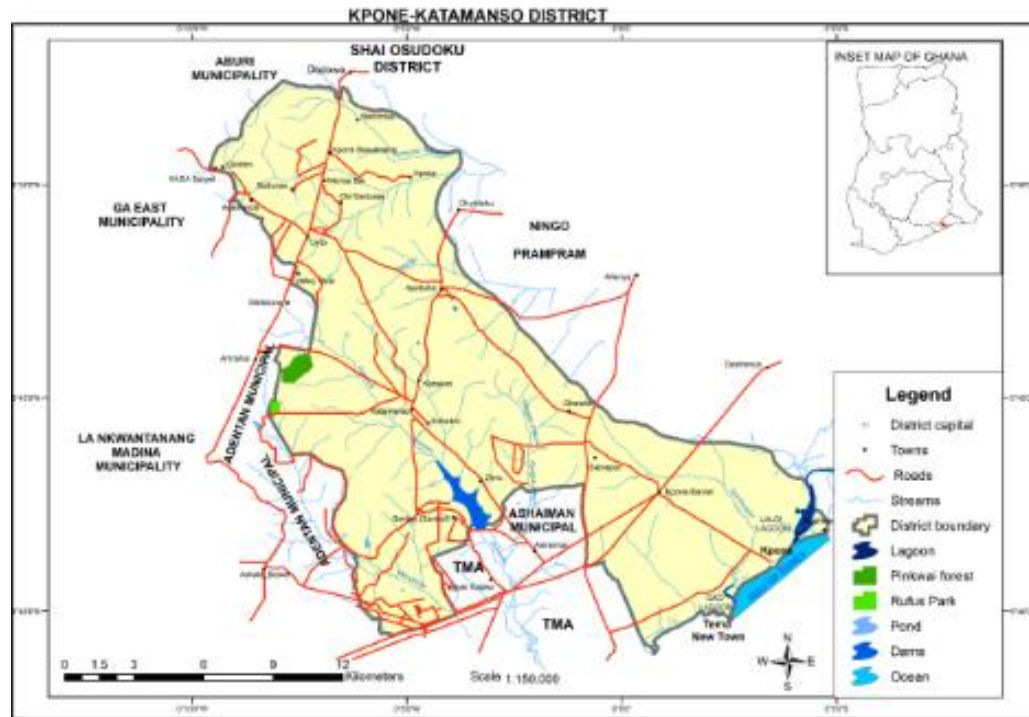


Figure 4.3: Kpone-Katamanso District Map

Source: Kpone-Katamanso Municipal Assembly, August 2019

4.2 DATA ANALYSIS RESULTS

The demographic results of the respondents, i.e., gender, age, highest level of education, profession, the number of years of experience in the construction industry, and the number of projects worked on, have been presented below using frequency distribution charts and statistics. The data was analyzed based on the 84 responses received.

4.2.1 Age Distribution of Respondents

The data gathered, from the distribution of questionnaires, in the study areas indicates that majority of the respondents, representing 51.2%, fell between the ages of 25 to 34, with 7.1% being within the ages of 45 and 54 years.

Table 4.1: Age Distribution of Respondents

Age	Frequency	Percent	Cumulative Percent
25 - 34 years	43	51.2	51.2
35 - 44 years	35	41.7	92.9
45 - 54 years	6	7.1	100.0
Total	84	100.0	

Source: Field Survey, August 2019

4.2.2 Gender Distribution of Respondents

Majority of the respondents were males, representing 71.4%, while the females were 24, representing 28.6% of the respondents.

Table 4.2: Gender Distribution of Respondents

Gender	Frequency	Percent	Cumulative Percent
Female	24	28.6	28.6
Male	60	71.4	100.0
Total	84	100.0	

Source: Field Survey, August 2019

4.2.3 Highest Level of Education

All respondents to the questionnaires possessed some form of education, with majority of them (35.7%) holding a first degree, followed by 35.7% of the having a Master's Degree. 14.3% of them have their professional certificate.

