KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY KUMASI

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF BUILDING TECHNOLOGY

PUBLIC – PRIVATE PARTNERSHIP IN ROAD INFRASTRUCTURE DEVELOPMENT IN GHANA: FACTORS AFFECTING PROJECT DELIVERY AND ASSOCIATED RISKS

A project report presented to the Department of Building Technology of the College of Architecture and Planning of the Kwame Nkrumah University of Science and Technology, Kumasi, in partial fulfillment of the requirement of the Masters Degree in Procurement Management

By

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NOVEMBER, 2014

DECLARATION

This report or any part of it has never been submitted in any form to KNUST, any other institution or body whether for purposes of assessment, publication or for any others. Excluding all expressions, acknowledgements and cited works, I corroborate that the academic content of this work is the result of my onerous but frank exertion and no other person(s).

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ACKNOWLEDGEMENT

I wish to express my humble gratitude and reverence to the Supreme Lord Krishna who is the best of all well wishers and has thus seen me through life to this point. A special gratitude also goes to my spiritual master B.T Swami by whose mercy I could approach this literary work with sufficient enthusiasm, perseverance, patience and diligence. Besides, I want to express my profound appreciation to my family for they encouraged me in various ways to render this research work a success.

I equally extend my gratitude to my supervisor Mr. Peter Amoah for his immense support in terms of guidance and inspiration and for his patience with me throughout the process.

Finally I am extremely grateful to all my colleagues both in the industry and in academia who contributed in no small way to the accomplishment of this literary piece.

DEDICATION

This work is dedicated to my family for the immense support they offered me to render this research work successful.

ABSTRACT

Road sector development requires huge capital investment. The government of Ghana however, is with limited financial, technological, and other requisite resources. These have over the years impeded its effort in sufficiently providing infrastructure to ensure comfort and economic growth. The traditional procurement method of road infrastructure project provision relies solely on the public sector (government) for funding. However the government is always faced with limited financial resource and is therefore unable to meet its investment demands.

Road infrastructure delivery is however influence by a lot of factors and therefore this the need of knowledge about those factors in the in the government`s attempt at providing road infrastructure. Although Public – Private Partnership (PPP) is a means through which the private sector comes in to augment the government effort with road infrastructure project provision, it is faced with a lot of risks and therefore there is the need for knowledge of those risks and how they could be managed so as to motivate the private partner as well as all stakeholders in road sector.

The purpose of the research was to create awareness of the significant factors affecting road project delivery, the risks associated with PPP in road infrastructural development and how those risks could be managed in order help stakeholders make a well informed decision. Questionnaire was used in gathering data from respondents. The data was subsequently analyzed using descriptive statistics generated in IBM SPSS Version 21.0. The study indicated that respondents were relatively aware of the factors that affect road project delivery, risks associated with the use of PPP in road infrastructure delivery and they (respondents) agreed to the strategies proposed for managing or sharing those risks identified. The study recommended the significant factors affecting road infrastructure project delivery

and the need for awareness creation on those factors among those in the road sector. The critical and less critical risks associated with PPP were underscored. It was further recommended that there should be an effective training on risk management among parties involved in road infrastructural delivery using the PPP approach beginning with the identification of the risks with the project, assessment of the risks and prescribing the most appropriate risk management strategies to transfer, share, minimize, absorb or prevent the Identified risks from happening.

Besides, it was recommended that government should adopt PPP procurement strategy to increase its road infrastructure base for its citizens Moreover, the Ministry of Roads and Transports of the Republic of Ghana should ensure that road contractor who is registered only when they have knowledge in procurement management. It was also recommended that tertiary institutions including should include as part of the curriculum procurement studies in their construction related programs so as to equip graduates from such institution with adequate knowledge in procurement management.

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LIST OF ABBREVIATIONS AND ACRONYMS

BOO Build-Own-Operate

BOOT Build-Own-Operate-Transfer

BOT Build-Operate-Transfer

BT Build Transfer

DBFO Design-Build-Finance-Operate

DBM Design-Build-Maintain

DBOM Design-Build-Operate-Maintain

DFR Department Of Feeder Roads

DUR Department of Urban Roads

ESCAP Economic and Social Commission of Asia and the Pacific

GDP Gross Domestic Product

GHA Ghana Highway Authority

GIP Ghana Infrastructure Plan

GOG Government of Ghana

GPRS Ghana Poverty Reduction Strategy

GSGDA Ghana Shared Growth and Development Agenda

IISD International Institute for Sustainable Development

LAD Liquidated and Ascertained Damage

NPM New Public Management

PPF Public Private Financing

PPP Public Private Partnership

UK United Kingdom

VFM Value For Money

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Public - Private Partnership(PPP) is defined as a long-term contractual agreement that allows the public and private sector agencies to come together by combining resources together and also sharing risks in a bid to provide infrastructure facilities for public use according to Akintoye, Beck and Hardcastle (2003).The public sector`s primary concern about Public – Private Partnership is to ensure that there is value for money in the services it provides while ensuring that the private-sector entities involved fulfills what is expected of it under the contract agreement (Grimsey and Lewis, 2002). PPPs are ways by means of which public procures by utilizing the private sector`s financing practices.

PPPs may be concerned with design, construction, financing, operation and maintenance of public infrastructure and facilities, or the operation of services, in order to provide the needs of the public. They are often financed by the private sector and investment can be recouped by operating the facility or delivering the services involved. What is the focal about the success of PPP is that favourable long – term financing opportunity that will ordinarily not be available is made accessible to the government or the public sector entity from the private sector partner such that the public sector is able to secure more rapidly the required financing (The National Council for Public–Private Partnerships, 2003). Such contractual agreements are for a long period of time usually for a period of between 25 – 30 years.

PPPs are concerned with the fundamental faults that are typical of public-sector procurement, Mustafa (1999). Some of which are high construction costs, inefficiencies in operations, construction overruns, poor design, and community dissatisfaction. Basically PPPs are concerned with transferring risks to the private sector by the public sector, where the private sector is considered best to manage those risks. One of the prominent characteristics of PPPs that appeal to the public sector is the shift of risks associated with projects risks from the government to the consortium involved with the project, although the project consortium will need some motivation (Grimsey and Lewis, 2002).

It is costly to provide and maintain infrastructure but this can be overcome with cost effective mechanism such as PPP. According to Duffield (2001) the New Prisons Project in Victoria, Sydney's Cross City Tunnel and the New South Wales Schools Project which are some instances in Australia are some of the advantages associated with PPP. As part of its purposes PPPs are to develop the local economy, increase efficiencies in construction and operations, reduce costs, improve the quality of service by incorporating the private sector's resources in the form of knowledge, expertise and capital to promote infrastructure development(Yuan et al., 2009).

PPP was seen basically as a means of cleaning the cost of infrastructure from balance sheet of the public, reducing government spending, increasing the level of investment in the public sector and reducing the extent of government borrowing which it was initially introduced in the United Kingdom(Li et al., 2005). However, according to Li et al. (2005) the impact of government borrowing is much less significant than first thought and that the PPP concept is now considered as means

of the government realizing its dream of infrastructure provision for the public and at the same time transferring as many risks as possible to the private sector. According to Li (2003) the most prominent demerits as far as PPP procurement is concerned are that so much of time is spent to negotiate the contract, negotiation getting delayed so much and the high cost of participation. PPP procurement brings about challenges such as complex negotiations, cost constraints on innovation, high cost of tendering and differing or conflict in objectives among the stakeholders of the project Akintoye et al.(2001).

American Home Mortgage Investment Treasury (2000) reports that , there are several forms of PPPs, with prominent ones being Sales of Business, Asset Sales, Partnership Companies, Wider Markets, Private Finance Initiatives (PFI), Joint Ventures, , Investment Partnerships And Policy Partnerships Build-Own-Operate-And-Transfer (BOOT) Projects. Private Finance Initiative is the commonest PPP model in UK (American Home Mortgage Investment Treasury, 2000). The interest in the use of PPPs in Uganda seems to be motivated by the fact that PFI model was successfully implemented in the United Kingdom. PFIs as forms of PPPs have chocked the highest success and it requires the public sector entering into contract with the private sector to provide quality public services on a long-term basis, usually 25–30 years. PFIs have the edge of private-sector infrastructure delivery and service management skills, motivated by having at risk private financing. The risks for designing, enhancing or constructing, , financing, operating and maintaining the infrastructure assets needed to deliver a public service in accordance with the public sector's output specification is the responsibility of the private sector. The public sector pays for the project through a number of performances - or through put-related

payments, which includes services delivered and return on investment. A central government may provide payment support to the public sector through grants and other financial mechanisms(American Home Mortgage Investment Treasury,2000). Public Private Partnerships (PPP) are found in one form or another, in most countries around the developed and developing worlds. According to Ahmad (2000) more than two thousand PPPs are formed worldwide. Countries where PPPs have experience successful implementation are as follow: Germany, the United States of America (USA), Australia, the United Kingdom (UK), Canada and Argentina, among others.

Governments around the world have not been able to provide infrastructure facilities adequately for their citizens due being budgetary constrained. Hence the implementation of PPP cannot be overemphasizing. There is lack on equality in accessing services as far as rich and the poor are concerned due to globalization thus creating an even more urgent demand for state services. Tension has therefore become that natural consequence between the poor and the affluent both the developed and the developing worlds(Glatzer,2002). Widdus(2001) suggests that this awareness has been accompanied by a reassessment of the respective strength and weaknesses of the public and private sectors , and a realization that collaboration between the two is required, if a solution is needed.

The finance Minister Trevor Manuel indicated that the South African Government has recognized the need to leverage risk, increase its budgetary capacity and gain desperately needed specialized skills, by partnering with the private sector. According to Donaldson (2003), the South African Government has already entered into numerous contractual partnership partnerships of this nature, worth billions of

Rands. He suspects that this trend shall continue to increase over time. It is however, reported that not all PPP experience success. Certain PPPs in UK are yearly losing a lot of money The Times UK (2002). They further suggest that these PPPs are looking for government help in the form of cash bail-outs. The Toronto Star(2002) reports that PPPs are more expensive in the long-run than alternative solutions. They suggest that more economical forms of government procurement and road infrastructure are available. Road infrastructure is very important to the economic growth of every country.

Investment in the area of road transport forms a larger part of public expenditure in many developing countries according to Kerali(2003). Road Infrastructure may be seen o be one of the skeletal framework on which a society is built and in Ghana, it forms a crucial part of the Ghana Shared Growth and Development Agenda(GSGDA 201-2013) as the main area addressing infrastructure and human settlement. Road transport is the most predominant means of transport in Ghana and has been identified as key wealth creation. Road infrastructure development allows people to access various economic and social resources. Humans, goods and services to be transported are aided by road infrastructure facilities.

According to Times UK(2002) road infrastructure provides essential and complementary services to all sectors of the economy which includes, mining, health, tourism trade, education, energy, agriculture among others (Adu, 2009).Sufficient funding is needed to provide and maintain required road infrastructure. The urgent need for road projects together with the constant budgetary constraints on the part of the government has necessitated the need to adopt an

innovative PPP arrangement. The public sector now enters into long - term arrangement with private sector to finance, construct and operate and finally transfer the capital intensive infrastructure projects. This strategic shift has become necessary since it realized that, scaling up financing from traditional sources (public funds) alone is not enough to close existing infrastructure deficit and ensure sufficiency for both the present and future generations. Of late there has been an increased cooperation between the private and the public sectors to develop and operate infrastructure for a various economic ventures.

Such Public-Private Partnerships (PPP) arrangements were motivated by the efforts to ensure and increased quality and efficiency of services in the public sector (European Commission, 2003). A Public Works Financing database of worldwide projects between 1985 and 2004 indicates that 1,121 Public Private Partnership infrastructure projects (road, rail, airport, seaport, water, and building), representing $450.9 billion worth of investment, were funded and completed with the least of the projects(9.7%) being in Latin America, Africa and Middle East as displayed in Table 1.1 below;

Table 1.1 Regional Share of PPP Projects funded and completed between 1985 and 2004

Region	Percentage (%)
Europe	37.8
Asia and the Far East	36.7
North America	15.8
Latin America, Africa and Middle East	9.7
Total (450.9 billion)	100

Source: Ahmed & Aziz, 2007

Partnership models has been used in UK through Private Finance Initiative (PFI) to design and provide all forms of infrastructure facilities including schools, roads to say a few. Private Finance Initiative projects now represent between 10 to 13 percent of all UK investment in public infrastructure. However about ten years ago, PPPs were less utilized and this long period of neglect led to schools, hospitals, and other public assets across Britain becoming deteriorated (Deloitte, 2006).Through the use of private financing options this trend has experienced a reverse in that more transport and other infrastructure facilities are realized. Ghana`s Gross Domestic Product (GDP) is 39.2 billion US dollars (World Bank Institute Report, 2011) still suffers road and other infrastructure deficit. The government is the main financier of road infrastructure development in Ghana. This fund comes from three main sources; the consolidated fund, the Ghana road fund and donor funds.

The main sources of inflows into the consolidated fund are taxes, fess, charges and government income from undertaking economic activities (Ministry of Roads and

Highways, 2011). Government of Ghana needs huge capital to close its infrastructure deficit. According to the World Bank Institute report 2012, Ghana requires not less than 2.5 billion US dollars yearly for ten years consecutively to close its infrastructure deficit. Considering the Ghana government balance sheet it is almost difficult for the Ghana government to obtain the required funding to close this infrastructure deficit. For Ghana to be able to close the deficit, procurement strategies that allow transfer or sharing of financial responsibilities and risks among government and private sector need to be contracted in the delivery of road infrastructure projects.

Government has been the sole financier of public infrastructure in Ghana with the use of Traditional Design Bid Build method of procurement. By implication the projects will put on hold as soon as government is financially restricted. Again, the traditional Design Bid Build model of procurement usually used for infrastructure project delivery in Ghana experiences delay in completion, cost overrun, corruption and low quality according to Owusu (2010). Owing to not achieving the above mentioned objectives government `s aim of closing the infrastructure deficit has been so slow. This is so primarily due to insufficient flow of funds for project delivery owing to inadequate public financial resources. It is upon this basis that the Government of Ghana (GOG) is instituting measures to implement PPP to help augment its effort of public infrastructure provision. Effort at formalizing Public Private Partnership (PPP) process in Ghana commenced in 2003, with the then Ministry for Private Sector Development.

