

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

**An assessment of current and emerging issues of pre-construction planning practices of
road contractors in the construction industry of Ghana**

By

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MASTER OF SCIENCE

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DECLARATION

I hereby declare that, this thesis 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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ABSTRACT

Pre-Construction Planning (PCP), a vital and effective tool for construction management, is defined by Laufer as the process of defining what activity should be done, how these activities are to be done or completed, who should be responsible for the completion and how long the activities should take. This study aims to assess emerging issues of pre-construction planning practices of road contractors in the Ghanaian Construction Industry. To achieve this aim, three (3) objectives were set which sort to assess the current pre-construction planning practices of road contractors in the construction industry, to examine the underlying barriers to effective pre-construction planning activities of road contractors and finally, to explore emerging pre-construction planning issues pertinent to the development of the construction industry. The quantitative research method was adopted for this study. Structured questionnaires were used in collecting data from the respondents. This research was limited to key stakeholders in the A1B1, A2B2, A3B3 and A4B4 registered road construction firms including Project Managers, Engineers, Site Supervisors as well as Quantity Surveyors in the Kumasi Metropolis. Using the purposive sampling technique, Fifty-five (55) out of the sixty-two (62) questionnaires distributed were retrieved. The data was analyzed using descriptive analysis for the background of the respondents and Relative Importance Index (RII) and mean score ranking to rank the various variables. Findings from the analysis revealed that Road Contractors as well as other stakeholders in the construction industry need to be adequately educated and sensitized on the pre-construction planning practices. With these findings, it was recommended that more researches or studies be done in the area of the road sector to address more issues in this subject matter. This is to establish measures in the identified areas that will help to achieve the full benefits of pre-construction planning during the execution of road project.

Key words: Emerging Issues, Pre-Construction Planning, Road Contractors, and Ghana.

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DEDICATION

I devote this work to the Almighty God for his guidance, protection and mercies and to my loving wife and children for their encouragement and support.

CHAPTER ONE

GENERAL INTRODUCTION

1.1 BACKGROUND TO STUDY

A project in general, is said to be successful when it adheres to the plan of the project (Subbiah, 2012). According to Kiessling *et al.* 2014, much extensive studies have been conducted by several researchers in the field of project planning to identify the relevance of planning towards the success of construction project. These studies however has shown that when there is effective participation of stakeholders of a project at the pre-construction stage there is a high tendency of project to be completed successfully (Tabish and Jha 2012).

Pre-Construction Planning (PCP) as defined by Laufer is the process of defining what activity should be done, how these activities are to be done or completed, who should be responsible for the completion and how long the activity should take (Laufer 1990). The project team receives this information in the form of a plan like the drawings of project, specifications, schedules, and many others (Laufer et al. 1994). Pre-construction planning also includes a comprehensive set of procedures that is undertaken by the contractor during the period between the award of the contract and the execution of the works. The output that result from preconstruction planning are schedules, estimates, budgets, manpower loading charts, coordination drawings, and safety notes (Hanna and Skiffington,2010).

Mawdesley et al. (1997) defined construction planning as a detailed scheme or method for attaining an objective. The detailed scheme includes the method, the activities to be carried out, the timing of the activities, the resources to be used and the finances required. Construction

planning is necessary to account for all the variables and situations that may arise during a construction project.

Planning for construction allows a contractor to be proactive rather than reactive to the problems as they arise. The complexity of construction industry requires the identification of work tasks and the coordination of interactions among them. As a result, construction planning is considered to be one of the most critical steps toward success and is the main focus of past research (Hanna and Skiffington, 2010).

Pre-construction Planning is essential in achieving the success of a construction project. Due to the early involvement of project participants in the construction phase, project managers are able to plan ahead and solve issues well in advance leading to the success of the project and the satisfaction of the client (Kim et. al.2016). Most of the factors that always affect the project profitability and successful completion of the project can be controlled through pre-construction planning (PCP) effort that usually require 2% to 5% of total installed cost of a project but also depends on type and complexity of the project (Abbas et al. ,2016).

Pre-construction is proven to improve the quality of the overall construction project (Menches et. al 2005). Pre-construction planning also improves the efficiency of construction tasks is further improved during the pre-construction phase (Lepech and Griggs 2015). According to Laufer et. al 1994), literature has capture that planning comprises of certain elements some of which includes A decision-making process; a process of anticipatory decision-making - to decide what and/or how to perform actions due at some point in the future; a process of integrating interdependent decisions into a system of decisions. Hierarchical process evolving from general guidelines to objectives, to the elaboration of means and constraints that lead to a detailed course of action.

In the effective planning of road construction works, a logical attempt has to be made to foresee every single event which is likely to interrupt or prevent the attainment of the stated goal. The main objective of every construction firm is to complete every project within the stipulated time at an estimated cost (Odeh and Battaineh, 2002). Furthermore, in the roads sector, the success of a company, project or any business endeavor is virtually left to chance if there is the absence of proper and adequate planning in the management processes (Ward, 2016). Therivel and Paridario (2013) indicated that planning involves deliberate actions to adequately consider all the prevailing conditions surrounding the project in order to devise best methods and ways of ensuring its successful completion. Without planning, waste and unproductive time cannot be avoided. Usually the actual time required for project planning depends on the type of project and the scope of the project. Project planning is very relevant in every construction project but its preliminary can affect the whole project.

Strategic and operational planning all involves vital techniques in achieving the overall project aim and objectives (Al-Jibouri and Mawdesley, 2001). For this reason before the actual commencement of every construction project on the site, ample time is given to allow for adequate planning of all activities that will take place on the site.

1.2 STATEMENT OF THE PROBLEM

The road sector of the construction industry has a major impact in the economic and developmental growth of a nation as it provides employment through transport services. But, this sector is faced with numerous problems as they aim at rendering their services in road infrastructure (Kyei 2015).

Most studies conducted on planning towards the construction work often times focuses on pre-project planning. The client completes the pre-project planning stages as it revolves from the

stage of conceptualization of idea to the stage where instructions are given to commence work as detailed designed has been produced. Most of this planning activities shows the level of companies profit, common activities performed and the important activities identified by the contractors (Gibson et al. 1995, 2006). There is a high-risk level and a major financial commitment to contractors as revealed when there is a negative outcome of the detailed post-contract planning since the project time and cost may have been finalized at award of the contract. The contractors facing these challenges may turn to share the risk with either the subcontractors or clients or other times pass on the burden wholly to clients in the form of claims variations.

According to Gidado, the construction industry is experiencing significant changes and these has resulted in a need for speed in the execution of work, works without defects of higher safety and with an environment standard or recognition (Gidado 2004). It is quite unfortunate that the increase in dynamism in the construction industry is not is handled equally with planning at the early stages of a project. As a result of this, contractors are often faced with the challenge in adjusting to a more detailed level of planning (Gidado 2004). The construction industry still plans projects at the activity level when works are actually to be done. The industry is therefore not attaining the full benefits of construction planning on the delivery of projects.

A perceived inadequate time or deficiencies in the expertise of organizations and the drive to thoroughly perform preplanning tasks are some of the reasons given for the poor planning of most construction projects (Gibson et al., 2006; Rahmat and Ali, 2010). Delays, cost overruns, and owner dissatisfaction are important challenges that are associated to the lack of effective planning process implementation (Casinelli 2005). The impacts that are negatively posed as a

result of poor construction planning mostly affects the contractors and the owners (Ndekugri, et. al 2008).

According to Kheni (2008), most Ghanaian contractors after being informed of having won a contract hardly plan the activities between the time of notification and execution of the actual construction works. Before submitting tender, most contractors do not do any planning (Cooke and Williams, 2013; Winch, 2005). Pierce (2013) and Watermeyer (2002) indicated that pricing of bills of quantities are generally done by quantity surveyors without construction planners or schedulers to plan thoroughly how and when each task would be executed if they become successful at the end of the tendering process. Due to this, most of the projects executed by these contractors are beset with problems such as: Delays, Cost overruns and Poor-quality work done (Alinaitwe et al., 2013; Sun and Meng, 2009; Nelson, 2007).