Table 4.3: Highest Level of Education

Level of Education	Frequency	Percent	Cumulative Percent
Diploma	8	9.5	9.5
First Degree	30	35.7	45.2
HND	9	10.7	56.0
Master's Degree	25	35.7	85.7
Professional Certificate	12	14.3	100.0
Total	84	100.0	

Source: Field Survey, August 2019

4.2.4 Respondent's number of years of experience in the Construction Industry

Respondents were asked to indicate the number of years of experience they have in the construction industry. This was because, it is believed that the response of the respondents will be guided by the experience they have on the construction industry. As shown in the table below, majority of the respondents (56%) have between 10-20 years of experience in the construction industry, with only one person, representing 1.2%, having more than 20 years of experience in the construction industry.

Table 4.4: Number of years of experience in the Construction Industry

Years of experience	Frequency	Percent	Cumulative Percent
10 - 20 years	47	56.0	56.0
Above 20 years	1	1.2	57.1
Less than 10 years	36	42.9	100.0
Total	84	100.0	

Source: Field Survey, August 2019

4.2.5 Number of projects worked on by respondents

Respondents were asked to indicate the number of projects they have worked on. This was because, it is believed that the response of the respondents will be guided by the experience they have gained from each project they have worked on. As shown in the table below, 45.2% of the respondents have worked on more than 15 projects, with 21.4% and 33.3% having worked on less than 5 projects and between 5 and 15 projects, respectively

Table 4.5: Number of projects worked on by respondents

Number of projects worked on	Frequency	Percent	Cumulative Percent
Between 5 and 15 projects	28	33.3	33.3
Less than 5 projects	18	21.4	54.8
More than 15 projects	38	45.2	100.0
Total	84	100.0	

Source: Field Survey, August 2019

4.2.6 Significant causes of delays in Building Construction Projects

This section presents analysis of data on the significant causes of delays in building construction projects. The respondents were asked rank their responses from **1** which indicates less significant, rising to **5** which indicates most significant. The results were analyzed and summarized, from the most significant to the least significant as presented in Table 4.6 and Table 4.7 below:

Table 4.6: One-Sample Statistics on the significant causes of delays

ID	Causes of delay	Mean	Std. Deviation	Std. Error Mean
1	Inadequate funds to finance project till completion	4.54	.719	.078
2	Monthly payment difficulties	4.19	.938	.102
3	Changes in scope by the owner during construction	3.63	.915	.100
4	Increasing prices of materials	3.61	1.053	.115
5	Improper planning	3.58	1.078	.118
6	Late delivery of materials to site	3.55	.987	.108
7	Poor contract management	3.54	1.069	.117
8	Project management problems	3.54	1.113	.121
9	Poorly defined scope	3.44	1.196	.130
10	Shortage of materials	3.39	.994	.108
11	Material procurement	3.25	.992	.108
12	Poor site management and supervision	3.20	1.180	.129
13	Inadequate contractor experience	3.02	1.075	.117
14	Lack of communication between parties	2.96	1.197	.131
15	Difficulty in defining project requirements	2.96	1.046	.114
16	Delay to furnish and deliver the site to the contractor	2.93	1.249	.136
17	Incomplete drawings	2.93	1.315	.144
18	Unqualified workforce	2.76	1.257	.137
19	Changes in government regulations	2.74	1.088	.119
20	Changes in site conditions	2.63	1.015	.111
21	Slowness in decision making process	2.58	1.382	.151
22	Type of project bidding and award	2.57	.960	.105
23	Severe weather conditions	2.52	1.237	.135
24	Shortage of labour	2.48	.950	.104
25	Land acquisition	2.43	1.254	.137