Policy Guidelines for the implementation of PPPs in Ghana were finalized and received for Cabinet approval in 2004. However, the 2004 guidelines did not result in an improvement in the delivery of PPP projects. To move a step further, the national PPP policy was drafted and approved by Cabinet in June 2011 (Apenteng, 2011). However, the required legal framework was still being prepared in order it can be fully implemented.

1.2 Problem Statement

Developing countries such as Ghana are in dire need of infrastructure development, and some developing countries are venturing into public–private partnerships (PPPs). The multiple objectives of PPPs(Bing et al., 2004), including promoting infrastructure development, developing the local economy, reducing costs, increasing construction and operation efficiencies, and improving service quality by incorporating the private sector's knowledge, expertise and capital, have attracted increasing interest from policy makers, researchers and industry practitioners. Governments believe that PPP procurement can provide a wide variety of net benefits for society, including enhanced government capacity, innovation in delivering public services; reductions in the costs and times associated with project implementation, and transfer of major risk to the private sector, with the net result of securing value for money for taxpayers(Gruneberg, Hughes and Ancell, 2007).

However, the government of Ghana is constrained with limited financial, technological and other infrastructural development resources. These have over the years hampered its effort to provide adequate infrastructure to ensure comfort and economic growth. The central government usually undertakes road infrastructure

projects without any form of formal investment partnership. The traditional design bid build procurement strategy which is mostly engaged in Ghana has been identified to produce unsatisfactory results as it is characterized by delay in delivery, project stoppage, quality deficiency and cost overrun (Owusu, 2010).

Owusu (2010) further holds that road projects scheduled to be completed in one year tend to be delivered in six to seven years with substandard quality and huge cost overrun due to financial, technical and management challenges among others. This normally disrupts or nullifies the original objective of the proposed project. Thus although public – private partnership as a procurement strategy may be use to help close the road infrastructure deficit in Ghana, it success is nonetheless influenced by a number of factors aside the risk associated with it. Therefore the study seeks to identify the factors affecting road infrastructure delivery in Ghana, identify the risks associated with PPP and recommend means of sharing the risks among the parties or managing those risks so as to enable parties to the PPP agreement to make a well informed decision. To this end the following research questions were asked.

1. What significant factors affect road infrastructure delivery?
2. What are the risks associated with Public Private Partnership in road infrastructure development?
3. How are those risks managed or shared between the parties?

1.3 Aim of the Research

The research aims at identifying road infrastructure delivery factors, risks associated with Public Private Partnership and how to manage them.

1.4 The Specific Objective

To achieve the general objective, the research attempts to:

- Identify the significant factors that affect the delivery of road infrastructure projects
- To identify the risks associated with Public Private Partnership in road infrastructure development.
- To determine how those risks should be managed or shared among parties involved.

1.5 Research Questions

Based on the problems discussed, the purpose of the study is to create better understanding of the significant factors affecting road infrastructure development, the risk associated with PPP in road infrastructure development as well as solutions to those identified risks will be managed in order to assist with making well informed decision before PPP agreement is entered into by parties. To enable the researcher to achieve this objective, answers will be found to the following questions:

1. What factors affect road infrastructure delivery?
2. What are the risks associated with Public Private Partnership in road infrastructure development?
3. How are those risks managed or shared between the parties?

1.6 Justification for the study

Several fast developing countries such as China, Malaysia, South Africa, Spain etc. have taken advantage of PPP to speed up their infrastructure development. Attempts

at formalizing Public Private Partnership (PPP) process in Ghana began in 2003 and the national PPP policy was approved by Cabinet in June 2011 with necessary legal frameworks to support its efficient operation, under preparation(Apenteng, 2012). However the success of PPP is hinged on certain factors. Also there are a number of risks that may hamper the success of road infrastructure delivery and these risks require to be well managed.

The study brings to light the factors that affect road infrastructure delivery. It also identifies the risks that are associated with the delivery of road infrastructure in Ghana through PPP since the development of the nation is hinged on infrastructure with roads being a key indicator. The study again provides means of managing or sharing those risks between the government and the private sector.

1.7 Limitation/Scope

Although, factors affecting the delivery projects could be considered in almost all sectors of the economy such as mining, agriculture, energy, water supply etc. The study focused on identifying those factors that affect road infrastructure delivery, risk that are associated with PPP in road infrastructure development in Ghana and how those risks would be managed or share between parties to the PPP contractual agreement.

1.8 Methodology

The study employed a range of research measures and was identified in four stages. Stage 1 was the literature review; Stage 2 for data collection; Stage 3 for data analysis and Stage 4 for writing up.

1.9 Stage

1.9.1 Stage 1 – Literature Review

The study reviewed relevant literature on the subject of factors affecting road infrastructural delivery, risks affecting Public Private Partnership (PPP) in the road infrastructure development in Ghana and how those risks will be managed. The basic concern throughout the literature review stage was to identify the factors that affect road infrastructure delivery, risks associated with PPP and how to manage or share those risks. In order to achieve the first objective, a systematic literature review was conducted which covered textbooks, institutional and statutory publications, periodicals and trade/academic journals, seminar and conference papers and internet publications. Based on the literature review, the factors affecting road infrastructure delivery were identified as well as the risks and how to manage those risks were used in the questionnaires to elicit the awareness and perceptions of respondents in the road sector.

1.9.2 Stage 2 – Data Collection

The sample size for the research was taken to be some key staff(The directors, Procurement Managers, Project Managers, Project Quantity Surveyors and Site Engineers) of Ghana Highways Authority, Department of Feeder Roads and Department of Urban Roads in Accra as well road contractors in Accra. The sampling procedure employed was purposive so as to sample respondents in the three identified road sectors and road contractors. Both secondary and primary data were gathered. The secondary data was extracted from documented facts and the latter collected using questionnaires which content comprised closed-ended questions for purposes of standardization and efficient processing for statistical

analysis to be conducted. The collection of data took the form of a structured questionnaire distributed to key staff in the road sector that is resident in Accra and in public practice as well as road contractors in the private sector in Accra, to respond to the questions posed in the questionnaire.

1.9.3 Stage 3 – Data Analysis

The analysis of the data gathered employed descriptive statistics. First, to determine the level of agreement or otherwise by the respondents to each question within the questionnaires by counting favourable or unfavourable responses. Some of the questions were based on rated scales. Judging by the responses, it was established whether or not the respondents are aware and conversant with the factors affecting road infrastructure delivery as well as the risks associated with PPP in road infrastructure development and their remedies. Further discussions and interpretations were made on the research findings.

1.9.4 Stage 4 – Writing Up

This involved reporting on the research by detailing out the content of the dissertation and covered the chapters stated in the following section.

1.10 Structure of the Report

In reporting on the study undertaken, the chapter one served as an introduction to the research and was devoted to giving the background to the research, statement of problem, aim and objectives, significance , scope of study and research methodology. Chapter two focused on the review of existing literature identified with the main themes of the research topic, i.e. factors affecting road project

delivery, risks associated with Public-Private Partnership in road infrastructure development and how the risks are managed or shared. Chapter three dwelt on the methodology adopted for the study. Chapter four was concerned with presentation of the data collected, its analysis and further discussions were made. Finally, chapter five discussed the findings of the study, gave recommendations and further concluded on the research. This section is purposefully to inform the reader of the contents of this dissertation. Each chapter within the dissertation has a brief description stating what that chapter includes, that is, the purpose of it, and its relationship to the research aim and objectives, followed by a conclusion of that chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The role of road infrastructure in the progress of every nation's economy cannot be downplayed. Road networks facilitate movement of humans, goods and services for various uses. Road infrastructure project delivery needs huge financial capital to ensure its provision. Traditionally time, cost and quality are the parameters for evaluation of any project (Rohaniyati, 2009). Project delay has been an issue of concern and therefore a lot of effort has been exerted worldwide to establish the causes. Some of these authors or researchers identified by Aiyetan(2010) in his research on the causes of project delay include Aibinu and Jagboro(2002) in Nigeria; Belout and Gauvreau(2003) in Canada, Koushki and Kartam(2004), Assaf and Al-Hejji (2005), and Faridi and El-Sayegh (2006) in Saudi Arabia, Frimpong et al.(2002) in Ghana, and Bryde, Iyer and Jha(2005) and Robinson (2005) in the UK.

According to Amoatey(2010) on road finance indicates that insufficient financial allocation to the road sector is a main cause of roads becoming deteriorated in developing countries, since maintenance work is always procrastinated. However, Owusu (2010), also is of the view that governments in many developing countries are less resourced and are therefore not able to satisfy its road infrastructure provision as his responsibility. Grimsey & Lewis (2002), are of the view that Public Private Partnerships (PPPs), known as "agreements where public sector bodies enter into long-term contractual agreements with private sector entities for the construction or management of public sector infrastructure facilities by the private sector entity or the provision of services by the private sector entities on behalf of a public sector

entity" has become popular because of the possibility to use the private sectors efficiency to deliver public service. The involvement of the private partner in projects executed through PPP ensure that the risks associated with the said project is shared between the parties as indicated by several authors such Akintoye et al.(2001) and Bing et al.(2004). However different writers, institutions and scholars such as Ham & Koppenjan(2001), Klijn(2000) & Teisman(2005) have different views about PPP and Commission on UK Public Private Partnerships(2001) about the conventional definition and efficiency of PPP. Different literature hints on the advantages and disadvantages and the circumstances where PPP may be applied by the government: in this regard, the idea of Value for Money was explained (American Home Mortgage Investment Treasury, 2008).

The review starts by looking at the overview of the road infrastructure and its relevance to the development of the nation. It further touches on the trend and identifies the significant factors that affect road infrastructure delivery. It also identifies the risks associated with PPP in road infrastructure development. Better understanding is aimed at by examining the definition of PPP and others issues associated with it. Different forms and PPP approached are carefully explained. To guide the decision to advocate for PPP, the merits and demerits of the Public Private Partnership procurement are clearly underscored. The relationship existent between PPP method of project delivery and the traditional project method are examined to ensure a well informed decision making and judgment.

2.2 Road Infrastructure

Road infrastructure is indispensable when it come the economic growth of any nation. Road infrastructure development offers the chance for people to access different economic and social resources. Road networks allows for the migration of people, goods and services for various purposes. It contributes to other sectors such as tourism, mining, health, trade, education, agriculture, energy among others by provision of services (Adu, 2009). Road inaccessibility will lead to, inefficient movement of economic resources such as human, information, logistics etc. to places where they are needed for high productivity. Amoatey (2007) revealed that, in accordance with the Ghana Investment Promotion Centre (2009) report, road transport accounts for 94% of freight ton-miles and about 97% of passenger miles in Ghana.

Road infrastructure is composed of road and highway networks, which includes structures (bridges, tunnels, culverts, retaining walls), signage and markings, electrical systems (street lighting and traffic lights), treatments at edges (curbs, sidewalks, landscaping), and road maintenance depots which is a special facility as well as other areas that support movement of goods, services, human capital etc, for various purposes. For and effective integrated transport system, roads may be divided into: local, arterial and national roads (Khulumane, 2008). The total roads network of Ghana as at 2012 was 67450km of which 19%, 63% and 18% are trunk roads, feeder roads and urban roads respectively. The network links all districts and regions, as well as most populated areas and is considered sufficient to meet the minimal requirements for sub-regional integration.

In spite of that there is from congestion in the form of very high traffic jams in major cities, rapid deterioration (with 41% of the road network considered in good condition), and poor connectivity in rural areas, where only one fourth of rural population live within 2km of an all season road. Although expansion of the road network is required, priority is given to improving roads quality through the introduction of improved/latest construction technology, better maintenance and regulation, decongesting urban traffic (in Accra first), and improving rural connectivity.

In order to offset the road gap, up-grading of road pavement and road furniture (drains signage etc.) and improved inter-connectivity of roads in all the three road sectors namely Highways, Urban and Feeder Roads across the country must receive very urgent and appropriate intervention(Ghana Investment Plan,2012). The road infrastructure as indicated earlier is very important for economic and social development in every nation. Ghana is a developing country and depends upon road for several of its transport activities. The Ministry of Roads and Highways is generally duty bound for road development and maintenance. The ministry is further broken down into three separate agencies according to the different categories of roads in Ghana in order to be able to help carry out its duties successfully. The Agencies are:

i. The Ghana Highway Authority (GHA)
ii. The Department of Urban Roads (DUR)
iii. The Department of Feeder Roads (DFR)

2.3 Road Infrastructure Project Delivery

Road infrastructure Projects involves very huge capital and usually consumes a large percentage of national budgets. However investing in road infrastructure project cannot be overemphasized since its presence contributes immensely to the economic growth of the nation. However, the need for its investment cannot be underestimated due to its enormous contribution to the national economic growth. Its provision takes due cognizance of issues bordering on time, scope, cost and quality.

2.3.1 Time

Every Project has a specific duration. Road infrastructure projects are bounded by schedule deadline which controls time progress of the project. In the contract document, project start and end dates are defined before start of the project. Once the contract commitment is made, it is very important on the part of performing organization to plan and work within its control to meet the delivery deadline. Delay in project delivery may affect cost, quality, and increase risk (Newcombe et al., 1990). On the part of the contractor or the performing organization, if the project is completed in time, it saves cost since the company`s resources could be transferred to different project for profit.

On the other hand, project delay may cause additional resources to be brought from other project in order to help complete the project behind schedule. Similarly, for the project owner a completion of a project on time or in time shall be an advantage for him/her to carry out his/her business as per his/her scheduled which can result in good fortune. On the other hand, delay in completion may affect the client's expectation and objectives and results in extra cost due to inflation and other

economic factors. That is why in most cases the project owner imposes LAD (Liquidated and ascertain damages) as a penalty to the contractor should the project delay (Mohd, 2010).