The road construction sector within the industry is no different from the issue, the road sector often do not achieve the full benefits of pre-construction planning. (Doloi et al., 2012). Kinsley 2004 also captured that most of the issues that spring up delay in the timely delivery of road projects is associated with lack of adequate planning before project commencement, and this often result in cost overruns. This study therefore seeks to assess the PCP practices and activities for road construction purpose to enable efficient use of its benefits.

1.3 RESEARCH QUESTIONS

This study which was geared towards assessing the pre-construction planning activities in the road sector of the construction industry poses the following questions;

1. What are the various aspects in the pre-construction planning for road works in the construction industry?

2. What are the bottlenecks that impedes the effective execution of pre-construction planning activities in road construction?
3. What are the emerging pre-construction planning issues pertinent to the development of the economy in the construction industry of Ghana?

1.4 RESEARCH AIM AND OBJECTIVES

1.4.1 Aim of the Study

The aim of this study was to examine the current practices and is related and emerging issues of pre-construction planning activities of road contractors in the construction industry in Ghana.

1.4.2 Specific Objectives of the Study

To achieve the above stated aim, the following objectives were set:

1. To identify the current pre-construction planning practices of road contractors in the construction industry of Ghana
2. To identify the underlying barriers to effective pre-construction planning activities of road contractors in the construction industry of Ghana
3. To identify emerging pre-construction planning issues pertinent to the development of the economy in the construction industry of Ghana

1.5 RESEARCH SCOPE

The study contextually focused on pre-construction planning, its activities aspects, determinants, as well as effects and benefits and also, considered literature on successful case studies to buttress the grounding of the research towards an effective assessment of the road sector

perception and practices in pre-construction planning. The study again tapped on examples in the building sector which can apply within the context of road construction. The literature for the thesis also covered the various aspects of road pre-construction planning activities from case studies. Further definition and dimensions of the pre-construction planning and the current issues associated will be the focus of the study. The geographical area for this study was the Kumasi metropolis i.e. considering the road sector contractors within the area. The area recently is being concentrated with ongoing road works while others are in bidding process. This makes it ideal for the study. The area is also in reasonable proximity with the researcher which makes the administration of research instrument and data collection more easy and efficient.

1.6 JUSTIFICATION OF THE STUDY

Several studies on Pre-construction planning as a construction activity has presented conclusion of its benefits and need to the entire construction project. The changes occurring in the construction industry currently has influenced the nature of construction processes and has made has therefore identified planning at pre-construction stage a useful tool in delivering successful projects. This has therefore made effective planning before commencement of the project more of a requirement. However, literature captures little of these PCP activities being done as it counted little or less time and effort being invested. This has made most construction project face certain issues like wrong estimates hence exceeding budget, not interpreting project scope well, poor risk assessment (Ndekugri et al., 2008) amongst others. In order to successfully deliver any project, it is important to ensure there is good planning before commencement. However, it is mentioned that planners are faced with challenges of insufficient time and effort during the pre-contract stages of a construction process. Gidado mentioned in his study that contractors may vary their approach from one company to another as well as from one project to another (Gidado,

2004). The study therefore addressed the pertinent issues and as such proposed a model that integrate project complexity in to construction planning.

This study will contribute to the body of knowledge by presenting the process steps, benefits and efficient methods within the pre-contract planning towards ensuring enough activities are done in the pre-construction phase of the project in the perspective of contractors in road construction. This could serve a basis for further studies to be done in this area.

1.7 RESEARCH METHODOLOGY

The research methodology adopted in this study includes a field research and a desk review. The study will adopt a deductive approach as it will be based on the use of existing theories. The deductive approach creates the possibility to explain causal relationships between concepts and variables, possibility to measure concepts quantitatively and also the possibility to generalize research findings to a certain extent. The deductive approach was adopted because the researcher desires a statistical or quantitative method.

The research design of any empirical research is the fundamental plan which aids in connecting the research questions to the research data and it includes the procedural arrangements and tools in the collection and analysis of empirical data, the sample to be used and the research strategy to adopt (Punch, 2000). The positivist research philosophy was adopted for this study. The positivist asserts that, social reality is independent of reality which is objective in nature and that research should be value free of the facts on the ground which can aid them measure precisely with the use of statistical methods in testing causal theories. Therefore, positivism uses quantitative research strategy in the collection of data using survey (Neuman, 2007).

The Quantitative research strategy was used for in the study. The study will also rely on primary data to be gathered and existing secondary information. A critical review of literature will be done in the academic paradigms relating to the subject. The review will be done using credible and scientific data from the extant literature which includes journals, thesis, conference proceedings and other publications. This is to help in identifying the variable attributes to the study to be used for the development of the survey instrument.

The field research adopted the purposive sampling technique. This method samples members from a larger population with selection based on the expertise needed to satisfy the research aim. The survey instrument i.e. questionnaire was developed based on an intensive review of literature and brainstorming and will be designed to suit its intended purpose. The questionnaires were developed and self-administered to the required respondents who were tasked to opine on the study. The data that were retrieved from the questionnaire administered were carefully analysed using the SPSS software and the further analysed using the one sample t-test which aimed at identifying the significance of the variables to the study and the relative importance index which also aided in determining the most important attributes to be noted.

1.8 ORGANIZATION OF THE STUDY

The research conducted was grouped into five main chapters. Chapter 1: Introduction; The Chapter relates to the background of the research, the statement of the problem, It also covers the aims, objectives and other related activities, also defines the scope of the research methodology and the justification. Chapter 2: Literature Review; the chapter discusses issues related to project pre-construction planning. The chapter also threw light on various commentaries and current knowledge on the topic as a foundation and support to the research. Chapter 3: Research Methods; This chapter gives a step by step approach to how the research will be conducted. It introduces the reader to the various stages of the research activity. The chapter also discusses the questionnaire to be developed and data to be collected incidental to the questionnaire. Chapter 4: Data Presentation, Analysis and Discussions; the main findings of the research are discussed in this chapter. The outputs of the analysis are presented in forms that are easy to comprehend. Chapter 5: Summary of Findings, Recommendations and Conclusion; This presents the conclusion drawn from the study of the data analysis and a set of recommendations necessary to improve the current state of the research problem. The chapter ends with subject areas recommended for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This section of the report presents the planning and overview of pre-construction planning and definitions. It entails the overview of the Ghanaian construction industry and its significance to the development of its economy. This is followed by pre-construction planning practices and techniques involved in Ghanaian Construction industry and the benefits and challenges affecting its development. It also seeks to bring afore the various stages of construction planning, the practices involved in construction planning stages and the role of the professionals in the construction team.

2.2 THE CONSTRUCTION INDUSTRY

Construction activities can mainly be classified into two main branches; civil engineering and building works. Construction activities cover several activities such as new works, maintenance works and repairs (Oladapo, 1974; Hamilton, 2006). Hamilton (2006) stated that building works covers projects such as the construction of residential houses, construction of offices and other commercial buildings. These building projects range from single room residential structures to multi-storey buildings. Civil engineering works on the other hand encompasses structures such as roads, towers, bridges and sewers (Fellini et al., 2007).

Also Strasser (1970) posits that the industry has several categories of firms performing different activities from heavy construction (like work on highways and bridges) to special trade contractors (plumbing work and carpentering). The construction work is seasonal, hazardous, and subject to an extensive amount of time lost because of bad weather and industrial strife (Strasser, 1970).

Ashworth and Willis (1994) in their study identified the characteristics of the construction industry to include the following; The project's physical nature; The inflexibility of the project's construction in that it is restricted on the client's premises; The traditional process where design is separated from construction; It is greatly influenced by a wider swings of activities as compared to other industries; the vagaries of the weather that affects construction industries and the investment nature of the construction project.