Source: Field Survey, August 2019

Table 4.7: One-Sample Test on the significant causes of delays

ID	Causes of delay	Test Value = 2					
		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
1	Inadequate funds to finance project till completion	32.329	83	.000	2.536	2.38	2.69
2	Monthly payment difficulties	21.414	83	.000	2.190	1.99	2.39
3	Changes in scope by the owner during construction	16.328	83	.000	1.631	1.43	1.83
4	Increasing prices of materials	14.375	83	.000	1.548	1.33	1.76
5	Improper planning	13.988	83	.000	1.607	1.38	1.84
6	Late delivery of materials to site	13.464	83	.000	1.583	1.35	1.82
7	Poor contract management	13.164	83	.000	1.536	1.30	1.77
8	Project management problems	12.841	83	.000	1.393	1.18	1.61
9	Poorly defined scope	12.641	83	.000	1.536	1.29	1.78
10	Shortage of materials	11.544	83	.000	1.250	1.03	1.47
11	Material procurement	11.040	83	.000	1.440	1.18	1.70
12	Poor site management and supervision	9.339	83	.000	1.202	.95	1.46
13	Inadequate contractor experience	8.727	83	.000	1.024	.79	1.26
14	Lack of communication between parties	8.445	83	.000	.964	.74	1.19
15	Difficulty in defining project requirements	7.384	83	.000	.964	.70	1.22
16	Delay to furnish and deliver the site to the contractor	6.811	83	.000	.929	.66	1.20
17	Incomplete drawings	6.471	83	.000	.929	.64	1.21
18	Unqualified workforce	6.218	83	.000	.738	.50	.97
19	Changes in government regulations	5.696	83	.000	.631	.41	.85
20	Changes in site conditions	5.553	83	.000	.762	.49	1.03
21	Slowness in decision making process	5.453	83	.000	.571	.36	.78
22	Type of project bidding and award	4.593	83	.000	.476	.27	.68
23	Severe weather conditions	3.882	83	.000	.524	.26	.79
24	Shortage of labour	3.870	83	.000	.583	.28	.88
25	Land acquisition	3.132	83	.002	.429	.16	.70

Source: Field Survey, August 2019

Table 4.6 presents the mean and standard deviation values of the respondents to questions relating to causes of delays in building projects. The respondents strongly agreed that the major cause of delays in building projects is inadequate funds to finance project till completion, with a mean rating of $M=4.54$ and a standard deviation of $SD=0.719$. It clearly indicates a strong agreement of the respondents the building projects are undertaken without adequate funds, hence the delays occurring in the projects. With a mean rating of $M=4.19$ and standard deviation of $SD=0.938$, it clearly indicates that monthly payment difficulties is another major significant cause of project delay. Some clients find it difficult to pay what is due the contractors at the end of each month. Hence the contractors are unable to carry out works, or feel reluctant to proceed with works knowing they might not be paid on time. From the findings, it is also realized that, some clients/owners change the scope of the projects being carried out for them. This may be due to the needs or expectations of the owner, to add to, expand or reduce a feature in the deliverable. When this happens, work usually pauses for a while to enable the contractors properly document the changes that will be carried out and come out with a change order. The cause was the 3rd most chosen by the respondents, with increasing prices of materials and improper planning being the 4th and 5th most chose response, with means and standard deviations of ($M=3.61$, $SD=1.053$) and ($M=3.58$, $SD=1.078$) respectively. Most projects suffer from delays because they are not properly planned before being carried out. Improper planning comes in many forms such as lack of understanding of the work by the project sponsor and stakeholders, not setting out the budget required and how the funds will be sought. This often leads to the projects not being carried out smoothly and in the long run, delaying. The increasing prices of materials is seen by the respondents as one of the major, significant

causes of project delays. This often leads to some contractors even postponing the purchase of materials with the hope of the prices decreasing, which ends up delaying the construction works.

4.2.7 Significant effects of delays in Building Construction Projects

This section presents analysis of data on the significant effects of delays in building construction projects. The respondents were asked rank their responses from **1** which indicates less significant, rising to **5** which indicates most significant. The results were analyzed and summarized, from the most significant to the least significant as presented in Table 4.8 and Table 4.9 below:

Table 4.8: One-Sample Statistics on the significant effects of delays

ID	Effects of delay	Mean	Std. Deviation	Std. Error Mean
1	Time extension	4.32	.867	.095
2	Increased cost of projects	4.30	.724	.079
3	Total abandonment of project	4.07	.861	.094
4	Termination of contracts	3.71	.989	.108
5	Disputes	2.96	1.156	.126
6	Wastage of materials	2.94	1.196	.130
7	Lack of commitment to the project	2.87	1.438	.157