2.3.2 Scope

Project scope definition is the process which involves developing a detailed description of the project and product. The preparation of a detailed project scope statement is critical to project success and builds upon the major deliverables, assumptions, and constraints that are documented during project initiation (Joel,1995). During planning, the project scope is defined and described with greater specificity as more information about the project is known. Existing risks, assumptions, and constraints are analysed for completeness; additional risks, assumptions, and constraints are added as necessary. The project scope serves as a boundary for the project activities and deliverables. It is important to adhere to project scope definition in the contract to avoid cost overrun and delay in completion.

2.3.3 Cost

Cost estimates are prediction of project cost that is based on the information known at a given point in time. It includes the identification and consideration of costing alternatives to initiate and complete the project. Cost trade-offs and risks, such as make versus buy, buy versus lease, and the sharing of resources in order to achieve optimal costs for the project must be considered (Charles and Andrew, 1990). All projects have finite resources available usually measured in terms of cost. Reducing

the cost of a project will have an impact on the time the project will take and changing the time available to a project will impact the cost of the project.

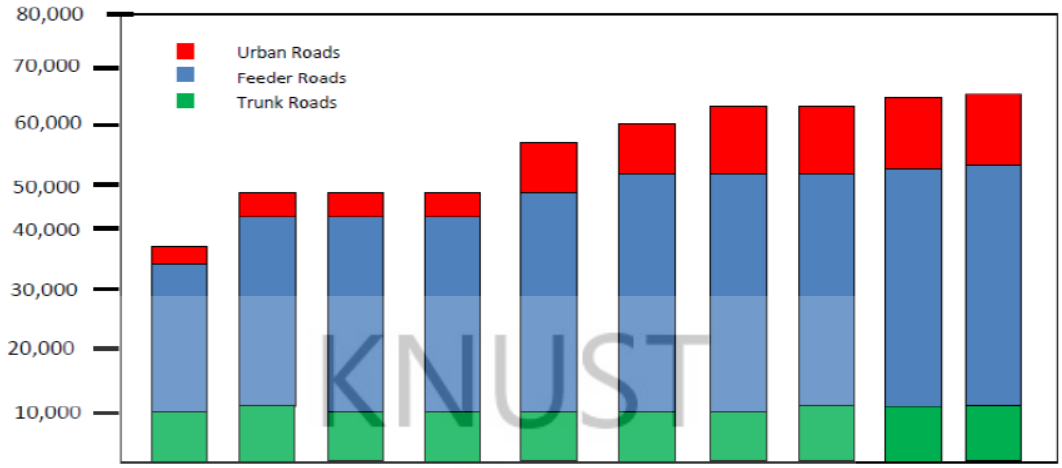
2.3.4. Quality

Quality means features of products which meet customer needs and thereby provide customer satisfaction (Juran, 1986). If the project is delivered but fails to meet client's needs or customer's expectation, the project is said to have failed. Project quality delivery includes the processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken (Flanagan and Tate, 1997). It implements the quality management system through policy and procedures with continuous process improvement activities conducted throughout the project execution. However, Harold (2009) also agrees that successful project must be within the allocated time period, within the budgeted cost and at the proper performance or specification level. He then added from contemporary perspective that, successful projects must be one with acceptance by the customer/user, with minimum or mutually agreed upon scope changes, without disturbing the main work flow of the organization and without changing the corporate culture.

2.4 The Trend of Road Development in Ghana

The network distribution by class remained at 19% trunk roads, 63% of feeder road and 18% urban roads. The total portfolio of roads stood at 37321km in 2000 and grew up to 67450km in 2009. This represents an annual average growth of 182.2km, 1801.9km and 171.7km for urban, feeder and trunk road respectively within the years of 2000 to 2009. As at 2009, the total length of paved and unpaved road in

Ghana stood at 12442km and 53863km respectively. The figure 2.1 illustrates the total network size by road type from 2000 to 2009.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Urban Roads	2,200	3,365	4064	5013	4796	5576	9764	9764	12400	12400
Feeder roads	23999	32597	32597	32595	38561	40862	40671	42010	42194	42209
Trunk Roads	11122	12688	12656	12696	12700	12781	12786	12549	12697	12839

Figure 2.1The Trend of Road Infrastructure Development from 2000-2009

Source: MRH, Road Infrastructure Development Annual Report, 2011.

2.5. Traditional Approach to Road Infrastructure Provision in Ghana

Generally, central government is responsible for the development, expansion and maintenance of road infrastructure for the benefit of all its citizens. The road infrastructure needs are prepared by the government's road or transport ministry or agencies and submitted to the government finance agencies for funding consideration. In many countries, roads infrastructure are funded by the central government through revenue generations, donor support in the form of loan or grants

from bilateral and multilateral Donor Agencies and the road fund. Ghana's road development and maintenance funding is of no difference.

The government is the main financier of road infrastructure development (Ministry of Roads and Highways, 2011). The government's main source of funding for the road sub-sector are the road fund, the Consolidated Fund and the donor Funds. The main sources of inflows into the Consolidated Fund are taxes, fees, charges and government income from undertaking economic activities. Fuel levy, road tolls, bridge tolls, ferry tolls, road use fees, vehicle registration fees and international transit fees are also the various constituents of road fund contribution (Ministry of Roads and Highways, 2011). Information from Ministry of Transport according to Nana-Benyin(2011) indicates that, the following Bilateral and Multilateral Donor Agencies supports Ghana road infrastructure funding in the form of loans or grants:

- IDA - International Development Association (World Bank)
- AfDB - Africa Development Bank
- OECF-Overseas Economic Co-operation Fund of Japan
- EU-European Union
- KFW- Kreditanstalt fur Wiederaufbau (Bank for Reconstruction)
- ECGD-Export Credit Guarantee Department of UK
- JICA-Japan International Co-operation Agency
- BADEA- Arab Bank for Development in Africa
- OPEC- Organisation of Petroleum Exporting Countries
- DANIDA- Danish Government.
- Saudi Fund

The Donor Agencies contribution to the Ghana government's road infrastructure development cannot be underestimated. In the case study of Road Funds in Ghana, Malawi and Tanzania, it was reported that, the overall Government of Ghana(GOG) road sector funding from 1996 to 2001 was US$ 1,121 million and Donor Funding represent about 44%, which is US$ 496.00 million (Andreski, 2008).

2.6 Factors that Affects Delivery of Road Infrastructure Projects

For successful delivery of road infrastructure projects, it is very important to know the key factors that affect their successful delivery. The identification and studying of these factors will enable one propose a suitable strategy to control the implementation of such projects.

It is indicated that, generally, the evaluation dimensions in any project correspond to the traditional constraints of time, cost and quality parameters (Rohaniyati, 2009).

However, there are several factors that affect project delivery with respect to time, cost and quality. The researcher such as Lyer (2006) has discovered a lot of factors that affect the delivery of projects. Since the year 2000, a concerted effort has been made all over the world to determine remedies to the issues of project delays. Aiyetan (2010) in his effort to examines influences on project delivery time, compiled some factors that affect project delivery, identified by the following researchers and authors; Aibinu and Jagboro (2002) in Nigeria; Belout and Gauvreau (2003) in Canada, Koushki and Kartam (2004), Assaf and Al-Hejji (2005), and Faridi and El-Sayegh (2006) in Saudi Arabia, Frimpong et al. (2002) in Ghana, Iyer and Jha (2005) and Robinson (2005) in the UK.

These factors are: Availability of fund; type of procurement system for the project; Project characteristics; client representation characteristics; project team performance (experience); client representative's characteristics; contractor's characteristics; Design Team characteristics; external conditions; project Manager's Competence; top Management support, project manager's coordinating and leadership skills; monitoring and Feedback by the participants; decision making; coordination among project participants; client or owners' competence; social condition; economic condition; climatic condition; availability of plants and equipment; the condition of the ground; availability and quality of construction materials; disputes and conflicts; availability of labour and productivity; nature of project planning; environmental regulations; nature of technology; political interest in the project.; the proposed project completion schedule or date and means of communication.

2.6.1 Road Infrastructure Deficit in Ghana

The length of the main (primary and secondary) network is more than adequate to achieve regional and national connectivity. The record on road network quality is quite reasonable, with 75 percent of the paved network in good or fair condition and, more impressive, 74 percent of the unpaved network in good or fair condition (Foster and Pushak,2011). It is measured by accessing the road infrastructure investment required for the present and future needs and the capacity of the present and the future economic budget to provide. From the table as indicated in the infrastructure plans Consultative Group Meeting, June 19, 2012, US$ 5,497 million is required to close the road infrastructure gap in Ghana.

Table 2.1 Infrastructure Investment Plans 2012-17 (US$ million)

Sector	Required investment in million dollars
Generation	1,980
Transmission	903
Distribution	1,000
Roads	5,497
Ports	674
Rails	2,832

Source: GIP 2012.

The amount is to be invested in expansion in length and number of lanes, up-grading of road pavement and road furniture (drains, signage etc.) and improved inter-connectivity of roads in all the three road sectors namely Highways, Urban and Feeder Roads across the country (Ghana Investment Plan, 2012).

2.6.2 Effects of Road Infrastructure Deficit

As already discussed, the importance of road infrastructure cannot be overemphasized. Road is one of the most important contributor of economic growth. The lack of modern infrastructure which includes road is a major challenge to many developing countries' economic development and creates major impediments to the achievement of the various projected development goals. This is a serious developmental challenge, especially in countries, where transport cost is a major determinant of prices of basic goods and services (Haris, 2004).

There is an urgent need for road maintenance, reconstruction, expansion among others in several countries. This is an evidence to what pertains in many Sub-Sahara

African countries, where on average about one-fourth of the entire network are in poor condition and require urgent interventions to prevent the networks from complete collapse (Amoatey, 2007). The problem of road infrastructure deficit is apparently pervasive in all developing countries. Inadequate road infrastructure leads to road accident, traffic congestion (which causes waste of fuel, increase travel time and global warming) and other economic and social losses. Extensively, the cost of road infrastructure deficit can be felt in almost all sectors of national economy. Some of the economic sectors which may experience the major impact include agriculture, health service, education, defense and security service, governance etc. This is because most of the activities of these sectors rely on road transport particularly in the developing countries. In agriculture for instance, the majority of farmers are located in the rural areas with less competitive market price for farm products. These compel them to transport their products to the urban centers where demand is higher for better sales value.

One can argue that, the high price of food items or farm products in the urban centers cannot only be attributed to the higher demand of food items in urban centers but rather due to poor and expensive transport accessibility. If farmers are not able to distribute their product due to transport problems, the majority of the other economic sectors such as education, defense and security, health, governance, communication etc. would be indirectly affected. These have motivated many countries to invest huge resources into improving, expanding, maintaining and modernizing road infrastructure through several innovative procurement strategies.

2.7 Public-Private Partnership (PPP) Overview

PPP is being adopted by public sectors (governments) as an alternative procurement strategy to pool resources from the private sector to supplement their efforts in infrastructural provision raging from roads, schools, information and communication, water supply, power supply, agriculture etc.

2.7.1 Evolution of Public-Private partnership (PPP)

Private sector involvement in the delivery of public services is not a new concept; PPPs have been used for over four decades, predating the contracting out initiatives of 1970s in the USA. Initially focusing on economic infrastructure, PPPs have evolved to include the procurement of social infrastructure assets and associated non-core services (facility management, maintenance and security). PPPs have extended to housing, health, corrective facilities, energy, water, and waste treatment (New South Wales Treasury, 2009). PPP policy has also evolved globally as public sectors develop the necessary skill base to procure infrastructure by way of PPP, including the capacity to create and maintain a regulatory framework. PPP have different names all over the world. Example of some countries and organizations and their reference to PPP are; United Kingdom (UK), Japan and Malaysia - Private Finance Initiative (PFI), Australia - Private Finance Project (PFP), North America - Public-Private Partnership (P3), Development Banks - Private Sector Participation (PSP) and World Bank – Private Participation in Infrastructure (PPI) (Abiodun, 2011).

Despite all the different names, the main focus is on the combined service delivery methodology by the private sector and the public sector (Osborne, 2000).

Governments have pursued this public procurement alternative for various reasons. In US, UK, Australia and Canada and other industrialized economies have tended to pursue public-private partnership in order to reduce the operating cost of public service, quality and customer satisfaction (White, 2006). The UK has been a modern instigator of this wave of private sector involvement, with the introduction of the Private Finance Initiative. PFIs have been used to develop and deliver all manner of infrastructure and services and now represent 10 to 13% of all UK investment in public infrastructure; close to 100 PFI projects are initiated or completed per year (Deloite research, 2006). Specifically, M25, one of the busiest motorways in UK, where over 200,000 vehicles ply daily, is presently being expanded from three lanes to four lanes in both directions through PPP to enhance traffic management (Abiodun, 2011).

The growing use of PFIs has inspired governments worldwide to adopt PPP arrangements. The Australian government has used PPPs to deliver several social infrastructure projects; Ireland has used them for transport infrastructure; in the Netherlands, social housing and urban regeneration programs have been delivered through PPP arrangements; India is investing heavily in highways through PPPs; Japan has around 20 new PPPs in the pipeline; in Canada, 20% of new infrastructure are designed, built and operated by the private sector; the USA is a pioneer with contracting out and have started experimenting with other forms of PPPs; emerging democracies from central Europe are also following suit. The former Prime Minister of Czech Republic, Jiri Paroublek (2010), explains that "just like any other market economy, we are trying to multiply our economic potential and implement projects

for which the public sector alone has neither the strength nor the resources (Deloitte, 2006).

In developing countries, contracting out was introduced in the mid 1980s during the first wave of governmental privatisation of state enterprises, under structural adjustment programs. Policies were adopted to address the perceived lack of managerial capacity in government, as well as the need to stop the continued dependence of state enterprises on state subsidies. According to Deloitte research (2006), in Africa, between 1990 and 2004, approximately 14% of public sector infrastructure was provided through a PPP, the most common sectors being water, energy and transport. The PPP trend is global, accelerating and encompassing a broad range of infrastructure sectors. Applying PPPs in social infrastructure sectors has to some extent reduced the concentration of PPP projects at the central government level. Increasing number of local authorities is engaging in PPP arrangements to procure much needed local infrastructure.