The above stated characteristics all point to the complex nature of the construction industry. This calls for stringent management strategies when dealing with construction projects.

2.2.1 The Ghanaian Construction Industry

Construction industries in Ghana has over the years developed into two major sectors; the formal and informal sectors. The formal sector mainly adopts diverse procurement routes whiles the informal sector is labour intensive. Gyadu-Asiedu, 2009 identified four major clients who are vital in the Ghanaian construction sector. These clients are as follows; the government, real estate developers, investors and those who own and will occupy the project after completion. There are other professionals such as the building and civil engineering contractors, architects and quantity surveyors. These professionals are also regulated by their respective professional institutions.

Agbodjah (2008) indicated that contractors undertake different type of works and therefore are categorized in eight different group according to the type of work they perform, the various categories are as follows; Category A; projects like Airports and Roads; Category B; projects like Bridges, Culverts and related projects; Category C; labor road works; Category S; projects involving steel bridges and structures which includes rehabilitation and maintenance; Category

D; includes general building works; Category K; general civil works; Category E; covers electrical works and Category G; comprises of plumbing works

In this thesis, the pre- construction planning practices of road contractors as well as the barriers affecting these practices will be studied to identify and understand the pre- construction issues relating to the construction industry in Ghana.

2.2.3 Importance of the Road Sector in the Ghanaian Construction Industry

Generally, when it comes to the construction industry, Ofori (2012) stated that construction is a key sector of the economy of every country. There are many reasons for the industry's importance. First, the construction industry is important because of the outputs and outcomes of its activities. Second, the physical infrastructure provided by the construction industry makes the industry the backbone to the nation's economy. The infrastructural projects delivered by the construction industry offers social and welfare advantages by improving the living standards of the populace. Third, construction also influences the nation's capacity to attract foreign investors which is key in the globalization of the world today. Fourth, the construction industry also contributes significantly to Gross Domestic Product (GDP) in the economy of many countries and since it's relatively labour – intensive it creates employment opportunities for a large number of people in the country and has the potential of boosting the overall growth of the economy of nations.

With respect to this study, the road sector plays important roles in the construction industry. From the official website of the Ministry of Roads and Highways in Ghana, some importance of the road sector and its contribution to the economy of the country are listed below:

- It enables trade and employment opportunities in both urban and rural communities.

- It facilitates the movement of goods and services in all sector of the economy including tourism, education, health and agriculture among others.
- An effective and efficient road infrastructure has reduced cost and comparative distance between trading partners, thereby increasing trade effectiveness and maximizing returns.
- Construction of roads across the country to link communities to ensure smooth travel.
- Gives government tax revenue due to the tremendous increase of car ownership and the flourishing car industry.

2.3 CONCEPT OF PLANNING IN CONSTRUCTION

Shapira Laufer, and Shenhar (1994) defined planning as “the process of deciding what to do and how to do it before action is required.” Elbeltagi (2012) also explains planning as a general term that sets a clear road map that should be followed to reach a destination. The term, therefore, has been used at different levels to mean different things. Planning involves the breakdown of the project into definable, measurable, and identifiable tasks/activities, and then establishes the logical interdependences among them. He clearly points out that planning answers three main questions: What is to be done, How to do it, and who does it.

To throw more light on planning in construction, Neale and Neale (1989) explained planning as a broad process that starts right from the project inception stages through the feasibility studies to the final handing over and commissioning of the completed project. Construction planning is very crucial to the success of a construction project. It is the fundamental activity in the effective management and execution of the construction project.

It includes activities such as defining the work tasks, determining the duration of all individual tasks, estimating the right quantity and quality of resources required for the execution of the

project as well as the identification of any unforeseen event that might interfere with the timely delivery of the construction project. Adequate planning ensures that the project is completed within time, budget and specified quality requirements (Hendrickson et al., 1987). Brian et al., (2015) agrees with Hendrickson et al (1987) and adds that planning is known to enhance construction project performance in terms of cost, schedule, and quality.

When it comes to poor planning, Kibwami and Tutesigensi (2015) explains that it can result in avoidable delays and its associated increase in construction cost. They go ahead to state that planning ensures that the resources required for the construction project are available as and when they are needed. The planning of resources should not only focus on materials but should encompass plant and labour availability.

In addition, lack of effective planning process implementation is an important challenge because research has linked poor planning to delays, cost overruns, and owner dissatisfaction (Casinelli, 2005; Wang & Gibson, 2010).

One of the aims of planning is to provide assistance to the construction manager to ensure he fulfils his role to ensure the success of the project. Clear and detailed communication among parties to the construction project is key factor to project success (Laufer and Tucker (1987).

2.4 PRE-CONSTRUCTION PLANNING ACTIVITIES

The construction industry views planning as complex. Hence pre-construction planning in any construction project is essential. Elbeltagi (2012) mentions that, in construction, for example, plans may exist at several levels: corporate strategic plans, pre-tender plans, pre-contract plans, short-term construction plans, and long-term construction plans. These plans are different from each other; however, all these plans involve four main steps: Performing breakdown of work

items involved in the project into activities; identifying the proper sequence by which the activities should be executed; activities representation and estimating the resources, time, and cost of individual activities. Hendrickson (1998) stated that planning in construction refers to the attempt made by a planner to predetermine the result of a project based on the various activities that will be taken. It estimates the resources that will be needed for the project, the duration the project will take and possible links among the different task to be performed.

It was also stated by researchers that no matter the time put into the plan, the plan not being interrupted in the process of executing the project cannot be guaranteed. Laufer et al. (1999) added that uncertainties in the project work and in the project planning are areas that need attention. Uncertainty is a major factor that influences the performance of a project and also determines its ultimate success. Uncertainties in a construction project is defined by Flanagan and Norman (1993) as a situation where there is no historic data or prior history that relates to the situation under consideration by the decision maker.

Laufer et al. (1999) stated that uncertainty leads to the rise in time demand of projects, increasing awareness on the environment as well as greater impact of the community on the decisions that relates to the quality of life. In this case, when uncertainties are identified, strategies should be put in place to manage the risk identified. Maylor (2005) indicated that the management of risk can be divided into three main areas;

- Identifying the risk that is to identify the key risk symptoms which indicate that something might not be right in the project.
- Measuring of the extent of the risk which involves defining the extent of the effect on the activity and identifying how to reduce the part of the project that is affected badly and

- The risk control or mitigation which deals with trying to reduce the effects of the risks or the probability of the risks happening.

2.5 CURRENT PRE-CONSTRUCTION PLANNING PRACTICES

Pre-construction planning has been defined as that stage of planning that begins after a project has been awarded but before construction has been executed (Laufer, Shapira, Cohenca-Zall, and Howell 1993). With respect to the definition by Laufer et al (1993), Menches et al (2008) adds that, pre-construction planning is not pre-project planning, pre-bid planning, or during-construction planning. On the other hand, Gibson, Kaczmarowski, and Lore (1993), defines pre-project planning as the process of gathering sufficient information on potential risks versus probable success so that the owner can determine whether the project should proceed or be cancelled.

In view of this, research has shown that pre-planning is the most significant planning method in the successful delivery of construction projects (Douglas, 2004; Laufer and Tucker, 1987).

Before executing a project, the type of contract under which the project is executed should be considered. The type of the contract is dependent on the client. Some of the types of construction contracts are design-bid-build (DBB) and design and build (DB).

