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A Study of the Roles of Public Works Departments of Metropolitan, Municipal  
and District Assemblies in the Delivery of Construction Projects in Selected  
Regions in Ghana.

by

Kofi Owusu-Diatuo Jnr (BSc. Construction Technology and Management)

A dissertation submitted to the Department of Building Technology,

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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 acknowledgment has been made in the text.

Owusu-Diatuo Kofi Jnr (PG3557815)

**(Student)**

.....

**(Signature)**

.....

Date

Certified by

Professor Edward Badu

**(Supervisor)**

.....

**Signature**

.....

**Date**

Dr. Theophilous Adjei-Kumi

**(The Head of Department)**

.....

**Signature**

.....

**Date**

## **ABSTRACT**

There is growing concern over the successful implementation of projects, that is, the smooth execution that meets specified requirements at optimal cost and delivered within time. Among the many institutions and organizations involved in construction projects, the subject is of the most importance to Metropolitan, Municipal and District Assemblies (MMDA's) because they are basically the unit responsible for managing public funds on development at the grassroots. The aim of this study was to appraise the roles of Public Works Departments (PWD) which is the departments under the Metropolitan, Municipal and District Assemblies (MMDA's) responsible for infrastructural projects delivery. The challenges faced by the PWD's in the performance of their roles were assessed as well as strategies to improve the status quo. The study sought the opinion of professionals who work with the MMDA through a questionnaire survey using purposive and snowballing sampling techniques. Out of the ninety (90) targeted professionals for the study, sixty-two (62) responded to the questionnaire representing a high response rate of 69%. Data generated from the survey were further analysed using percentages, frequencies, mean and Relative Importance Index (RII). The key findings were that, respondents perceived the overall development of jurisdictional areas of PWD's, post construction monitoring and support services, provision of other works and services as community health /environmental protection, promotion and provision of support for productive activities were the PWD's principal roles. In addition, it was revealed that, weather and other environmental challenges was the major reason for most delays on construction projects among others such as poor site management and unrealistic timelines for project delivery. Subsequently, strategies such as ensuring qualification of contractors' key personnel, effective communication management, better incentives and remuneration to attract and retain experienced personnel, provision of logistical support for supervision on projects were also identified. A key recommendation was for policy formulators and planners of PWD to ensure execution of infrastructural projects within periods where inclement weather is unlikely so as to avoid slip-ups, possible design variations and other undesirable effects.

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## **DEDICATION**

This thesis is dedicated to my family and my boss, Ing. Daniel Obeng-Atuah (PhD). I have  
come this far because you inspired me.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 BACKGROUND OF THE STUDY**

The Government of Ghana in its bid to take governance to the grass roots, including more people even at community levels to participate in active governance have over the years set up various Area, District, Metropolitan and Municipality-based units. The units have evolved from what was called the 'Indirect Rule System' (IRS) where the local Government units were referred to as native authorities; gone through local, urban and district councils and presently the Metropolitan, Municipal and District Assembly (MMDA) concept which was initiated in 1988. The MMDA is an improvement on the previous set-ups established by Ghana's decentralization process as encapsulated in the Constitution. The District Assemblies have been chosen to be the highest legislating, planning, budgeting and political authority at the local level. The Local Government Act (Act 462) of 1993 underpins the constitutional provision for the operation of these MMDA's. The Ministry of Local Government is the Ministry that has oversight responsibility over the operations of the MMDA's. The MMDA's have various departments that undertake planning, budgeting control of finances but the department that is most relevant to this research is the Public Works Department (PWD). This is because they are directly responsible for the physical implementation of the construction projects.

Section 10 of the Local Government Act 462 of 1993 task MMDAs in Ghana to be the highest political and administrative body in the Districts responsible for the entire development of the Districts. Specifically, PWD's under the MMDA's are to monitor and as well initiate to completion, the delivery of rudimentary infrastructural projects.

The construction industry accounts for a significant portion of the worlds' gross domestic product (GDP) (Basheka and Tumutegyeize, 2011). This was deep-rooted in the Institute of Statistical Social and Economic Research (ISSER) (2008) that between 2006 and 2007, the construction industry contributed 0.7% and 1.0% respectively to Gross Domestic Product (GDP) of Ghana. In the developing world, Basheka and Tumutegyeize (2011), hypothesized that the construction sector provides a substantial source of direct and indirect employment to majority of citizens all over the world. In this sense, the sector serves as a pivot for many economies with its activities hinging on project delivery and the contractor who serves as the final producer of all these infrastructural project. Hence the importance of identifying the Public Works Departments (PWD's) of the Metropolitan, Municipal and District Assemblies (MMDA's) as agents of construction work delivery and performance in the construction industry is evident throughout the economies worldwide, and the consequences of which sometimes impact on the cost, time and quality of construction project completion and delivery (Kagioglou et al., 2000).

The research shall find out the perspective of the PWD's on the performance standards with regards to cost, time and quality and any institutional models they apply in achieving successful construction project delivery.

## **1.2 STATEMENT OF THE PROBLEM**

Despite the immense contribution of the construction industry with regards to the resources and service, there have been relentless criticisms of the poor performance in terms of quality project delivery of the major players (Ali and Rahmat, 2010). These criticisms have in the recent past occasioned an interest in a number of studies that focused on assessing the factors affecting project delivery in the construction industry. An example is the research by Edmonds and Miles (1984). The research gave qualitative confirmation of the foregoing. Ofori (1984), about three decades ago also revealed prevalent delay in the payments of

contractors for work done. The study also revealed that there was lack of credit facilities for firms, poor communication structures and an unreliable material supply base (Amoah et al.,2011). Also, Layea, (2010) using analogous qualitative method concluded that financial, political, organizational and economical are the main factors endangering the project delivery in the industry.

The Government of Ghana (GoG) through the Ministry of Finance and Economic Planning (MFEP) in 2007 set up a five-person task force to submit recommendations that would subsequently help to improve upon the general performance of project delivery in the construction industry (Taskforce Report, 2007). And between January, 2008 and March 2008, the Taskforce with support from Ministry of Finance and Economic Planning (MFEP) held about eight awareness meetings with the participants in the industry such as consultants, client organizations, and contractor associations, in both the northern and southern sectors of the country. Remarkably amongst the concerns stipulated at the stakeholders' awareness meetings was the quality performance in project delivery and the negative perceptions people had developed as well as to support the creation and improvement of socioeconomic infrastructure in the country, and improve the delivery of social services by the MMDAs (Taskforce Report, 2007).

The private sector has over the years shown its appreciation for the need for quality service. Meanwhile, their counterparts in the public sector are seen to hold a seeming contrasting view or they are at least seen not to be very worried about quality service delivery. The status quo has remained unchanged for so many years, perhaps as a result of the fact that, organizations under the public sector do not generally face competition in their activities by competitors providing similar services. The situation makes doing business of any sort with public institutions non-attractive. This attitude gives bureaucracy a bad name, as evidenced by poor services offered by many of these public institutions. When public institutions fail to m

meet the expectations of consumers in service delivery, the ripple effects result in grave consequences on political, social and economic growth of a state. Latham (1994) was of the view that quality management system comprises list of guidelines, disciplines and processes that together aims at achieving customer satisfaction and continuous improvement and therefore its implementation could minimize errors induced by a system.

Thus, this study is motivated by Latham's (1994) views and that will be the basis to stipulate ideas aimed at stimulating a rethinking of the use of Public Works Departments (PWD's) of MMDA's as agents of construction work delivery in the Ghanaian industry and to erase the negative perceptions associated with cost, time and quality of project delivered that have direct involvement of the Works department of MMDA's. The 2012 Auditor General's Report indicated that a substantial amount of government projects failed in achieving the specified quality. If the trend continues there will be general apathy towards government projects and especially those managed by the local administration i.e. the MMDAs

### **1.3 RESEARCH QUESTIONS**

1. What are the roles of Public Works Departments (PWD's) of the Metropolitan, Municipal and District Assemblies' (MMDA's) on project delivery in the Brong Ahafo, Central and Volta regions of Ghana?
2. What are the challenges encountered by MMDA's as agents during construction project delivery?
3. What are some of the strategies to ensure a successful project delivery in the construction industry?

### **1.4 AIM OF STUDY**

The aim of this study was to appraise the roles of the Public Works Department (PWD) of Metropolitan, Municipal and District Assembly (MMDA) on construction works delivery in Ghana.

## **1.5 OBJECTIVES**

In order to achieve the aim, the following were advanced:

- to identify the roles of PWD on construction works delivery;
- to identify the challenges of PWD's on construction project delivery; and
- to identify strategies that will ensure successful construction project delivery by the PWD's.

## **1.6 SCOPE OF THE STUDY**

The research was conducted having in mind that resources and time are limited and that further detailed studies in this field could be done in a thesis for the award of a PhD certificate or similar higher education qualifications. The topic has been carefully selected and trimmed to streamline the scope of the research in accordance with the requirements and demands. The scope covers the PWD's of MMDA's located in the Brong Ahafo, Central and Volta regions respectively including other stakeholders and professionals.

Other limitations other than the aforementioned were envisaged in the course of the research. Notable among these as is the case with most researches are difficulties in accessing information, time and financial constraints as well as the reluctance of respondents to answer questionnaires. Notwithstanding these limitation or restrictions, the research employed remedial measures to enable the research to be conducted without any setback to achieving the overall success of the study i.e. meeting the objects of the study.

## **1.7 RESEARCH METHODOLOGY**

Research methodology focused on research method adopted, sampling techniques, and administration of instructions and data analysis. To ensure that the set objectives were achieved, this study employed the use of primary data and secondary source of information. The Quantitative approach was adopted as used in a similar study by Gesuka and Namusonge

(2013). Questionnaire was the means for collection of primary data. Secondary information was sourced taken from books, articles, journals, and the internet. The collected data were analyzed using the descriptive analysis (percentage, frequency, pie and bar charts) aided by Statistical Package for Social Sciences (SPSS) and ranked with a system of Relative Importance Index (RII) using the MS Excel.

## **1.8 SIGNIFICANCE OF THE STUDY**

All the activities and processes of the construction industry end on the project delivery and their failure always will render any project short of value for money. This study seeks to probe use of Public Works Department ((PWD's) of MMDA's as agents of construction work delivery in Ghana. It is intended that the research would give the construction professional at the PWD's a firm basis for assessing the construction project delivery methods that they work with. On the other hand, the outcome of the study shall be of immense worth to the PWD's in the country who have an intention to appreciate their short falls for improvement that will be progressive in their mandate of project delivery. Again, it would also help the PWD's and other construction professionals as well as stakeholders to understand the roles of the works department at the MMDA. It is hoped that the research will come out with an ideal role of PWD's that will significantly improve project delivery. Furthermore, it would add to the existing literature and serve as a bases for further research in the area of construction and the quality performance of construction project delivery methods in general.