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Better understanding of PPPs will make PPP strategy implementation much more effective. Dutch Public Management Scholars Ham and Koppenjan (2001) defined PPP from organizational perspective as cooperation of some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs and resources which are connected with these products. The note points out several features of this definition. First, it underlines cooperation of some durability, where collaboration cannot only take place in short-term contracts. Second, it emphasizes risk-sharing as a vital component. This means that both parties in the partnership together have to bear parts of the risks involved. Third, the parties jointly produce something (a product or a service) and, perhaps implicitly, both stand to gain from mutual effort.

However, the definition does not emphasize on user charges as a means of repayment and final ownership of the product or service after the concession period.

Similar features are also evident in the definitions of PPPs that are provided by Klijn (2000) and Teisman, (2005) and Commission on UK Public Private Partnerships (2001), where PPPs are described as a 'sustainable cooperation between public and private actors in which products and/or services are developed and risks, costs and profits are shared' (Klijn 2000 and Teisman 2005) and as 'a risk-sharing relationship between the public-private including voluntary sector to bring about a desired public policy outcome' (Commission on UK Public Private Partnerships, 2001).

World Bank institute (2012) however, argues that, there is no single, internationally accepted definition of "Public-Private Partnership (PPP). PPP definitions differ from countries to countries and organization to organizations. For instance in Ghana, The National Policy on PPP defines PPP as "a contractual arrangement between a public entity and a private sector party, with clear agreement on shared objectives for the provision of public infrastructure and services traditionally provided by the public sector with the private sector party performing part or all of the government's delivery functions and assuming the associated risk for a significant period of time which in return, the private sector party shall receive a benefit/financial remuneration (according to predefined performance criteria), which may be derived entirely from service tariffs or user charges, government budgets, which may be fixed or partially fixed, periodic payments(annuity) and contingent or a combination of the above and whereby the facility is transferred to the public sector party after the concession period or repayment.

In this case, the private sector entity's responsibility may include designing, financing, construction, operation, maintenance etc. of either a new or existing facility or service and assume the associated risk. Also, per Ghana's PPP definition,

for any partnership arrangement between the public and the private sector for project delivery to be classified as PPP, the final ownership of the facility must be transferred to the public sector after the concession period.

2.7.2 Ghana Public Private Partnership Bill Draft

A draft bill on PPP will soon be presented to cabinet for approval and subsequently presented to Parliament for consideration and passage into law by the end of the 2014. This follows a national policy document on PPP put together and approved in 2011. Mrs. Apenteng hinted that by the end of the 2014, the PPP Law would be in place along with its regulations and guidelines to ensure that processes are followed diligently.

2.7.3 Public-Private Partnership (PPP) Projects in Ghana

15 infrastructure projects are currently being pursued by the Ghana Government under its private-public partnership (PPP) initiative with a US$ 30 million facility from the World Bank. The Director of the Public Investment Division of the Ministry of Finance and Economic Planning (MoFEP), Mrs Magdalene Apenteng, said the projects were expected to help in terms of capacity building and ensure that the country put together a line of projects to entice the private sector to undertake infrastructure projects. There are about 15 projects in the pipeline, with six being effectively prepared by various transaction advisors that are on board, and it is hoped that by 2015 some good projects would be seen on the ground. This was disclosed by Mrs. Magdalene Apenteng at the launching of the first Global PPP conference held in Ghana from August 18– 21, 2014.

2.7.3 Models of Public-Private Partnership (PPP)

A wide spectrum of PPP models have emerged and they vary mainly by ownership of capital assets, responsibility for investment, assumption of risks and duration of contract. PPP models can be used for two broad infrastructure purposes:1) use for new infrastructure e.g. Greenfield projects 2) use for already existing infrastructure. Some of PPP models related to the new infrastructure projects are described below:

- **Build-Transfer (BT)**:

Under this model, the public sector authority contracts with a private partner to design and build a facility in accordance with the requirements set by the public sector authority. The government assumes responsibility after completing the facility for operating and maintaining the facility. This method of procurement is also referred to as Design-Build (DB) (Deloitte, 2006).

- **Design-Build-Maintain (DBM):**

This model is similar to Design-Build except that the private sector also maintains the facility. The public sector retains responsibility for operations (Deloitte, 2006).

- **Design-Build-Operate (DBO)**:

Under this model, the private sector designs and builds a facility. Once the facility is completed, the title for the new facility is transferred to the public sector, while the private sector operates the facility for a specified period. This procurement model is also referred to as Build-Transfer-Operate (BTO) (Deloitte, 2006).

- **Design-Build-Operate-Maintain (DBOM)**:

This model combines the responsibilities of design-build procurements with the operations and maintenance of a facility for a specified period by a private sector partner. At the end of that period, the operation of the facility is transferred back to the public sector. This method of procurement is also referred to as Build-Operate-Transfer (BOT), (Deloitte, 2006).

- **Build-Own-Operate-Transfer (BOOT)**:

The municipal authority grants a franchise to a private partner to finance, design, build and operate a facility for a specific period of time. Ownership of the facility is transferred back to the public sector at the end of that period (Deloitte, 2006).

- **Build-Own-Operate (BOO)**:

The government grants the right to finance, design, build, operate and maintain a project to a private entity, which retains ownership of the project. The private entity is not required to transfer the facility back to the government (Deloitte, 2006).

- **Design-Build-Finance-Operate/Maintain (DBFO, DBFM or DBFO/M):**

Under this model, the private sector designs, builds, finances, operates and/or maintains a new facility under a long-term lease. At the end of the lease term, the facility is transferred to the public sector. In some countries, DBFO/M covers both BOO and BOOT (Deloitte, 2006). Palmer(2009) added that PPPs can also be used for existing services and facilities in addition to new ones under the following models:

- **Service Contract:**

The government contracts with a private entity to provide services the government previously performed (Deloitte, 2006).

- **Management Contract:**

A management contract differs from a service contract in that the private entity is responsible for all aspects of operations and maintenance of the facility under contract.

- **Lease:**

The government grants a private entity a leasehold interest in an asset. The private partner operates and maintains the asset in accordance with the terms of the lease (Deloitte, 2006).

- **Concession:**

The government grants a private entity the exclusive rights to provide, operate and maintain an asset over a long period of time in accordance with performance requirements set forth by the government. The public sector retains ownership of the original asset, while the private operator retains ownership over any improvements made during the concession period (Deloitte, 2006).

- **Divestiture:**

The government transfers an asset, either in part or in full, to the private sector. Generally the government will include certain conditions with the sale of the asset to ensure that improvements are made and citizens continue to be served (Deloitte,

2006). Even though, various model described above demonstrate a degree of partnership relationship between the public and private sector, per the Ghana's PPP definition, only models that allow transfer of final ownership of the facility to public sector after the concession period is regarded as PPP. Therefore models described above that satisfies the Ghana's PPP definition include; Concession, Lease, Management contract, Service contract, Design-Build (Build-Transfer), Design-Build-Maintain, Design-Build-Operate, Design-Build-Operate-Maintain (DBOM), Build-Own-Operate-Transfer (BOOT), and Design-Build-Finance-Operate/Maintain (DBFO, DBFM or DBFO/M).

2.8. Assessment of PPP Option for Road infrastructure projects

Several PPP types exist as indicated earlier and a suitable model must be selected based on the purpose of the project and the partners' characteristics. There is no single PPP model that can satisfy all conditions due to changes in project's locational setting, technical and financial features.

- Is the project affordable? Will users or the Public sector (Authority), or both, pay for the project? How will they pay (e.g. user charges, operating subsidies, public sector or EU grants)? Are the procurement costs significant if the project is procured as a PPP?
- What are the key sources of risk in the proposed project? What is the optimal risk allocation and risk management strategy?
- What are the financing sources for the proposed project? Will the project be "bankable" (i.e. capable of raising debt finance)? Will it attract investors? Will it comply with the requisites for national public funding?

- Even if the project is affordable and bankable, does the project represent value for money? Source: EPEC PPP guidebook 2008.

2.9 Risk and Risk Management in PPP in Road Infrastructure Projects

For successful implementation of PPP in road infrastructure projects, it is very important for one to identify, understand and address the risks associated with PPP strategy. This is because investors would only consider a project base on their understanding of the risk and rewards associated with the project. Risk is defined as an uncertainty event or condition that if it occurs has positive or negative impact on the project objectives such as time, cost, quality, scope etc.

Every project has some level of risk(s) stemming either from the project itself or project environment or the general environment. Thus risk is indispensable in project but proactively applying the significant management strategy can control their probability of occurrence and their associated impact. Usually, in project delivery, the higher a party assumes risk, the higher the reward or loss and vice versa depending on the outcome of the risk. PPP infrastructure project is exposed to several risks emanating from the project's micro and macro environment. This is due to the number of parties involve, their location and the complexity of the project itself.

Some of the risk associated Public – Private Partnership are as follows:

- **Political Risks**

To be successful, public – Private Partnership (PPP) projects must be supported by strong political will at all levels of government. This includes support from the

legislative and of political risk includes the outright cancellation of projects by the public executive branches as well as the general public. A lack of political commitment is one of the critical risks during the project development phase. It can lead potential private partners to withdraw from the project if concerns arise surrounding the certainty of investment terms. Manifestations agency, the inability to reach an agreement between the public and private partners on the project structure, and the failure to appropriate funds necessary for the proposed project.

Cancellation of a project or failure to reach an agreement between the private and public partners due to lack of political commitment can make it more difficult to attract the private sector in future PPP projects that may be proposed by the public agency. Political risk is heightened if state PPP legislation allows for a veto of the project by a state or local assembly. The uncertainty surrounding final approval of the project and the inclusion of local political pressures in the decision-making process are powerful deterrents to private sector investment. This problem may be overcome by having a well drafted national policy which is to be followed no matter which government in power.

- **Regulatory Risks**

A clear prerequisite to the development of PPP projects is the existence of PPP enabling legislation. Regulatory risk exists when an inadequate PPP framework is in place. State and local PPP legislation must contain certain provisions to ensure that the PPP program can be attractive to the private sector while protecting the public interest. PPP regulations should provide sufficient guidance, striking the right balance between flexibility and certainty. This will encourage private sector interest.

Desirable provisions in PPP legislation include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall, restrictive PPP statutes (e.g., restricting PPP to a pilot program or requiring multiple legislative approvals for a project) are less likely to attract private sector interest than more flexible legislative provisions. Other regulatory restrictions may include limits on the type of procurement that is authorized, limitations on leasing, limitations on use of financing instruments (including mixing public and private funds on a given project), and restrictions on which public agencies are allowed to enter into PPP agreements (e.g., state departments of transportation but not local authorities). Restrictions on the type of projects and "pilot program" provisions are likely to be perceived by private sector entities as indicating a lack of long-term political commitment to PPP.

- **Site Risks**

During the development phase, green field or hybrid PPP projects are exposed to a variety of risks related to the project site's ground conditions. Issues can arise with regard to the suitability of the site, including environmental contamination, poor geological conditions, and archeological remains. Community relations can also lead to site risks if there is a significant amount of local hostility toward a project. In these cases, site risk becomes closely tied to political risk, as local opposition to a project can jeopardize its political support.

Community relations issues can also lead to or worsen right-of-way acquisition risk. In some cases, the public agency will take responsibility for the acquisition of the required land, or the land will be federal or state-owned land. Occasionally, however, the private sector entity must acquire land (e.g., Dulles Greenway in Virginia), which

allows for the possibility of a real estate-related upside, but also increases the risk to the private sector. The state may still need to use their condemnation rights in extreme cases. The government of the home country of PPP project should ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project.

- **Permitting Risks**

The successful development of PPP projects is tied to the ability of the private sector entity to receive the required federal state, and local permits. Permitting issues stemming from a lack of preparedness or from difficulties caused by the project's design can cause considerable delays and additional costs. As with site-related issues, public agencies and the private sector partner can share the responsibility for permitting to varying degrees.

- **Procurement Risks**

Procurement risk refers to the risk of failed or flawed procurements. This includes fewer proposers than anticipated, affordability threshold exceeded by lowest bid, procurement award successfully challenged, or noncompliant or low-quality bids submitted. Procurement issues can be caused by general market conditions, but they most often stem from flaws in the design of the procurement process or unsuitable project structures/ risk transfer expectations. It is important that public agencies not be constrained in their procurement practices by regulations requiring that they award contracts to the lowest price bidder rather than to the bidder presenting the best value. There are often valid reasons for conducting a lowest-price competition with a quality threshold, and many proposers prefer this arrangement. In best value

procurements, technical or financial quality plays a significant role in the award decision. The public owner needs to understand the value associated with the quality factors. PPP legislation or guidelines often include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial and innovation criteria. However, procurement issues can arise from a lack of clarity in response requirements, excessive financial commitment requirements, insufficient protection of design and proprietary information, or a lack of transparency in the selection criteria. The procuring agency's track record with PPP and other procurements also influences bidders' perception of procurement risk. Procurement risk for private entities seeking to bid on a project can be significant since it is very expensive to prepare a proposal. The public owner should before the PPP project appoint the services of an expert procurement expert in order to offset this risk.

- **Financing Risks**

Risks associated with financing for PPP projects can result in the inability to reach financial close or lead to default on project debt during the operating period. Inaccurate or overly optimistic traffic projections and underestimated project costs can lead to the development of pro-forma financials that appear to justify the investment decision, but that do not reflect the project's actual ability to repay debt or to meet equity investors' return requirements. On project cost estimates, both equity investors and commercial lenders will look to achieve realism in the estimates and will subject them to similar stress tests. Lenders may, however, take a more conservative view of traffic volume projections, and their conclusion on the viability of the project might differ from the more aggressive outlook of the private sector entity. This could make financing difficult to obtain on reasonable terms. Both

commercial and public lenders make their decisions based not only on the intrinsic risk of project default, but also on external factors. Transportation projects have high capital costs and long-term revenue streams and are, therefore, generally financed over 20 or 30 years. With the constrained financial markets since 2007, however, banks became reluctant to have repayments outstanding for such lengthy periods of time. Commercial lenders have demanded more stringent terms, including higher minimum debt service coverage ratios and shorter loan life terms, tighter dividend distribution covenants, higher margins, mandatory refinancing and cash sweep provisions, and requirements for multiple reserve accounts (e.g., for debt service, O&M, and capital improvements).