According to Nordstrand (2008), in DBB contracts the design of the construction project is solely the client's responsibility. The contractor on the other hand is given the design documents such as the drawings and specifications by the client. Thus the project documents could be sent to a pool of contractors who are competing to the execution of the project. The contractors then prepare their tender documents for bidding upon which the successful contractor would be selected to undertake the construction of the project. The difference between DB and DBB is that

for DB, the contractor is responsible for both the design and construction of the project (Soderberg, 2011). Mitsch (2012) describes some of the pre-construction planning activities below:

2.5.1 Estimation of construction cost

For the contractor estimating is part of planning process. In order to make estimates, a project plan of works is required. In order to prepare estimates, the contractor has to use information acquired from the tender documents. During the estimating process, the resources required for each activity are considered. Also the contractor identifies and allocates and calculates the costs for the work performed by sub-contractors (Frank Harris, 2013)

2.5.2 Develop sequences for project activities

Project objectives are statements that describe what has to be accomplished with the project. The owner is a central the main figure in creating the objectives and developing a sequence. Effective objectives refer to specific aspects of the road construction. That can be function, sustainability, maintainability, operation, schedule, technical specifications and other requirements. (American Society of Civil Engineers, 2012)

2.5.3 Risk assessment and response planning

According to (Verzuh, 2008) the planning consists of two major components: risk management and schedule and budget development. Risk management and detailed planning are closely related to each other and can be repeated several times before the construction begins. With every review the project plan become more and more accurate. A risk management is the process of forecasting and evaluating financial risks and identification of the procedures to avoid them or

minimize their impact. All road construction projects carry certain risks and these risks can be managed, minimized, shared, transferred or accepted.

2.5.4 Materials Procurement scheduling

Scheduling is an important aspect to management of project as it helps indicate the flow of materials, works or equipment. It is therefore important to ensure that activities that will indicate the time for procuring materials or any other item are properly documented or stated. Brick procurement, boiler manufacturing, delivery etc. are some examples of materials that can be scheduled (Elbeltagi, 2012).

2.5.5 Drafting Work break down Structure

The WBS is a major tool that facilitates management and operations. Often described as a structure that breaks down works into components or elements and presented graphically. In the road sector project construction is placed higher and then broken down into smaller units. Elements of work at the lowest level of the WBS is called a work package. A number of activities of the project is developed from the work packages. Where WBS is effectively used, it will provide the scope of the project and the associated responsibility to each work package (Elbeltagi, 2012).

2.5.6 Site Layout Planning

According to Yahya and Saka (2014), construction site layout planning has been recognized as a critical step in construction planning with respect to roads. The basic function of this process is to find the best arrangement of the temporary facilities, minimizes the cost associated with the interaction between facilities on sites and also helps to avoid or reduce safety and environmental hazards. Ahmed (2010) added that a detailed planning of the site layout and location of

temporary facilities can enable the management to make considerable improvement by reducing travel time, waiting time, and boosting worker morale by showing better and safer work environment. He explains that construction site layout involves identifying, sizing, and placing temporary facilities within the limits of construction site. These temporary facilities range from areas to store rooms, fabrication shops, maintenance shops, batch plant, and residence facilities. A well planned site including all temporary facilities and utilities results in; increasing productivity and safety, reducing area(s) needed for temporary construction, and maximizing utilization. Finally he suggested that some factors to consider when planning a construction site are; safety, site accessibility, security, offices, information signs, water supply and sanitation, ware houses, fabrication shops etc.

2.5.7 Preparation of conceptual scope

Wanga (2010) stated that pre-project planning process contains a detailed framework for project planning and includes project scope definition. Preparation of conceptual scope definition during construction pre-planning allows more accurately predict project cost and program for detailed design and construction, also including stakeholders and obtaining their commitment in scope definition process leads to fewer changes during design and construction. The project scope can be explained by listing all the activities that leads to the end of the project which is related to issues concerning the specifications, performance and functional objectives. Larsen (2013), highlights that poor definition or preparation of the conceptual scope results in higher costs during the project, because of changes affects project planning, cause modification of the work and increases project time. If there are changes on scope of the project it has a negative effect on the process and the successful outcome becomes very dependent on project manager's ability to manage those changes.

2.6 BARRIERS TO EFFECTIVE PRE-CONSTRUCTION PLANNING ACTIVITIES

This section aims at identifying barriers that affect pre-construction planning in the Ghanaian construction industry especially the road sector.

Wood (2010) points out that indeed, there are several barriers that exist in the construction industries and most of which are associated with road construction. The adoption of inappropriate construction methods is a major factor to project failure. Construction challenges could also stem from inadequate pre-construction planning.

Some barriers that affect effective pre- construction planning activities in road construction are; inadequate resource allocation for executing task, not getting the involvement of stakeholders, ineffective collaboration between team members, unclear definitions of roles and responsibilities, incorrect perception of stakeholders, inconsistency in communication, insufficient expertise of professionals, limited resource availability, inadequate scope definition, lack of time for PCP activities and exception of some key actors in process.

According to Djokoto et al (2014), the barriers identified in literature can be grouped into four primary categories: cultural, financial and professional barriers.

2.6.1 Cultural Barriers

According to Djokoto et al (2014), construction is dominated with blocks and concrete in Ghana and as such disregards other alternative to this much known building materials and services. This becomes a major barrier to changes by these indigenes who over the past decades made use of this very building materials. The effect this barrier introduces is that clients and stakeholders of construction do not purchase alternatives for work which eventually affects supply. Hence, not

getting the involvement of stakeholders, inconsistency in communication as well as incorrect perception of stakeholders fall under this category.

Not getting the involvement of stakeholders: the outcome of the project is influenced by stakeholders as they play major roles. An assertion made indicated that there is a higher chance of project facing obstacles when stakeholders are gathered in the design stage. Thus, involving the stakeholders can help achieve a smoother construction phase. (Heywood and Smith 2006). However, Kazaz, Manisali and Ulubeyli (2008), points out that lack of support and involvement of the stakeholders in the development of plans and schedules are considered significant in pre-construction planning. Therefore, the success of a project depends on the consideration of the needs and deliverables of all stakeholders involved in the project. (Halpin and Riggs, 1992).

Inconsistency in communication: Kumaraswamy et al. (2004) explains that ineffective communication in project planning may lead to the failure of a project. Good communication affects the project positively and brings about the difference between a successful project and a litigious one. Therefore, it is important to establish good communication at the beginning of any project. They recommended a web-based management system that can help achieve better communication between the team members of the project.

2.6.2 Financial Barriers

Inadequate resource allocation of executing tasks and limited resource availability contribute to the financial barriers that affect the pre-planning activities in road construction.

Limited Resource availability: According to Carmichael (2006), some resources used in road construction projects are costly or limited. He adds that some of resources that are costly and limited can be the workers, machinery and other materials that are required to execute the

project. Moreover, it was discovered that failure to plan for resources in the pre-construction stage leads to limited resources which negatively affects the construction project and may lead to delays in the construction process.

Inadequate resource allocation for executing tasks: Hammad and Radhlinah (2016) agrees that insufficient resources is one of the barriers affecting the effective pre- construction planning activities in road construction. They add that, this barrier can lead to impractical work schedules, overwhelming uncertainties that is associated with resource dependencies and critical work activities. Hammad and Radhlinah (2016) suggested that the main decision makers of a construction project should make sure that the right resources are allocated to the right tasks for the success of a project.

2.6.3 Capacity/Professional Barriers

Professional barriers is one of the most critical barrier to pre-planning activity in road construction. Prior to this study, insufficient expertise of professionals and ineffective collaboration between team members are major factors.

Ineffective collaboration between team members: This is one of the major factors that fall under professional barriers in pre-planning of construction projects. Azmy (2012) explains that team members in construction have been impacted by various and exceptional features in the construction industry. When team members are able to work together effectively it creates faster delivery times, minimizes costs, and creates an enjoyable working relationship for the entire project team and also contributes to the success of the planning.