Source: Field Survey, August 2019

Table 4.9: One-Sample Test on the significant effects of delays

ID	Effects of delay	Test Value = 0					
		t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
1	Time extension	54.371	83	.000	4.298	4.14	4.45
2	Increased cost of projects	45.707	83	.000	4.321	4.13	4.51
3	Total abandonment of project	43.325	83	.000	4.071	3.88	4.26
4	Termination of contracts	34.429	83	.000	3.714	3.50	3.93
5	Disputes	23.504	83	.000	2.964	2.71	3.22
6	Wastage of materials	22.535	83	.000	2.940	2.68	3.20
7	Lack of commitment to the project	18.290	83	.000	2.869	2.56	3.18

Source: Field Survey, August 2019

From Table 4.8, the respondents are of the view that the most significant effect delays have on building projects is time extension, with a mean of $M=4.32$ and standard deviation of $SD=0.867$. Increased cost of the project was seen as the second most significant effect. The value of money that is invested in projects keeps increasing with time, with interest rates, economic growth and inflation all affecting the value of money. Represented by a mean value of $M=4.07$, and standard deviation of $SD=0.861$, some projects are totally abandoned and they are left at the mercy of squatters or are left to rot, in severe cases of delays. The respondents are of the view that, termination of contracts and disputes were the 4th and 5th most significant effects, with means and standard deviations of $M=3.71$, $SD=0.989$ and $M=2.96$, $SD=1.156$, respectively.

4.2.8 Summary of significant causes and effects of delays in Building Construction Projects

Table 4.10 and Table 4.11 below presents a rank of the significant causes and effects of building projects delays, based on the responses received.

Table 4.10: Ranks of causes of delays from results

ID	Causes of delays	Rank
1	Inadequate funds to finance project till completion	1 st
2	Monthly payment difficulties	2 nd
3	Changes in scope by the owner during construction	3 rd
4	Increasing prices of materials	4 th
5	Improper planning	5 th
6	Late delivery of materials to site	6 th
7	Poor contract management	7 th
8	Project management problems	8 th
9	Poorly defined scope	9 th
10	Shortage of materials	10 th
11	Material procurement	11 th
12	Poor site management and supervision	12 th
13	Inadequate contractor experience	13 th
14	Lack of communication between parties	14 th
15	Difficulty in defining project requirements	15 th
16	Delay to furnish and deliver the site to the contractor	16 th
17	Incomplete drawings	17 th
18	Unqualified workforce	18 th
19	Changes in government regulations	19 th
20	Changes in site conditions	20 th
21	Slowness in decision making process	21 st
22	Type of project bidding and award	22 nd
23	Severe weather conditions	23 rd
24	Shortage of labour	24 th
25	Land acquisition	25 th

Source: Field Survey, August 2019

Table 4.11: Ranks of effects of delays from results

ID	Effects of delays	Rank
1	Time extension	1 st
2	Increased cost of projects	2 nd
3	Total abandonment of project	3 rd
4	Termination of contracts	4 th
5	Disputes	5 th
6	Wastage of materials	6 th
7	Lack of commitment to the project	7 th

Source: Field Survey, August 2019

4.3 REVIEW OF BUILDING PROJECTS UNDERTAKEN BY THE ASHAIMAN, TEMA AND KPONE-KATAMANSO ASSEMBLIES

The Works Departments of the Ashaiman Municipal Assembly (ASHMA), the Tema Metropolitan Assembly (TMA) and the Kpone-Katamanso Municipal Assembly (KKMA) were visited by the researcher to make enquiries on building projects that have been undertaken by these Assemblies in the past ten (10) years, with the focus on the start and finish dates and the causes of delays of the projects that were not completed on schedule.

With the establishment of the Ashaiman Municipal Assembly about 10 years ago, quite a number of projects have been undertaken to aid in the development of the locality. Some of which include residences, classroom blocks, libraries, office complex, market stalls and shops. Information was sought for on the start and finish date of these various projects. It was realized that though a few of the projects have been completed, they were not completed within the scheduled period. Some of the projects are still ongoing, though they were started quite a long time ago. A few other projects have also been stalled. It was realized that most of these projects were not with schedule due to the major reason of delays in payments, of which some was due to inadequate funds. The sources of funding for some of these projects include Universal Development Goal (UDG) fund, District Assembly Common Fund (DACF), funds from Government of Ghana (GoG), Ghana Education Trust Fund (GETFund), Public-Private Partnership (PPP) and the MP's Common Fund. It was made known to the researcher that, the Assembly makes payments to the contractors within 30 days when the contractors submit their claims, and when payments are not done, the contractors submit a variation. Also, the contracts are re-assessed when the delays occur. Other causes of the delays in these projects carried out by the Assembly included the

demise of the contractor, and slow pace of work. With projects that were delayed due to the demise of the contractor, the contracts were awarded to different contractors to take over. The reasons for these delays have led to some of the projects being stalled and also the increase in the cost of the projects.