Many PPP projects today achieve a significantly reduced cost of capital through government loan programs, such as the Transportation Infrastructure Finance and Innovation Act (TIFIA) program, to provide long-term subordinate debt. The availability of TIFIA financing depends on the project's eligibility, the amount of budgetary authority available to TIFIA and the successful mitigation of project risks. Financing risk exists even for projects with strong economics due to the limited amount of credit available from private and public sources.

Financing risks can also be related to regulatory risks. For example, if the tax treatment is not clearly outlined by the PPP regulations or the concession agreement, private lenders are likely to be unwilling to accept the risks. This reinforces the importance of transparency and predictability in PPP legislation, policies and guidelines. The financial risk can be overcome by a clearly defined concessionary

agreement and commitment to it as well as transparency and predictability and accountability.

- **Design risk**

This refers to the potentially negative effects to the project resulting from flaws in the design work. Design flaws can lead to delays and cost increases, as well as environmental and safety issues, both during the construction and during the operations period of a project. To prevent design risk from occurring expert and experienced designer must be charged with the responsibility for the design giving them adequate time the design. The design must be checked again and again to ensure completeness and accuracy by sourcing and award of contract.

- **Construction costs risks**

These are an important risk area for PPP projects as they can be affected by increases in labor and material costs, as well as by delays and the cost of performance bonds. Construction costs are estimated during the design phase and can be locked in through lump-sum turnkey contracts (design-build) which allow for fixed costs and penalties in case of completion delays. Performance bonds and completion guarantees can also be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, although this practice can result in a higher contract price.

- **Latent defect risk**

This is a form of risk linked to a project's construction that is present after the completion of construction. It is the risk of flaws in the infrastructure that are not

apparent until operation of the facility begins. Most construction contracts make the design - build contractor liable for such defects, and they include penalties and damages to compensate the owner and operator against lost revenue caused by the underperformance or lack of availability of the facility. It is only possible to lock the design - build contractor into a relatively short warranty of the work following Final Acceptance.

- **Force Majeure risk**

These are defects arising several years after the design - build contractor has finished will not generally be resolved through recourse to warranty provisions within the original design - build contract. This is the reason why a PPP DBFOM provides an effective long-term hedge against latent defects in a way that a design - build cannot. However, in hybrid greenfield-brownfield projects, where the concessionaire takes responsibility for existing assets, latent defects are a very contentious issue. It is important to note that construction cost risk is the only risk that is typically transferred under conventional procurement, although not always successfully. Typically under conventional procurement with DBB, the designer cannot take into consideration all of the contractor's construction methods.

The design is therefore not optimized to suit a specific contractor's sequencing, methods, equipment and preferences. The DBB process requires the public owner to manage design and construction interfaces, which often results in claims and inefficiencies compared to DB which has a single point of responsibility. The desire to control cost overruns is a key motivator for the public sector. For the private sector, managing construction costs is a key risk, which the concessionaire usually

handles by a design-build contract with another private firm. One way of offsetting this risk is through insuring the project with an insurance company to indemnify the insured since force majeure risks are risks resulting from circumstances beyond the control of both the public and private owners.

- **Traffic Risks**

Traffic risk (for toll-based concessions) refers to the risk that over the life of a project actual traffic levels do not reach projected levels. This would negatively affect the project's cash flows and the ability of the concessionaire to repay debt and generate sufficient equity returns. Traffic risk is often the core component of toll-based concessions, and its allocation defines the project and determines the remainder of the contractual arrangements. Traffic risk is present in any revenue generating facility. It is borne either by the public agency (in the case of availability payments) or by the private sector entity (in the case of toll-based or shadow toll-based concessions), or may be shared by both.

Traffic risk can be influenced by several factors, including the quality of the initial traffic projections, changes in the macroeconomic environment, the existence of alternative routes, and the level of user fees. Initial traffic projections are subject to a thorough vetting by lenders. This vetting can include requiring a review of the initial projections by an independent expert, lowering the risks associated with the quality of the projections. Competing facilities present revenue risk for toll-based PPP projects. Existing or planned competing facilities can be integrated into traffic and revenue projections, and diversion from the proposed toll facility can be modeled. However, calculating the risk of new (i.e., not previously planned) competing

facilities built during the operation phase of a PPP project is less straightforward. Some PPP agreements include a non-compete clause whereby the public agency agrees not to grant permits to a competing facility, or to compensate the concessionaire if a new competing facility is constructed that negatively impacts revenue from the existing PPP facility.

The burden of proof typically lies on the private party to demonstrate harm. The public sector may identify planned facilities that are exempt from qualifying as "Relief Events" or cause for compensation. Additional risks in the operations phase include technology risk, toll violation and toll collection enforcement risks, and risks related to toll escalation with policy gaps. Positive impacts from facilities built by the public sector must also be taken into account. In Texas, the concession agreements specify that construction of facilities that induce traffic on the PPP facility must also be taken into account and the net effect must be considered.

- **Operations and Maintenance Risks**

Operations and Maintenance (O&M) risk may result from actual physical issues with facilities or by an increase in O&M costs. O&M risk can also translate into loss of revenue if the facility needs to be closed for an extensive overhaul or if its capacity is reduced during maintenance activities. O&M costs forecasted at the time of the project's development generally include increases in costs based on inflation or other predetermined factors. Costs can, however, increase beyond the anticipated level, e.g., in cases where labor costs increase above expectations.

Insufficient maintenance can lead to a deterioration of the condition of a project and can ultimately lead to closures, which in turn will cause a loss in revenue (either from tolls or from availability payments) and damage the public's perception of the project. Loss of availability due to natural disasters and similar events is, however, generally considered to be caused by force majeure events and may be insured, or may be designated as a risk to be shared by the public and private partners. For hybrid greenfield-brownfield projects, where the concessionaire takes responsibility for existing assets, latent defects represent a significant risk that can raise contentious issues. A comprehensive plan and program for operating and maintaining the PPP project must be ensured by both parties to the contract.

- **Appropriations Risks**

Appropriations risk is the risk that the public agency is incapable of meeting its financial obligations to the project because funds for the project fail to be obligated into its budget. Appropriations risk can affect PPP projects where the public agency is expected to make payments, either as lump-sum payments during the construction period or as availability payments during the life of the project. This risk can be caused by political issues (if there is strong local opposition to the project) or by a change in economic conditions affecting public sector revenues.

- **Refinancing Risks**

Financing risk remains present during the operating life of a project. Depending on the initial financing terms, PPP projects can be exposed to interest rate risks, especially if the concessionaire has entered into a floating rate loan and have opted not to hedge. Loan agreements can also carry mandatory refinancing provisions; this

provision exposes a project to financing risk when it seeks to refinance its existing loan. To maintain similar debt service coverage ratios, and therefore the same level of default risk, private partners must be able to secure a loan of the same amount as the outstanding principal at the time of refinancing for a sufficient loan repayment period and at an equally or more favorable interest rate. The availability of debt at the time of the mandatory refinancing (associated with "bullet" maturities) cannot be known to the concessionaire at the time of the initial financing, making refinancing risk difficult to estimate accurately. In the past the private entity has benefited from refinancing, though less so recently. Many recent PPP contracts have provisions that require that the private party share any gains from refinancing with the public agency.

- **Hand back Risk or Residual Value Risk**

This is the risk that facility conditions are worse than anticipated at the end of the project. Hand back provisions include the terms, conditions, requirements and procedures governing the condition in which a private partner is to deliver an asset to the public sector upon expiration or earlier termination of the PPP agreement, as set forth in the contract. Contracts need to be structured so that there are financial incentives at the end of a contract to encourage the private partner to make the investments necessary to hand back the facility to the public agency in suitable condition.

- **Technical Risk**

There is a range of technical risks to be factored into bid calculation. While the PPP seeks to encourage innovation, in a technical context there is a bias against the use of

new products or procedures if these have not been thoroughly tested. The risk areas are not unrelated to each other and construction and technical specification must work together. A bidder may build to a higher initial standard in the hope of reducing maintenance costs. (Blackwell, 2000).

2.10 Why Choose PPP (Advantages and Disadvantages of PPP)

Different perceptions, views and thoughts have emerged over the years concerning the pros and cons of PPPs. It is necessary to look at these advantages and disadvantages because they could be considered for future projects and can also provide an important guidelines in terms of considering the specific opportunities and threats associated with PPPs (Haarhof, 2008).

Advantages of using PPP

- **Resources:** A partnership allows a pooling of resources so that larger projects or more aspects of a project can be tackled than is possible for an individual agency or it allows the agency to devote some resources targeted at one policy to be realized for use elsewhere (Osborne, 2000).
- **Effectiveness and Efficiency:** Depending on the nature of the problem, partnership can greatly increase an individual's organizations effectiveness and efficiency, especially through improved coordination between (and within) organizations. The end result is that greater output and cost savings might be achieved (Osborne, 2000)
- **Increased investment in public infrastructure:** Governments are able to implement projects more frequently and on a larger scale because the private

sector finance element reduces its need to raise or budget additional funds, as is the case in standard procurement.

- **Optimum Allocation of risks:** Risks are identified and allocated to a party who is able to deal with them. Project risks (e.g., finance, timeframe, planning permits, community consultations) are transferred to the party best equipped to deal with it, both in terms of expertise and costs, to the stability and benefit of the project. The advantage for the public sector is that cost overrun can be borne by the private sector (Osborne, 2000)
- **Value for Money:** Because of the private sector's expertise, it can bring a more commercialized approach to projects. Utilizing private sector skills and technology to deliver projects in a more efficient manner, resulting in either lower costs or a superior product for the same investment. Value for money projects deliver greater value for money compared with that of an equivalent procured conventionally. Also, value for money is achieved because in PPP project, an output specification defines the performance standards to be achieved by the delivery of the service. Thus'good specification means good job'.
- **Speed of Delivery:** By the use of PPP, projects are able to complete quicker because they don't have to wait for government to make funds available. Private sector capacity and flexibility are seen to be superior to the public sector, and PPPs therefore allow projects to be finished more quickly and on schedule than those attributed to public sector provision. Projects are also completed quicker because the private sector generally wants to earn revenue as soon as possible. The social and economic advantages flowing out of the project are also excelled. The end result of early delivery can contribute

towards economic growth and increased tax income for government (Bruxel, 2005; Haarhoff, 2008).

- **Whole of life cycle approach:** Because the design, construction and operation are often undertaken by the one consortium there is a greater integration of the different elements and more coherence to the final product, unlike standard procurement options which may see several different subcontractors operating in loose cooperation. Motivated by the desire to preserve long-term value of assets and to minimize costs, whole of life cycle responsibilities encourage the private sector to choose the most appropriate technology for the long term and adequately maintain it. This may be in contrast to decisions by governments that are often guided more by short-term financial pressures and think in much shorter cycles according to political terms and budget constraints.
- **Transfer and Sharing of technology:** Experts and international institutions are involved with PPP's resulting in knowledge sharing and experience sharing depending on the level of partnerships and the capacity of government to absorb such new technology expertise. It also promotes the transfer and sharing of technology (Bruxels, 2005).
- **Training:** The involvement of international institutions in PPPs creates training opportunities for local staff in business methods and techniques. The partnership can draw from combined experience and expertise of the private sector and public sector. As PPP deals are concluded government and the private sector will become more at ease with the concept of PPPs (Deloitte; Touche, 2006).

- **Shifting construction and maintenance risk to the private sector:** Infrastructure projects usually have cost overruns which are borne by the public sector. Budget constraints also put immense pressure on the maintenance priorities culminating in reduced spending on maintenance and the result is that maintenance is often deferred. Well-designed PPPs can ameliorate the above problems by transferring certain construction and maintenance risk to the private partner. The ability to shift some of these risks to the private party can be an important benefit for public sector (Deloitte; Touche, 2006).
- **Development of new business sector:** The PPP concept has created new business opportunities in Europe of firms experienced in building and operating PPP projects. Countries adopting PPP have often used foreign advisors initially but have soon developed their skills and are now competing on the international stage for business in other countries (Harris, 2007)
- **Access to additional capital/off-balance sheet financing:** Because all or a large percentage of finance in PPP is provided by the private sector, the government is not responsible for raising funds from within its own coffers or adjusting budgets to allow for large infrastructure spending. This is particularly advantageous during times of fiscal crisis where the government is already short of funds or where the government may have a poor credit rating and is not able to raise the necessary finance. International and national accounting standards do provide some guidance as to what and how PPPs are recorded on balance sheets, but the issue is far from secure.
- **Trustworthiness:** PPP Projects are normally delivered on time and on budget because the private sector carries the risk of cost overruns and delayed

completion. The contractual commitment in this regard, which includes incentives and penalties, promotes effective management (Deloitte & Touche, 2006).

- **Political advantage:** There is political leverage to be gained from PPP agreements in terms of public perception and financial management credentials, as projects are delivered on time with less impact on the budget and provide superior quality infrastructure or services.
- **Private sector growth and stability:** PPPs provide the private sector with access to reduced risk, secure, long term investment opportunities that are underwritten by government contracts. Such agreements ensure private capital flows, provide investment opportunities, and stimulate local industry and job market.

Disadvantages of using PPP

- **Goals:** Partnerships have failed because the aims and goals of the project have not been clearly identified. Partnerships sometimes have broad aims and this leads to misunderstandings, lack of coordination and thus conflict between partners (Osborne, 2000)
- **Performance enforcement:** The management of performance in a PPP contract can sometimes be problematic which can lead to bad customer relations. The issue of performance specification is problematic because it is hard to formulate in a way that is suitable for an arms-length contract (Katz, 2006). Arms-length contracts are fair and enforceable if both parties to the contract have relatively equal powers of negotiations upon entering the contract. Neither party has a disproportionate amount of power to strong arm

the other party into an unfair deal. Furthermore the public sector in many cases does not have the capacity to monitor these projects and the private sector can abuse the situation by not complying with agreed service standards.