Insufficient expertise of professionals: According to Utting (2010), not enough skilled professionals and managers within the construction industry is reflected in many parts of the

world, and the construction industry is becoming more global. The industry will be crippled by skills shortage. Insufficient expertise of professionals during the pre- planning stage of road construction projects puts more pressure on existing systems and processes. Hence, more projects are not completed on time or within budget, some organizations attempt to take short cuts and safety slips. Inadequate skilled professionals gets blamed for project delays, power shortage, hazards etc.

2.7 PRE-CONSTRUCTION PLANNING ISSUES PERTINENT TO THE DEVELOPMENT OF THE ROAD SECTOR IN THE CONSTRUCTION INDUSTRY

From this study, it was found out that these pre construction planning issues related to the development of road construction in Ghana are; Effective and accurate project scope definition, adapting good integration management, better human resource management, efficient site and area investigation, constructive selection of project team, time management, good health and safety planning, quality management implementation, effective communication, early procurements to ensure material availability and value engineering.

Some researchers and scholars highlighted some of the issues related to the road sector and these are briefly outlined below:

2.7.1 Better Human Resource Management

According to Othman and Napiah (2012), Human resource management (HRM) is the process of managing people within an organisation. In construction, HRM is primarily concerned with ensuring that the road construction project has sufficient human resources, with the correct skill-sets and experience, for the project to be successfully completed.

2.7.2 Ensuring Better Time Management

A key factor to project management is in the management of time as there will be delays in the completion of the project when it is neglected. This therefore calls for time control to be considered in road constructions projects from the start to the time of completion of the project (Memon et al 2014).

2.7.3 Constructive selection of the project team (experts' composition)

As soon as there is a new project, construction project teams are developed. The team is formed to enable team members exhibit their desire to work cooperatively through the performance of a project. It is necessary to promote, measure, and evaluate a team's effectiveness by construction companies in order to ensure construction teams successfully complete their projects (Azmy, 2012)

2.7.4 Good Health and safety planning

Effective planning for Health and Safety is therefore essential if projects are to be delivered on time, without cost overrun, and without experiencing accidents or damaging the environment or the health of the site personnel, hence resulting in a successful project. (Hare et al.)

2.7.5 Critical review of designs and coordination among professionals

Design professional practice frequently involves the processing, review, and approval of drawings. The use of drawings plays an important role in the design professional's ability to render appropriate professional services on behalf of the owner. It is therefore essential that all designs for the road construction project must be reviewed thoroughly before the start of the project. (Taylor, 1996)

2.7.6 Quality management Implementation

Effective quality management implementation is a supporting framework that is geared towards learning, creativity and innovation in the road sector. (Pimental and Major, 2016). York and Miree (2004) supported by saying that quality management supports the attainment of customers satisfaction via an integrated system of techniques and tool. Implementing quality management in the construction industry can aid to build up infrastructures that will help to satisfy the customer's needs, and also attain business excellence on part of the contractors. This is supported by (Modell, 2009; Lo and Chai, 2012) when they made it known that, key success themes for quality management implementation consists of services quality measurement and customer satisfaction.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter provides a general overview of how the research was carried out. It details the various procedures, techniques and processes used to get information on the work that was carried out. The methodology is a systematic, theoretical analysis of the methods applied to a field of study or the theoretical analysis of the body of methods and principles associated with a branch of knowledge. This descriptive research aims to describe or portray an accurate profile of persons, events or situations. This chapter makes mention of some pre- construction planning activities in road construction, the barriers that affect these activities and issues related to the development of the road sector in the construction industry. This is geared towards activities carried out in various firms.

3.2 PHILOSOPHICAL CONSIDERATIONS

There are two main philosophical positions of social research, of which is composed of ontology and epistemology. Ontology is simply the nature of reality (Hudson and Ozanne,1988). At the ontological level, the position used for the research is objectivism. The researcher is detached from the participants and is therefore emotionally impartial in making clear distinctions between reason and feeling (Carson et al., 2001). . Fitzgerald and Howcroft (1998) defined ontology as comprising two extreme positions: relativist and realist positions. In social research, key ontological questions are concerned with whether or not social reality exists independently of human concepts and interpretations, whether there is a common, shared, social reality or just multiple context-specific reality and whether or not social character is governed by ‘laws’ that can be seen as generalizable. The positivist research will involve the use of statistical and

mathematical techniques adhering to specifically structured research techniques. According to Ritchie and Lewis (2003), this subject lingers three main issues. The first is the relationship between the researcher and the researched, secondly the theories about truth and finally concerned with the method through which the knowledge is acquired. Epistemology, according to Ritchie and Lewis (2003), is concerned with the ways of learning and knowing about the social world and it pivots on questions like; how we can figure out the reality and what the fundamentals of such knowledge are. It captures the question of knowledge and its acceptability in a discipline. Epistemology is the relationship between the researcher and the reality (Carson et al., 2001) or how the reality is known to the researcher.

3.3 RESEARCH APPROACH

The approach to a research study can be deductive or inductive. According to Burney, (2008) In research, we often refer to the two broad methods of reasoning. Deductive reasoning works from the more general to the more specific. Sometimes this is informally called a "top-down" approach. Conclusion follows logically from premises (available facts) as the deductive and inductive approaches. Inductive reasoning works the other way, moving from specific observations to broader generalizations and theories. Informally, we sometimes call this a "bottom up" approach. Conclusion is likely based on premises involves a degree of uncertainty (Burney, (2008) Induction is usually described as moving from the specific to the general, while deduction begins with the general and ends with the specific (Soiferman (2010).

3.4 RESEARCH DESIGN

A research design is a plan, structure and strategy of investigations conceived as to obtain answers to research questions or problems (Kumar, 2011). This research is a typical case study in which we explored pre-construction planning activities in road construction, the barriers

affecting road construction and how the road sector in the construction industry can be developed.

According to Creswell (2009), there are three approaches to research. They are quantitative, qualitative and a mixed approach to research (which combines both qualitative and quantitative approaches). The quantitative approach is one in which the investigator primarily uses post positivist claims for developing knowledge and employs strategies of inquiry such as experiments and surveys and collects data on predetermined instruments that yield statistical data. The qualitative approach deals with the inquirer making knowledge claims based primarily on constructive perspectives. The quantitative approach was used for the study. In the quantitative approach, the researcher tests a theory by specifying narrow hypotheses and the collection of data to support or refute the hypotheses. The analysis of the data through this means enables that relevant amount of the components of our search to be placed in a better view. This was done in our quest to achieving the objectives to our search.

3.5 SOURCES OF DATA AND INFORMATION

Data collection instruments, methods, and procedures used for this study is captures in this aspect of research methodology. In details, it tends to explain how these methods are used to address the aims, objectives and research questions of the study. An important aspect of research is in the gathering of data as it contributes largely to the better understanding of a theoretical work (Bernard, 2002). Therefore it is important when determining the means by which data can be obtained, and from whom the data will be received from since an improperly data can never be worked with regardless of the analysis adopted (Bernard et al., 1986; Tongoco, 2007).

The data gathered for this research involved both literature review (secondary data) and field survey (primary data). Information was required from various construction sites especially from

those responsible for materials to and from the firms. The objective of the survey was to collect data for analysis on the pre- construction planning activities in road construction in the Ghanaian construction industry, its barriers and how to develop the road sector. The secondary data obtained from reviewed literature on the area of study includes; reports, relevant books obtained from libraries, journals, articles, and published works of interest.

3.6 SURVEY INSTRUMENT

Structured questionnaires were designed and self-administered to the various firms and experts in the road construction business. The main structure of the questionnaire is in two main parts were one part addressed the background information of the respondent and the second part deals with the research objectives. The questionnaire used was closed ended questions that focused mainly on the subject matter of the literature review. The survey instrument used a five-point Likert scale displaying the degree of ranks from 1 to 5. These questionnaires were mainly self-administered to the construction sites and offices of the required respondents.

