

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,  
KUMASI GHANA**

Project Closure Practices In Ghana: A Case Study of Ghana Cocoa Board  
Construction Projects

by

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A dissertation submitted to the Department of Building Technology,  
College of Art and Built Environment

In partial Fulfilment of the requirements for the degree of

**MASTER OF SCIENCE**

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**DECLARATION**

I hereby declare that, this submission is my own work towards the MSc Construction Management and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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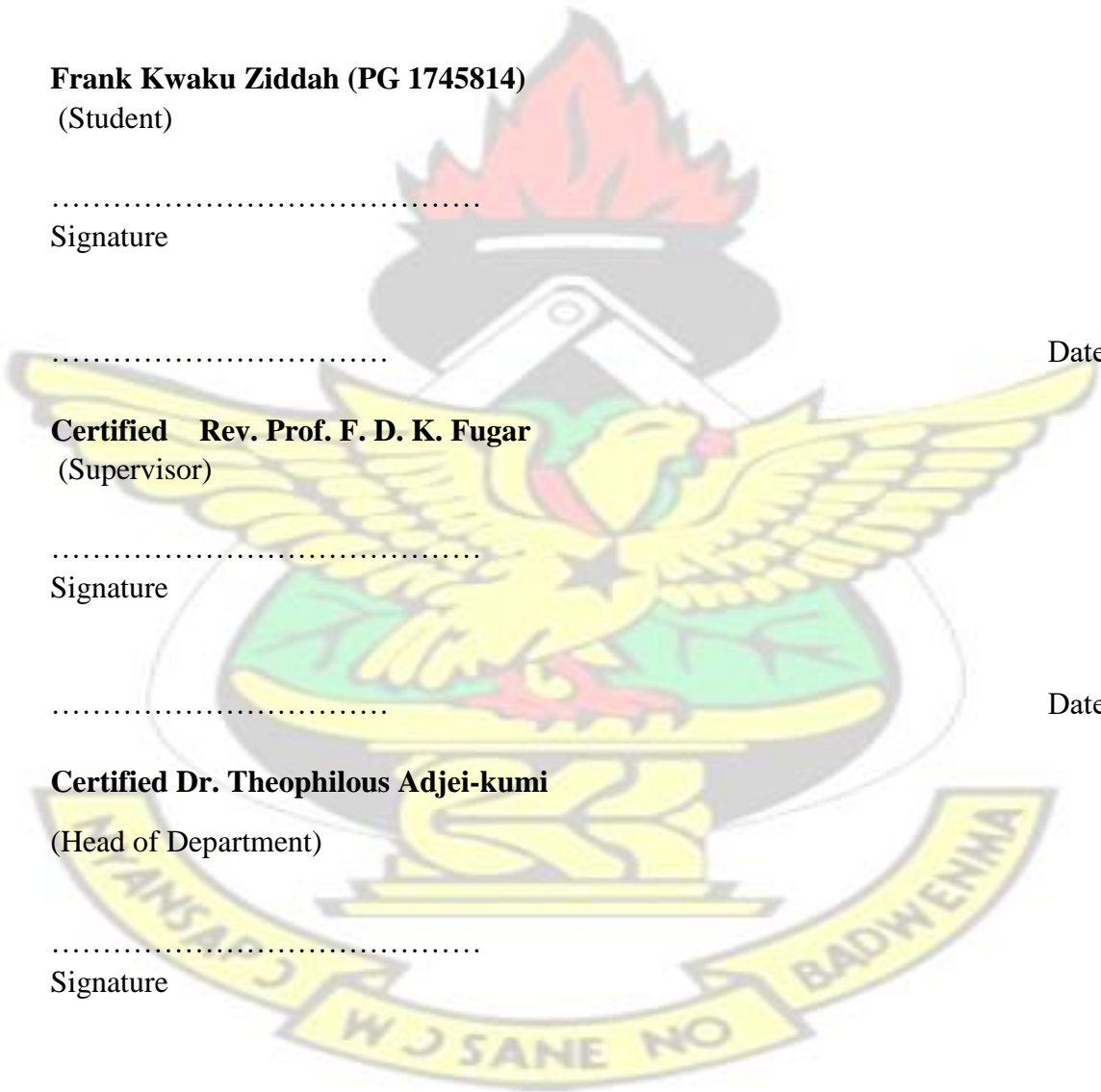
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## ABSTRACT

The study sought to identify from literature the general project closure practices, the stages and the standard practices of project closure implemented by Ghana Cocoa Board for its construction projects as well as finding out adherence and compliance of project closure practices and identify problem associated with project closure. The study employed the quantitative method of research. Questionnaires were developed and distributed among forty (40) respondents comprising of fourteen (14) employees of Ghana Cocoa Board, thirteen (13) employees each of contractors and consultants to Ghana Cocoa Board's building construction projects. Data collected were analyzed using the Relative Importance Index (RII) and the mean score. The study revealed that the general project closure practices from literature comprised of contractual and administrative close out activities. These represents the basic stages of project closure practices, which are being adhered by Ghana Cocoa Board in their building construction projects. Ghana Cocoa Board in their building construction projects adheres and complies highly with contractual closure practices but comply and adhere fairly to administrative closure practices. Further, it revealed that the problems associated with Ghana Cocoa Board project closure are delay and documentation of standard practices and construction events which will serve the basis for project evaluation and lessons for future projects. The study recommends that Ghana Cocoa Board should address the causes of delays as enumerated by the study and document standard practices and construction events for each project for future purposes. For the purposes of future research, it is also recommended that future research should focus on the impacts of delay from the perspectives of the client, consultant and the contractor.

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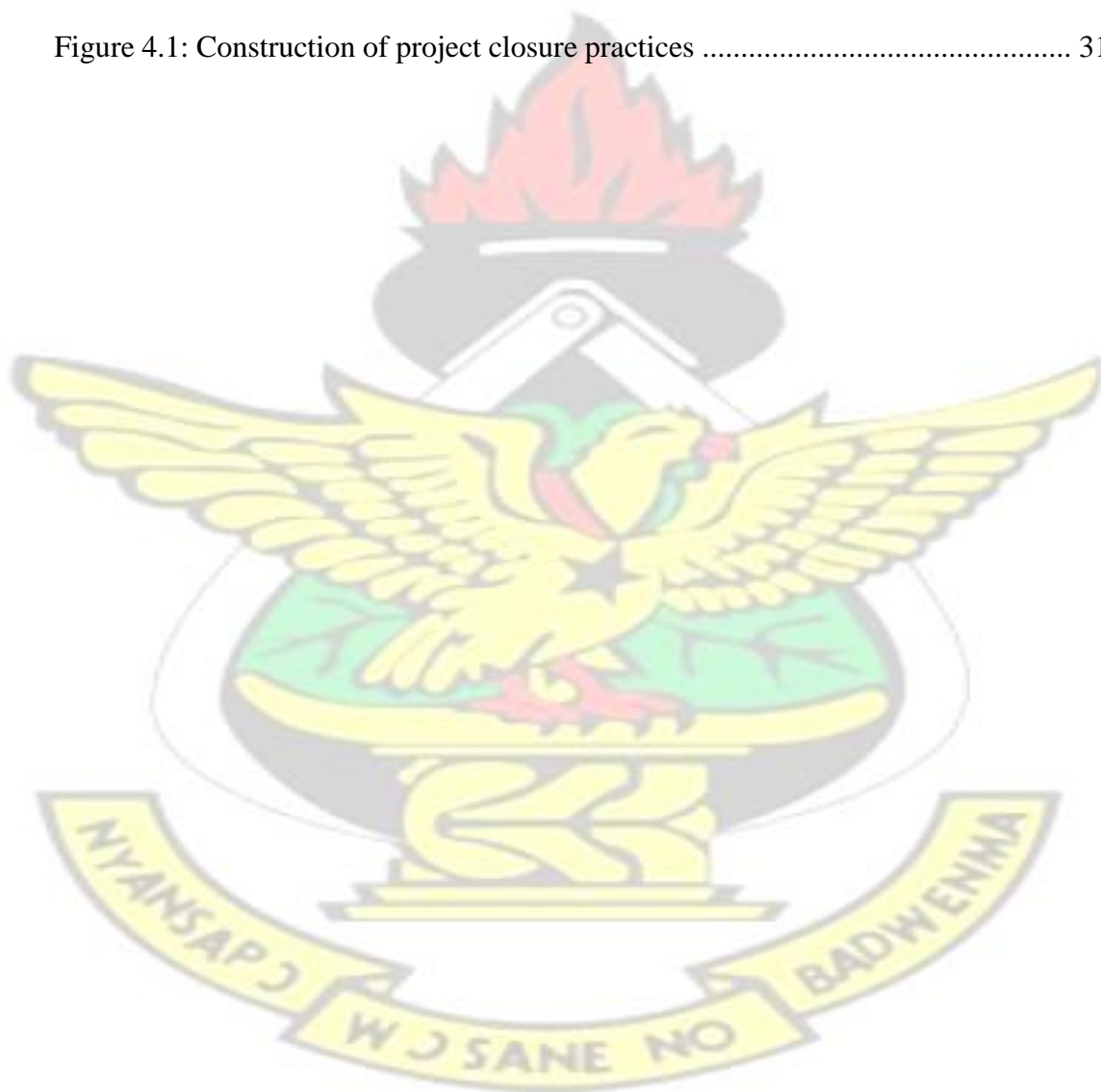
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## DEDICATION

I humbly dedicate this work to my Maker Jehovah God for his protection and guidance throughout the years. Secondly to my family who's supported me in diverse ways. Thirdly to my employers, Ghana Cocoa Board for their support and finally to all friends and colleagues who stood by me all this while, I dedicate my research to all and hope that i have made all proud.



# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND OF STUDY

Project closure phase is the last phase and the most critical stage in the project lifecycle since inability to manage it well could delay the project resulting into time and cost overrun and or result into outright failure of the project. This applies to all projects but its importance to construction projects cannot be overemphasized. The significance of project closure in a construction project stems from the fact that it has the propensity to sour relationship between the client/owner of the facility and the contractor, thus destroying the goodwill earned by both parties during the construction stage (Gransberg and Elliot, 1997 as cited in Rogers, 2012). Besides, it has the propensity to increase the cost of the project to both the contractor and the clients, thus creating a financial burden. This implies that there is the need to manage project closure in order to avoid any financial burden and most importantly relationships that could yield financial returns in the future.

However, the question remains that “what is the best way to manage construction project closure in order to avoid cost and time overruns”? Management of the construction project closure is the responsibility of both the owner/client and the contractor since any disengagement can result to ‘opportunity lost’ to the contractor (Bryde and Robinson, 2005 as cited in Rogers, 2012). Rogers (2012) has asserted that the client/owner dreams to use the facility for a long period of time, thus carefully selects the contractor who can help achieve this dream. This means that any lag on the part of the contractor can reduce incremental performance achieved during the construction phase.

Perhaps, the ability to manage effectively and efficiently the project closure to avoid any delay whatsoever depends on the consultants whose drawings were used as a guide to the contractor. It must be noted that the contractor only translates the drawings of the consultant/architect into a physical structure. Thus, any misinterpretation of the drawings could affect project closure since time spent on understanding the drawings when the project is underway can result into time overrun, thus, making the time-frame set for the project unrealistic. This means that project closure should be managed carefully during the planning stage. If this is not managed effectively at the planning stage, project closure then becomes a daunting task to the building team.

The practice of project closure finalises all project activities completed across all phases of the project to formally close the project and transfer the completed or cancelled projects to the client/owner (ITRM Guideline - Project Management Guideline, 2006). The purpose is to assess the project, ensure completion and derive any lessons learned and best practices to be applied to future projects. This assessment should not be undertaken in isolation but within the context of project management, where each component, be it human resource, procurement, quality control, risk and time management, are critically examined to ensure that the final completion is achieved on schedule (Project Management Institute, 2008). For instance, an effective risk management can project hindsight on some of the factors that can prevent the ontime completion of the project, which can be integrated in the project closure activities to ensure the construction project is finally completed on time.

However, these components of project management seem to be managed in isolation resulting into the opportunity lost associated project closure. The opportunity lost here is mostly referred to the cost overrun which is largely borne by the contractor.

Mismanagement of the project closure can affect the contractor's image negatively, thus reducing the number of contracts gained in the future (Rogers, 2012).

The main reason for this mismanagement is due to the fact that many contractors are not in the know of the standard practices in project closure, thus do not adhere to them. Besides, they do not undertake any post implementation review of their projects to understand some key problems associated with the project. Thus, they usually do not document the problems and how they were solved so as to serve as reference points for future projects to avoid any recurrence.

## **1.2 STATEMENT OF PROBLEM**

Over the years, there have been various studies to explore the problems associated with project closure in the construction industry. Extant literature has indicated that the major problem associated with project closure in the construction industry is inability to achieve final completion. This can be attributed largely to delay of the building construction. In fact the causes of delay have been identified in most literature with its recommending measures to address them. In most cases, these causes are categorized and ranked to reflect their significance (Archarya, et al., 2006) (Al-kharashi and Skimore, 2009) (Ramanathan, et al., 2012). The causes of delay were categorised and ranked using statistical techniques such as the relative importance index, severity index, importance index, frequency index and significance index among others. In a critical review of the several methods used in categorizing and ranking the causes, Ramanathan, et al (2012) reiterated that the results of using these techniques are not universal but unique to a country and organization. This means the results are not absolute but relative reflecting the peculiar situation of the study.

Reviews of current literature on the causes of delay are country focused. For instance, Al-Kharashi and Skimore (2009) considered the causes of delay in Saudi Arabia, and Archarya, et al (2006) examined the causes of delay from the Korean, Marzouk and El-Rasas (2014) examined causes of delay in Egyptian context while Muhwezi, Acai and Otim examined the subject from the Ugandan perspective. Still date, there is little or no evidence considering the Ghana context, thus creating a context gap.

Further, there is little or evidence of the general project closure practices apart from the guidelines outlined in the construction project management manual such as FTA Manual (2006) and general project management manual such as the ITRM Guideline (2006), thus creating a subject gap.

In response, this study is examining the causes of delay in the Ghanaian context using the Relative Importance Index (RII). In addition, the study will consider the project closure practices and the extent to which Ghana Cocoa Board Civil Works Department adhere to the closure practices.

### **1.3 PURPOSE OF THE STUDY**

The aim of the study is to explore the standard project closure practices in Ghana using Ghana Cocoa Board as a case study.

### **1.4 OBJECTIVES OF STUDY**

The objectives of the study are as follows:

1. To identify from literature the general project closure practices.
2. To examine adherence and compliance of project closure practices in Ghana Cocoa Board construction project.
3. To identify problem associated with project closure practices in Ghana Cocoa Board

## **1.5 RESEARCH QUESTIONS**

The study sought to answer the following questions:

1. What are the general project closure practices from literature?
2. What is the level of adherence and compliance with project closure practices in Ghana Cocoa Board?
3. What are the factors and problems associated with project closure practices in Ghana Cocoa Board?

## **1.6 SCOPE OF THE STUDY**

The study scope centers on project closure practices in construction projects. Construction projects are managed according to general project management practices, thus there is a project inception, project implementation and project closure. This research is strictly considering project closure practices in a construction project/industry.

## **1.7 RESEARCH METHODOLOGY**

The study employed a quantitative method of research. Questionnaires were deployed to explore the standard project closure practices implemented by the Ghana Cocoa Board in its building construction projects. It made use of both primary and secondary sources of data. Primary data was collected using convenience and purpose sampling technique. Secondary data was sourced from journal articles, books and other publications on the subject. The data was analysed using the Relative Importance Index (RII) and the mean score.

## **1.8 SIGNIFICANCE OF THE STUDY**

The significance of the study can be viewed from three perspectives, i.e. future research, practice and policy. The gaps identified during the research will inform the

scope of future research on project closure practices in the construction industry in Ghana and beyond. Further, it is expected that findings of the study will influence policy directives and practice of construction project closure practices in Ghana Cocoa Board and other public sector institutions as well as private sector organizations.

If the findings and recommendation of this research are well adhere to, it will encourage emerging contractors and client with good potentials to close project properly. It will also help address the abandoning of project and doing shoddy jobs. It will help increase the performance of officials who work on projects which will in turn increase productivity. It will also identify loop holes in the closure process of construction works so that the necessary polices and measures can be put in place to address them. Numerous problems are caused when a contractor is unable for whatever reason to close a construction project on schedule.

### **1.9 ORGANIZATION OF THE STUDY**

Chapter one provides an overview of the study by highlighting the problem statement, objectives and significance of the study. Chapter two reviews literature on project closure in the construction project. Chapter three details the methodology used in the study while chapter four analyses and discusses the results of the study. Chapter five concludes the study by summarizing the findings and providing recommendations thereof.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

## **2.1 INTRODUCTION**

This section reviews literature on project closure in the construction industry. It will consider three (3) strands of literature, namely, the stages of project closure and project closure practices, problems associated with project closure as well as factors that prevent contractors from achieving projects on time, compliance and adherence of project closure practices.