- **Resource costs:** Partnership involves a considerable amount of resource cost because of the time it takes to finalize a deal. The time spent on discussions and consultation can also cause delay and be costly. The cost of procuring the services of transaction advisors is also high and this is seen as an obstacle by departments (Osborne, 2000)
- **Unequal Power:** There may be unequal power relation between the public and private sector which can sometimes lead to tension as the parties may try to alter another's priority. Although there are different types of power, the greatest power generally rest with those controlling resources (Osborne, 2000).
- **Impact on other services:** It is argued that PPP project impacts on other services because resources are drawn from other projects reducing the effectiveness of a department. The road sector has highlighted this as big problems of PPP projects. It is argued that sometimes other projects have to be cancelled in order to finance the unitary monthly payment of the PPP (Osborne, 2000).
- **Organizational difficulties:** Sometimes partnerships fail because they are difficulties in successfully coordinating the programs and approaches. Furthermore barriers such as lack of institutional capacity can also impact on the partnership. The inability of departments to enforce agreements has been

highlighted as one of the major stumbling blocks in the failure of PPP projects (Osborne, 2000; Haarhoff, 2008).

- **Higher cost:** The borrowing rates given to the private sector may be higher than those typically available to governments. An expensive tender and negotiation process, including higher contract transaction costs paid to legal and accounting firms, can neutralize any savings made in design and construction phases. Transferring risk from one party to another has its price, and the private sector will expect guarantees of income proportionate to its risk burden.
- **Lack of capacity:** It is necessary for both the public and private sectors to possess PPP-specific capacity for an agreement to be signed and administered successfully. Such capacity is absent from many jurisdictions, both at a national and regional level, and it takes both time and experience to establish it. An over-reliance on external consultants also leads to an expertise flight, where any knowledge gathered throughout projects is not retained by public bodies or private companies, but rather lost to external sources, making it difficult to build knowledge and lessons for the future(International institute for Sustainable Development Report, 2012).
- **Higher consumer prices**: Driven by a need to cover high levels of cost plus makes a return on investment, market-driven pricing can see services cost the consumer more than if delivered by the public sector. The issues of competitiveness and monopolies also mean there is potential for abuse in regards to user fees(International institute for Sustainable Development Report, 2012).

- **Double taxation**: The general public may perceive user fees as a form of "double taxation" whereby they are paying for services they feel their taxes should be providing or already have paid for. This will be noticeable in the case of toll ways, for example, where tolls have not existed under previous public sector provision and where there was no tangible cost to the user (International institute for Sustainable Development Report, 2012).
- **Less accountability/transparency:** Project transparency is weakened under the PPP model because of the difficulty in accessing private sector information, now considered of commercial value or commercial-in-confidence by the consortium. Whole of project evaluation becomes problematic for similar reasons, as data is spread over numerous sources, compiled differently, and not always available for public scrutiny (International institute for Sustainable Development Report, 2012).

2.11 Traditional Road Infrastructure Delivery Procurement Strategies in Ghana

Procurement strategy can be said to be a generic term embracing all those activities, path or methods undertaken by a client seeking to provide a particular infrastructure or product or service. Traditional road infrastructure procurement strategies can therefore be said to be those procurement strategies that are commonly employed in delivering road infrastructure projects in Ghana.

In Ghana, the traditional Design Bid Build (DBB) is the main procurement method usually employed for the provision of road infrastructure and other public and private facilities such as schools, hospital, prison etc. However, some other procurement methods have emerged and gained recognition for the delivery of road

infrastructures and other facilities. They include Design and Build, Construction at Risk and Traditional with Project Manager.

- **Design Bid Build (DBB)**

This is a type of traditional procurement whereby the owners (public sector) contracts separately for design, and construction of the road infrastructure. The design bid build contract process is segmented into three separate phases and they are designing, bidding, and construction. The owner (public sector) design team which may include in-house designers and consultants prepares the design according to the client's brief (specification). At this stage the construction methods are clearly prescribed and described in detail in the designs (plans) and specifications for the project are prepared for easy understanding and construction. The advantages of DBB are that the owner is provided opportunities to develop and maintain the technical expertise of the in-house professionals. Also new contractors and smaller, less-experienced firms will have opportunities to gain experience and prepare themselves for other methods of bidding. However, some disadvantages have been identified with the application of this procurement method.

According to Owusu, 2010, the weakness of the model is that when the design team is not abreast with the prevailing market prices of items or construction costs, then any increase of the cost could increase project cost and also delay the project for especially when documents should be re-written to reduce costs. Rwelamila & Hall (1995) and Best and Gerard (1999) both also discovered that, the traditional procurement system where competitive bidding emphasizes on construction cost and time, quality is usually compromised. Also, as the owner can choose the lowest

bidder, that is paying the least amount of money for the project, a problem that can arise is that the general contractor who is offered the contract may produce shoddy work and also provide deliverables that are not of good quality (Owusu, 2010). In addition, in a traditional DBB, since the project contract is split into phases, among distinct entities, the delay of one phase or entity affects the commencement or progress of the next phase. This may lead to no corresponding time savings in the arrangement because the contractor often does not even bid, much less begin work, until the design professional has finalized the plans (Bryan Shapiro, Shapiro Hankinson & Knutson, 2003). Furthermore, the funding responsibility of this type of procurement comes from the client only. For instance, in the case of government project, the project funding responsibility rest in the hands of the government only and shortage of fund may leads to suspension or abandonment of project, quality deficiency and cost overrun due to inflation.

2.11.1 Other Emerging Procurement Strategies

- **Design and Build:**

Design and build can be considered as a "family of procurement options" characterized by their integrated approach (Ameyaw, 2009). This is because, under this procurement method, single contractor or organization becomes contractually responsible for design and construction of the proposed infrastructure. In the case of the public road infrastructure, the contract involves two parties which include the owner (public sector) and the design build firm.

The contractor does all design (including construction drawings) and adds construction practicality to design imagination. Owners receive an enforceable price

for construction sooner and can the contractor can fast-track the project. The contractor can negotiate subcontracts methodically so the owner can benefit from good prices, reliable subcontractors, better technology and tighter contracts. But it is difficult to formulate an enforceable price before design begins (Owusu, 2010). There are certain benefits of using design and build which entrust the responsibilities of designing and construction in a single entity (either private or public). From the client's perspective design and build bundles the responsibilities in a single organization. This means that the owner has just one organization as design and construction are in the hands of a single entity which allows little degree of flexibility for the owner (Owusu, 2010). Again, the contractor bears any additional cost that may arise due to the application of improper construction methods or inadequate design produced by his organization. This removes the problem of "finger pointing" because the contract is between the owner and organization responsible for design and no other organization could be accused of providing any shoddy work or delivering a bad quality deliverable (Owusu, 2010).

The disadvantage is that the owner may not obtain the lowest cost for the project since the design/build contract is usually entered into by negotiation rather than competitive bidding (Shapiro, Hankinso & Knutson, 2003). Another disadvantage is that the design-builder is given a great deal of control over the entire process of both how the project is configured, and how it is completed. With no third-party observer such as an independent architect to administer the process, design-builder may sacrifice the quality of materials and systems in order to increase his own profits at the expense of the owner (Owusu, 2010). This two procurement method (DBB and DB) are mostly employed in delivering road infrastructure projects in Ghana. It is

important to note that with each method, the public sector (client) is solely responsible for financing the project and bear all associated risks accordingly.

- **Traditional model with Project Manager:**

This is a kind of model that occurs when the owner engages the designer(s) and the constructor(s) and often includes the project organization to lessen the traditional flaws.

In view of that an organization with experience is selected in the construction to improve cost, schedule and quality. Construction and design contracts are unbundled by the project manager. The project of this nature may have different architects for different aspects which are selected by the owner and the project manager and assigned to lead architect. Project Manager may negotiate for equipment, subcontracts and assign to selected general contractors which help to maintain a single bonded price for construction but also permits direct negotiation with other subcontractors and manufacturers.

2.11.2 Public-Private Partnership (PPP): Verses Traditional Public procurement Strategy

Traditional procurement has been used to deliver many infrastructure projects in the past. Even after PPP the emerged, the traditional public procurement strategy is still in high use for the provision of many infrastructure projects. This is because PPP is not a "fit to all" strategy. It is also important to note that, PPP is not a replacement to the traditional public procurement strategy but rather an innovative infrastructure provision option. As indicated by Hart (2003), a key property of a public-private

partnership is the fact that facility construction and subsequent service provision are bundled and assigned to a single private-sector entity.

The bundling encourages innovative design solutions during the construction phase that may reduce the subsequent costs of service delivery (Yescombe, 2007). In contrast, under traditional procurement, the government contracts one party to build the infrastructure and another to provide the public goods or services. This means that, under the PPP, the private sector usually bears more risk since the service provision are bundled and assigned to the private entity as compare to traditional public procurement strategy where designing, building and service provision are separately contracted to different entities.

Thus all parties are protected by limited liability. Different PPP models exist and each of them is designed based on the expected degree of involvement from the private sector entity. For example the UK PFI engages the private sector entity in a bundle contract involving financing, designing, construction, operation, maintenance and other related services for a fee. The public sector procurer does not pay capital over the construction period, but rather pays for the service during the operational period. The private sector, on the other hand, pays the capital cost, which it recoups through the service payments. The Key difference between PPI and traditional public procurement is the structure of contracts involved.

2.12 The PPP Road Market

PPP in infrastructure provision has been utilized widely in road sector. However, it is difficult to produce complete, consistent and coherent statistics for the worldwide

PPP market (Yescombe, 2007). According to Yescombe, 2007, in 2006 private-sector project-finance debt financing raised for infrastructure projects was probably in the range $65-80 billion. Road (and bridge / tunnel) projects made up a significant share of this perhaps 40-50%. The volume of financing in this sector has increased considerably over recent years. PPPs could represent an additional source of immediate financing, their bearing on debt sustainability depending on Ghana's ability to carefully assess related fiscal contingent liabilities, foregone public revenue and associated disadvantages indicated in the review (Ghana Investment Plan, 2012). Although, PPP as a phenomenon is well-known and practiced in all continents today, it is used more in some regions in the globe (Markus, 2011). During the last decade, the majority of the PPPs have been established in the Europe, Asia North America and Far East. In contrast, PPPs are less promoted in Latin American countries, Africa and Middle East(Ahmed & Aziz,2007).

Table below indicates the Regional share of PPP projects completed between 1985 and 2004 produced by Ahmed and Aziz (2007)

Table 2.2 Regional share of PPP projects completed between 1985 and 2004

Region	**Percentage (%)**
Europe	37.8
Asia and the Far East	36.7
North America	15.8
Latin America, Africa and Middle East	9.7
Total (450.9 billion)	100

Source: (Ahmed & Aziz, 2007)

Apart from differences in the usage from continental perspective, some countries are identified to be more PPP users than others. According to Markus a maturity model describes the stage of countries PPP development in two dimensions, activity of use and sophistication. For instance according to the maturity model, the maturity of PPPs differ largely inside the Europe: England being far ahead, Greece, Italy, Germany, France, Netherland and Spain being in transition (second stage), and Baltic countries and BRIC countries being in a baby shoes (first stage) (Markus, 2011). Major road delivery projects by PPP are indicated by Yescombe (2007),

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter addresses the methodology to the study. It provides an explanation of the research design, details regarding the sample, means of data collection, and data analysis. Having concluded the literature review, this chapter focuses on discussing how observations, assertions and conventions that emerged from the literature review were combined to develop the questionnaire for the study. The questionnaire served as the data collection instrument for the study in favour of establishing the factors affecting road infrastructure delivery in Ghana, the risk associated with PPP and how those risks should be managed. The chapter also discusses issues relating to how the sampling frame was established and the data used for the analysis. The chapter concludes with the research questions for analysis and a summary.

3.2 Method Adopted

In conducting this study, information was collected from the key staff from the Ghana Highways Authority, Department of Feeder Roads and Department of Urban Roads as well as contractors in the road sector in Accra about the factors that affect road infrastructure delivery together with the risks associated with PPP in road infrastructure development and how those risks are managed. Specifically, they were asked to rate their perceptions on some identified factors that affect road infrastructure delivery. These respondents were also asked to state those factors that they think can create an effect but were not stated. The respondents were also asked to identify and rate the risk associated with PPP in the road infrastructure

development. Finally their responds was asked on how those risk will be managed. The purpose of this research is to provide the basis for awareness creation on the significant factors that affect road infrastructure delivery, the risks associated with PPP and how to manage those risks. The broad aim of the research was to identify the factors affecting road infrastructure delivery as well as identifying the risks associated with PPP in road infrastructure development and how to manage or share them forms the basis for the design of the research instrument (questionnaire) and the category of respondents selected. According to Naoum (2001) to achieve the aim of a study an important area to consider is the kind of method to be adopted. The researcher has consequently employed three stages, i.e. stage 1, stage 2 and stage 3 in this concern.

3.2.1 Stage 1

Information on PPP was gathered from relevant literature with the focus on the factors that affect PPP in road infrastructure development, the risks that are associated with PPP in road sector and how they are managed or share among parties. The literature reviewed was solely from the secondary source and inclusive of desk review of both published and unpublished materials. These sources generally yielded rich knowledge in procurement management. Information gathered from this stage was invaluable to the design and distribution of the questionnaire to obtain responses for further analysis.

3.2.1.1 Design of Research Instrument

A well-structured questionnaire was designed to elicit information from key staff and contractors in the road sector in Accra. Questions posed in the questionnaire were deemed fair and practical and were deduced from the literature sources. The questionnaire was designed in four sections (i.e. A, B, C and D) and the questions are combinations of open and close ended questions. Section A is captured as demographic questions aimed at gathering some peculiar characteristics of the respondents in the road sector. This part however comprises open and close ended questions. Sections B and C are devoted to factors affecting road infrastructure delivery and risks that affect PPP in road infrastructure development respectively.

This section is closed and intended to establish the importance of the factors affecting road infrastructure delivery and the frequency of occurrence of the risks affecting PPP in road infrastructure development respectively. Section D solely captures close ended questions on how the risk identified should be shared or managed. This is to establish the level of awareness and thus help both the public and the private sector partners to make a well informed decision before employing PPP strategy. The closed ended questions were fundamentally used because Glasow (2005) as cited by Danso (2010) indicated that they are simple for respondents to answer and it helps researchers to analyze their data with ease. The open ended questions were asked so the respondents could express their opinions on the themes of the research.