Finally, the outcome of the study will prompt government officials and departments concerned with the PWD's to streamline hierarchical relations among and within the government organizations to follow project works to the latter. This will minimize or prevent project failures, among which are delays and cost overruns and work done of poor quality or not in accordance to specifications. This makes it important to undertake this study. It must

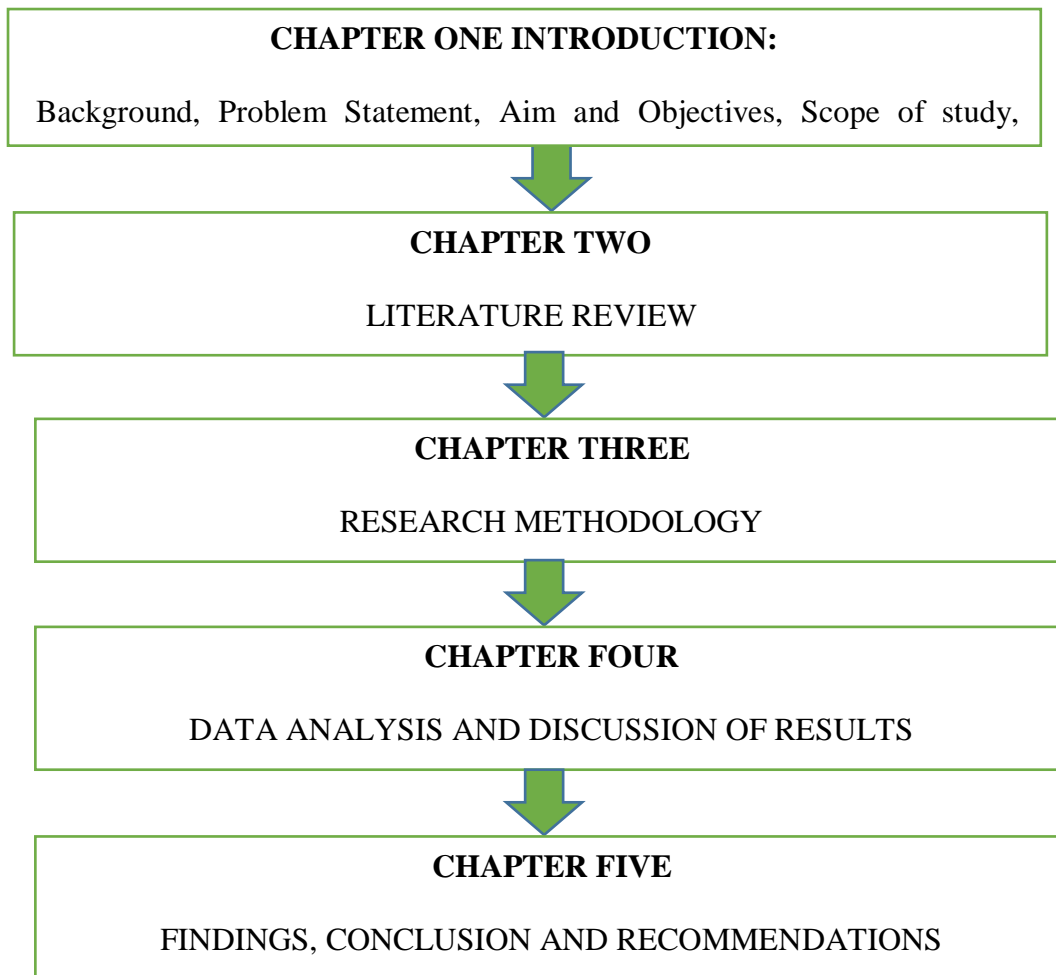


be noted that there is general apathy by Ghanaian Construction firms towards projects being implemented by the GoG through MMDA's. Various reasons have been cited for this trend.

## **1.9 ORGANIZATION OF THE STUDY**

The study was planned to cover five chapters as follows:

**Chapter one** of this report covered the background and introduction of the study, statement of the problem, research questions, objectives, significance of the study, outline of methods to be used and scope of research. **Chapter two** dealt with the review of the related literature in the format of the specific objectives and key words which is the use of public works department of MMDA's as agents of construction work delivery in the construction industry as the main focus in scope. **Chapter three** discussed the methodology, and included the research design, data collection techniques and tools, and sampling method to be used. **Chapter four** stated the findings and presented an analysis of the data and results of the field work in the form of graphs, figures and tables. The results and findings were discussed. **Chapter five** included conclusions and proposed appropriate recommendation(s) mainly to achieve the objects of the study.



**Figure 1.1: Summary of workflow involved in the research**

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

The chapter two serves as a framework for the study. It is the backbone of the study such that it was used to support or refute findings made in the research at the analysis stage of this report.

#### **2.2 AN OVERVIEW OF THE CONSTRUCTION INDUSTRY IN GHANA**

Frimpong *et al* (2003) postulated that the success of a project is cramped to the project's goals and set objectives within an explicit project scope. A project is administrated by many characteristics. However, a completed project which ensures that it technical requirements, the required quality and its intended duration are met clearly defines the success of a project. Shaban (2008) specified that projects basically revolve around three areas, these are completing a project in time within an estimated budget based on a defined quality with the aim of getting value for money.

The Bank of Ghana (2009) affirmed that the Ghanaian Construction Industry represent 10.30% of Ghanaian's Gross Domestic Product (GDP), signifying that the Construction Industry impacts the economy of Ghana. It also indicated that owing to the contribution of the Construction Industry into the economic well-being of Ghana, the Ghana Government invest in construction as a form of sustaining and governing the economy. The Construction Industry is very gigantic cutting across from the building sector to civil engineering works, however, it is beset with non-standardization, lack of expertise in project management and delivery which continually affect the objectives of a project by causing failures in the delivery time and cost (Royal Institute of Chartered Surveyors, 2013).

The challenge of poor project delivery and performance in the Construction Industry is because construction projects were unable to meet its set objectives as identified (Earlier and Al-Moumani, 2000). The Association of Project Managers (2006) and Arditi and Pattanakitchamroon (2006) also found that, another challenge associated with the Construction Industry is interruption. Their study further stated that delay is witnessed in all construction projects nevertheless that, the degree of delay varies from projects to projects because some delays are as a result of days behind schedules whilst others are years. Whether the interruption occurred within a couple of days or years, it negatively affects the well-being of the project in cost, time, quality as well as the delivery times of projects (Arditi and Pattanakitchamroon, 2006).

Since delivery and closing is where all contracts between client and other parties terminate by default. The project is now handed over to the client to occupy, during this time the defect liability would have been exhausted and all other claims have been settled. Smith (2011) also corroborate to Association of Project Managers (2006) and Arditi and Pattanakitchamroon (2006) contention that delay in project delivery times are often associated with Construction projects, notwithstanding that, Smith (2011) argued that interruption can result as a result of the default of the contractor, client, consultants or other situations beyond the control of the parties involved. Moreover, as interruption has a monetary consequence on a project which at times in legal combat between the client and the other parties to the project.

### **2.3 OVERVIEW OF THE PUBLIC WORKS DEPARTMENT**

The involvement of Public Works Department (PWD) cuts across various sectors of development including corporeal and public infrastructure for international relations, national security and national development. Being the basic unit of development, its activities are evident throughout the country including the very remote areas.

The Public Works Departments is the core driver of physical construction and other development that are usually supported financially by the federal administration for general good. Public works projects include dams, bridges, highways, and hospitals. Projects of that nature are funded by the state, federal or local annexations. However, the department is in charge of co-ordination and programming of reintegration, reconstruction as well as the maintenance of government funded estates and housing units of public infrastructure (Eden *et al*, 2005).

The Public Works Department (PWD) which is under the Ministry of Housing and Public Works (MHPW), forms the forerunner in the construction sector of Ghana. More than two centuries, Public Works Department can successfully set the standard as well as the trend in Ghana's infrastructural expansion (Mwale, 1997). PWD plays a significant role in the administration of projects funded by the government in the construction industry. PWD again execute projects for other independent organizations as deposit works. It has expertise and professional workforce constituting a team of multi-disciplinary like mechanical, electrical and civil engineers who execute their tasks hand in hand with architects from the Architecture Department. In a related study by Cheung *et al* (2004), together with its professionalism and a strong base of standards developed for some years now, PWD is a body of proficiency and hence the foremost option among other astute clients for other construction project type in Ghana. In addition, PWD being an agency of the national administration in the sector of construction, executes controlling task in making the way and handling construction projects in the name of country's construction sector under the supervision of the Ministry of Housing and Public Works.

Notwithstanding the aforementioned assertion Voigt (2015) postulated that, it lies in the mission of the PWD to form part as an integral body in our community so as to improve life quality by means of using the foremost practices of management to maintain infrastructure in

the Metropolis. Hence, concentration is laid on the execution of the aforementioned services so as to enhance both fiscal and economic duty. This is realized by a dedicated team of professionals in the public works who assist superior customer in efficient, timely, and effective execution of public services (Heggie, 1999; Lamptey and Elle, 2000). Lastly, the main responsibilities and work arena of PWD are shown in the following list below:

- Construction of National Monuments;
- Design and Construction of Public Buildings except those of RHD, T&T, Postal Department;
- Acquisition and Requisition of Land for construction Work;
- Construction of Buildings for Other Agencies on a Deposit Work Basis;
- Maintenance of Public Parks;
- Preparation of Book of Specifications and Code of Practice;
- Valuation of Land and Property and Fixing of Standard Rent;
- Repair and Maintenance of Public Buildings;
- Preparation of Book of Schedule of Rates and Analysis of Rates for Construction & Maintenance of Public Buildings; and
- Procurement of Materials & Equipment Required for Construction Work.

(Source: Local Government Act (Act 462) of 1993)

### **2.3.1 Public Perception on the Performance of Public Works Department**

The public normally have different opinions usually established on user satisfaction. A typical illustration is the Sydney Opera House Project. Thomsett (2002) *cited in* Nduro (2010), which was testified to have exceeded its budget and duration sixteen and four times respectively than originally scheduled. However, bestowing to Thomsett (2002) *cited in* Nduro (2010), the final impression that the project made was very huge that nobody reminisced the original missed goals. In the opinion of the project management, the project

was a failure, but the public saw it as success. Contrary to this, the Millennium Dome in London was a project completed on schedule and within budget but the public view was that it was a failure since its final impact could not be felt (Cammack, 2005 *cited in* Nduro, 2010). Additionally, realization of the set project goals like professional image, satisfaction, aesthetics, absence of conflicts, and social, education, as well as professional aspects are regarded to the indicators of project success (Elattar and Sabry, 2009).

## **2.4 DEFINITION OF PROJECT DELIVERY**

The Associated General Contractors of America (AGC) indicated that, a project delivery process is a “wide-ranging process which assign contractual tasks for constructing and designing a project” (AGC, 2004). In explaining this, the AGC assumes a project delivery method as a broad process that has the purpose of assigning contractual tasks and as well has the work scope bound to the construction and the design of the project. In expounding further on the definition, AGC accepts that it is their effort in the above definition to restrict the number of methods engaged in the execution of project to three basic methods (AGC, 2004):

- Construction Manager-At-Risk (CMAR);
- Design-Build (DB); and
- Design-Bid-Build (DBB).

Methods under project delivery, according to AGC (2004) are assigned to constraints basically on the answer to the questions below:

- i. Is the final selection of the constructor based on criteria other than merely the lowest total construction costs; and
- ii. Are the design and construction under separate contracts directly with the owner, or are they under one contract?