## **2.2 STAGES OF PROJECT CLOSURE**

Project closure is the last stage of a project. It involves the activities which indicate the expiration of a project. In the construction industry, it begins with the client accepting the output (deliverables) of the project and ends with the commissioning of the facility for use (Federal Transition Administration, 2006). The purpose of project closure is to assess the project, that is whether the deliverables or output are achieved or not and draw lessons learnt for future purposes (ITRM Guideline - Project Management Guideline, 2006). Thus, the process of project closure involves turnover of project deliverables, documentation of the project success and lessons learnt, redistributing resources, closing out financial accounts, compiling project records as well as planning of post implementation review. According to the ITRM Project Management Guideline, the main key concern for project closure is administrative closure and logistics.

For a construction project, the project closure has two basic components, namely, the contractual closure and the administrative closure (Federal Transition Administration, 2006). Contractual closure involves the signing off the project by parties to the project. This includes parties following the procedures and actions in each contract's terms and conditions, the permitting authority issuing certificate of beneficial occupancy as well as conducting verification of cost accuracy and contract audit. The administrative

closure involves reassigning project staff to other projects be it long and or short term as well as project evaluation (compilation of archives and documentation) and financing halted.

### **2.2.1 Contractual closure**

Contractual closure can be defined as the process of signing off a project according to stipulated terms and conditions. This will involve the verification of the scope of the completed project, contract audit, and final payment and release of retention as stated above. According to the FTA Construction Project Management Handbook (2006), the contractual closure for a construction project should ensure that the following activities are completed and accepted by all stakeholders.

#### ***2.2.1.1 Prepare a punch list***

A punch list is an itemized list of significant activities that needs to be undertaken in order to ensure final completion of the construction project. this include painting works, touch-up carpentry work, fitting of fixtures such as keys, locks, etc. according to Rogers (2012), these are superficial deficiencies that needs to be sorted in order for the construction project to achieve its final completion status.

#### ***2.2.1.2 Manuals and training***

The contractor should develop and present operations and maintenance (OandM) manuals for the facility and equipment installed. This provides a brief but detailed procedure on how to use the facility, maintain the facility to ensure durability and avoid accidents that could endanger the life of users. It must be noted that the manuals should not just be presented but there should be a training, particularly, a hands-on training on equipment use as well as safety tips, FTA Construction Project Management Handbook (2006).

### **2.2.1.3 Beneficial occupancy**

According to the FTA Construction project management handbook “*a contract is substantially complete when the permitting authority issues a Certificate of Beneficial Occupancy to the Agency and then the Agency can occupy and begin use of the facility and equipment*” (pg. 8-3). Providing the beneficial occupancy certificate, therefore, legalizes the use of the facility.

### **2.2.1.4 Guaranties and warranties**

The contractor should provide a facility/equipment guarantee and warranty. While the guarantee certifies that the facility/equipment does work, the warranty indicates that the contractor will bear the cost of service or replacement of item within a specified period, after which the client will bear the cost. It must be noted that guarantee and warranty of the facility/equipment is initiated with the provision of the beneficial occupancy certificate (Federal Transition Administration, 2006).

### **2.2.1.5 Record drawings**

This provides a report on the as built condition and reported location of the constructed facility and equipment installed. This is completed by the architect based on the information provided by the contractor, thus the accuracy of the drawings depends on the latter. (Schinnerer & Company Inc., 2007). Although the record is believed to be accurate and thus reliable, it is usually advised that those who rely on the record drawings should conduct an independent verification before use of the facility (Schinnerer & Company Inc., 2007).

### **2.2.1.6 Final inspection**

According to the FTA Construction Project Management Guideline, the contractor should organize and lead final inspection of the facility to confirm to the stakeholders that the facility/equipment is correctly and satisfactorily completed. Final inspection is crucial in a construction project since it provides room for quality checks.

### ***2.2.1.7 Resolve Outstanding Change/Claim Disputes***

As part of the project closeout, the contractor is required to ensure any outstanding claims/disputes are settled, thus contributing to the achievement of the project objectives. Disputes/claims can be categorized under procurement, human resource and any other issues that could result to breach of the terms and conditions of the contract, thus resulting into project delay or failure.

### ***2.2.1.8 Obtain project acceptance from principal stakeholders***

After the final inspection and resolution of outstanding claims, if any, the contractor is required to obtain project acceptance from the principal stakeholders in a form of a letter or template. This means that the stakeholders do accept the project deliverables taking into consideration the quality specifications.

### ***2.2.1.9 Final Payment***

When the above activities are completed, the client is required to approve and make final payment to the contract. Final payment should be accompanied by other sign off as per the terms and conditions of the project.

### ***2.2.1.10 Commissioning***

After the final payment and official close out of the project, the stakeholders commission the facility. The commissioning of the project means the facility as per designed is commissioned to the relevance stakeholders.

## **2.2.2 Administrative closure**

Administrative closure is activities undertaken by the contractor to ensure the redistribution of the project resources (ITRM Guideline - Project Management Guideline, 2006). The activities undertaken include project demobilization, closure of project financing and funding, disposition of project records, project evaluation and

stakeholder closure (Federal Transition Administration, 2006). These activities are explained as follows:

#### ***2.2.2.1 Project demobilization***

Project demobilization has been defined as the completion and removal of the construction debris and manpower resources from a construction site at the completion of contract. The construction debris includes the excesses of sand, stones, woods and electric cables. Although the removal of construction debris is important to the project demobilization process, the importance of the removal of manpower/human resources cannot be overemphasized since it tests the project managers' administrative and interpersonal skills (Federal Transition Administration, 2006). It must be noted that, the project staff in this case are not removed or retrenched but rather reallocated to other projects and or departments where their services are needed. Thus, it is required that contractor or the project manager prepares a detailed staffing plan for the final phase of the project to clearly spelt out how the project staff will be reallocated (Federal Transition Administration, 2006). This will help improve individual staff efficiency and efficiency of the organization as a whole (ITRM Guideline - Project Management Guideline, 2006). As a best practice, this should be managed not in isolation but in congruent to the human resource management of the organization in order to ease any disquietedness associated with the demobilization process and provide incentives that will encourage the staff remain in the agency (Federal Transition Administration, 2006). Besides, the staff reallocation should be based on performance in order to make the demobilization process effective. It must be noted that the demobilization process should include provisions that will ensure that project staff handover all project materials and properties to ensure accurate records of the

asset and property register of the project and the organization as a whole (ITRM Guideline - Project Management Guideline, 2006).

#### ***2.2.2.2 Closure of project financing and funding***

This process involves the process finalizing and terminating the financial and budgetary components of the project. This requires all funds released are properly and accurately accounted for. The necessary accounts such as the bank reconciliation statement, project cash book account, purchases orders and other invoices are completely closed (ITRM Guideline - Project Management Guideline, 2006) Further, it involves filing applications and release for final payment and issuance of bank guarantees (Kumar, 2011).

#### ***2.2.2.3 Disposition of project records***

This refers to the collection and compilation of all pertinent documentation in order to assess whether project deliverables and objectives are achieved. Documents collected and compiled are performance reports, procurement, contracting documents, project schedules and changes in contract. These are then kept in a safe and accessible place for reference purposes (ITRM Guideline - Project Management Guideline, 2006) (Federal Transition Administration, 2006).

#### ***2.2.2.4 Project evaluation***

This refers to the process of matching the expected deliverables to the actual deliverables achieve as well as assessing whether the set objectives of the construction project is achieved. This can be done in a stakeholder meeting and or internally among the project staff. During this process the project staffs are required to document the lessons learnt which stems from resolving real problems that arise during the construction process (ITRM Guideline - Project Management Guideline, 2006). This can be done in the form of SWOT analysis by indicating the strengths and opportunities

of the project, particularly, how weakness and threats were turned to strengths and opportunities in order to achieve the construction deliverables (ITRM Guideline - Project Management Guideline, 2006) (Federal Transition Administration, 2006). The weakness and threats could be identified through the risk management process for the construction project. The ITRM Project Management guideline summarizes the process as follows:

*“Lessons learned typically provide: a brief discussion of the problem to identify its nature, source, and impact; site any references that provide additional detail (references may include project reports, plans, issue logs, change management documents); and general literature or guidance used from another source; and, recording the corrective actions taken and results”* (pg. 7).

#### **2.2.2.5 Stakeholder closure**

This refers to the process of accepting the construction by the principal stakeholders, those who funded the project and those who are to use the facility. This may come in the form of letter and or filling of a construction closeout template/form. Even though verbal statements could be used, this is not encouraged since it may not provide any form of reference in the future. The closure can be crowned with a ceremony to mark the opening of the facility for use (Federal Transition Administration, 2006).

From the above, it is evident that contractual and administrative closeout for a construction project are interwoven and iterative. For instance, both closeouts have financial, documentation and stakeholder activities which cannot be undertaken in isolation but rather undertaken together in order to reduce cost, thus making the project economical.