3.2.1.2 Content and Rationale of Research Questionnaire

Section A – demographic questions (gender, level of education, employment status, years of practice, was to establish the level of operations, experience of the respondents and awareness of the concept of PPP. Section B was to indicate the level of importance of the factors that affect road infrastructure delivery in Ghana. Section C, similarly was to indicate how evident (How often do they occur?) are the risks that are associated with PPP in road infrastructure development. Section D was concerned with establishing the extent to which respondents agree on how the risk affecting PPP in the road infrastructure development should be shared or managed. It is believed that the responses to Sections A, B, C and D will help address the research questions adequately hence achieving the aim and objectives of the study.

3.2.1.3 Cover Letter and Preamble to Questionnaire

In ensuring high rates of response from the key staff of the Ghana Highways Authority, Department of Feeder Roads and the Department of Urban Roads as well as contractors in the road sector in Accra; a cover letter from the Building Technology Department was attached to the questionnaires to ultimately complement the preamble on the questionnaire. In the letter, the researcher was introduced adequately to the respondents. In the preamble on the questionnaire, again the researcher and his supervisor were introduced, the purpose for the study was explained and an indication to the respondents of the importance of their responses and an assurance of confidentiality was made.

3.2.2 Stage 2

3.2.2.1 Stage 1 Data Collection – Sampling Frame and Sample Description

This refers to a list of items or entities from which a statistical sample is drawn. This study was targeted at key staff of the Ghana Highway Authority, Department of Urban Roads and the Department of Feeder Roads and road contractors in Accra. The respondents of the above mentioned road agencies were targeted because they are more organized and have knowledge about PPP and how it can be used in road infrastructure developmental projects. Besides, road contractors in Accra were considered because PPP projects require huge capital cost and it is believed that such contractors are usually able to pre-finance such expensive projects.

According to literature these factors affecting road infrastructure delivery are: Availability of fund; type of procurement system for the project; Project characteristics; client representation characteristics; project team performance (experience); client representative's characteristics; contractor's characteristics; Design Team characteristics; external conditions; project Manager's Competence; top Management support, project manager's coordinating and leadership skills; monitoring and Feedback by the participants; decision making; coordination among project participants; client or owners' competence; social condition; economic condition; climatic condition; availability of plants and equipment; the condition of the ground; availability and quality of construction materials; disputes and conflicts; availability of labour and productivity; nature of project planning; environmental regulations; nature of technology; political interest in the project.; the proposed project completion schedule or date and means of communication.

Also the risks that affect PPP in the road infrastructure development are:

- Political Risks
- Regulatory Risks
- Site Risks
- Permitting Risks
- Procurement Risks
- Financing Risks
- Design risk
- Construction costs risks
- Latent defect risk
- Force Majeure risk
- Traffic Risks
- Operations and Maintenance Risks
- Appropriations Risks
- Refinancing Risks
- Hand back Risk or Residual Value Risk
- Demand risk

3.2.2.2 Sampling technique

The respondents were selected by purposive sampling technique. This technique was used because Erbil et al (2010) has indicated that, the purposive sampling technique allows the researcher to select the individuals who have good knowledge on the subject under discussion.

3.2.2.3 Determination of Sample Size

Two of each category of key staff (the Directors, Procurement managers, Project managers, Quantity Surveyors and site Engineers) of the Ghana Highways Authority, Department of Urban Roads and the Department of Feeder roads in Accra totaling 30 (constituting each of the above classified staff and his immediate subordinate) in number was considered. According to Stoker(1985) in A.S Devos(1998) as cited by Fugar(n.d) on the determination of sample size for research work, if the population is 30 then 80% may be considered as the sample size. Thus 24 key staff representing 80% was used to represent the key staff from the above mentioned road agencies. The 80% is above 30% according to Oladapo (2005) and other researchers such as Newman and Idrus (2002), Ellhag and Boussabaine (1999) and others and therefore it is ideal.

According to Ministry of Roads and Transport as at 18TH October, 2012 there are 2,095 registered "road contractors" in good standing with the ministry and 61.15% of these road contractors are in the Greater Accra Region. Meaning, the region has about 1,281 registered contractors in good standing as 2012. To determine the minimum sample size of these registered contractors in the Accra metropolis, Kish (1965) formula which gives a procedure for calculating minimum sample size was applied.

$$n = \frac{k}{1 + \frac{k}{N}}$$

Where: n = Sample Size,

N = Population Size

S = Maximum standard deviation in the population element (total error = 0.1at a confidence level of 95%)

V = Standard error of sampling distribution = 0.05

P = the population elements.

$$k = \frac{s^2}{v^2}$$

$S^2 = P\,(1\text{-}P) = 0.5(1\text{-}0.5) = 0.25$

Therefore in determining the minimum sample size of contractors in Greater Accra region given that N = 1,281

$$k = \frac{s^2}{v^2}$$

$$k = \frac{0.25}{0.05^2} = 100$$

$$n = \frac{k}{1 + \frac{k}{N}}$$

$$n = \frac{100}{1 + \frac{100}{1281}}$$

$n = 93$

n = 93 means that, the minimum sample size of road contractors in Accra to be used for the study is approximately 93. This 93 number of contractors and 24 number of key staff from Ghana Highways Authority, Department of Urban Roads and the Department of Feeder Roads both figures totaling 117 will help in establishing the actual sample size for the study. However 10% was added to the minimum sample size to cater for irregularities such as refusal to respond to questionnaires,

ineligibility to respond to questionnaires, inability to locate respondent which occur during distribution and collection of data.

$$\therefore \frac{10}{100} x\, 117 = 11.7$$

And so 117 + 11.7 = 128.7 = 129

Finally, 129 respondents were decided to be used for the study.

3.2.2.4 Data Collection Procedure

The Questionnaires were administered personally and retrieved from key staff of the road agencies and road contractors based in Accra. This was done to ensure that the targeted respondents were reached and also to help improve the response rate. 129 persons were initially contacted through telephone. However only hundred (100) of them responded. Therefore, the hundred (100) key staff of the road agencies and the road sector contractors in Accra were duly contacted and were given one set of questionnaires each.

Four weeks were used to administer the questionnaires with thirty (30) responses retrieved in the first week of distribution. In the second week another thirty-five (35) were retrieved. An extra twenty (20) were received in the third week and during the fourth week fifteen (15) were retrieved. In all hundred (100) questionnaires were administered and retrieved. Hence a response rate of 100% was achieved and a non – response rate was 0%. This response rate is considered adequate as according to Oladapo (2005), Newmann and Idras (2001) and Ellhag and Boussabaine (1999) a 30% response rate is considered good enough in construction studies as cited by Danso (2010). The summary of the data collection is displayed in table 3.1 below.

Table 3.1 – Summary of Data Collection

Week	Questionnaires Retrieved	Questionnaires to be Retrieved
1	30	70
2	35	35
3	20	15
4	15	-
Total Retrieved	100	

Source: Field survey, 20th August, 2014.

3.2.3 Stage 3 – Data Analysis and Description of the Analysis

3.2.3.1 Research Questions for Analyses

The following three research questions were proposed as part of and to guide the study:

1. What are the factors that affect road infrastructure delivery? Factors that affect road infrastructure development were deduced from the relevant literature reviewed. Respondents were asked to indicate how important the factors are.
2. What are the risks associated with Public Private Partnership in road infrastructure development? The respondents were required to indicate how evident the risk affecting PPP in road infrastructure development is. They were also asked to identify any other risks affecting PPP apart from those identified. The respondent were also asked to rate their conversance with the concept of PPP as: *very conversant, conversant, not sure, fairly conversant, not conversant.*

3. How are those risks are managed or shared among parties? The respondents were again asked to express the extent to which they agree or not **(Strongly agree; agree; fairly agree; disagree; strongly disagree)** on how the risks identified with PPP will be managed or shared.

3.2.3.1.1 Data Analysis

IBM SPSS Version 21.0 for Windows (IBM SPSS Version 21.0 Core System User's Guide, 2011) was the statistical software program used to conduct the analysis in order to come out with the means, standard deviations and the significant test values of attributes or variables. A five-point scale was used to facilitate responses to questions included to determine the: extent to which respondents consider the factors affecting road infrastructure delivery and risks associated with PPP and how those risks should be managed.

First, the researcher analyzed the frequencies of the demographic data (Section A). Second, the researcher used descriptive statistics to examine the factors that affect road infrastructure delivery and the risks associated with PPP, and how those identified risks will be shared or managed (Sections B, C and D respectively) to establish those factors and risks that are significant. The Tables containing results of these analyses and a more detailed description of the findings are presented in Chapter four.

3.3 Summary

This chapter has elaborated on the research methodology adopted. The Questionnaire was designed based on the research questions and objectives. One hundred questionnaires were distributed and 100 were retrieved by hand. The immediate stage is to analyze and discuss the results obtained. The research methods described in this chapter offers insights into the significant factors affecting road infrastructure delivery, risk associated with PPP in road infrastructure projects and how those risks should be managed.

Information from these respondents provides a better understanding of how they perceive the factors that affect road infrastructure delivery and the risk associated with PPP in road infrastructural projects and how to manage those indentified risks. These respondents were required to provide information about other factors and risks associated with PPP in road infrastructural development which were not captured. The instrument and results from the analyses as described in this chapter helps to enhance our understanding of the factors and risks associated with PPP in road infrastructure development and the perception of respondents about those factors and the risks and how the risk will be managed.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter is concerned with the findings of the research. The aims of the research were to identify and rank the factors that affect road infrastructure delivery, identify and rank, the risks that affect PPP in road infrastructural projects in Ghana, and to recommend ways through which those identified risks may be managed or shared among parties to the PPP agreement to enable the parties to make a well informed decision in the provision of road infrastructure in Ghana.

In order to achieve the above objectives, a three phase research method, consisting of a review of literature, field questionnaire survey and data analysis was designed and data collected from respondents who are key staff from Ghana Highways Authority, Department of Urban Roads and Department of Feeder Roads as well as the Accra based contractors in the road sector registered with the appropriate ministry. The researcher therefore used quantitative analysis techniques such as graphs, charts, and statistics to analyze the information.

4.2 Presentation and Analysis of Results and Data

A total of one hundred (100) questionnaires were administered to the categories of respondents of which one hundred (100) were received representing a response rate of 100%. Aibinu et al. (2006) in accessing construction delays and their causative factors in Nigeria, made reference to the assertion by Moser and Kalton(1971) that

"the result of a survey could be considered as bias and little value if the return rate was lower than 30-40%". This assertion indicates that the response rate of 100% was adequate for the analysis. Table 4.1 shows the response rate for all the respondent institutions:

Table 4.1: Details of Questionnaire Distribution, Rate of Return And Response.

Categories	Nomenclature	Questionnaires Issued	Questionnaires Received	Questionnaires Responsive	Response Rate (%)
A	Ghana Highway Authority-Accra	8	8	8	100
B	Department of Feeder Roads - Accra	8	8	8	100
C	Department of Urban Roads - Accra	8	8	8	100
D	Road Contractors in Accra	76	76	76	100
	Total	100	100	100	**100**

Source: Field Survey, 20th August, 2014

From Table 4.1, a response rate of 100% was achieved from the respondents. This was due to the fact that all the relevant respondents agencies were located within a common geographical area that is Accra, which made follow up on respondents easy.

4.3 Demography and Awareness of the Concept of PPP

4.3.1 The Demographics of Respondents from the Road Sector

The views of the respondents are considered here as those of the principals of the various road sector agencies and the road contractors in Accra for the purpose of the analysis. The general information being sought are the respondents age, gender, level of education, the description of employment status, , the working experience in the practice of respondents, It also probes their level of conversance of respondents with the concept of PPP. It concluded by examining the respondents experience on the number of road projects executed that require the use of PPP.

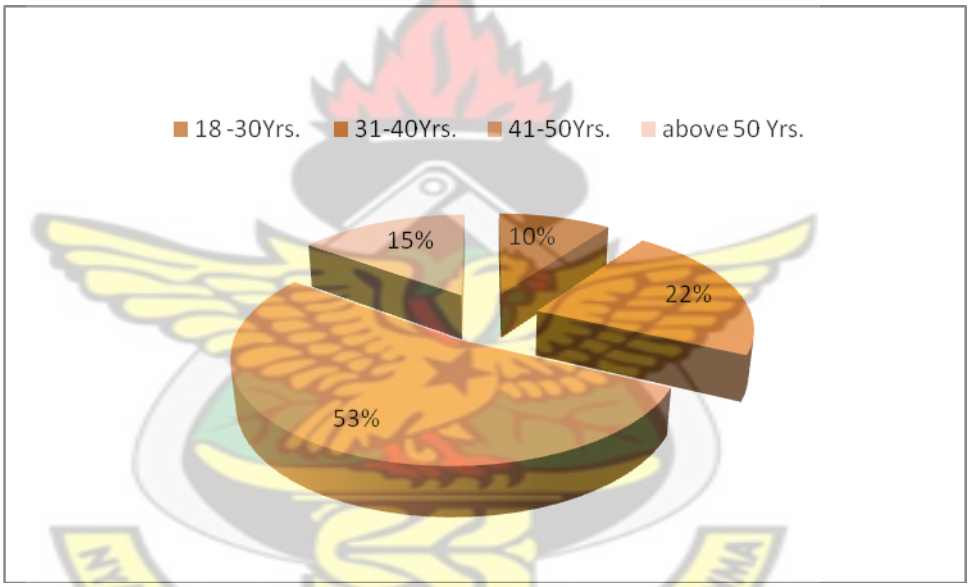

Figure 4.1- Age Distribution of Respondents

From figure 4.1, 10 respondent representing 10% fell within the age range of 18-30years, 22 respondents representing 22% had their ages between 31–40, Again 53 of the respondents had their ages within 41-50 and finally 15 of the respondent constituting 15% fell within 50 years and above. It can be concluded that those respondents falling within 41-50 are dominant.