The AGC further acknowledge other projects existence means but demotes these project deliveries to the “hybrids” category which is a combination of three basic project delivery methods. The AGC sorts no effort in classifying or expanding on the hybrid definition of project delivery methods. Contrary to this, Thomsen (2006) defines project delivery as the sequence of defining task, reimbursement and scope. Thomsen stated further that, clients must consider in selecting a particular method of project delivery on the grounds of the following:

- conditions of payment between cost-plus arrangement (material as well as time) and lump-sum arrangement (fixed price);
- the amount of contracts carried out by the client that from few to a number of contracts in which the client is undertaking direct procurement of the project;
- relationship with the contractor between a contract where the contractor acts in a fiduciary capacity to a contract where the contractor is acting as a vendor; and
- type of selection which ranges from decently experiences on selection based to price based selection.

Considering the definition, one can realize that delivery of project meaning: a scope, purpose of assigning task, sequence or a process, and compensation and as well gives no restrictions or what so ever to the project scope. Sanvido and Konchar (1998) also stated that “the responsibilities, roles, and relationships of the project stakeholders and the order of activities needed to execute the project.” Looking closely at this definition, one can realize that the system of project delivery is:

- i. the responsibilities, relationships and roles and the arrangement of the project activities;
- ii. the reason for establishing the responsibilities, roles, and relationships among the project’s stakeholders; and
- iii. focus all project activities on the how to achieve the required facility.



Combining all the definitions, it can be noted that they agree to the fact that, the system of project delivery is a process or procedure. Again, the definitions agree with the fact that one key factor of project delivery is assigning or defining tasks among project team members. In disparity to their representation, the foremost distinguished dissimilarity between the three definitions is the project's scope or activity. The AGC (2004) possess the finest scope restricting the definition of project delivery to just the construction and design, whereas (Sanvido and Konchar, 1998) extends the project scope to “activities” needed to realize a project success. Apparently, the Sanvido and Konchar (1998) definition can be explained in a way to render it easy for the inclusion of property procurement, operation, financing, and maintenance into the project scope of services needed for a successful project delivery. Being part of the analysis process, it could assist in looking at how the construction industry came to point of realizing the various project delivery methods.

#### **2.4.1 Types of Project Delivery methods**

Whereas there exist various methods of delivering project to the client, the following form the overall characteristics of the various methods among the most popular ones:

##### **a) Design-bid-build**

This is as well referred to as the “hard bid” or the “low bid” delivery method. It is considered as the traditional method of project delivery for construction and design in which the design comes before the construction itself and the contract makes provision of unit price bid or lump sum to get the project. Usually, the responsive bidder and the lowest responsible gets the contracts to undertake the activities of project. As a result of the price, completion date, and quality of the contract are all proven by the requirements of the contract, there is small incentive for the contractor to make all provisions for expertise exceeding the minimum requirement in obtaining and completing the construction project inside the contract's requirements.

### **b) Design-build (DB)**

This method is in a way a reversion to years even before the design-bid-build method came to being as the foremost method of project delivery for construction and design services. Using the design-build method, the client contracts with one firm to make provision for the design as well as the construction aspect of the project. This method has the benefit over the fact that construction can essentially start before the completion of the design which even saves time for the client. Additionally, as the design-builder provides combined services, the client can benefit from the contractor's experience in the design phase of the construction project as well as the engineer/architect's experience in the phase of construction.

### **c) Construction-management-at-risk (CMAR)**

Whereas this method possesses particular characteristics that are similar to that of the design-bid-build approach in terms of the client contracting separately with a constructor and a designer, the manager in charge of the project has the duties exceeding that of the general contractor. The construction manager form part of the design team in the design phase so as to provide input into the design and will, again make provision for the cost estimating services all through the design phase to assist in ensuring that the project does not exceed budget. In the construction phase of the project, the construction manager assist the client to manage the activities of the sub-contractors hired to execute the work. Generally, there exist an open-book which account for the process between the construction manager and the client for the purpose of assisting client in knowing how money are being spent on site.

### **d) Design-build-operate (DBO)**

The DBOM and the BOT form the family of project delivery methods extending the client-contractor relation afar just the construction and design. In some cases, the contractor can as well deliver maintenance services, operating services, and financing to support the client so as to meet the needs. Example of the above is a municipality which is in need of a new water

and waste treatment facilities in meeting an up surging demands but lack financial support and or knowledge to build and operate such a facility. In cases like this, a contractor who has the required expertise and financing can provide support to the client in meeting such demands.

**e) Job-order-contracting (JOC).**

The JOC is a special type of indeterminate delivery, indefinite quantity contract (IDIQ) which the client contracts a contractor for an indeterminate quantity of work in a particular scope of work. Generally, the work is fairly small and monotonous and it may include little design services. This method of project delivery is basically planned for clients who mostly have the need for construction services that go way beyond the abilities of the maintenance staff but that are not large enough to justify the time and cost needed to deliver various construction services in a conventional manner.

## **2.5 ROLES OF PWD ON CONSTRUCTION WORKS DELIVERY**

Assigned roles by the Local Government Act, Act 462 (1993) to the MMDAs are:

1. preparation and execution of strategies, programmes, and plans for effective resources mobilization essential for growth;
2. general development of their jurisdictional areas;
3. promotion and provision of support for productive activities and development; and
4. provision of basic infrastructure, municipal works and services (Local Government Service, 2014).

To perform the above roles, the law charges each MMDA to set up the following;

1. finance and Administration Sub-Committee;
2. social Service Sub-Committee;
3. works Sub-Committee;

4. development Planning Sub-Committee; and
5. justice and Security Sub-Committee

Under the law, MMDAs are charged for provision of the following:

- basic education including provision of school buildings, furniture and residential accommodation;
- community health and sanitation including provision of clinics, health posts, liquid and solid wastes disposals;
- firefighting services;
- general amenities such as roads, bridges, gutter, toilets, bathhouses, etc;
- legal arbitration of litigations, disputes and violence;
- maintenance of law and order.
- registration of births, marriages, divorces and deaths;
- social amenities such as community centres, leisure centres, sports and games fields;  
and
- stool land management and administration;

In order to execute its mandate competently based on the Local Government Atct (Act 462) of 1993, the Department of Public Works (Department) also identified five strategic outcome-orientated goals that define its direct service delivery responsibilities. These goals are:

- i. sound legislative and policy prescripts to accelerate service delivery;
- ii. oversight, leadership and support to Provincial Public Works;
- iii.** coordination of the EPWP for the creation of decent employment through inclusive economic growth;

**iv.** d in delivering the project is among the earliest decisions taken before the project commences. Not having the understanding concerning the meaning of project delivery method, clients as well as other users of the facility will not be able to make decisions on the best method of project delivery to suit their needs (Gransberg, 2006).

According to Thomsen (2006), the areas that normally influences the early stage of the construction project is incentives and risk. As indicated above, one task of the project delivery method is the task of contractual duty. Clients, architects/engineers, and contractors all have an entrusted attention inside the task of duty in the contract as all duties contains risk. Characteristically, clients are exposed to risks like payments to the designer or contractor, financing, as well as site conditions. The architects/engineers faces the risk of ensuring the design is code compliant and again ensuring the design meets the artistic and functional requirements proven by the client. The contractor is exposed to risk of ensuring the constructions is delivered within budget, on time, and with the specified quality. Selecting a particular project delivery method for a specific project will form the risks to be shared as well as managed on the project; this in turn affect project cost. According to Schexnayder and Mayo (2004), risks are best expected by the party that has the ability to control it.

Among the disadvantages of the design-bid-build method of delivering project is that it “tends to cause a confrontational relation between the parties involved the construction project, rather than enhancing a supportive setting where challenges can be fixed effectively and efficiently” (Trauner, 2007). Whereas a cooperative setting of a construction project may or may not be something that a client would require from a project, the matter here is the incentive that can affect the selection of the method of delivery project for a specific project work.

Sanvido *et al.* (1998) identified two component of the method of project delivery that delivers the most incentives; they are the terms of payment and method of selection of the project contractor. If a contractor gets selected on grounds of low cost only, then there exist little incentive for the contractor to make provision for anything outside the minimal to meet the contract's requirements. Instead, a contractor selected on the grounds of best value has an incentive to enhance and as well maintain their value through performance that exceeds or meets the client's requirements.

## **2.6 QUALITY MANAGEMENT OF PROJECT DELIVERY IN THE CONSTRUCTION INDUSTRY**

In the construction industry, quality project delivery can be distinct as satisfying the cravings of the designer, constructor and regulatory agencies as well as the owner (Arditi and Gunaydin, 1997). The construction industry in many parts of the world suffers from problems such as defective product, time, and cost overrun as associated with project delivery systems of firms to their respective clients. Thus, the need for transformation is inevitable to be able to improve the condition of the construction industry project delivery methods (Harrington and Voehl, 2012). According to Wong (1998) quality management in construction project delivery is progressively gaining recognition for curbing these problems in the attempt to meet the needs of the clients. Hence, Arditi and Gunaydin (1997) postulated that there is a latent for quality improvement in the construction sector and that the industry has no excuse to misuse time and resources, due to reworks and delays. Arditi and Gunaydi, (1997) signposted that commitment of the construction industry to quality project delivery is minimal as compared to the manufacturing industry. However, they self-proclaimed that the perception is gaining grounds.

In Osei-Assibey's (2005) *towards the Implementation of Total Quality Management (TQM) on project delivery for DACF projects at the pre contract stage* listed the following as the outcome of Quality Management Systems (QMS) on projects.

- There is a proven test of commitment and pursuit to which the product or service has been subjected to;
- Results in better designs;
- Cost effective way of obtaining a product of known quality, recognized performance and value for money;
- Efficient handling of problems;
- Ensures effective planning;
- Improves quality;
- Increases project performance;
- Provision of feedback for continuous development;
- Results in fewer delays and disruptions; and
- Results in fewer delays and repair works;

## **2.7 CHALLENGES OF PUBLIC WORKS DEPARTMENTS (PWD's) OF METROPOLITAN, MUNICIPAL DISTRICT ASSEMBLIES (MMDA'S) ON CONSTRUCTION PROJECT DELIVERY**

Although every project, whether construction or other non-infrastructure projects come with their own peculiar challenges but that in the construction industry are quite similar and repetitive. One would think that construction projects ought to be easier with experience, however, these flaws continue to occur over and over again especially at the local government level. Many including technical staff of the PWD's have cited various reasons and challenges for the inability of projects under the PWD's to be executed within cost, to the right quality and most importantly without delay.

### **2.7.1 Contractor Selection/Procurement Procedure**

The practices and procedures for selecting contractors and awarding contracts in the construction industry are based on those used in the public sector (Holt *et al*, 1994; Herbsman and Ellis, 1992; Merna and Smith, 1990; Moore, 1985). These involve systems of bid evaluation dominated by the principle of acceptance of the lowest evaluated price (Russel and Skibniewski, 1988; Nguyen, 1985). Many now believe that the public sector system of bid evaluation, concentrating as it does solely on bid price, is one of the major challenges of project delivery problems (Holt *et al*, 1994; Ellis and Herbsman, 1991; and Bower, 1989). Contractors, when faced with shortage of work, are more likely to submit low bids simply to stay in business in the short term and with the hope of somehow raising additional income through 'claims' or cutting costs to compensate for their low bids (Hatush and Skitmore, 1998).