### **2.3 PROBLEMS ASSOCIATED WITH PROJECT CLOSURE**

There are various problems associated with a project closure. This ranges from “touchup painting, installation of minor finish items that were missing from an original order, or repair of work damaged accidentally” (Carson, et al 2009 as cited in (Rogers, 2012)). According to Rogers (2012), these are superficial deficiencies (also referred to as punch list) that will result into final completion of the construction after substantial completion has been achieved. Rogers (2012) explained that the period between substantial completion and final completion is prolonged since completing the punch list takes extremely long time, thus delaying the achievement of final completion. This then becomes the major and overarching problem of construction projects, not only in Ghana but around the globe.

### **2.4. FACTORS THAT PREVENT CONTRACTORS FROM ON-TIME COMPLETION**

One of the key characteristics of a successful project is the on-time completion. This is of essence since time management is a key component of construction project management. When a construction project is not completed on-time or on the specified date as agreed by the parties, it means that it has been delayed (Divya & Ramya, 2015). Delay in construction project occurs due to the multiparty participation nature, advanced technologies, frequent-client changes coupled with the inherent uncertainties which may be physical, financial, environmental and economic (Divya & Ramya, 2015).

Delay has serious effects or impacts on the construction, and this ranges from late completion of the construction, increased cost, lost productivity and termination of contract (Divya & Ramya, 2015).

But the question, which is usually asked, is “What are the major causes of the delay?”

“Who can be held responsible and how can this be mitigated?” The section below attempts to provide answers to these questions.

## **2.5 CAUSES OF DELAY**

Extant literature has not been conclusive on what causes delays in a construction projects, thus there are varying opinions on what are the major causes of delay. The causes of delay can be viewed from varying perspectives, namely, owners, consultants, contractors, users, designers, and suppliers among others (Divya & Ramya, 2015; Archarya, et al., 2006).

Archarya, et al (2006) categorized construction delays into five (5) pronged sources namely; owner, consultant, contractor, project matter and third party caused delays. Owner caused are delays caused by the initiator and financier of the construction project. Periodically, they make amends to the project scope, thus making orders for change, which are sometimes in large scale requiring redesign. At times their inability to take quick decisions and make quick payments to hasten the construction project frustrates the contractors. Consultant caused is delays that arise from drawing the design for construction, and this ranges from inconsistent detailing of drawings, frequent revision of design due to errors and unqualified site personnel among others. Contractor caused arise due to mismanagement on the part of the contractor to manage key activities of the construction project such as finance, work planning and scheduling, site organization, materials management and coordination between workers among other things. Third party and project matter caused are both project related since they are not caused by the owners, consultants, contractors but are events that occur outside their control such as remoteness of site, rain/natural disasters, material shortage, etc.

Divya and Ramya (2015) categorized construction delays into seven (7) sources. Like Archarya et al (2006), they identified owner/client, contractor and consultant related delays but added material, equipment, labour and external related delays instead of the project matter and third party caused delays. Unlike Archarya et al., Divya and Ramya (2015) identified that poor communication and co-ordination is a key cause of delay related to the first three categories, namely, owner, contractor and consultant related delays. This means that good communication and interpersonal skills are pivotal to the success of the construction project, which is not technical but managerial and administrative in nature. Besides, Divya and Ramya identified delay in obtaining permits from municipalities/local governance and rise in the price of materials are external to the project but reiterated that they should be conceived at the early stage of the project to avoid the achievement of unsatisfactory result.

Al-Kharashi and Skimore (2009) also identified and categorized seven (7) causes of construction delays just as Divya and Ramya (2015). Although client/owner, consultant and contractor related delays appeared to be constant, they introduced contract and contractual relationship related delays in addition to material and labour related delays identified by Divya and Ramya (2015). In their view, one of the key sources of the delays in construction projects is unrealistic time-frame of project (contract related) as well as the use of ill-experienced staff who usually determine unrealistic project duration (contractual relationship), thus confirming Divya and Ramya's (2015) stance that poor communication and co-ordination causes construction delay.

From the above literature, it can be deduced that causes of the construction delays are categorized into nine (9), namely, owner/client, contractor, consultant, material, labour, equipment, external, contract and contractual-relationship related delays.

These are explained as follows:

### **2.5.1 Owner/client related delay**

As noted earlier, owner-caused delays are triggered by the initiator and financier of the construction project. As the financier of the project, the owner/client has the power to influence the scope and the order of the project (Archarya, et al., 2006). This can cripple the owner in decision-making and financing since some of the changes are on large scale, thus take a long time to effect the changes, thus resulting into cost and time overrun (Ramanathan, et al., 2012). Example of owner/client related delays are deferment of payments, postponing the site delivery to the contractor, insufficient of communication and co-ordination, delay in revising and approving design documents as well as change order during construction (Archarya, et al, 2006).

To resolve this issue, owners/clients of construction projects are advised to provide the contractors will revised project design and change orders in time to avoid any delay.

### **2.5.2 Contractor related delays**

As noted earlier, this delay arises due to mismanagement on the part of the contractors to manage key activities of the construction project. According to Archarya et al. (2006), the contractor is responsible for effective implementation of the construction design thus; most of the delays can be attributed to them. In their view, the contractor manages the construction finance, undertake work planning, scheduling and site organization, manages materials and co-ordinate between the workers among other things, thus, if these are not managed well, it may cause delay and or result in project failure. Examples of contractor related delay are rework due to errors during construction, inadequate communication and co-ordination, unskilled technical staff, delay in sub-contractors' work, etc.

### **2.5.3 Consultant related delays**

Consultants are the technicians of the construction project since they design the facility to be constructed and most of the technical problems that causes delay can be attributed to them (Archarya, et al., 2006). The problem arises as a result of errors in the design and inconsistent detailing of the drawings resulting in cost and time overruns (Ramanathan, et al., 2012). Examples of such delays are inadequate experience of consultant, poor communication and coordination, errors and inconsistencies in design documents, and vague drawings among others.

### **2.5.4 Material related delays**

This delay is associated with the procurement (purchases and supply) and inventory management construction materials. The fundamentals of material related delays can be attributed to stock management (material) of the construction project. According to Drury (2000), there are two conflicting requirements of stock management which should be met to ensure that there is optimal level of materials for production. First, a construction firm should ensure that there is sufficient stock of materials to meet construction requirement and second, construction firms should avoid holding excessive material that will increase the risk of obsolescence. Thus, the construction project should have a re-order level, supply lead time, the economic reorder quantity and buffer stock level to ensure availability of material for construction, thus avoiding shortage and wastage concurrently. (Drury, 2000). Examples of material related delays are shortage of construction materials, delays in material procurement and delivery and changes in material types among others.

### **2.5.5 Equipment related delays**

This category of delay arises as result of frequent equipment breakdown, shortage of equipment, low level of equipment operators and low productivity and efficiency of the equipment resulting in both cost and time overruns. It must be noted that lack of

maintenance of equipment resulting into frequent equipment breakdown cause high labour turnover on the project. In order to avert this, construction contractors should ensure that their equipment are regularly maintained in order to improve their efficiency and consequently, on-time completion of projects.

#### **2.5.6 Labour related delays**

This category of delay is attributed to the inadequate and unskilled man-power on the construction project. This is critical since construction is highly labour intensive and the ability of the construction firm to meet time, cost, and quality depends largely on the availability of skilled and knowledgeable persons (Praveen, et al., 2013). Thus, inadequate skilled man-power, according to Praveen et al (2013), slows and delays construction since they are unable to understand drawings and manage unforeseen site conditions, thus causing time and cost overruns. Apart from the unavailability and shortage of skilled labour, labour related delays can be attributed to personal conflicts among workers, which seem inevitable due to diverse opinions on how things should be done which usually result to clash of interpersonal relations.

To solve this, it is highly recommended that construction projects should hire highly skilled personnel and provide them with incentives that will motivate them to stay on the job from its inception to closure (Praveen, et al., 2013)

#### **2.5.7 External related delays**

This group of delay is out of control of the owners/clients, contractors, and consultants. Example of such delays are late permission obtained from municipality, weather effect on construction activities, accidents during construction, rises in prices of materials and delays in providing utility services.

### 2.5.8 Contract related delays

This group of delays is associated with the terms and conditions for the construction project, particularly, when the project duration is not clearly defined. A study by AlGhafly (1995) reveals that setting unrealistic timeframe for construction works impedes on-time completion of projects (as cited in Al-Kharashi and Skimore 2009). Besides, Al-Kharashi and Skimore (2009) have reiterated that setting realistic timeframe for projects requires experienced staffs which are usually spelt out in the contract document.