The Tema Metropolitan Assembly (TMA), has since its establishment, carried out several building projects. However, data on building projects undertaken within the past 5 years were available for review. These projects also included classroom blocks, gatehouses, fence walls, and office blocks. Of all the data gathered on building projects within the past 5 years, none of the projects have been completed, with very few of them nearing completion. All these projects are behind schedule and the reason for this is due to delays in making payments to the contractors when they submit their payment certificates. From the data gathered, there was no record of any of these projects having been stalled, as the projects are still ongoing.

The Kpone-Katamanso Municipal Assembly is a fairly new assembly that was established, but quite a number of projects have been and are being undertaken. These projects include health facilities, classroom blocks, water closet toilets (W/C), district court, school feeding kitchen, teacher's accommodation and educational facilities. With reference to all the various projects being undertaken, and with the exception of projects that had no records of their start and finish dates, they have all been delayed. The major reason for the delays is also due to delays in payments by the Assembly, as well as other sources of funding such as District Development Fund (DDF), Internally Generated Fund (IGF), District Assembly Common Fund (DACF) and Ghana Education Trust Fund (GETFund). From the data gathered, some of these projects have been completed though not all of them were in use.

There was no record of any of these projects having been stalled, as the projects are still ongoing. One project was however stopped due to variation issues above the accepted MPA

In all these projects, there were conditions in the contracts signed, concerning delays and what to be done when the delays are caused by any of the parties involved.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents a summary of the entire study including findings made, conclusion based on the outcome of the study and recommendations brought forward for consideration.

5.2 SUMMARY OF FINDINGS

The aim of the study was to evaluate the significant causes and effects of delays in building construction projects. The quantitative research approach was adopted and the instruments for data collection used were questionnaires and one-on-one interactions with some respondents. Data coding and analysis were carried out with the aid of the Statistical Package for Social Science (SPSS), descriptive statistics such as mean, standard deviation and rank score.

The first objective of the study was to identify the significant causes of delays in building projects. Twenty-five (25) causes of delays were identified from literature review. These causes were subjected to a linear scale analysis for respondents to assess which ones they think play a significant role in the delays of building projects. Data gathered from the distribution of questionnaires revealed that, the following six (6) played a major role in causing delay to building projects. These are inadequate funds to finance project till completion, monthly payment difficulties, changes in scope by the owner during

construction, improper planning, increasing prices of materials, and project management problems.

The second objective of the study was to examine the significant effects these delays have on the projects. The identified effects, which were seven (7) in number, were also subjected to a linear scale analysis for respondents to assess which ones they think are the significant effects. Many respondents ranked time extension as the first effect, with increased cost of projects and total abandonment of projects following in second and third place respectively. The respondents were of the view that lack of commitment to the project was the least significant effects, as compared to termination of contracts, wastage of materials and disputes.

And the third objective was to look at some mitigation strategies that can help reduce the occurrence of delays in building construction projects. Respondents gave their views and suggestions on some mitigations strategies that will help reduce the occurrence of delays in building projects.

5.3 CONCLUSION

Lots of projects in Ghana have been delayed due to a lot of reasons. And these have had many consequences on individuals and projects as a whole. Six most significant causes were identified, which were inadequate funds to finance project till completion, monthly payment difficulties, changes in scope by the owner during construction, improper planning, increasing prices of materials, and project management problems. The top three significant effects identified were time extension, projects cost increase and project abandonment.

5.4 RECOMMENDATIONS

As part of the objectives of this study was to suggest some mitigation strategies that can help reduce the occurrence of delays in building projects. The suggestions have been discussed below.

1. *Inclusion of strict clauses and adherence to such clauses in case of breach of contract*

There should strict clauses in the contracts to be signed, and they must be adhered to in case the parties involved breach the contract. There should also be provisions in the contracts that are signed that enables contractors to claim interest on delayed payments.