To this extent, Bower (1989) opined that there are four (4) factors of project delivery challenges broadly categorized, namely contractor- related factors, consultant-related factors, client-related factors and external factors. Seven (7) most significant variables stemming from the contractor have been identified. These are contractor's financial difficulties, material shortages, labour shortages, poor site management, equipment and tool shortage, coordination problems as well as construction mistakes and defective works. These significant variables are discussed below.

### **2.7.2 Contractors' Financial Difficulties**

Zagorsky (2007), specified that financial difficulty is said to be the situation where the credit of an individual is affected. The financial difficulties of a contractor as a result of unavailability of funds by the client (in this case the MMDA) can affects the execution of the project. Situations where a contractor will require funding include payment for materials, the salary of labourers and the equipment used for the works. Bestowing to Thornton (2007),



slow collection, low profit margin and insufficient capital constitutes three major causes of financial difficulties faced by contractors in rendering the necessary projects to be delivered. Such a contention is indorsed by Arshi and Sameh (2005), Majid and McCaffer (1998), Frimpong *et al.* (2003), Sambasivan and Yau (2007) and Mansfield *et al.* (1994). The authors further established that client's delay to pay contractors for work done would lead to the contractor facing financial difficulties and thereby affecting the delivery times of project. It tails that the succeeding works cannot be executed amidst the financial difficulties. The inadequacy of profit also contributes to the financial difficulties faced by contractors on project delivery.

Coulter and Kelley (1992) affirms and further indicates that the insufficiency of profit is overwhelming because it is warranted by economic conditions. Coulter and Kelley (1992) and Thornton (2007) both advocated that insufficient capital creates a major cause of financial difficulties faced by contractors to adequately complete their tasks on times, within budget and deliver it to their lawful owners. However, Liu (2010) also affirms and pawns the assertions that, poor control of cost by the contractor can also contribute to inadequate capital and therefore, there will be massive debt on the contractor which will cause them to experience financial difficulties.

### **2.7.3 Labour Shortage**

Labour shortage according to Bruce and Dulipovici (2001) explained as the struggle involved in locating the right people with the requisite ability to execute the work available. Labour scarcity is caused by numerous factors. Trendle (2008), indicated that the lack of skills in labour is an antidote of labour shortage and hence increase the demand for labour. It is instigated when the goods and services are in high demand. In the circles of construction, the increase in the purchasing power of clients increases the rate at which buildings are constructed to meet the demand. In that sense the demand for labour increases.

Another contributing factor to labour shortage is the cost of foreign labour. According to Hanim (2010), the rate at which foreign labour avenged can also lead to deficiency of labour. Wang (2010) and Anonymous (2010), asserts that the economic crisis that is being experienced globally is another factor contributing to shortage in labour and thereby hindering the success of delivery of projects in the industry. They stated that people are comfortable living in low cost cities than high cost cities because of the cost involved in residing in high cost cities. Sweis et al. (2008) also stated manpower shortage is another contributor of labour shortage. This was also confirmed by Sambasivan and Yau (2007) who also found in their study that labour shortage is a dominating factor for project delivery time delays in the Malaysian construction industry.

#### **2.7.4 Material Shortage**

Majid and McCaffer (1998), accentuated that the deficiency of materials stanches from poor material planning, unreliable suppliers, inefficient communication, and late delivery. According to Mochal (2003) an important mistake in project management is poor planning. Notwithstanding the aforementioned assertions, the author further postulated that poor communication is another factor that contributes to material shortage. Another factor contributing to delay in delivery of material are as a result of “unreliable suppliers”. According to Dada *et al.* (2003, 2007), an unreliable supplier is a supplier who supplies materials short of the quantity ordered. When the materials ordered is not supplied to quantity, there is a clear case of material shortage and hence it effect on successful project delivery

#### **2.7.5 Poor Communication**

Dunkelberger (2009), reckoned that communication is an essential factor for the success or failure of projects ranging from the inception to completion for every business entity. Communication is thus a very important element and the failure to communicate effectually

affects a project. A misapprehension of what is being communicated between contractors and suppliers can lead to interruption in the delivery of materials.

#### **2.7.6 Poor Site Management**

The management of site by project managers is crucial to the success or otherwise of the project. Poor coordination of activities is a major contributor to delay of projects. Ineffective site management may occur in cases where the contractors do not have the sufficient experience and suffers from the required knowledge to manage the project team (Kadir *et al*, 2005).

The leader to every project is the project manager. There is therefore, the high expectation that he manages the works onsite which includes monitoring progress and the management of the administrative work in the project. It is important that the manager manages the work and workforce very well. The failure to manage site effectively can lead to delay of the project delivery time. (Toor and Ogunlana, 2008; Yang and Ou, 2008; Sweis et al. 2008).

#### **2.7.7 Unavailability and High Cost of Equipment and Tools**

The contribution of tools and equipment involved in construction are either acquired through leasing or direct investment mainly by the contractor (Chang *et al.*, 1991). Some also acquire these equipment using a hybrid of the above methods. It is therefore important that the usage of the above be planned so that they are used to capacity. This has to be done according the methods and the programme of the project. This is because, leased equipment would have to be returned after the lease period.

Yet again Joyce (2006) added that, there is a rise in the number of high rise buildings that are being constructed in recent times. This is due to the entrance of cranes in the construction industry. This has however contributed to shortage mainly because there not enough crane suppliers to meet the demand for them. Another contributing factor is the high cost in outright

purchase and even hiring. It is therefore not like for contractors to increase the lease period when they are due. This is a perfect indication that the lack of effective planning of the usage of plant and equipment will cause shortages and affect the delivery time of the project.

In the Russian construction industry, theft is a major contributor to shortage of equipment (Wendle, 2008). Shree (2007) accentuated that the renting cost for plants and equipment have increased by 30% to 40% within some few years. The intensifying cost have affected contractors massively because of the financial difficulty they experience. This has therefore led to the shortage of tools and equipment and its associated effect on the quality and delivery time of projects to clients

#### **2.7.8 Management Problems**

There are several parties engaged in construction projects. It ranges from owners through contractors to suppliers. However, the harmonization of these parties can be problematic. The difficulty in managing these parties can lead to delay in the final delivery stage of projects (Assaf *et al*, 1995). Agreeing to the statement by Ali *et al* (2008) and Kadir *et al* (2005) also indicated that the incompetence to coordinate these parties can lead to construction project delivery delays. An example is where revised drawings are not released early enough for the contractor. This can lead to mistakes which will have to be rectified subsequently. This can lead to rework and hence an extension of the construction period and consequently its delivery time. Thus, an important ingredient to project early completion is the coordination of the parties involved.

#### **2.7.9 Construction Slipups and Defective Works**

Failure to work to specification is a major cause of mistakes and defective works (Gerskup, 2010). The eminence of projects constructed in the Zambian construction industry are questionable due to poor workmanship by contractors (Zanis, 2010). Moreover, Kedikilwe

(2009), in another gasp specified that poor workmanship contributes hugely to defective structures.

Using low standard materials is one indicator of poor workmanship. Several structures collapse in countries that experience light earth quakes because of the poor quality materials they are made of (Binici, 2007). It was also found that the reinforcement bars used in such structures had corroded and hence a reduction in their strength (Binici, 2007). A typical example is the shopping mall that collapsed in the capital city of Ghana in some few years ago. Thomas (1991) indicated that where a work is found to be defective, it has to be rectified but the rectification always leads to an extension of the project duration. Lack of precision in measurement from plans and specifications can also lead to mistakes in construction and extension of the project duration (Thomas, 1991).

**Table 2.1 Summary of Challenges of PWD's of MMDA's and References**

<b>Item</b>	<b>Challenge</b>	<b>Reference</b>
<b>1</b>	Contractor Selection based on lowest bid	Russel and Skibniewski (1998) Nguyen (1985) Holt et al (1994) Ellis and Herbsman (1991) Bower (1989)
<b>2</b>	Contractor's financial difficulties resulting from unavailability of funds by the Client to execute the project	Bestowing and Thornton (2007) Arshi and Sameh (2005) Majid and McCaffer (1998) Frimpong <i>et al.</i> (2003) Sambasivan and Yau (2007) Mansfield <i>et al.</i> (1994) Coulter and Kelley (1992)
<b>3</b>	Labour Shortage	Bruse and Dulipovici (2001)
<b>4</b>	Material Shortage	Majid and McCaffer (1998) Mochal (2003) Dada <i>et al.</i> (2003, 2007)
<b>5</b>	Poor communication	Dunkelberger (2009)
<b>6</b>	Poor Site Management	Kadir et al (2005) Toor and Ogunlana (2008) Sweis et al (2008)
<b>7</b>	Unavailability and high cost of Equipment and Tools	Wendle (2008) Shree (2007)
<b>8</b>	Management Problems	Assaf et al (1995) Ali <i>et al</i> (2008) Kadir <i>et al</i> (2005)
<b>9</b>	Construction Slipups and Defective Works	Thomas (1991)

## **2.8 PERFORMANCE INDICATORS AND PERFORMANCE MEASURES OF PROJECT DELIVERY**

Performance Measurement terminologies mostly look tricky (Artley, 2001). The researcher was of the view that some people equate Performance Measures and performance indicators as being the same, while others look at the two as being entirely different. For example, Artley (2001); Sinclair and Zairi, (1995) purported that Performance measures quantitatively talks about the products, services, and the processes that produce them and helps us

understand, manage, and improve what our organizations do. On the contrary, Mbugua *et al* (1999) postulated that performance indicators specify the determinate evidence necessary to attest that a planned exertion has achieved the desired result. In other words, when indicators can be measured with some degree of accuracy and with certainty they are called measures. However, when it became possible to obtain a precise measurement they are referred to as performance indicators. Artley (2001) again emphasized that, Effective performance measures can help us know:

- How well an institution or a firm is performing;
- If and where improvements are necessary;
- If our customers are satisfied;
- If our processes are in statistical control; and
- If we are meeting our targeted goals and objectives.

They provide us with the information necessary to help us make intelligent decisions about what we do and is composed of a number and a unit of measure. The number gives us a magnitude (how much) and the unit gives the number a meaning (what). Performance measures are always tied to a goal or an objective which is the target (Artley, 2001). Performance measures can be represented by single-dimensional units like hours, meters, number of reports, number of errors, number of construction employees, and length of time to complete a project. They can show the variation in a process or deviation from design specifications. Single-dimensional units of measure usually represent very basic and fundamental measures of some process or products (Artley, 2001).

In reaction to calls for incessant improvement in performance, Mbugua *et al.*, (1999) claimed that many performance measurements have emerged in management literature; (Financial measures, Client satisfaction measures, Employee measures, Project performance measures).

Furthermore, Xiao and Proverbs, (2003) distinct overall contractor performance to include construction cost, time, quality and sustainable development of project delivery systems. The idea being that the attainment of an aspect of performance should embrace all but not at the detriment of another. Mbugua *et al.* (1999) theorized that the performance measuring methods can be assessed in terms of the technical performance, commercial performance and overall performance. The areas of measurement are at the planning and design level, marketing level, manufacturing level, and the overall performance at the level of a firm or strategic business unit.