### 2.5.9 Contractual relationships related delays

According to Al-Kharashi and Skimore (2009), contractual relationships related delays could be attributed to the varying interest of the contractor, client and consultant. The common goal of all the parties is to ensure the successful and on-time completion of the project. Nonetheless, if this common goal is not managed well it will result to clash of interests, particularly, if any amend by the client is not well captured in drawing by the consultant for consequent amendment by the contractor, thus causing delay. This could cost both time and overrun.

To resolve this, parties to the construction are advised to exhibit high interpersonal skills in managing the project to ensure that their common goal is achieved. The table 2.1 below provides the overview of the categories of causes of delays in construction projects identified above.

**Table 2.1: Overview of causes of delays in construction project**

Causes of delays	Example of activities
------------------	-----------------------

<b>Owner/client related</b>	Deferment of payments, postponing the site delivery to the contractor, insufficient of communication and co-ordination, delay in revising and approving design documents as well as change order during construction
<b>Contractor related</b>	Rework due to mistakes during construction, poor co-ordination and communication, ineffective planning and scheduling of project, poor qualification of contractor's technical staff, delay in sub-contractors' work
<b>Consultant related</b>	Inadequate experience of consultant, poor communication and co-ordination, errors and discrepancies in design documents, vague details in drawings
<b>Equipment related</b>	Frequent equipment breakdown, shortage of equipment, low level of equipment operators and low productivity and efficiency of the equipments
<b>Material related</b>	Shortage of construction materials, deferment of material delivery
<b>Labour related</b>	Shortage and unavailability of skilled labour, conflicts among labour, changes in material types during construction and late purchases and supply of materials
<b>External related</b>	Late permission obtained from municipality, weather effect on construction activities, accidents during construction, rises in prices of materials and delays in providing utility services
<b>Contract related</b>	Unrealistic project time frame by stakeholders
<b>Contractual relationships related</b>	Clash of interest among stakeholders on the achievement of the project's deliverables and objectives

*Source: Al-Kharashi and Skimore 2009*

## **2.6 COMPLIANCE AND ADHERENCE TO THE PROJECT CLOSURE**

### **PRACTICES BY GHANA COCOA BOARD**

Ghana Cocoa Board as part of its mandate of promoting the production and marketing of Ghana's cocoa both in Ghana and abroad undertakes several construction projects since its mandate cannot be achieved without infrastructural development.

Infrastructural development is key since the personnel who facilitate the achievement of the mandate needs to be housed, therefore, there is the need for the construction of

office and residential complex that will ensure the safety of the personnel in their discharge of their duties.

Ghana Cocoa Board, as client of construction projects, is required to commit to the achievement of the deliverables and objectives of a construction project throughout the construction period. As stated above, project closure and its itineraries are crucial and significant to them since its mismanagement could result in to the failure or otherwise of the project as reiterated by Rogers (2012). In effect, Ghana Cocoa Board is required to comply with the above-mentioned standard practices of project closure. Table 2.2 provides a summary of its compliance and adherence status. Data was collected from the Civil Works Department of the organization.

## **2.7 PROBLEMS ASSOCIATED WITH CONSTRUCTION PROJECT IN GHANA COCOA BOARD**

In Ghana Cocoa Board, delay as identified by extant literature, is major problem associated with construction projects and most of the causes of the delay are similar to those identified in table 2.1 above.

Besides, one key problem associated with construction projects in Ghana Cocoa Board is lack of documentation of the project closure activities. From table 2.2, it is evident that it complies and adheres to the standard practices but there is no documentation that outlines these practices in order to serve as a reference. Apart from documenting the standard practices of project closure, there is no documentation of the events of construction projects, particularly, errors and mistakes and how they were resolved. Compilation of such events as noted above will serve as a reference for future project, particularly, ensuring the avoidance of such errors and mistakes during projects.

**Table 2.2: Compliance and adherence status of project closure practices by Ghana Cocoa Board**

Activities	Compliance and adherence status	
	Done	Not done
<b>Contractual closeout</b>		
a. Prepare punch list after defects liability period	√	
b. We do prepare manuals on how to use the facility and conduct training	√	
c. Provide certificate of beneficial occupancy to the owner to use the facility		x
d. Provide guaranty that the facility does work and warranty for after construction service	√	
e. Provide a record drawing indicating the location of the facility and its current status	√	
f. Conduct a final inspection of the facility to test for quality	√	
g. Resolve any claim disputes with the owner/clients	√	
h. Obtain project acceptance from the principal stakeholders	√	
i. Make final payment	√	
j. Commission/launch the facility		
<b>Administrative closeout</b>		
k. Conduct project demobilization to relocate project staff		
l. Close project accounts		
m. Collection and Compilation project records such as procurement records, performance reports, changes in contracts, etc.		
n. Conduct project evaluation to document lessons learnt		
o. Stakeholder closure in the form of letter and other written documents indicating their acceptance of the project deliverable	√	

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

This section discusses the approach employed in undertaking the study. It will consider the research design, methods of data collection and analysis, sampling methods used, limitation and delimitation and some ethical considerations for the study.

#### **3.2 RESEARCH DESIGN**

Research design defines the context within which data is collected, processed and analysed for the purposes of the research. This context is further informed by the research methodology, i.e., exploratory (descriptive) and conclusive (causal). For the purposes of this study, the tenets of quantitative methods to support or disprove a relationship is best conducted using the quantitative methods.

Thus, the study sought to explore the standard practices of project closure in construction project in Ghana, using Ghana Cocoa Board as a case study. Exploration of this phenomenon will provide answers to the following questions as stated in chapter one

1. What are the general project closure practices from literature?
2. What is the level of adherence and compliance with project closure practices in Ghana Cocoa Board?
3. What are the factors and problems associated with project closure practices in Ghana Cocoa Board?

### 3.3 POPULATION

Population refers to the total sum of persons who have the specific characteristics to help understand the phenomenon under study. According to Polit and Hungler (1999), the persons are of interest to the research and generalizations can be drawn from them. The population of this research are employees of owners/clients, consultants and contractors of Ghana Cocoa Board's construction projects.

### 3.4 SAMPLING

Sampling refers to the sub-set of the population who have been selected to participate in the study, thus representing the population (LoBiondo-Wood & Haber, 1998). Respondents for this study were sampled using non-probability methods of convenience and purposive sampling. Convenience sampling was used since it is difficult to identify all the members of the population due to time and place of the study, thus those who are available to participate were used (Kumekpor, 2002). Purposive sampling was also used since the respondents to the study were intentionally selected as a result of their background in relation to construction projects (Kumekpor, 2002). The group of respondents selected for this study are defined as follows:

1. **Employees of Owners/clients of construction projects:** these are the workers of the initiators and financiers of the construction project. For the purposes of this study, four owners/clients are identified, namely Ghana Cocoa Board and its three subsidiaries (i.e. Quality Control Company (QCC), Cocoa Marketing Company (CMC) and Seed Production Unit (SPU). A total of fourteen (14) respondents participated in the study.
2. **Employees of Consultants of construction projects:** these are architects who design the facility to be constructed. The targeted population is the employees who are involved in the design of the building. For the purposes of this study,

consultants to the owners/clients of the construction project. A total thirteen (13) respondents were used.

3. **Employees of contractors of construction projects:** these are the employees of the construction firm that implements the design of the consultants. For the purposes of this study, thirteen (13) respondents participated in the study.

### **3.5 SOURCES OF DATA**

The study used primary data collected from forty (40) respondents who are basically the employees of the owners/clients, consultants and contractors of construction projects undertaken by Ghana Cocoa Board and its two subsidiaries.

In addition a desktop data representing secondary data was used for the literature review which provided support in generalizing the findings of the research.

### **3.6 DATA COLLECTION METHOD AND INSTRUMENT**

Data for the purposes of the research was collected using a questionnaire. This approach was used to allow the respondents to provide responses without any interference from the researchers, thus ensuring the accuracy and the reliability of the data collected (Leedy & Ormrod, 2001). According to Kumekpor (2002) questionnaire provides a low cost of obtaining information or data with a minimum interviewer bias, particularly, when they are self-administered by the respondents. As a result, a self-administered questionnaire was developed in a likert scale based on the research questions.

### **3.7 DATA ANALYSIS**

Data was analysed using SPSS using the Relative Importance Index (RII) and the means score scale. RII measures significance of the variables in causing delay in building construction projects and problems associated with on-time completion of

projects. This is intended to present the results in the Ghanaian context. This will be measured using the formula as follows:

$$RII = \frac{\sum W}{A*N} (0 \leq RII \leq 1) \text{ where}$$

W – is the weight given to each factor by the respondents and ranges from 1 to 5, (where “1” is “strongly disagree” and “5” is “strongly agree”); A – is the highest weight (i.e. 5 in this case) and; N – is the total number of respondents.