2. *Availability of building materials and well-defined project scope*

The necessary building materials needed to complete works from start to finish should all be made available before projects are executed. Also, the project should have a well-defined scope that sets expectations from and for all parties. This is to ensure that the parties understand all that is expected from them.

3. *Proper and effective project management team, and using good project management skills and tools*

There should be an effective project management team put in place to look out for possible risk factor that might cause delays and take steps to mitigate them. Also, there are some skills that the project team should possess. These include effective communication, critical thinking, scheduling, risk management, etc., and these skills should be implored when carrying out projects. This can go a long way to help reduce the occurrence of delays.

4. *Funds must be available before execution of the project*

Enough and reliable funds should be set aside for the entire project. Probable increase in prices of materials should be taken into consideration when planning the budget for a project. With the help of the Project Management Information System (PMIS) such as the MS Project, it is possible to determine how much it'll cost to carry out a project. Market research needs to be carried out to determine the prices for all materials needed, how much to be paid to the project team and other contingencies. Results from computing all these in the MS Project, in terms of how much money will go into the whole project, should be budgeted for. Having enough funds budgeted for the entire project will help avowing the problem of untimely payment of contractors, when they issue their payment certificates.

5. A procurement team should be actively involved in any project

Sometimes, a procurement team is not involved in the project, as most contractors tend to procure materials on their own, which sometimes brings about the delays. As part of the project team, should be a procurement team who are well vested in the procurement process so that they can aid in acquiring the necessary material needed for the project. This can help mitigate the occurrence of delays. The procurement team will also help in a diligent and efficient bidding evaluation process for the purchase of materials. Also, the approved procurement processes should be followed.

6. Consulting the right professionals for proper guidance and information on projects they want to undertake, instead of family and friends.

Some clients are fond of not consulting the right professionals before they carry out any project. They seek the advice of family and friends on how much and how long it took them to carry out their projects. Without the proper information from the right consultants on how long it will take to carry out a project, these clients begin the projects with their

expected period of completion, and are not able to complete on time. Clients should rather resort to professional advice from the right people before carrying out projects.

Other mitigation strategies include:

1. Employing skilled professionals to work on projects and avoiding cheap labour.

Construction firms should employ artisans and craftsmen who have the required skills to do the works. The firms should also invest in training the labour they have so that they acquire more skills to enhance their works and make them more efficient.

2. Organizations should prioritize projects they intend to undertake

Poor projects prioritization often leads to failure of projects. When organizations prioritize the projects they intend to undertake, it allows them to align their resource allocations decisions strategically, hence producing successful projects.

3. Good collaboration among the relevant stakeholders.

All parties who have an interest in the projects must meet and agree on what is to be done. There should also be effective community consultation to enable the community members express their ideas to the consultants and contractors before projects are undertaken.

4. Projects should be devoid of unhealthy political interference.

Politicians should ensure that public projects are carried out smoothly without interfering with unhealthy decisions. With respect to change of government, when one government starts a project and is unable to complete it before the end of their tenure, the next government should continue with it, instead of putting a stop to it or making other decisions that will affect the success of the project.

5.5 DIRECTIONS FOR FURTHER STUDIES

This study opens way for new areas to be explored, and these areas need further research attentions. The following areas have been suggested for future studies:

- a. Political interference and its impact on public construction projects.
- b. Effects of delays on cost of building projects.

REFERENCES

- Alamri, N., Amoudi, O. and Njie, G. (2017), “Analysis of construction delay causes in dams projects in Oman”, *European Journal of Business and Social Sciences*, Vol. 6 No. 2, pp. 19-42.
- Amoatey, C. T. and Ankrah A. N. O. (2017). Exploring critical road project delay factors in Ghana. <https://doi.org/10.1108/JFM-09-2016-0036>
- Akpalu, L. V. and Kyei, Y. (2018) “Ghana Building Code Unveiled”, 1st November, 2018. Available at: www.gsa.gov.gh/2018/11/ghana-building-code-unveiled/ (Accessed on 19th July, 2019)
- Aryal S, and Dahal R, K. (2018). A Review of Causes and Effects of Dispute in the Construction Projects of Nepal. *J Steel Structure Construction* 4:144. doi:10.4172/2472-0437.1000144
- Asnaashari, E., Knight, A., Hurst, A., and Farahani, S. S. (2009). Causes of Construction Delays in Iran: Project Management, Logistics, Technology and Environment. (September), 897–906.
- Assaf, S.A. and Al-Hejji S. (2006) ‘Causes of delay in large construction projects’, *International Journal of Project Management*, **24** (4), 349-357
- Chan D., and Kumaraswamy M. (1997), A comparative study of causes of time delays in Hong Kong construction projects, *International Journal of Project Management* 15 (1) (1997) 55–63.
- Enshassi, A., Lisk, R., Sawalhi, I. and Radwan, I. (2003), “Contributors to construction