## **2.9 STRATEGIES FOR SUCCESSFUL PROJECT IMPLEMENTATION**

In recent times, PWD project performance has become a main issue for national development. From the data provided by PWD Project Monitoring Unit, it showed that more than 50% of the projects in the Ghanaian construction industry and managed by PWD were completed behind time (Amponsah, 2010). The underpinning factors to this is because of issues pertaining to Land acquisition, additional works and relocation of public services and change of original designs by clients (Khair, 2010). Auditor General's Report (2012) postulated that a substantial amount of government projects failed to achieve the specified quality like the incident of Melcom collapse in the capital city of Ghana

Hence, the level of performance in carrying out PWD project will depend on the quality of the managerial, financial, technical and organisational commitment of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability (Takim and Akintola, 2002). According to Wang (1994), as construction is becoming more complex, a more sophisticated approach is necessary to deal with initiating, planning, financing, designing, approving, implementing and completing a project. However, payment to the contractor is also an essential criterion to increase the



project performance. Wang (1994) averred that one of the main success factors in project performance is prompt payment by the client to the contractor.

In order to be efficient there must always be a certain demonstration of effective communication skills. Otherwise, there will be difficulty in implementing any organisations objectives. Effective communication enables problems to be talked promptly. It is in fact an essential factor to consider if an organization was to function well in this modern era where diversity is increasingly the norm. Seven key requirements for successful communication include; provision of an explicit communication structure, solving problems together, practice strong nonverbal communication, practice conflict management, consider cultural issues, cultivate extraverted qualities and practice strong written communications (Daft and Lengel, 1986).

A project cost estimate is a prediction of the most likely total cost of the identified scope of work for a project. The successful implementation of every endeavor and in this case project requires careful planning. Most construction projects start with briefs, initial design and cost estimation, fine tuning of the client needs with regards to the funds available and final preparation of designs and itemized bill of quantities. This is all aimed at preventing unplanned decisions and excessive variation in design with its associated cost.

One of the effective motivation strategies for employers is to reward or recognize the work of employees. This can be done by cash reward and such simple gestures as sending a thank you note to a deserving employer. Some researchers have postulated that it is even more important to retain employees than to retain customers. The construction industry is vibrant and the need for professionals keep increasing by the day. It is therefore important for special agencies and organisations such as the PWD's to attract and retain the experienced if they are to better manage their projects.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 INTRODUCTION**

Naoum (1998) asserted that upon identifying the purpose of a research and completing a comprehensive literature review, it is then prudent to proceed into the detail of the research. This chapter deals with the approaches adopted for the study. This was also affirmed by Dawson (2007) that it discusses the various research strategies adopted and the various tools in gathering information for the study.

This section discusses the method utilized to undertake this research study. It is then prudent to proceed into the detail of the research. It is of this view that Kumekpor (2002) highlighted that, “research methodologies are the methods, procedures and techniques used in attempting to discover what we crave to know”. It also discusses the various research strategies adopted and the various tools in gathering information for the study (Dawson, 2007). It thus relates to the orderly methods to collecting data that depend on on recognized procedures as well as measures obtain from scientific techniques of study, mainly those employed in the behavioral and social sciences.

#### **3.2 RESEARCH DESIGN**

The choice of research method, which forms the basis of data analysis in any scientific research is very essential and must be guided by scientific principles (Eldabi et al., 2002). The method adopted should therefore ensure proper data collection which will produce credible and reliable analysis and results. Generally, a researcher may employ either qualitative or quantitative method (Eldabi et al., 2002).. This research largely adopted the Quantitative design.

Punch (2005) defines quantitative research as an empirical method which deals with data in the form of numbers. This method is suitable for research that seeks to measure quantities or amounts of some variables either to ascertain an existing position or to envisage a future development or pattern. Quantitative research has an advantage of easy extraction and analysis of a large amount of quantifiable data. Because results are quantifiable, it is easier to compare and simplify future developments. Quantitative data also incorporates control measures that warrant for validity of data. This study seeks to provide a more objective result and therefore preferred quantitative design over qualitative which often prefer rather generalized results

### **3.3 RESEARCH STRATEGY**

Research strategy can be taken to mean the way in which the objectives of the research are probed (Bouma *et al*, 1995). According to Bouma *et al* (1995) two types of research strategies exist, that is, qualitative and quantitative research. The one to adopt rely on the study intent as well as the availability and the type of information needed.

The researcher used mainly questionnaire survey for the collection of data. The study was based on identifying the roles and challenges of Public Works Departments (PWD's) of MMDA's on construction project's delivery in the Brong Ahafo, Central and the Volta regions of Ghana. The study also identified strategies aimed at successful project implementation by the PWD's. In this study, the research strategy was a survey and the main data collection techniques used in this research was survey questionnaires. This method allowed the researcher to ask all respondent the same question with predetermined responses, which allows the objective data to be collected throughout the study therefore being in tandem with the positivist tradition with survey as the main data collection approach.

The research approach was descriptive and explanatory study. The descriptive approach was used to describe the organizational structure of the study area and the background of the professionals who participated in the study. Also the explanatory study was used to ascertain the relation between variables that were used for the study.

### **3.4 SOURCES OF DATA**

In coming out with this study both primary and secondary data was used in conducting the research.

#### **3.4.1 Primary Sources**

There are several approaches available in gathering primary data. The method used in collecting primary data is mainly questionnaire.

#### **3.4.2 Secondary Sources**

The sources of secondary information include periodicals or journals, government publications, books from library, the internet, reports, newspapers, magazines and so on. This will help the researcher to identity how others defined and measured key concepts in relation to project delivery.

### **3.5 SAMPLE SIZE AND SAMPLING TECHNIQUE**

#### **3.5.1 Population of the study**

A research population can be defined as the totality of a well-defined collection of individuals or objects that have a common, binding characteristics or traits (Polit *et al.*, 2006). Burns et al., (1993) added that a population is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. However, the population of the study focused on the Professionals at Public Works Departments (PWD's) at MMDA's in the following regions: Central, Brong Ahafo and the Volta. The main reason for using this category of people was that their activities directly has a bearing on project delivery within

the study area which is the scope for the study. The researcher decided to undertake the research in only the three regions mentioned due to resource constraints.

### **3.5.2 Sample Size**

The process of selecting a portion of the population to represent the total population and the findings from the sample represents the rest of the group (Burns *et al.*, 2001). The importance of picking out a sample is that it is not as much expensive and time saving as gathering data from a large group of respondents. The chosen sample should consequently, have comparable features to the population under study to allow generalizability of the outcome to characterize the population (Burns *et al.*, 2001, Polit *et al.*, 2006).

In this study a total number of 30 professionals were sampled in each of the three selected regions namely: Brong Ahafo, Central and Volta regions, thus, certifying the central limit theorem which states that 30 is an adequate sample in a survey research context (Kar and Ramalinga, 2013). Hence, a total number of ninety (90) professionals were considered for the study. In addition, this was as a results of limited time available for the study. In all, six PWD's were considered for each region. For each department, five professionals were considered, which included: engineers (2), planner (1), director (1) and a contractor. This gave a total number of five (5) professionals per each selected PWD (See the table 2 below).

**Table 3.1 Targeted Respondent at MMDA's in selected Regions**

<b>Region</b>	<b>MMDA</b>	<b>Professionals Targeted Per MMDA</b>	<b>Targeted No. per MMDA</b>	<b>Total Respondents per Region</b>
<b>Central</b>	1.Assin South District			
	2.Assin North District	Engineers (2)		
	3.Asunafo South	Planners (1)	5	
	4.Cape Coast Metropolitan	Directors (1)		30
	5. Abura Asebu Kwamankese	Contractors working in the District (1)		
	6.Gomoa West			
<b>Volta</b>	1. Ho Municipal	Engineers (2)		
	2. Ketu North	Planners (1)	5	
	3. Krachi West	Directors (1)		30
	4. Krachi East	Contractors working in the District (1)		
	5. Kadjebi			
	6. Nkwanta South			
<b>Brong Ahafo</b>	1. Asunafo South			
	2. Asutifi South	Engineers (2)		
	3. Kintampo North Municipal	Planners (1)	5	
	4. Nkoranza North	Directors (1)		30
	5. Sunyani Municipal	Contractors working in the District (1)		
	6. Sunyani West			
<b>TOTAL</b>	<b>18 MMDA's</b>	<b>5 per PWD</b>		<b>90</b>

### 3.5.3 Sampling Technique

The study adopted purposive and snowballing sampling techniques. The purposive sampling technique helped the researcher to exercise his or her own judgement about who will provide the best perspective on the subject under consideration (Polit and Hungler, 1999). Hence, the study intentionally invited specific professionals who work directly in PWD's work with the MMDA's in the selected regions. This study was further accomplished through the use of snowballing technique due to the difficulties encountered in having access to the respondents using purposive sampling. According to De Vos (1998), snowball sampling is valued in research as it is focused on individuals hard to find. It was difficult to find Contractors who were actively working or had been involved on projects managed by the PWD's thus

snowballing technique was used to identify them. Employing this method, a small likely respondents were known and then asked whether they know any other respondent with the characteristics that we are looking for in the research. This technique was employed to identify hard-to-get respondents. Professionals who were easy to locate in the municipality/region was contacted to give lead to other professionals with the same characteristics.

### **3.6 DATA COLLECTION INSTRUMENTS**

The researcher used the primary data collection method, that was, structured questionnaire in soliciting data from the professionals. Basically, questionnaire was the predominant tool for gathering data. Respondents included engineers, directors, planners and Contractors who work with the works department. Data was also solicited from books, internet search engines, newspapers and academic journals that are related to the research topic.

#### **3.6.1 Survey Questionnaire**

Questionnaires were developed because of the following: They presented likelihood of anonymity since subjects' names were not needed on the completed questionnaires. There was little chance for partiality as they were offered in a reliable manner. Many of the things in the questionnaires were structured, which made it simple to relate the answers to each item. They needed little time and energy to answer. A questionnaire was developed by the researcher to obtain relevant information on the topic. The questions were divided into sections that covered the research objectives and research questions.

#### **3.6.2 Questionnaire Administration**

The research questions were developed by the researcher and reviewed by some experts in academia. Subsequently, a pilot test of the questionnaire was directed to identify and eliminate potential ambiguity in the questionnaire. Few questions were reviewed as a result of

non-response from the respondents of the pilot study. This was done to improve the reliability and validity of the questionnaire. The questionnaires were self-administered on one-to-one basis to respondents willing to fill or provide answers. To expand the rate of the response, follow-up procedures and tactics was well thought-out, for instance sending reminder notices to non-respondents. This was not overly done. Dunn and Huss (2004) detected that increasing the response rate may undesirably influence the consistency of the data gotten. The reading additionally states that increasing pressure by a researcher on subjects to answer will result in more unaware responses. To avoid the afore mentioned, a variety of actions to improve the response rate founded on recognized conditions of reciprocity, social proof and legitimacy as well as authority as endorsed by Bednar et al (2006) was used within the survey. These includes measures like having a shorter questionnaire. The primary data collected was reviewed by the researcher to ensure maximum accuracy, legibility, completeness, consistency and to reduce ambiguity.