### **3.8 LIMITATIONS AND DELIMITATIONS**

Limitations are the constraints faced by the researcher which is outside their control. The major limitation of the study was the failure of researcher to retrieve all the questionnaires from the respondents. Out of the 100 questionnaires distributed, 40% of the questionnaire were filled and returned by the respondents, despite several follow-up checks. This then limits the generalization of the study.

The study was delimited by its scope, i.e. the project closure practices in construction projects. Construction projects are managed according to general project management practices, thus there is a project inception, project implementation and project closure. This research is strictly considering project closure practices in a construction project/industry.

Besides, the researcher is delimited in scope with the focus on Ghana Cocoa Board, as one of the public sector institutions in Ghana. The study could have been a comparative study that is comparing project closure practices in a public sector vis-à-vis private sector institutions. However, the researcher is highly constrained by time thus decided to focus on Ghana Cocoa Board.

### **3.9 ETHICAL CONSIDERATIONS**

Ethical issues were considered while undertaking the study to ensure respondents cooperative and participate in the study by providing accurate and reliable data. As much as possible, the researcher reiterated the confidentiality and anonymity of the information provided. This was achieved using an introductory letter from the Department of Building Technology of the Kwame Nkrumah University of Science and Technology (KNUST) to the management of targeted population.



## CHAPTER FOUR

### DATA ANALYSIS AND DISCUSSION

#### 4.1 INTRODUCTION

This section presents the results of the study. It presents the results on the social demographics of the respondents, stages of project closure including the basic activities carried out during project closure, the problems associated with project closure, causes of delay and measures to address.

#### 4.2 PROFILE OF RESPONDENTS

Table 4.1 below presents the summary statistics on the profile of the respondents according to gender, employee category, years with organisation, and current position in the organisation. The results indicate that 80% (32) of the respondents were males and 20% (8) were females, making males the majority of the respondents. Category of respondents was determined by whether the respondent was from the project client organisation, the project consultant firm, or the project construction firm. 35% (14) were from owners of construction project firms and 33% (13) each was from contractor and consultant firms. This means that all three categories were almost equally represented. Further, 63% of the respondents have worked for at least 5 years, 28% have worked for 6 to 10 years while 10% of the respondents have worked for more than 10 years. This means that the respondents have had immeasurable working experience which helped them to provide unbiased responses to the study. In addition, 20% of the respondents were senior managers of the organization, 77% were junior managers while 3% were from other ranks within the organization. This means that most of the respondents were junior staff members of their organization.

**Table 4.1: Profile of respondents**

Variables	Frequency	Percent
<i>i. Gender of Respondent</i>		
Male	32	80%
Female	8	20%
<i>Total</i>	<i>40</i>	<i>100%</i>
<i>ii. Category of Respondents</i>		
Employee of Owner/Client of construction project	14	35%
Employee of Contractor of construction project	13	33%
Employee of Consultant of construction project	13	33%
<i>Total</i>	<i>40</i>	<i>100%</i>
<i>iii. Years of Employment with your organization</i>		
0-5	25	63%
6-10	11	28%
10+	4	10%
<i>Total</i>	<i>40</i>	<i>100%</i>
<i>iv. Current Position in organization</i>		
Senior Management Staff	8	20%
Junior Management Staff	31	77%
Other	1	3%
<i>Total</i>	<i>40</i>	<i>100%</i>

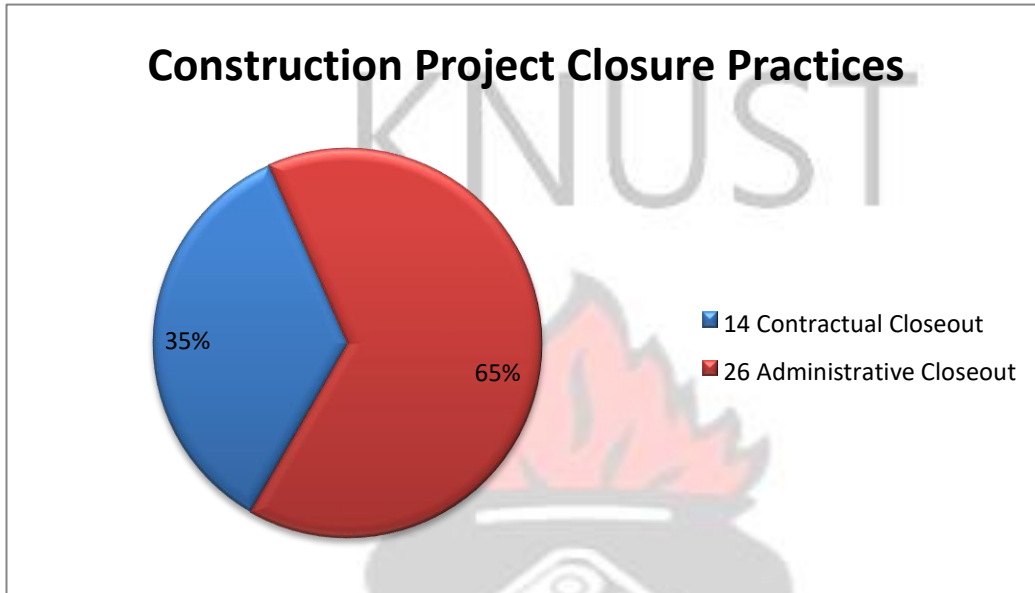
*Source: Field survey, 2016*

#### **4.3 IDENTIFICATION OF PROJECT CLOSURE PRACTICES**

##### **4.3.1 Stage of Closure of Construction Projects**

Respondents were required to indicate the basic stages of closure of construction projects being practiced by their organisation. 35% (14) of the respondents indicated projects were closed by contractual closeout, and 65% (26) indicated projects were closed by administrative closeouts. This is illustrated in figure 4.1. The respondents identified two (2) project closure practices, i.e. administrative and contractual project closure as indicated in the FTA Construction Project Management Handbook (2006) and ITRM Guideline for Project Management (2006), in section 2.2.1. This means that Ghana Cocoa Board together with its consultants undertakes administrative closure

practices compared to contractual closure practices as indicated by ITRM Guideline for Project Management (2006). According to the guideline administrative closure practices are significant in construction projects.



**Figure 4.1: Construction of project closure practices**

*Source: Field survey, 2016*

#### **4.4 EXTENT OF ADHERENCE TO PROJECT CLOSURE PRACTICES**

Respondents were required to indicate on a scale of 1 to 5 representing strongly disagree to strongly agree the extent to which Ghana Cocoa Board adheres to the following project disclosure practices.

#### **4.5 CONTRACTUAL CLOSEOUT**

Table 4.2 below shows respondents' level of agreement with contractual project practices at Ghana Cocoa Board using the relative importance index, as well as the mean score.

**Table 4.2: Ranking of contractual closeout practices**

<b>Contractual Closeout Practices</b>	<b>RII</b>	<b>Rank</b>
Provide certificate of beneficial occupancy to the owner to use the facility	.915	1
Conduct a final inspection of the facility to test for quality	.854	2
Provide a record drawing indicating the location of the facility and its current status	.852	3
Provide guaranty that the facility does work and warranty for after construction service	.818	4
Obtain project acceptance from the principal stakeholders	.799	5
Commission/launch the facility	.758	6
Resolve any claim disputes with the owner/clients	.704	7
Prepare punch list after defects liability period	.648	8
We do prepare manuals on how to use the facility and conduct training	.615	9
Make final payment	.531	10
<b>Mean Score: 3.4850</b>		

*Source: Field survey, 2016*

The results indicate that “*Provide certificate of beneficial occupancy to the owner to use the facility*” ranked highest among the contractual closeout practices undertaken by Ghana Cocoa Board and its consultants with a relative importance index of 0.915. This is followed by conduct a final inspection of the facility to test for quality with making the final payment as the least rank with a score 0.531, meaning it is less significant to contractual closure practices. This means that Ghana Cocoa Board and its consultants adhered highly to the provision certificate of beneficial occupancy practice as part of its construction project closure activities as indicated by the FTA Construction Project Management Manual (2006). According to the manual, a construction project is significantly complete when the owner receives a certificate of beneficial occupancy from the contractor, thus, indicating the legal completion of the

contract. Although, making final payment ranked low with a score of 0.531, it does not mean that Ghana Cocoa Board does not meet its financial obligations under its construction project. Perhaps, it is the last things they consider as part of its contractual closure activities but consider the quality of the infrastructure, thus, ensuring value for money. The mean score extent of agreement to all the practices was 3.4850 indicating respondents' agreement to all the contractual closeout practices.

#### 4.6 ADMINISTRATIVE CLOSEOUT

Table 4.3 below shows respondents' level of agreement with administrative project practices at Ghana Cocoa Board using the relative importance index, as well as the mean score.