3.7 METHOD OF SAMPLING

Sampling is a process of selecting a portion of the population to represent the total population and the findings from the sample to represents the rest of the group (Burns et al., 2001). The advantage of selecting a sample is that it is less costly and time saving than collecting information from a large group of respondents. The selected sample should therefore, have similar characteristics to the population under study to allow generalizability of the results to represent the population (Burns et al., 2001). There are two types of sampling, namely probability and non-probability sampling (Burns et al., 2001). In this study non-probability sampling is used.

3.7.1 Purposive sampling

Purposive sampling refers to strategies in which the researcher exercises his or her judgment about who will provide the best perspective on the phenomenon of interest, and then intentionally invites those specific perspectives into the study. Because the study pertains to a particular topic and requires response from such group of people, the researcher used purposive sampling technique to arrive at the sample size of professionals who will provide accurate information needed to carry out the research. The main target samples were professionals who had expertise and practiced in the road sector and therefore, key professionals like site engineers, project managers, quantity surveyors, store keepers' production managers and procurement officers were our main targets. Information on the registered road contractors in operation in Kumasi are about 40 and hence the researcher intends to retrieve responses from them. In this regards, the researcher targeted 62 professionals hence developed a questionnaire to aid in the collection of data.

3.8 ANALYSIS OF DATA

The survey focused professional into road construction such as project managers, site supervisors, contractors and quantity surveyors in A1B1, A2B2, A3B3 and A4B4 road construction firms. The data presented for the study was obtained from the respondents and analysed using relative importance index and mean score ranking. This was done using Statistical Package for Social Sciences (SPSS) and Excel software programs where Excel was mainly used for the background analysis and the scaled close ended questions were analysed with the help of the SPSS software. These two tools made analysis very simple and easy because they converted the information from the questionnaire to numerical data and charts. Again,

relative importance index was also used to analyse some of the data by computing to deduce their rankings.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

This section of the thesis presents the analysis and interpretation of the results from the survey conducted for the purpose of the study. It further captures the discussions of the results derived from the various analyses done. The analysis is done to the respective objectives to realize the aim of the entire study.

4.2 BACKGROUND INFORMATION OF RESPONDENTS

This presents the results on the descriptive analysis done on the demographic data of the respondents. For the purpose of the study some background information on the educational background, the gender, the area of expertise, the classification of contractor they belong as well as their years of working experience in their area of expertise.

Table 4.1 Background information of respondents

BACKGROUND INFORMATION		FREQUENCY	PERCENTAGE
Gender	Male	35	63.6
	Female	20	36.4
	Total	55	100.0
Educational level	Diploma/ professional certificate	10	18.2
	Bachelor's Degree	23	41.8
	Master's/ Postgraduate Degree	22	40.0
	Total	55	100.0
Professional Expertise	Contractor	5	9.1
	Quantity Surveyor	9	16.4
	Project Manager	11	20.0
	Engineer	22	40.0
	Architect	8	14.5
	Total	55	100.0
Classification	A1B1	10	18.2
	A2B2	17	30.9
	A3B3	11	20.0
	A4B4	13	23.6
	Total	55	100.0
Working Experience	5 years and below	1	1.8
	6 to 10 years	19	34.5
	11 to 15 years	24	43.6
	16 years and Above	11	20.0
	Total	55	100.0

Source: (field survey, 2018)

From the information or results presented above, the total number of responses was 55. The entire number of questionnaires distributed were sixty-two out of which fifty-five could be retrieved and was used for the analysis. The survey respondents sampled for the study comprised of both males and females and hence was sort to establish the gender domination of the responses received. The above table presents the frequency and percentages results on gender. Out of the fifty-five responses, 35 were males and 20 were females, representing 63.6 and 36.4 percent respectively. The results on the educational level also presented in the table indicate that

majority of the respondents had obtained degree which indicates a reliability on their understandings of the questions asked. There were 10 who had Diploma/ professional certificate, bachelor's Degree holders were 23 and 22 had masters or postgraduate degrees.

The professional expertise information is also resented above. The questionnaire sort for professionals like Contractors, Quantity Surveyors, Project Managers, Engineers and Architects. The survey contacted 5 Contractors, 9 Quantity Surveyors, 11 Project Managers, 22 Engineers and 8 Architects representing 9.1, 16.4, 20.0, 40.0, 14.5 percent of the responses respectively.

The respondents were also further tasked to state the classification of the construction firms they are with. The classes ranged from A1B1, A2B2, A3B3 and A4B4 out of which majority belonged to the A2B2 and A4B4. The breakdown shows that 10, 17,11, and 13 belonged to A1B1, A2B2, A3B3 and A4B4 respectively.

Finally, the years of working experience on the respondents were sorted. This was to establish if a great reliability could be placed on the responses retrieved from the survey. The years of experience was ranged in the questionnaire from 5 years and below, 6 to 10 years,11 to 15 years and 16 years and Above. The results indicate that majority of the respondents had above 5 years' experience and this was a good indicator for the reliability despondences retrieved. Out of the 55 respondents 1.8% had 5 years and below, 34.5% 6 to 10 years, 43.6% 11 to 15 years and finally 20.0% of the responses had ticked experience; level of above 16 years. In general the results in the above table are good indicators that the respondents could provide the necessary information the survey sort to get more accurately.

4.3 CURRENT CONSTRUCTION PLANNING PRACTICES OF ROAD

CONTRACTORS IN THE CONSTRUCTION INDUSTRY OF GHANA.PRE

This section of the survey instrument was designed to inquire the pre-construction planning activities that professionals in the road sector engage in. This was done in a 5-point Likert scale where the respondents were tasked to opine on their level of agreement or disagreement to the variables. The variables were identified through the review of literature.

Table 4.2 Current pre-construction planning practices

N_O	PCP Practices	(ΣW)	Mean	RII	Rank
1	Develop sequences for project activities	250	4.545	0.909	1
2	Risk assessment and response planning	248	4.509	0.902	2
3	Time allocations for construction activities	239	4.345	0.869	3
4	Drafting Work break down Structure	228	4.145	0.829	4
5	Review of contract documents	227	4.127	0.825	5
6	Materials Procurement scheduling	225	4.091	0.818	6
7	Review of company safety plans and OSHA requirements	223	4.055	0.811	7
8	Site layout planning	223	4.055	0.811	8
9	Preparation of conceptual scope	215	3.909	0.782	9
10	Estimation of construction cost	215	3.909	0.782	10
11	Determination of labour requirements	212	3.855	0.771	11
12	Labour management planning	195	3.545	0.709	12

Source: (field survey, 2018)

The table 4.2 above presents information on the various pre-construction planning practices being done within the road section of the Ghanaian construction industry. The general analysis that was run was the relative importance index, but the table presents the 'means' as well. Develop sequences for project activities obtained a mean of 4.545 and RII 0.909 which was the

highest recorded. It was followed by the Risk assessment and response planning which also had a mean of 4.509 and RII 0.902. Time allocations for construction activities, Drafting Work break down Structure and Review of contract documents followed with RII 0.869, 0.829 and 0.825 and means 4.345, 4.145 and 4.127 respectively. Materials Procurement scheduling had a mean of 4.091 and RII 0.818, followed by Review of company safety plans and OSHA requirements with mean and RII as 4.055 and 0.811. Site layout planning, Preparation of conceptual scope, Estimation of construction cost, Determination of labour requirements and Labour management planning all followed closely with the various means and RII as follows 4.055 and 0.811, 3.909 and 0.782, 3.909 and 0.782, 3.855 and 0.771, 3.545 and 0.709 respectively.

Generally, the means that were calculated were all above three which was the central of neutral point on the Likert scale which was used. It shows that most of the respondent viewed that the variables are indeed practices that are engaged in during the pre-construction planning stage of any road project to be executed.