### **3.7 DATA ANALYSIS AND TECHNIQUES**

The data was organized into tables and figures based on the questionnaire made available to the respondents. The result was then evaluated and presented into percentages and other charts. Quantitative methods were adopted in the data analysis. The result was subsequently computed into percentages. Percentage (%) values, which are not round figures, were approximated to the nearest whole numbers. Diagrammatic illustrations of the statistical summaries of the outcome was shown in the form of pie charts, graphs as well as frequency tables. The following statistical tools were used; that is mean, frequencies, percentages and Relative Importance Index (RII) which was aided by Statistical Package for Social Scientist (SPSS).



$$\mathbf{RII} = \sum \mathbf{P_i U_i} / \mathbf{Nn}$$

N (n) Where RII = Relative importance index

Pi = respondent rating of severity of the challenges

Ui = respondent's placing identical weighting or rating

N= sample size; n =the highest attainable score

## **CHAPTER FOUR**

### **DATA ANALYSIS AND DISCUSSION**

#### **4.1 INTRODUCTION**

In this chapter, the data gathered from the survey is thoroughly subjected to scientific analyses and interpretations. This chapter introduces the data analysis and discussions of results using Statistical Package for Social Sciences (SPSS Version 21.0). The discussions largely centers on the objectives of the research. Descriptive statistics is used to analyze the background and demographic study of each study area and Relative Importance Index (RII) and Mean Score method are the main statistical techniques used to analyze the variables identified in the existing literature relevant to the roles of public works department (PWD's) of Metropolitan, Municipal and District Assembly (MMDA's) on construction works delivery in Ghana, its challenges and opportunities as well as the challenges and strategies needed to curb the such challenges.

The first section deals with the profile of the various professionals and the impact such attributes have on the research. The other part also deals with the detailed analysis of the specific objectives of the study in relation to the roles of Public Works Departments (PWD's) in the construction industry in Ghana.

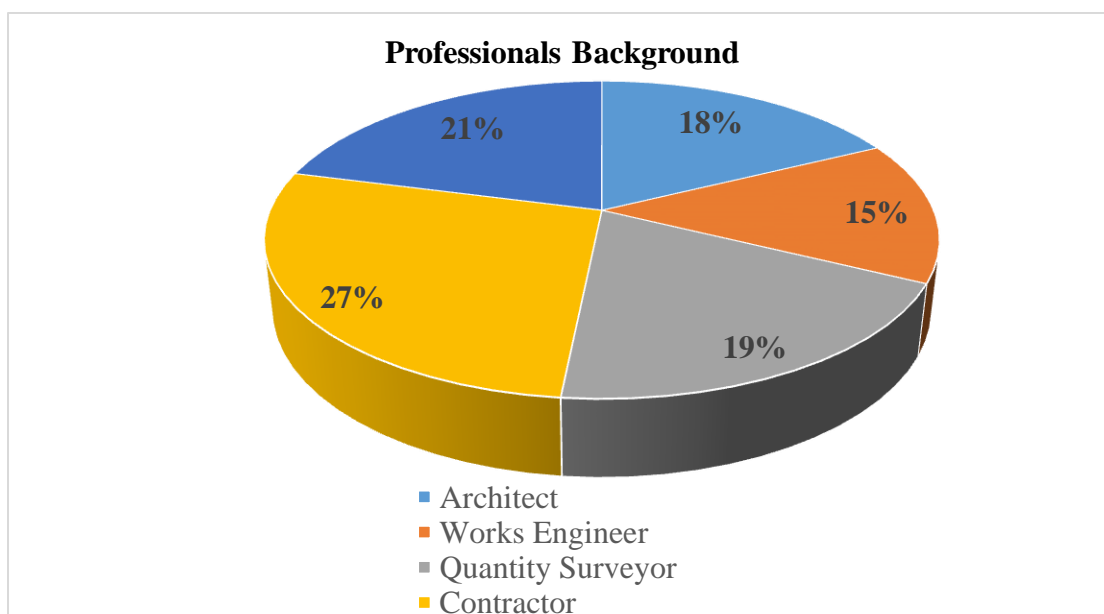
The researcher systematically discussed the empirical analysis of the roles of PWD's in the Ghanaian construction industry, challenges faced by PWD's in the project delivery in the construction industry, and the proposed strategies necessary to curb the challenges faced by the PWD's.

## 4.2 PRESENTATION AND DESCRIPTIVE ANALYSIS OF DEMOGRAPHIC INFORMATION DATA

This section deals with the professionals' profile and the influence such attributes have on the research. The other part also details out the analysis of the specific objectives of the study in relation to roles of PWD's in the project delivery in the construction industry of Ghana.

### 4.2.1 Background of Professionals

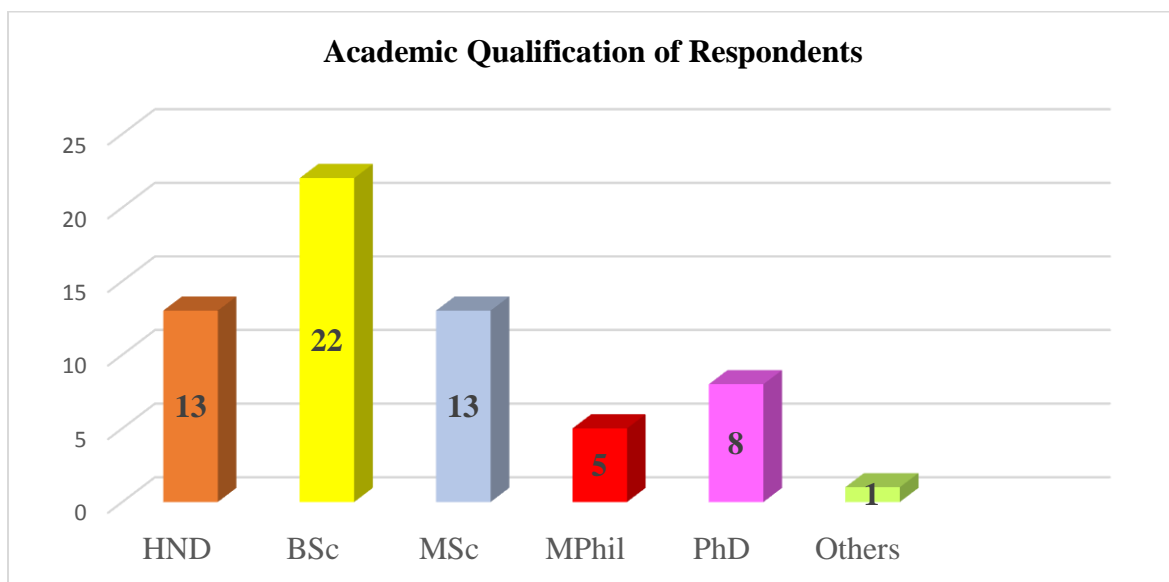
The intention of this question was to ascertain and confirm from respondent the professional categories of respondents in their respective firms of operation. Figure 4.2 established the category of respondent's professionals and it gave the following interpretation; 27% of the respondents representing the majority of the respondents were contractors by profession, 21% belongs to other categories of professions, 18% were architect, while 19% were Quantity Surveyors by profession and the remaining 15% having the professional background of Works Engineer operating in the industry. It therefore can be concluded that; the construction industry is spearheaded with mostly Contractors.



**Figure 4.1 Profession of Respondents (Field Survey, 2016)**

#### 4.2.2 Highest Academic Qualification

The intent of this interrogation is to establish from respondents the educational backgrounds as well as their other professional qualifications the have acquired while working in their respective MMDA's. From Table 4.2 below, it was established from respondents that 13 of the respondents' holds HND degree, 22 respondents with BSc Degree, 13 respondents with MSc degrees and 5 respondents holding MPhil degrees while 8 respondents hold a heavy PhD degrees and only 1 respondent holding other certificate which was not specified in the questionnaire. It can therefore been inferred from the above results that most of the workers have certain levels of education and hence dominated mostly with Degree holders (BSc Degrees specifically).



**Figure 4.2 Academic Qualification of Respondents (Field Survey, 2016)**

#### 4.2.3 Year of Professional experience of Respondent in their firms

This section seeks to identify the level of experience of the various professionals and workers in the construction industry because how long they have been in the field of operation will affect the quality of responses that will be given. Table 4.1 indicates the number of years of the respondent's in their firms respectively. Respondents were asked to indicate how long

they have been in the construction industry with respect to their role at the PWD's and in the Ghanaian construction industry. This was to establish the familiarity between the respondent's and its environment. 14 respondents representing 23% indicated they have been in the industry for less than 5 years, while 11 of the respondents representing 18% of the total respondents have 6 – 10 years of working experience in the industry and 26% representing 16 of the response had 16 – 20 years while 9 respondents representing 15% had 20 years and above working experience. It can therefore be deduced from the data obtained that, majority of the respondents have adequate level of experience.

**Table 4.1 Years of Experience of respondents in the their firms**

<b>Years</b>	<b>Less than1-5 yrs</b>	<b>6-10 yrs</b>	<b>11-15 yrs</b>	<b>16-20 yrs</b>	<b>Above 20 yrs</b>	<b>Total</b>
<b>%Response</b>	23	18	*26	19	15	100
<b>Number</b>	14	11	16	12	9	62

\*shows majority of the respondents

A critical study of table 4.1 above advocates that, majority of the respondents' have existed in the industry for considerable number of years and therefore have the required experience for generalization and realistic view as far as this research is concerned.

#### **4.2.4 Professional Qualification of Respondents**

Most of the professional were members of the Ghana Institution of Engineers. Some also indicated membership with the Ghana Institution of Construction. The information gathered from respondents showed that 29% representing the second highest of the respondents possess a Member professional qualification, 18% are Corporate members while 8% are Technicians by profession and the majority of the respondents representing 42% were not members of any professional bodies.

#### **4.2.5 Respondents Years of working existence with the Assembly**

This section of the questionnaire sort to give the respondents the opportunity to indicate how long have they have worked with the Assembly. As evident in Table 4.2 below, 18 respondents representing 29% of the total respondents had worked with the assembly for less than 1-5 years. 19 respondents representing a total of 31% have worked with the assembly between 6-10 years, while 16 respondents have worked with the assembly between the years of 11-15 years representing 26% and the remaining 15% constituting 9 respondents had worked with the assembly for 16 years and above. Table below show how long respondents have worked in MMDA setting.

**Table 4.2 How long have you worked with the Assembly**

<b>Years</b>	<b>Less than 1-5 yrs.</b>	<b>6-10 yrs.</b>	<b>11-15 yrs.</b>	<b>16 Years and Above</b>	<b>Total</b>
<b>%Response</b>	29	*31	26	15	100
<b>Number</b>	18	19	16	9	62

\*shows majority of the respondents

A study of the aforementioned in table 4.2 above indicates that, majority of the respondents' have worked with the assembly for considerable number of years and therefore have the required experience for generality and accurate understanding as far as this study is concerned.