**Table 4.3: Ranking of administrative closeout practices**

<b>Administrative Closeout Practices</b>	<b>RII</b>	<b>Rank</b>
Collection and Compilation project records such as procurement records, performance reports, changes in contracts, etc.	.671	1
Conduct project evaluation to document lessons learnt	.529	2
Close project account	.458	3
Stakeholder closure in the form of letter and other written documents indicating their acceptance of the project deliverable	.448	4
Conduct project demobilization to relocate project staff	.416	5
<b>Mean Score: 3.5100</b>		

*Source: Field survey, 2016*

The results indicate that “*Collection and Compilation project records such as procurement records, performance reports, changes in contracts, etc.*” ranked highest among the administrative closeout practices at Ghana Cocoa Board with a relative importance index of 0.671. This means Ghana Cocoa Board fairly adhere to this practice since it is less significant to them. This is followed by conducting project

evaluation to document lessons learnt, closing of project account, stakeholder closure meetings and project demobilization to relocate project staff in contrast to the guideline on project closure as outlined in the FTA manual (2006). Although, the manual did not rank the activities using an index it was arranged in order of importance. According to the FTA manual (2006) demobilization of project team is a significantly important to the administrative closure process. Perhaps, this is highly considered since it can create a conflict of interest or clash of roles among staff, thus negatively affecting the longterm leadership/management succession plan (Emison, 2013). The mean score extent of agreement to all the practices was 3.5100 indicating respondents' agreement to all the administrative closeout practices at Ghana Cocoa Board.

#### 4.7 PROBLEMS ASSOCIATED WITH PROJECT CLOSURE

Respondents were required to indicate their level of agreement with stated problems associated with construction project closeouts. The two main problems are delays and documentation, with documentation having two factors under it. Table 4.4 below shows respondents' level of agreement with problems associated with project closeouts.

**Table 4.4: Ranking of problems associated with project closeouts**

<b>Problems Associated with Project Closeouts</b>	<b>RII</b>	<b>Rank</b>	<b>Mean Score</b>
Delay	.266	1	4.225
<i>Documentation</i>			3.7375
Documentation of the standard project closure practices	.956	1	
Documentation of construction events e.g. errors and mistakes to serve as reference point	.941	2	

*Source: Field survey, 2016*

The results indicate that delay is the major problem associated with project closeouts with a mean score of a mean score of 4.225 followed by documentation with a mean

score of 3.7375. meanwhile, with a RII of 0.266 delay is not a problem associated with building construction project closeouts at the Ghana Cocoa Board whiles documentation is a problem associated with project closeouts with a high RII 0.9485 (average). This means that documentation is key problem associated with building construction projects at the Ghana Cocoa Board but delay is not, thus implying that Ghana Cocoa Board is able to complete its project on-time. The results contradict the findings of Divya and Ramya (2015) as indicated in section 2.3.1 above. According to the authors delay usually occur in construction project due to its participatory nature which require the input of architects and engineers to ensure the achievement of the objective of the project. They explained further that the problem can be associated with high use of technology and the frequent-client changes coupled with inherent risks. Out of the two documentation issues, documentation of the stand project closure practices ranked the most relevant documentation problem associated with project closure practices with RII of 0.956 compared with documentation of construction events to serves as reference point with RII of 0.941, thus, indicating the relevance of documentation to the success of building construction projects at the Ghana Cocoa Board. Documentation usually is an important activity in the FTA manual (2006) since by outlining weaknesses, strengths and lessons learnt it serves as a point of reference that could facilitate the achievement of future building construction projects.

Nonetheless, a critical study of the table 4.4 reveals the inconsistencies in the respondents' responses. Delay as a higher mean (i.e. 3.7375) compared to documentation with a mean score of 4.225. Although, documentation had a relative low mean score, it had the highest RII compared with delay. This contrary to priori expectation that the mean score would be associated with high RII such that higher mean score for delay would be accompanied with higher RII.

#### 4.8 CAUSES OF DELAYS

Respondents were required to indicate their level of agreement with stated causes of the major problem associated with Ghana Cocoa Board project closeouts. The causes were classified as consultant-related, equipment-related, contractor-related, contract-related, and contractual relationships-related; owner/client-related, materials-related, externally-related, and labour-related. Table 4.5 below shows respondents' level of agreement with cause of the problems.

**Table 4.5: Causes of delay**

Causes	RII	Rank
<b><u>Consultant related</u></b> such as inadequate experience of consultant, poor communication and co-ordination, errors and discrepancies in design documents, vague details in drawings	.907	1
<b><u>Equipment related</u></b> such as frequent equipment breakdown, shortage of equipment, low level of equipment operations and low productivity and efficiency of the equipment	.887	2
<b><u>Contractor related</u></b> such as rework due to mistakes during construction, poor co-ordination and communication, ineffective planning and scheduling of project, poor qualification of contractor's technical staff, delay in sub-contractors' work	.782	3
<b><u>Contract related</u></b> such as unrealistic project time frame by stakeholders	.689	4
<b><u>Contractual relationships</u></b> related such as clash of interest among stakeholders on the achievement of the project's deliverables and objectives	.671	5
<b><u>Owner/client related</u></b> such as deferment of payments, postponing the site delivery to the contractor, insufficient of communication and coordination, delay in revising and approving design documents as well as change order during construction	.611	6
<b><u>Material related</u></b> such as shortage of construction materials, deferment of material delivery	.585	7
<b><u>External related</u></b> such as late permission obtained from municipality, weather effect on construction activities, accidents during construction, rises in prices of materials and delays in providing utility services	.533	8
<b><u>Labour related</u></b> such as shortage and unavailability of skilled labour, conflicts among labour, changes in material types during construction and late purchases and supply of materials	.494	9

**Source: Field survey, 2016**

The results indicate that “*consultant-related practices*” ranked highest among the causes of delay problems in Ghana Cocoa Board’s closeout practices with a relative importance index of 0.907. This was followed by equipment and contractor related with RII rank score of 0.887, and 0.782, respectively. The study established that contract, contractual relations and owner/client related causes have less effect on causing delay in construction projects. Meanwhile, material, external and labour related causes are not significant in explaining the causes delay of construction projects undertaken by Ghana Cocoa Board. The responses have a mean score of 4.1750. The findings corroborates with the results of Divya and Ramya (2015), Archarya et al (2006) and Al-Kharashi and Skimore (2009). It must be noted that, these studies did not rank the causes of delay identified as done by this current study. The rankings obtained are distinct to this study since there is no standard ranking for the causes of delay in building construction projects as noted by Ramanathan, et al (2012). In addition, the study indicates that different approaches were used to rank the causes identified. Some studies used the relative importance index, mean score, frequency index, severity index and rank correlation among others (Ramanathan, et al., 2012). However, a critical review of studies on causes of delay have identified that owner/client, contractor, equipment, labour and consultant and contractual relationships related causes of delay as the five (5) ranked categories that appeared in most studies in descending order, i.e, 1, 2, 3, 4, 5, with owner/client cause ranked as 1. The findings of Ramanathan et al (2012) similar to the findings of this study since consultant, equipment, contractor, contract, contractual relationships, and client/owner related causes of delay were identified. The difference between Ramanathan et al (2012) and this study is that contractand contractual relationships has been treated as one (1) by Ramanathan et al (2012) whiles they were separated in this study. in

addition, this study ranked consultant related causes of delay had the highest ranking followed by equipment, contractor, contract, contractual relationships and owner/client related causes of delay. It can be observed that owner/client related was highly ranked (i.e. 1) in most studies but ranked 6<sup>th</sup> in this study, thus supporting the argument of Ramanathan et al (2012) that the ranking of the categories are distinct to each study based on the area of study.

#### 4.9 RECOMMENDATIONS

Respondents were required to put forward recommendations to mitigate each of the causes outlined in the previous section. This question was open-ended; their recommendations were therefore coded grouping responses / recommendations according to similarity.

**Table 4.6: Causes of delay and recommendations**

Cause of Delay	Recommendation(s)
Owner / Client Related	Payment and other related issues should be done on time
Contractor Related	Competent and Skilled contractors should be hired
Consultant Related	Experience consultants should be hired
Equipment Related	Quality should be ensured when buying equipment
Material Related	Materials should be delivered to sites on time
Labour Related	Employment of skilled labour
External Related	Proper planning
Contract Related	Realistic project deadlines should be stated
Contractual Relationships related	Ensure goals are clearly stated and unified

*Source: Field survey, (2016)*

The results indicated that majority (more than 98%) of the respondents indicated similar responses / recommendations for all the stated causes, or did not make a recommendation.