4.4 UNDERLYING BARRIERS TO EFFECTIVE PRE-CONSTRUCTION PLANNING ACTIVITIES OF ROAD CONTRACTORS IN THE CONSTRUCTION INDUSTRY OF GHANA

The study also sought to identify the barriers to the effective pre-construction planning activities of the Road contractors in Ghana. The questionnaire that was developed was structured on a Likert scale from 1 to 5. It was for the professionals to tick 5 if they strongly agree, 4 if they agree, 3 if they are neutral, 2 if they disagree and 1 if they strongly disagree. The table below presents the results from the analysis run on the variables.

Table 4.3 Underlying barriers to effective pre-construction planning activities

No	BARRIERS	Maximum	Minimum	Mean	Standard Deviation	Ranking (Means)
1	Not getting the involvement of key stakeholders at early stages	5.00	1.00	3.6545	1.12576	1
2	Incorrect perception of stakeholders	5.00	1.00	3.6364	1.12815	2
3	Inconsistency in communications	5.00	1.00	3.6182	1.14651	3
4	Limited resource availability	5.00	1.00	3.5818	0.95628	4
5	Exception of some key actors in the process	5.00	1.00	3.5455	0.97787	5
6	Inadequate resource allocation for executing tasks	5.00	1.00	3.5091	0.9789	6
7	Inadequate scope definition	5.00	1.00	3.5091	0.9789	7
8	Insufficient expertise of professionals	5.00	1.00	3.5091	1.13648	8
9	Unclear definitions of roles and responsibilities	5.00	1.00	3.4727	0.97856	9
10	Lack of enough time for PCP activities	5.00	1.00	3.4364	1.1347	10
11	Ineffective collaboration between team members	5.00	1.00	3.4000	1.2561	11

Source: (field survey, 2018)

From the above table the analysis that was done was the mean score ranking. The tables present columns on the maximum and minimum Likert ranks, the standard deviation and the ranking per the ratings of the means. The highest and the lowest means recorded were 3.6545 and 3.4000 respectively. The two means are not so much in terms of difference from each other, which informs that the respondents have opinion that indeed all the variables identified are indeed pertinent in the road sector. The highest variable is not getting the involvement of key stakeholders at early stages with mean 3.6545 with standard deviation of 1.12576 and the lowest

ranked was ineffective collaboration between team members also with mean of 3.4000 and standard deviation 1.256. The second to the fourth ranked barriers obtained means of 3.6364, 3.6182 and 3.5818 and the barriers were; incorrect perception of stakeholder, Inconsistency in communications and Limited resource availability. The following barriers followed in descending order; Exception of some key actors in the process with mean of 3.5455, Inadequate resource allocation for executing tasks, Insufficient expertise of professionals, Inadequate scope definition, Unclear definitions of roles and responsibilities, Lack of enough time for PCP activities all of which obtained means of 3.5091, 3.5091, 3.5091, 3.4727 and 3.4364 respectively.

4.5 EMERGING PRE-CONSTRUCTION PLANNING (PCP) ISSUES PERTINENT TO THE DEVELOPMENT OF THE ROAD SECTOR IN THE CONSTRUCTION INDUSTRY OF GHANA.

The final objective of the study was to identify the emerging pre-construction planning issues pertinent to the development of the construction industry in Ghana. The survey instrument also designed close ended questions based on a five-point Likert scale for the respondents to rank per their level of agreement with the identified variables. The table below presents the results of the analysis done on the objective. The respondents ticked on a scale from one to five with the one being strongly disagree increasing to the fifth rank indicating strongly agree.

Table 4.4 emerging pre-construction planning (PCP) issues

N o	PCP Issues Pertinent to Development	(ΣW)	Mean	RII	Rank
1	Critical review of designs and coordination among professionals	230	4.182	0.836	1
2	Quality management implementation	219	3.982	0.826	2
3	Adapting good Risk analysis	227	4.127	0.825	3
4	Value Engineering	226	4.109	0.822	4
5	Constructive selection of the project team (experts composition)	224	4.073	0.815	5
6	Long lead or early procurements to ensure material availability	214	3.891	0.808	6
7	Effective coordination and Communication management	221	4.018	0.804	7
8	Good Health and safety planning	215	3.909	0.782	8
9	Early and efficient Site and area investigation	214	3.891	0.778	9
10	Effective and accurate Project scope definition	212	3.855	0.771	10
11	Adapting Good Integration Management	211	3.836	0.767	11
12	Conducting Constructability Assessment	209	3.800	0.760	12
13	Ensuring Better Time Management	205	3.727	0.745	13
14	Better Human Resource Management	203	3.691	0.738	14

Source: (field survey, 2018)

From the table illustrated above, the result of the relative importance index analysis is captured there. The relative importance index analysis was done to establish the more relevant and pertinent issues for development in the road sector in the area of pre-construction planning. The

top five highly ranked obtained RII of 0.836, 0.826, 0.825, 0.822, 0.815 and means 4.182, 3.982, 4.127, 4.109 and 4.073, they are; Critical review of designs and coordination among professionals; Quality management implementation; Adapting good Risk analysis; Value Engineering and Constructive selection of the project team (experts composition). The respondents closely ranked these variables to make the top five. The other variables also followed closely where; Long lead or early procurements to ensure material availability, Effective coordination and Communication management also with RII above 0.8 i.e 0.808 and 0.804. The results from the analysis, Good Health and safety planning, Early and efficient Site and area investigation, Effective and accurate Project scope definition, Adapting Good Integration Management, Conducting Constructability Assessment, Ensuring Better Time Management and Better Human Resource Management are also very important issues pertinent to the improvement of pre-construction planning in the road sector. They all obtained very high and significant RII as follows, 0.782, 0.778, 0.771, 0.767, 0.760, 0.745 and 0.738.

In a nut shell, the results displayed in the table above is an indication that the road sector need enhancement, and these are the various issues that must be tackled well to realize the full benefits of pre-construction planning. This will go a long way to save the actual project some cost and time during the execution.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This section of the thesis is about the general conclusions, the summaries and the recommendation made from the study. The purpose of this study was to examine the current practices and its related and emerging issues of pre-construction planning activities of road contractors in the construction industry if Ghana. To achieve these, specific objectives were set and this chapter presents the concluding summaries of the objectives and how they were achieved as well as the limitations encountered through the study. The general conclusion and the recommendation for future study will be captured here.

5.2 GENERAL FINDINGS

The general finding from the study revealed that though much studies have been done on pre-construction planning in general, not much focus has been made on the road sector or into road construction as done in the building sector. The study therefore, based on this gap gathered respondents who are into road construction or belong to road construction firms. The study purposively sampled the respondents and made contact with sixty-two (62) who suited the criteria to be purposively sampled. The questionnaires were distributed to 62 respondents and out of that only 55 copies were retrieved. This is to say that the study received about 88.71 % of the responses and was used for the analysis.

The results also show that the responses or opinions made by the respondents could be highly relied on as they mostly had attained higher educational degrees and had more than 5 years of working experience. In spite of the male dominance in the construction industry, the researcher sampled more females for the purpose of the study to realize a more holistic view on the subject

matter. Out of the fifty-five responses retrieved twenty were females. In relation to the classification of the road contractors the study took response from all the various classes of road contractors available in Kumasi. The respondents also had various professional expertise in the road construction sector, some of which include five Contractors, nine Quantity Surveyors, eleven Project Managers, twenty-two Engineers and finally eight architects.

5.3 REVIEW OF THE OBJECTIVES

This briefly describes the various objective that were set for the study and how they have been achieved. The survey instrument and the analysis that were done on the data.

5.3.1 To assess the current pre-construction planning practices of road contractors in the construction industry of Ghana.

In attaining this objective, the rigorous literature review which was done identified and outlined the activities that are done at the pre-construction phase in project delivery. The attributes that were identified in literature were carefully put into close ended questions and was developed on a five-point Likert scale. This was to allow for the respondents to rank on the attributes or activities based on the level at which they agree or disagree with them. The relative importance index analysis was used this established the relevant activities that are currently being practiced in the road sector as captured in the objective. Hence it was achieved.