delays in Palestine”, The Journal of American Institute of Constructors, Vol. 27 No. 2, pp. 45-53.

Famiyeh, S., Amoatey, C. T., Adaku, E., and Agbenohevi, C. S., (2017). Major causes of construction time and cost overruns projects in Ghana.
<https://doi.org/10.1108/JEDT-11-2015-0075>

Frimpong, Y., Oluwoye, J., and Crawford, L (2003) ‘Causes of delay and cost overruns in construction of ground water projects in developing countries: Ghana as a case study’, International Journal of Project Management, 21, 321-326

Fugar, F. D. K., and Agyakwah-Baah, A. B. (2010). 'Delays in Building Construction Projects in Ghana', *Australasian Journal of Construction Economics and Building*, 10 (1/2) 103-116.

Garsden, B.R. (1995). Postconstruction Evaluation, *Journal of Construction Engineering and Management*, 121 (1), 37-42.

Ghana Statistical Service, (2010). Population and Housing Census, Ghana: Ghana Statistical Service

Ghana Statistical Service, (2015). Annual Gross Domestic Product, Ghana: Ghana Statistical Service

Hampton, G., Baldwin, A. N. and Holt, G. (2012). *Project delays and cost : stakeholder perceptions of traditional v . PPP procurement*.

Kwofie, T.E., Adinyira, E. and Botchway, E. (2011). Historical overview of housing provision in pre and post-independence Ghana in: Laryea, S., Leiringer, R. and

- Hughes, W. (Eds) Procs West Africa Built Environment Research (WABER) Conference, 19-21 July 2011, Accra, Ghana (p.541).
- Mansfield, N. R., Ugwu O.O., and Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects, *International Journal of Project Management*, 12 (4) (1994) 254–260.
- Mezher T., and Tawil W. (1998), "Causes of delays in the construction industry in Lebanon", *Engineering, Construction and Architectural Management*, Vol. 5 Issue: 3, pp.252-260, <https://doi.org/10.1108/eb021079>
- Nagata, M., Manginelli, W., Lowe, S. and Trauner, T., 2009. ‘Types of Construction Delays’ in “*Construction Delays*”. 2nd ed. Oxford: Butterworth-Heinemann, pp, 25-36
- Norusis, M. J. (2006). Guide to Data Analysis. *Upper Saddle River, N. J.: Prentice Hall*
- Ogunlana, S.O., Promkuntong, K., and Jearkjirm, V. (1996) ‘Construction delays in a fast-growing economy: comparing Thailand with other economies’, *International Journal of Project Management*, **14** (1), 37-45
- Owolabi J. D., Amusan L. M., Oloke C. O., Olusanya O., and Tunji-Olayeni P. (2014). Causes and Effect of Delay on Project Construction Delivery Time. *International Journal of Education and Research*, 197-208.
- Oxford Business Group (2017). The Report: Ghana 2017
- Polit, D. F and Hungler, B. P. (1997). *Essentials of nursing research: Methods, appraisals and utilization*. 4th edition. Philadelphia: Lippincott-Raven Publishers.

Public Procurement Authority, 2003. Public Procurement Act 2003 (Act 663)

Public Procurement Authority, 2003. Standard Tender Documents

Sambasivan, M. and Soon, Y.W. (2007), “Causes and effects of delays in Malaysian construction industry”, *International Journal of Project Management*, Vol. 25 No. 2007, pp. 517-526.