#### 4.10 SUMMARY

Majority of the respondents were male junior management staff who had been with their respective organisations for between 1 to 5 years. Majority of the respondents (65%) indicated Ghana Cocoa Board project closures were mainly administrative closeouts. This is further supported by respondents' level of agreement with the extent of practices under contractual closeouts and administrative closeouts. Contractual closeouts practices had a mean score of 3.4850 while administrative practices had a means score of 3.5100. The results indicate that "*Collection and Compilation project records such as procurement records, performance reports, changes in contracts, etc.*" ranked highest among the administrative closeout practices at Ghana Cocoa Board with a relative importance index of 0.671. Delays were the main problem of project closures with respondents' mean score agreement of 4.225 compared to documentation which showed respondents' mean score agreement of 3.7375. Consultant-related issues ranked highest among the causes of delays in Ghana Cocoa Board's project closures ranking highest with a relative importance index of 0.907.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 INTRODUCTION

This chapter summarizes the study, draws conclusion and gives recommendation that will help Ghana Cocoa Board to manage its construction project closure.

#### 5.2 SUMMARY OF RESEARCH OBJECTIVE

The study sought to identify from literature the general project closure practices, the stages and the standard practices of project closure implemented by Ghana Cocoa Board for its construction projects as well as finding out adherence and compliance of project closure practices and identify problem associated with project closure.

The study employed the quantitative method of research. The questionnaires, filled by forty (40) respondents, were coded to generate numerical values for the purposes of drawing references and making value judgments. The respondents were chosen using the convenience sampling technique. The results of the study are as follows:

##### 5.2.1 Objective 1

The study was intended to identify the general project closure practices from literature.

The general project closure practices from literature comprised of contractual and administrative closeout activities. The study revealed that Ghana Cocoa Board undertakes administrative closeout practices.

##### 5.2.2 Objectives 2

The study was intended to measure the extent to which Ghana Cocoa Board adhere to the above-mentioned practices.

The study revealed that Ghana Cocoa Board highly adhere to contractual closure practices but fairly adhere to the administrative closure practices since average it had a high (3.5100) and low RII (3.4850), respectively.

### 5.2.3 Objective 3

To identify problems associated with project closure practices in Ghana Cocoa Board

- The study identified two problems associated with the on-time completion of construction projects.
- It identified delay and documentation as the key problems associated with project closure. Delay was highly ranked with a mean score of 4.225 while document had a mean score of 3.7375. This is congruent to literature.
- In addition, the study identified the causes of delay of construction projects at the Ghana Cocoa Board is categorized into six (6) groups, namely, consultant, equipment, contractor, contract, contractual relations and owner/client related causes.
- These categories are related with the five (5) categories of causes identified by literature. The table below indicates how causes can be addressed.

**Table 5. 1: Recommendations on causes of delay**

Cause of Delay	Recommendation(s)
Owner / Client Related	Payment and other related issues should be done on time
Contractor Related	Competent and Skilled contractors should be hired
Consultant Related	Experience consultants should be hired
Equipment Related	Quality should be ensured when buying equipment
Material Related	Materials should be delivered to sites on time
Labour Related	Employment of skilled labour
External Related	Proper planning
Contract Related	Realistic project deadlines should be stated
Contractual Relationships related	Ensure goals are clearly stated and unified

*Source: Field survey, (2016)*

### 5.3 CONCLUSION

The study concludes that contractual and administrative closure activities are the standard project closure practices undertaken by Ghana Cocoa Board. Among the two, the contractual closure practice is highly adhered compared with the administrative closure practice. Further, the documentation is the key problem associated with Ghana Cocoa Board project closure.

### 5.4 RECOMMENDATIONS

The study has made the following recommendations

**Policy:** the study recommends the Ghana Cocoa Board should have guideline that stipulates project closure practices. It will serve as point of reference for closing out constructions projects and ensure that standard practices are adhered to.

**Practice:** the study recommends that Ghana Cocoa Board to implement the standard project closure practices to ensure successful completion of its project. In addition, the recommendations outlined to address the causes of delay are duly considered to help making informed-decisions during project closure.

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## APPENDIX

### Questionnaire

Dear Sir/Madam,

I am currently pursuing my Master's Degree in building Technology with the Kwame Nkrumah University of Science and Technology (KNUST). Currently, I am writing my thesis titled "***Project Closure Practices in Ghana: A Case Study of Cocoa Board Construction Projects***". The purpose of the study is to identify the problems associated with closure of construction project. This questionnaire is meant to solicit information regarding the topic. Information provided will be used for academic purposes only, thus your responses are strictly confidential and anonymous. It will take approximately 15 minutes to provide your responses to this questionnaire.

Thank you for your co-operation.

Please TICK [] where appropriate

Section A: Demographics

1. Sex: Male [] Female []
2. Category of respondents
  - a) Employee of owner/client of construction project []
  - b) Employee of contractor of construction project []
  - c) Employee of consultant of construction project []
3. How long have you been an employee in your organization?
  - a) 0 – 5 years []
  - b) 6 -10 years []
  - c) 10 years and above []
4. What is current position in your organization
  - a) Junior Management Staff []
  - b) Senior Management Staff []
  - c) Other, please specify:

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Section B: Stages of Closure of Construction Projects

5. What the basic stages of closure of construction projects being practiced by your organization?
  - a) Contractual closeout
  - b) Administrative closeout
  - b) c) Other, please specify:

.....

6. Indicate by ticking on scale 1-5 the extent to which Ghana Cocoa Board practices the following project closure practices. .

SD – Strongly Disagree, DA – Disagree, NS – Not sure, AG – Agree, SA- Strongly Agree

<b>Activities</b>	<b>SD 1</b>	<b>DA 2</b>	<b>NS 3</b>	<b>AG 4</b>	<b>SA 5</b>
<b><i>Contractual closeout</i></b>					
p. Prepare punch list after defects liability period					
q. We do prepare manuals on how to use the facility and conduct training					
r. Provide certificate of beneficial occupancy to the owner to use the facility					
s. Provide guaranty that the facility does work and warranty for after construction service					
t. Provide a record drawing indicating the location of the facility and its current status					
u. Conduct a final inspection of the facility to test for quality					
v. Resolve any claim disputes with the owner/clients					
w. Obtain project acceptance from the principal stakeholders					
x. Make final payment					
y. Commission/launch the facility					
<b><i>Administrative closeout</i></b>					
z. Conduct project demobilization to relocate project staff					
aa. Close project accounts					
bb. Collection and Compilation project records such as procurement records, performance reports, changes in contracts, etc.					
cc. Conduct project evaluation to document lessons learnt					
dd. Stakeholder closure in the form of letter and other written documents indicating their acceptance of the project deliverable					

7. The following are the problems associated with construction project closure/closeout.

Please indicate your level of acceptance.

<b>Problems</b>	<b>SD 1</b>	<b>DA 2</b>	<b>NS 3</b>	<b>AG 4</b>	<b>SA 5</b>
Delay					
<b><i>Documentation</i></b>					

Documentation of construction events e.g. errors and mistakes to serve as reference point;					
Documentation of the standard project closure practices					

# KNUST



8. Causes of delay can be viewed from varying perspectives. These perspectives are presented in the table below. Please indicate your level of acceptance.

Causes of delays	SD 1	DA 2	NS 3	AG 4	SA 5
a. <b>Owner/client related</b> such as deferment of payments, postponing the site delivery to the contractor, insufficient of communication and co-ordination, delay in revising and approving design documents as well as change order during construction					
b. <b>Contractor related</b> such as rework due to mistakes during construction, poor co-ordination and communication, ineffective planning and scheduling of project, poor					

qualification of contractor's technical staff, delay in subcontractors' work					
c. <b>Consultant related</b> such as Inadequate experience of consultant, poor communication and co-ordination, errors and discrepancies in design documents, vague details in drawings					
d. <b>Equipment related</b> such as Frequent equipment breakdown, shortage of equipment, low level of equipment operators and low productivity and efficiency of the equipments					
e. <b>Material related</b> such as Shortage of construction materials, deferment of material delivery					
f. <b>Labour related</b> such as shortage and unavailability of skilled labour, conflicts among labour, changes in material types during construction and late purchases and supply of materials					
g. <b>External related</b> such as Late permission obtained from municipality, weather effect on construction activities, accidents during construction, rises in prices of materials and delays in providing utility services					
h. <b>Contract related</b> such as Unrealistic project time frame by stakeholders					
i. <b>Contractual relationships related</b> such as Clash of interest among stakeholders on the achievement of the project's deliverables and objectives					

9. For each of the causes outlined above, recommend ways to mitigate them

Causes of delays	Ways to mitigate them
<b>Owner/client related</b>	

<b>Contractor related</b>	
<b>Consultant related</b>	
<b>Equipment related</b>	
<b>Material related</b>	
<b>Labour related</b>	
<b>External related</b>	
<b>Contract related</b>	
<b>Contractual relationships related</b>	

10. Recommend measures to solve the documentation problem

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