5.3.2 Underlying barriers to effective pre-construction planning activities of road contractors in the construction industry of Ghana

The study also established the most pressing barriers to the effective planning of activities at the pre-construction phase in the road sector. This was also achieved from the use of a well-structured questionnaire developed into a scale. The variable that were used were gotten from

brainstorming and also reviews of journals and books and also life experiences or case studies. The respondents were tasked to tick by ranking their degree of agreement. The results were analysed with the mean score ranking. This was done to establish the main central point with which the respondents are agreeing with the attributes. It was clear from the results that the most pressing barriers were not getting the involvement of key stakeholders at early stages, incorrect perception of stakeholders and Inconsistency in communications

5.3.2 Emerging pre-construction planning issues pertinent to the development of the road sector in the construction industry of Ghana.

The study finally after identifying the problems and barriers to determine or identify the issues that are essential for the growth of the road sector in the vein of preconstruction planning. The attribute for this objective were mainly identified through literature review and case studies documented. The questions were also close ended and the respondents again had to tick per their level of agreement to the attributes or the issues. The relative importance index was used to analyse the data that was retrieved from the survey. The results ranked by the level of relevance from the highest to the lowest and the most important issues that were identified from the study include; Critical review of designs and coordination among professionals, Quality management implementation, Adapting good Risk analysis, Value Engineering and Constructive selection of the project team (experts composition). If much attention is given to these areas, the road sector will perform well in preconstruction planning.

5.4 LIMITATIONS

The study was limited in relation to the geographical scope and this was due to the fact that the researcher could only sample respondents from Kumasi or operating within that proximity. The purpose of this study was to examine the current practices and its related and emerging issues of

pre-construction planning activities of road contractors in the construction industry in Ghana. The study would have realized a more general results if other regions in the country could be sampled. This was mainly as a results of time constraints and the proximity of the researcher to the area of research. Again, another limitation to the research was based on the fact that out of the 62 questionnaires distributed to respondents only 55 were retrieved.

5.5 RECOMMENDATIONS

The main recommendations that can be drawn from the study is that for the benefits of pre-construction planning to be fully achieved, there must be more researches or studies done in the area of the road sector to address more issues in this subject matter. Also, the developmental issues identified in this studied should be given a more critical look. This is to establish measures in the identified areas that will help to achieve the full benefits of pre-construction planning during the execution of road project.

Also, it is recommended that the professional bodies take on their programmes and meetings to explain or educate its members of the studies being done in these areas and the best possible improvement solutions.

5.6 CONCLUSIONS

Pre-construction planning is one area of study that is very important in the entire construction industry. The idea behind this is to help and improve upon the smooth running of the project to save time and cost during execution and also to reveal to some extent some conditions that could occur and may pose detrimental effects on the project. The study delved into the road perspective to reveal the issues that could be looked at, that will help to improve the road sector in pre-construction planning. The relevant barriers affecting the road contractors include not getting the involvement of key stakeholders at early stages, incorrect perception of stakeholders, and

inconsistency in communications, limited resource availability, exception of some key actors in the process and inadequate resource allocation for executing tasks. To enable the massive development in the road sector, the following must also be considered; Quality management implementation, Adapting good Risk analysis, Value Engineering and Constructive selection of the project team (experts composition) amongst others. The pre-construction activities being engaged in by the professionals require improvement and hence further studies is needed to be done in the area.

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APPENDIX
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

RESEARCH QUESTIONNAIRE

An Assessment of Current and Emerging Issues of Pre-Construction Planning Practices of Road Contractors in The Construction Industry of Ghana

These set of questions are intended for the research work on **Assessing current and emerging issues of pre-construction planning practices in the construction industry: The Case of road contractors**. The work will be submitted to the Department of Building Technology of Kwame Nkrumah University of Science and Technology, in partial fulfillment for the award of Master's Degree in Construction Management The research is for academic purpose only. All information provided by the respondent will be held privately and confidentially.

Further information can be obtained from the researcher **Mr. Baffour Bandoh** of telephone number **0244-740790**

Thank You.

PART ONE

SECTION A: DEMOGRAPHIC DATA OF RESPONDENT

Please **tick** [✓] where appropriate and provide brief answers where necessary.

1. Please indicate your gender

Male [] Female []

2. Please indicate your educational level?

Diploma / Professional Certificate [] Bachelor's Degree []
Masters / Postgraduate Degree [] Others, specify

3. Please indicate your professional expertise the construction industry?

Contractor [] Quantity Surveyor [] Project Manager [] Engineer [] Architect []

Others please specify

4. Please indicate the classification category you work with?

A1B1 [] A2B2 [] A3B3 [] A4B4 []

5. How many years of working experience do you have in the profession?

5 years and below [] 6 - 10 years []
11 – 15 years [] 16 years and above []

PART TWO

SECTION B: TO ASSESS THE CURRENT PRE-CONSTRUCTION PLANNING PRACTICES OF ROAD CONTRACTORS IN THE CONSTRUCTION INDUSTRY OF GHANA.

Please rank the statements below by ticking; *strongly disagree-1, disagree-2, neutral-3, Agree-4, strongly agree-5.*

Pre-construction planning activities						
Please tick [√] under your choice of rating		1	2	3	4	5
1	Preparation of conceptual scope					
2	Determination of labour requirements					
3	Estimation of construction cost					
4	Review of company safety plans and OSHA requirements					
5	Develop sequences for project activities					
6	Site layout planning					
7	Materials Procurement scheduling					
8	Review of contract documents					
9	Risk assessment and response planning					
10	Labour management planning					
11	Drafting Work break down Structure					
12	Time allocations for construction activities					
Others, Please specify						
13						
14						
15						

SECTION C: UNDERLYING BARRIERS TO EFFECTIVE PRE-CONSTRUCTION PLANNING ACTIVITIES OF ROAD CONTRACTORS IN THE CONSTRUCTION INDUSTRY OF GHANA

Please rank the statements below by ticking; *strongly disagree*-1, *disagree*-2, *neutral*-3, *Agree*-4, *strongly agree*-5.

Barriers						
Please tick [√] under your choice of rating		1	2	3	4	5
1	Not getting the involvement of key stakeholders at early stages					
2	Inadequate resource allocation for executing tasks					
3	Ineffective collaboration between team members					
4	Unclear definitions of roles and responsibilities					
5	Lack of enough time for PCP activities					
6	Insufficient expertise of professionals					
7	Incorrect perception of stakeholders					
8	Inconsistency in communications					
9	Exception of some key actors in the process					
10	Limited resource availability					
11	Inadequate scope definition					
Other(s), Please specify						
12						
13						
14						

SECTION D: EMERGING PRE-CONSTRUCTION PLANNING ISSUES PERTINENT TO THE DEVELOPMENT OF THE CONSTRUCTION INDUSTRY OF GHANA.

Please rank the statements below by ticking; *strongly disagree-1, disagree-2, neutral-3, Agree-4, strongly agree-5.*

Planning Issues Pertinent to Development						
Please tick [√] under your choice of rating		1	2	3	4	5
1	Effective and accurate Project scope definition					
2	Adapting Good Integration Management					
3.	Better Human Resource Management					
4.	Early and efficient Site and area investigation					
5.	Constructive selection of the project team (experts composition)					
6.	Critical review of designs and coordination among professionals					
7.	Effective coordination and Communication management					
8.	Ensuring Better Time Management					
9.	Conducting Constructability Assessment					
10.	Value Engineering					
11.	Adapting good Risk analysis					
12.	Good Health and safety planning					
13.	Long lead or early procurements to ensure material availability					
14.	Quality management implementation					
Other(s), Please specify						
15.						
16.						
17.						

THANK YOU FOR YOUR PARTICIPATION!!!