#### **4.2.6 Number of construction projects undertaken in the Assembly**

It was necessary to ascertain the average number of construction projects executed by the PWD looking at the last five (5) years. This was to buttress the experience of the respondents while working in, for or with the PWD's. Table 4.4 below which gives a summary of respondents answers to the question shows that 10 respondents stated that the assembly in which they work has undertaken 16 projects and above since they started work there and this represents 16% of the total population under consideration. 25 professionals denoting 40%

also indicated that between 11-15 projects were undertaken ever since they were engaged at their respective assembly. Again, 13 respondents stated that 6-10 projects have been undertaken by the assembly and the remaining 14 respondents asserted that their assembly has undertaken less than 1-5 projects which is represents 23%. This can generally be attributed to the fact that these persons were quite new at their respective Assembly. The Table below gives further information on the subject.

**Table 4.3 Number of construction projects undertaken in the Assembly**

<b>Years</b>	<b>Less than 1-5 projects</b>	<b>6-10 projects.</b>	<b>11-15 projects.</b>	<b>16 projects</b>	<b>Total</b>
<b>%Response</b>	23	21	*40	16	100
<b>Number</b>	14	13	25	10	62

\*shows majority of the respondents

Table 4.4 above unfolds that, majority of the respondents' have worked with the assembly for a considerable number of years and therefore a number of construction projects have been undertaken in the Assembly with majority of the respondents asserting 11-15 projects being undertaken ever since they joined the Assembly.

### **4.3 RELATIVE IMPORTANT INDEX (RII) FOR ROLES OF PUBLIC WORKS DEPARTMENT**

This section of the questionnaire sought to tap into respondents' views of the mandate and obligations of the public works departments (PWD's) of the MMDA's. In order to draw out any successful plans aimed at efficiently executing assigned mandates there ought to be clearly defined roles. Identified roles numbering thirteen were presented for respondents to indicate in terms of which they strongly believed to be the core roles of PWD's in the MMDA setting.

#### **4.3.1 Roles of Public Works Departments (PWD's)**

The table 4.3.1 below presents the results of the analysis that includes a ranking in terms of which role respondents generally agreed to be the core mandate, the least and those in-between using the Relative Performance Index (RII). Inference can be drawn from the table mentioned that respondents regarded over-all development of the MMDA's areas under their jurisdiction as the fundamental obligation of the PWD's with an RII of 0.919 and a mean of 4.59. This is in conformity with Section 10 of the Local Government Act 462 of 1993 that confers the status of the MMDA's the highest political and administrative body in the Districts and tasks them with the responsibility for the overall development of the Districts/Municipalities/Metropolis. Interesting to note that Formulation of strategies for mobilization resources necessary for development was identified among the least ranked. That is 9<sup>th</sup> ranked with an RII of 0.600 and a mean of 3.00. Roles such as post construction monitoring, provision of other works and services as community health and environmental protection and even promotion and provision of support for productive activities and development were ranked higher with RII's and means of 0.822 and 4.11; 0.819 and 4.09; 0.754 and 3.77; 0.632 and 3.16 respectively. This may stem from the fact that personnel at the Works Department are mostly not burdened with revenue collection or mobilization but are often only involved in the planning and physical implementation of infrastructural projects. It can also be seen that the results indicates that respondents placed quite a fair importance to PWD's role of Consultants and Contractors for the execution of projects. This is the eighth ranked with an RII of 0.609 and a mean of 3.04. There was a general notion that selecting contractors and consultants who are not suitably qualified mostly results in negatively affecting project delivery. This confirms the statement "failure to work to specification is a major cause of mistakes and defective works" (Gerskup, 2010). Also, the 2010 research by Zanis postulated that projects constructed in the Zambian construction



industry are questionable due to poor workmanship by contractors. Kedikilwe (2009), in another gasp specified that poor workmanship contributes hugely to defective structures. Respondents were of the view that it is very important to get the right contractors or service providers for the right jobs to ensure successful project delivery. Much weight was not given to construction project monitoring and control. The item ranked tenth with an RII of 0.593 and a mean of 2.96. It is known fact that most often the MMDS's procure consultants or project/contract managers for the execution of their projects. Personnel from the works department give oversight monitoring. This same reason could be attributed for twelfth and thirteenth ranked roles as well. The general view was that Contractor and MMDA liaison was regarded as the least important among the list. This is because the PWD's are a sub department of the MMDA which on most occasions are the clients. In effect the PWD's in itself becomes the client and playing intermediary roles become a bit awkward. It must however be noted that the PWD's become the source of information on any infrastructural project in terms of progress, variances and the reasons for them, cost, slip-ups etc. to the other department of the MMDA. This is a form of liaison although it is more often limited information dissipation.

**Table 4.4 Roles of Public Works Department**

<b>Roles of PWD</b>	<b>Mean</b>	<b>RII</b>	<b>Rank</b>
Over-all development of their jurisdictional areas	4.59	0.919	<b>1<sup>st</sup></b>
Post construction monitoring and support services	4.11	0.822	<b>2<sup>nd</sup></b>
Provision of other works and services as community health / environmental protection	4.09	0.819	<b>3<sup>rd</sup></b>
Formulation and execution of plans	3.77	0.754	<b>4<sup>th</sup></b>
Promotion and provision of support for productive activities and development	3.16	0.632	<b>5<sup>th</sup></b>
Provision of basic infrastructure	3.14	0.629	<b>6<sup>th</sup></b>
Construction project initiation and implementation	3.11	0.622	<b>7<sup>th</sup></b>
Procurement of Contractors/Consultant's for works	3.04	0.609	<b>8<sup>th</sup></b>
Formulation of strategies for mobilisation of resources necessary for development	3.00	0.600	<b>9<sup>th</sup></b>
Construction project monitoring and cost control	2.96	0.593	<b>10<sup>th</sup></b>
Archive for drawings and other construction project documents	2.95	0.590	<b>11<sup>th</sup></b>
Monitoring the roles of all stakeholders are undertaken by each	2.75	0.551	<b>12<sup>th</sup></b>
Liaison between Contractors and Assembly	2.53	0.506	<b>13<sup>th</sup></b>

Rank: [Highest-1 Higher-2, High-3, Lower-4, Least-5]

Source: Field Survey, 2016

#### **4.4 RELATIVE IMPORTANCE INDEX (RII) FOR CHALLENGES TO PROJECT DELIVERY**

Various challenges besiege the various PWD's in the performance of their mandates on projects. This section of the study assesses the factors that impede the work of the PWD's. Nineteen challenges were identified and respondents were to indicate on a scale how they perceived the challenge, i.e. whether they found it most or the least challenging. The

variables were also ranked with the aid of the mean responses and Relative Importance Index (RII). The Table 4.4.1 displays the results of the analysis.

#### **4.4.1 Challenges to Construction Project Delivery**

Inclement weather was regarded as a major challenge to successful project delivery. This had a mean of 4.26 and RII of 0.851. In our part of the world and especially in the regions under consideration where there are usually heavy rains in the wet seasons, most of the project delays have been as a result of inclement weather. In extreme cases designs have had to be revised together with its associated cost. Again, it can be observed from the results that many of the factors considered most challenging have had to do mainly with the contractors. Factors as Labour shortage, poor site management, material shortage and contractors' financial difficulties have been ranked high buttressing respondents earlier high ranking of procurement of contractors as a major role to ensure successful project delivery. Respondents also regarded unrealistic delivery schedules to be quite high on challenges affecting project delivery. Other lowly ranked factors include delays in disbursements, insufficient revenue mobilization, poor project management and policies regulating the work of technical personnel of the PWD's. Furthermore, those factors are things can be managed by the PWD's. The general trend is that the most challenging factors are external, they have to do with third parties, i.e. contractors, other stakeholders and issues of force majeure and not inherent. The least ranked are those that are inherent and can be managed. Finally, it was generally agreed that influence by political heads occur but is not a major bottleneck to project delivery. This factor was ranked eleventh with a mean of 3.37 and RII of 0.674. Respondents indicated that because there are laid out rules and procedure for project initiation and management it leaves very little room for any manipulation by political heads.

**Table 4.5 Challenges to Project Delivery**

<b>Challenges to Project Delivery</b>	<b>Mean</b>	<b>RII</b>	<b>Rank</b>
Weather and other environmental challenges	4.26	0.851	<b>1st</b>
Equipment and Tool Shortage	3.77	0.754	<b>2nd</b>
Labour Shortage	3.68	0.735	<b>3rd</b>
Poor Site Management	3.50	0.700	<b>4th</b>
Material Shortage	3.45	0.690	<b>5th</b>
Unrealistic timelines for project delivery	3.42	0.683	<b>6th</b>
Contractors' Financial Difficulties	3.40	0.680	<b>7th</b>
Inadequate logistics	3.40	0.680	<b>7th</b>
Inefficient Contractor selection methods and procedure	3.40	0.680	<b>7th</b>
Lack of coordination and cooperation of other stakeholders	3.40	0.680	<b>7th</b>
Influence of Processes by Political Heads	3.37	0.674	<b>11th</b>
Inadequate Human Resource to carry out supervision	3.35	0.671	<b>12th</b>
Changes in the scope of work and un-workable designs.	3.29	0.658	<b>13th</b>
Non-involvement of technical personnel during design and planning of projects	3.29	0.658	<b>13<sup>th</sup></b>
Delays in Disbursement	3.26	0.651	<b>15<sup>th</sup></b>
Construction Slipups and Defective Works	3.24	0.648	<b>16<sup>th</sup></b>
Insufficient revenue mobilization.	3.13	0.625	<b>17<sup>th</sup></b>
Poor Project Management	3.048	0.609	<b>18th</b>
Policies regulating the work of technical personnel of the PWD's	2.967	0.593	<b>19th</b>

Rank: [Highest-1 Higher-2, High-3, Lower-4, Least-5]

Source: Field Survey, 2016

#### **4.5 RELATIVE IMPORTANCE INDEX (RII) FOR STRATEGIES TO ENSURE SUCCESSFUL PROJECT DELIVERY**

This section gave the respondents the option to rank on a scale of 1-5 their level of agreement and the importance of such strategies aimed at forestalling the above challenges and their negative effects on project delivery. The variables were also ranked with the aid of the mean responses of the interviewed respondents. The result is presented in Table 4.5.1

#### **4.5.1 Strategies to ensure Successful Construction Project Delivery**

From the table respondents indicated that ensuring the qualification of Contractors' Key personnel as the highest in terms of importance to ensure that projects are delivered in accordance with specifications, within budget and in time. Communication management was next ranked in order of importance with a mean of 4.10 and RII of 0.819. Unambiguous information goes a long way to prevent defective work and the need for rework and other misunderstandings that draws back successful project implementation. Unclear lines or channels of communication also induces multiple instruction and a lot of confusion that mostly stagnates progress. Again, respondents were of the view that where conditions of work and other remuneration is improved better qualified staff will be attracted to the department and retained. Experienced personnel are in better positions to manage projects to successful completion. This view is in tandem with the provision of logistical support on projects. Also, respondents viewed the use of PWD's for design and construction supervision as fairly important if projects are to be delivered successfully. Revision of procurement strategies, bureaucratic procedure in paying invoices and provision of adequate capital finance were not held highly among the factors for ensuring successful project delivery. Realistic time schedule was ranked least among the factors with a mean of 3.21 and RII of 0.642. Respondents indicated in interview sessions that even before the contractor is shown site there would have been a revision of the implementation schedule to reflect a realistic completion period. In cases where it is anticipated that the initial delivery schedule is not achievable it is changed thus making this factor less critical as compared to the other variables.