Tijani, H. (2018) ‘SSNIT to complete Asokore Mampong Housing Project in 2018’, 16th July, 2018. Available at: <https://citinewsroom.com/2018/07/16/ssnit-to-complete-asokore-mampong-housing-project-in-2018/> (Accessed: 26th April, 2019)

Trigunaryah, B. (2017). Constructability Practices among Construction Contractors in Indonesia Constructability Practices among Construction Contractors in Indonesia. 9364 (October 2004). [https://doi.org/10.1061/\(ASCE\)0733-9364\(2004\)130](https://doi.org/10.1061/(ASCE)0733-9364(2004)130)

APPENDIX: QUESTIONNAIRE

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI, GHANA
INSTITUTE OF DISTANCE LEARNING**

**RESEARCH TOPIC: EVALUATING THE SIGNIFICANT CAUSES OF DELAYS
OF BUILDING CONSTRUCTION PROJECTS IN GHANA**

Dear Respondent:

This study is being conducted on the above topic for academic purposes and the researcher would be grateful if you could provide answers to the questions below. Please note that the strictest confidentiality is assured with respect to answers given as facts are needed for academic purposes. Your honesty is both critical and paramount when you respond to the questionnaire. Please tick (✓) the alternative information that is most appropriate. Please, it will take 5-10 minutes to respond to these questionnaires. Thank you for participating in my research.

Section A: Demographic Information

1. Gender

a. Male []

b. Female []

2. Age

a. 25- 34years []

b. 35-44years []

c. 45-55years []

d. 55-60years []

e. 60 years and above []

3. Highest level of education?

a. Diploma []

b. Professional certificate []

c. HND []

d. First Degree []

e. Master's Degree []

f. Others (kindly specify)

4. Please indicate your profession.
 - a. Architect
 - b. Quantity Surveyor
 - c. Project Manager
 - d. Engineer
 - e. Other
5. Which of the following categories do you fall under?
 - a. Client
 - b. Consultant
 - c. Contractor
6. Please indicate your years of experience in the construction industry.
 - a. Less than 10 years
 - b. 10 years
 - c. Above 20 years
7. Please indicate the number of projects you have worked on.
 - a. Less than 5 projects
 - b. Between 5 and 15 projects
 - c. Above 15 projects

Section B

This part contains the list of some identified causes of delay in construction projects and some effects they have on the projects.

1. From your experience, which of the following are the significant causes of project delays in Ghana? On a scale of **1** to **5**, kindly rate them by ticking (✓) the appropriate box, where **1** indicates less significance on the scale, rising to **5** which indicates most significance.

NO.	CAUSES OF DELAYS	LEVEL OF SIGNIFICANCE				
		1	2	3	4	5
1	Improper planning					
2	Inadequate funds to finance project till completion					
3	Material procurement					
4	Poor contract management					
5	Lack of communication between parties					
6	Inadequate contractor experience					
7	Increasing prices of materials					
8	Changes in site conditions					
9	Poor site management and supervision					
10	Project management problems					
11	Changes in scope by the owner during construction					
12	Monthly payment difficulties					
13	Delay to furnish and deliver the site to the contractor					
14	Severe weather conditions					
15	Land acquisition					
16	Difficulty in defining project requirements					
17	Slowness in decision making process					
18	Shortage of labour					
19	Type of project bidding and award					
20	Unqualified workforce					
21	Changes in government regulations					
22	Incomplete drawings					
23	Shortage of materials					
24	Late delivery of materials to site					
25	Poorly defined scope					

2. In your opinion and from your experience, what do you think are the most significant effects of these delay causes? On a scale of **1** to **5**, kindly rate them by ticking (√) the appropriate box, where **1** indicates less significance on the scale, rising to **5** which indicates most significance.

NO.	EFFECTS OF DELAYS	LEVEL OF SIGNIFICANCE				
		1	2	3	4	5
1	Total abandonment of project					
2	Time extension					
3	Increased cost of project					
4	Disputes					
5	Wastage of materials					
6	Termination of contracts					
7	Lack of commitment to the project					

3. If there are any other effects not indicated in the table above, kindly indicate them in the space provided below.

.....
.....
.....

4. What are some strategies you would suggest to help avoid delays in building projects?

.....
.....
.....
.....
.....

THANK YOU.