**Table 4.6 Strategies to Ensure Successful Project Delivery**

<b>Strategies to Ensure Successful Project Delivery</b>	<b>Mean</b>	<b>RII</b>	<b>Rank</b>
Ensure Qualification of Contractor key personnel	4.92	0.984	<b>1st</b>
Effective communication management	4.10	0.819	<b>2nd</b>
Better incentives and remuneration to attract and retain experienced personnel	3.97	0.794	<b>3rd</b>
Provision of logistical support for supervision on projects	3.94	0.787	<b>4th</b>
Use of PWD's for design and construction supervision	3.66	0.732	<b>5th</b>
Adequate Planning, design and cost estimation	3.63	0.726	<b>6th</b>
Revise procurement strategies	3.60	0.719	<b>7th</b>
Lessen bureaucratic procedure in paying certificates	3.44	0.687	<b>8th</b>
Provision of adequate capital/finance	3.56	0.713	<b>8th</b>
Realistic time/project schedule	3.21	0.642	<b>9th</b>

Rank: [Highest-1 Higher-2, High-3, Lower-4, Least-5]

Source: Field Survey, 2016

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 INTRODUCTION**

As postulated in the 1992 Constitution by PNDC Law 207 (1993) and Act 462 (1993) Metropolitan, Municipal and District Assemblies were established as legal fulcrum for political, administrative and legislative authorities to partner the central government in public service delivery for national development.

The chapter concludes this reports and presents the main points with regards to the findings, achievements and contributions of this study. It reiterates the intention that necessitated the need for the study and touches on the methodology. It subsequently looks at activities of the research including the achievement of the aim and specific objectives of the research. Furthermore, the chapter indicates the contributions this research has made to knowledge and offers suggestions aimed at encouraging a rethinking of the roles of public works department in the construction industry as well as its philosophical contribution. Finally, it makes recommendations for further research and outlines its limitations. The chapter concludes this thesis.

#### **5.2 REVIEW OF OBJECTIVES**

##### **5.2.1 Roles of Public Works Department**

It was found out from that the data gathered from respondents and in the discussions above that the key roles undertaken by the professionals of the Public Works Department according to their level of ranking were; Over-all development of their jurisdictional areas, Post construction monitoring and support services, Provision of other works and services as community health / environmental protection, Formulation and execution of plans, Promotion

and provision of support for productive activities and development and Provision of basic infrastructure.

As the aforementioned were seen as the first five roles carried out by the professionals of the PWD, other roles such as archive for drawings and other construction project documents, monitoring the roles of all stakeholders are undertaken by each, liaison between contractors and Assembly were the least ranked according to the data gathered from respondents.

### **5.2.2 Challenges to Construction Project Delivery**

From the findings and the discussions of this study, it was noted and found out that considerable numbers of challenges are associated with construction project delivery in among professionals of working in the PWD assembly. Challenges that were found and ranked according to their levels of severity includes Weather and other environmental challenges, Equipment and Tool Shortage, Labour Shortage, Poor Site Management, Material Shortage, Unrealistic timelines for project delivery, Contractors' Financial Difficulties, Inadequate logistics, Inefficient Contractor selection methods and procedure, Lack of coordination and cooperation of other stakeholders. These were the most ranked challenges according to the data obtained from respondents and discussed in the previous sections of this study.

However, a personal observation found out that Weather and other environmental challenges are the paramount problems as far project delivery is concerned.

### **5.2.3 Strategies to ensure Successful Construction Project Delivery**

To ensure successful project delivery in the PWD in Ghana, the study identified some strategies ranked according their level of impact.



Strategies such as Ensuring Qualification of Contractor key personnel, Effective communication management, Better incentives and remuneration to attract and retain experienced personnel, Provision of logistical support for supervision on projects, Use of PWD's for design and construction supervision, Adequate Planning, design and cost estimation, Revise procurement strategies, Lessen bureaucratic procedure in paying certificates, Provision of adequate capital/finance and Realistic time/project schedule were the nine most ranked strategies found in the study according to the data gathered and discussed from respondents.

### **5.3 CONCLUSION**

The central finding of this study is that the roles of professionals in the PWD are complex and stipulated out as it should be. Over-all development of their jurisdictional areas and Post construction monitoring and support services was the major theme in the analysis and proves to be an essential element in understanding how the roles of PWD are related to business performance in the construction industry

The findings from the study confirm that Weather and other environmental challenges, Equipment and Tool Shortage, Labour Shortage, Poor Site Management, Material Shortage, Unrealistic timelines for project delivery, Contractors' Financial Difficulties, Inadequate logistics are the major challenges that hinder the successful project delivery of the PWD's

## 5.4 RECOMMENDATIONS

The following are recommended based on the findings of the study:

1. There is the need for central government and other managers of the economy to put the needs of PWD's high on the priority list and provide them better incentives and logistics for them to be able to perform their roles effectively. When these PWD's are effective in undertaking their duties the result will be an improvement in the overall development of the Country;
2. Again, there should be policy that will regulate when (which period) governmental agencies and organisations should embark on infrastructural projects;
3. The PWD's must follow the procurement laws and rules for contractor/service provider selection so as to procure very suitably qualified contractors/ suppliers/ consultant for projects. Issues such as resources, technological abilities, finances and experience should be key determinants of who shall be engaged to ensure slip-ups are kept to the minimum in project delivery; and
4. Finally, it is also recommended that, further studies should be done to establish the specific roles of the professionals at the Public Works Departments (PWD's). This is because the researcher observed that there were many professionals whose roles were not well defined. This will enhance and contribute to better performance by the PWD's in managing projects and contribute to better construction project implementation in the Ghanaian Construction Industry.
5. The construction industry needs to find solutions to overcome the challenges associated with the operational roles of the PWD assembly as well as for the immediate to short term and medium to long term strategies. This will enable the assemblies as well as the construction industry to strive towards higher economic growth and global competitiveness.

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## APPENDIX

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

**COLLEGE OF ARTS AND BUILT ENVIRONMENT**

**DEPARTMENT OF BUILDING TECHNOLOGY**

Dear Sir/Madam,

Invitation to Participate in a Study

I am Owusu-Diatuo Kofi Jnr, a MSc candidate of the Department of Building Technology, Kwame Nkrumah University of Science and Technology, Kumasi. This questionnaire is designed for research study entitled **“THE ROLES OF PUBLIC WORKS DEPARTMENT OF MMDA’s ON CONSTRUCTION PROJECT’S DELIVERY IN SELECTED REGIONS IN GHANA”**. The study seeks to undertake an appraisal of the current roles of PWD’s in achieving successful construction project delivery. It is hoped that the study will stimulate a rethinking of the use of PWD’s for better results in terms of timely delivery of projects, delivery within budget and to the specified quality.

Kindly respond to the questions by ticking (✓) and writing the appropriate answers in the options and spaces provided for each item respectively. Information provided will be treated with the highest confidentiality. I would like to convey my appreciation for your cooperation in completing these questions.

Thank you,

Owusu-Diatuo Kofi Jnr

Department of Building Technology

Kwame Nkrumah University of Science and Technology

Kumasi-Ghana

Phone No.: 0244967943

Email: kofiowusujnr@gmail.com

## **SECTION A: Respondent's Profile**

### **1. What is your professional background?**

- a. Architect [ ]
- b. Works Engineer [ ]
- c. Quantity Surveyor [ ]
- d. Contractor [ ]
- e. If Other, Please Specify .....

### **2. What is your highest academic qualification?**

- a. HND [ ]
- b. BSc [ ]
- c. MSc [ ]
- d. MPhil [ ]
- e. PhD [ ]
- f. If Other, Please Specify .....

### **3. How many years of professional Experience do you have?**

- a. 1-5 years [ ]
- b. 6-10 years [ ]
- c. 11-15 years [ ]
- d. 16-20 years [ ]
- e. Above 20 years
- f. If Other, Please Specify .....

### **4. What is your highest professional qualification?**

- a. Fellow [ ]
- b. Member [ ]
- c. Member Corporate [ ]

- d. Technician [ ]
- e. None [ ]
- f. If Other, Please Specify

**5. How long have you worked with the Assembly?**

- a. Less than 5 years [ ]
- b. Between 6-10 years [ ]
- c. Between 11-15 years [ ]
- d. 16 years and Above.

**6. How long has the Assembly Existed?**

- a. Less than 5 years [ ]
- b. Between 6-10 years [ ]
- c. Between 11-15 years [ ]
- d. 16 years and Above [ ].

**7. How many construction projects have been involved in since you started work with the Assembly?**

- a. Between 1-5 projects [ ]
- b. Between 6-10 projects [ ]
- e. Between 11-15 projects [ ]
- f. 16 projects and Above [ ].

## SECTION B: Roles/ Challenges/ Strategies to project delivery of the PWD

Based on your experience and knowledge, please indicate the most appropriate opinion/response with the scale below by ticking the appropriate box.

Use a scale of 1 = strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

No	Roles of PWD	1	2	3	4	5
1.	Over-all development of their jurisdictional areas					
2.	Formulation and execution of plans					
3.	Formulation of strategies for mobilisation of resources necessary for development					
4.	Promotion and provision of support for productive activities and development					
5.	Provision of basic infrastructure					
6.	Provision of other works and services as community health / environmental protection					
7.	Construction project monitoring and cost control					
8.	Post construction monitoring and support services					
9.	Liaison between Contractors and Assembly					
10.	Archive for drawings and other construction project documents					
11.	Procurement of Contractors/Consultant's for works					
12.	Construction project initiation and implementation					
13.	Monitoring the roles of all stakeholders are undertaken by each					
	<i>If Other, Please Specify</i>					
14.						
15.						
16.						
17.						
18.						
	<b>Challenges to Project Delivery</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	Contractors' Financial Difficulties					
2.	Labour Shortage					
3.	Material Shortage					
4.	Poor Site Management					
5.	Equipment and Tool Shortage					
6.	Construction Slipups and Defective Works					
7.	Poor Project Management					
8.	Insufficient revenue mobilisation.					
9.	Delays in Disbursement					
10.	Changes in the scope of work and un-workable designs.					
11.	Inadequate Human Resource to carry out supervision					

12.	Inadequate logistics					
13.	Inefficient Contractor selection methods and procedure					
14.	Influence of Processes by Political Heads					
15.	Non-involvement of technical personnel during design and planning of projects					
16.	Unrealistic timelines for project delivery					
17.	Lack of coordination and cooperation of other stakeholders					
18.	Policies regulating the work of technical personnel of the PWD's					
19.	Weather and other environmental challenges					
	<i>If Other, Please Specify</i>					
20.						
21.						
22.						
23.						
24.						
	<b>Strategies to Ensure Successful Project Delivery</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1.	Provision of logistical support for supervision on projects					
2.	Better incentives and remuneration to attract and retain experienced personnel					
3.	Revise procurement strategies					
4.	Use of PWD's for design and construction supervision					
5.	Lessen bureaucratic procedure in paying certificates					
6.	Adequate Planning, design and cost estimation					
7.	Provision of adequate capital/finance					
8.	Realistic time/project schedule					
9.	Effective communication management					
10.	Ensure Qualification of Contractor key personnel					
	<i>If Other, Please Specify</i>					
11.						
12.						
13.						
14.						
15.						

**Thank you**