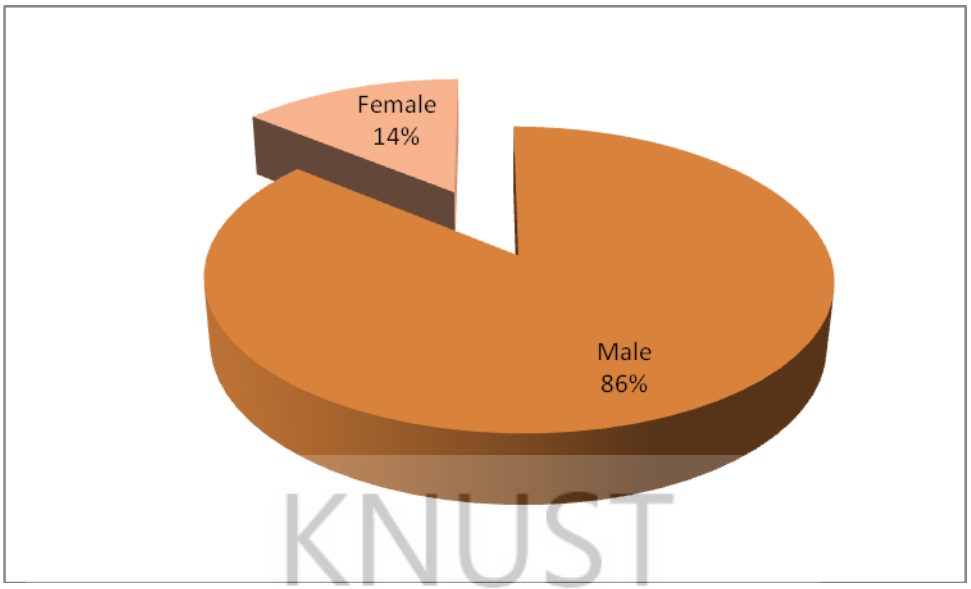

Figure 4.2 – Gender

From figure 4.2, 86 of the respondents representing 86% were males whiles 14 respondents representing 14% were females. This is an indication that the road sector is male dominated.

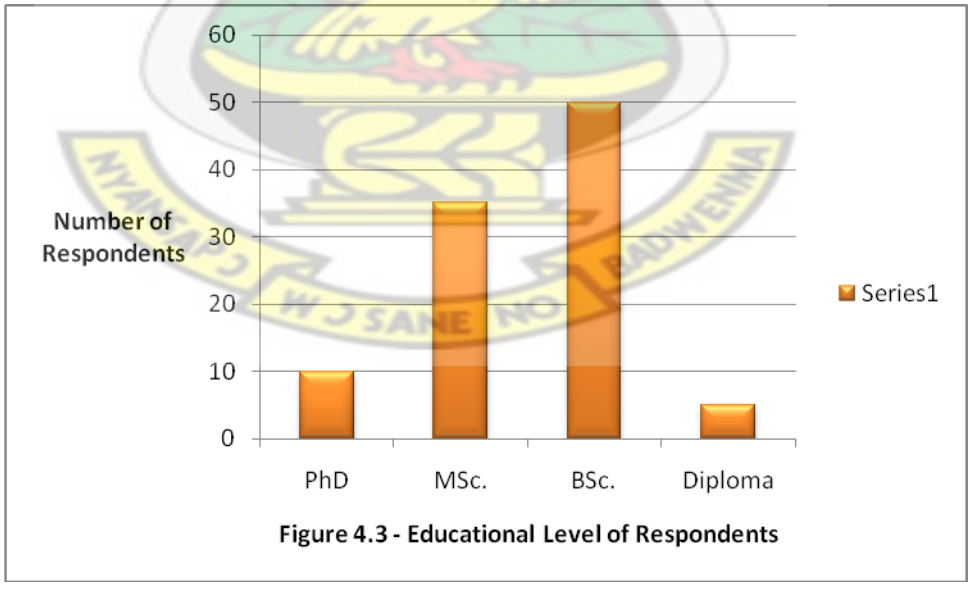

Figure 4.3 - Educational Level of Respondents

Figure 4.3 above indicates that most respondents have had their formal and higher education up to the first degree level. 10 of the respondent constituting 10% had PhD while 35 respondent representing 35 had masters` degree (MSc.). Also 50 respondents representing 50% had First degree (BSc.) and finally 5 of the respondents had Polytechnic Diploma which represents 5%.

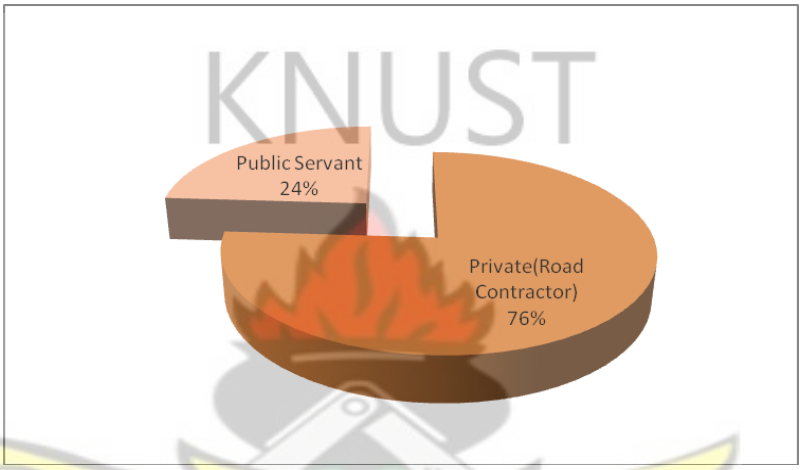

Figure 4.4 - The Employment Status of Respondents in Accra

From figure 4.4 above it is indicated that 76 of the respondents representing 76% said they work in the private sector as road contractors while the remaining 24 respondents representing 24% said they work in the public sector. This means most of the respondents are in the private sector.

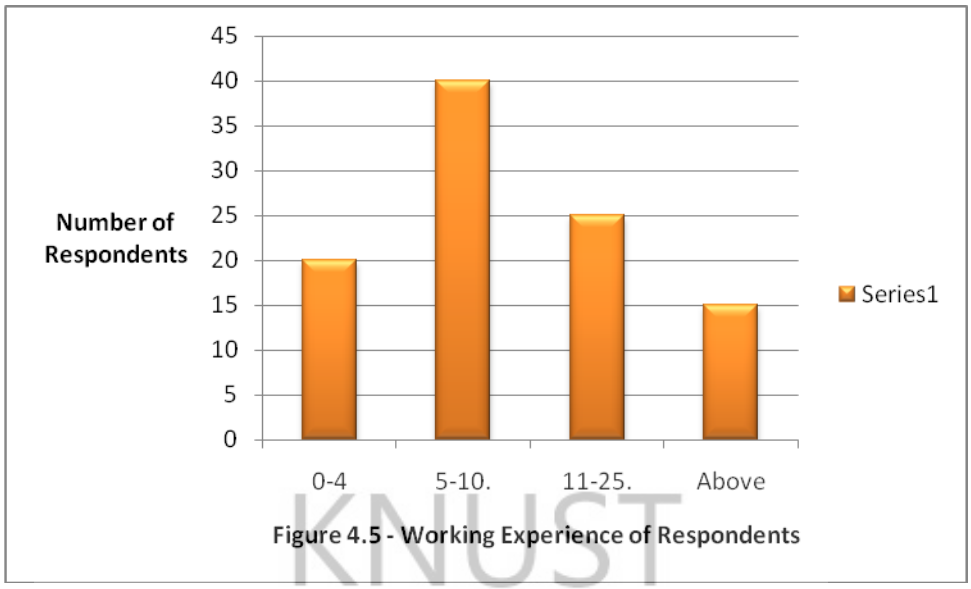

Figure 4.5 - Working Experience of Respondents

From figure 4.5, in terms of the working experience of the architects, 20 respondents representing 20% said they had working experience of up to 4years, 25 respondent representing 25% said they had working experience of between (5 – 10) years, 40 respondent representing 40% said they had working experience of between (11 – 15) years and 15 respondent representing 15% said they had working experience of more than 15 years. From the above figure it is evident that most of the respondents have working experience of between (11-15) years.

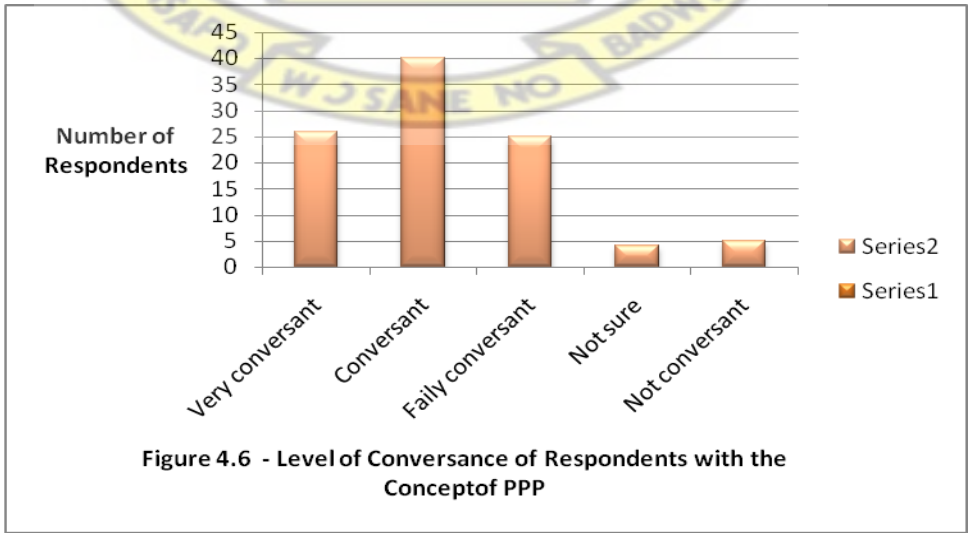

Figure 4.6 - Level of Conversance of Respondents with the Conceptof PPP

Regarding the extent of conversance with the concept of PPP from figure 4.6 above 26 respondents representing 26% said they were very conversant, 40 respondents which constituting 40% said they were conversant with the concept of PPP, 25 respondents representing 25%indicated that they were fairly conversant with the concept of PPP, 4 respondents representing 4% indicated that they were not sure of the concept of PPP and finally 5 respondents constituting 5% said they were not conversant with the PPP concept. It was not surprising that most of respondents were conversant with the concept of PPP considering the fact that all respondents had attained tertiary education.

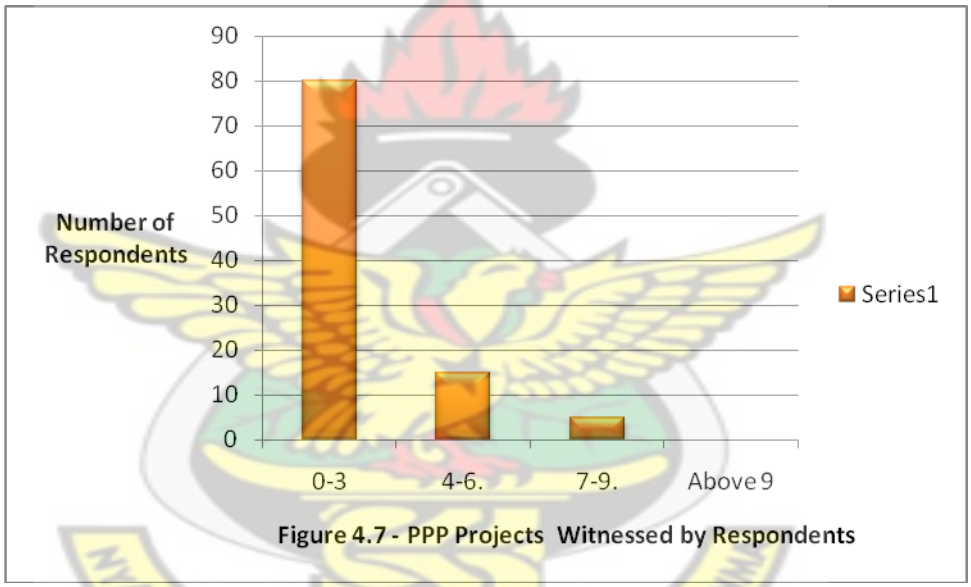

Figure 4.7 - PPP Projects Witnessed by Respondents

From figure above 4.5, 80 respondents representing 80% indicated they had worked on between (1-3) PPP based projects, 15 respondents representing 15% said they had worked on between (4-6) projects which were delivered through PPP, 5 respondents constituting 5% indicated they had worked on between (7-9) PPP based projects. However none of the respondents indicated having worked on any project involving the application of PPP.

4.4 Factors Affecting the Delivery of Road Infrastructure Projects

Table 4.1 indicates the extent to which respondents place importance on the identified 30 factors that affect road infrastructure delivery. It is notable to know that the more the mean of importance placed on a factor is above to 2.5 (average of a range 1-5) the more it indicative that the factor in question was considered very important by the respondents and the on the other hand the closer the mean of the importance place on the factor is below 2.5 the more it was considered less or not important. What is interesting to know is that a mean of 2.5 indicated that the factor was considered fairly important. It is worth noting that for an attribute to be significant it must have a mean of 3.5 and at a confidence interval of 95% the attribute must have T-Test value of 0.00 to 0.049 to be considered significant.

Table 4.2; Respondents` Perception on the Importance of the Factors Affecting Road Infrastructure Delivery

Factors that affect Road Project Delivery	Mean	Standard deviation	Significant Test Value	Ranking
1. Top Management support	4.57	0.756	0.000	**1st**
2. Availability of fund	4.54	0.626	0.000	**2nd**
3. Project team performance (experience)	4.44	0.641	0.000	**3rd**
4. Availability of plants and equipment	4.43	0.655	0.000	**4th**
5. Economic condition	4.41	0.637	0.000	**5th**
6. Means of communication.	4.39	0.665	0.000	**6th**
7. Decision making	4.38	0.632	0.000	**7th**
8. Design Team characteristics	4.38	0.722	0.000	**8th**
9. Project manager's coordinating and leadership skills	4.38	0.850	0.000	**9th**
10. Political interest in the project	4.37	0.720	0.000	**10th**
11. Coordination among project participants	4.37	0.787	0.000	**11th**
12. Project Manager's Competence	4.33	0.652	0.000	**12th**
13. Monitoring and Feedback by the participants	4.32	0.649	0.000	**13th**
14. Availability and quality of construction materials	4.32	0.766	0.000	**14th**
15. Disputes and conflicts	4.28	0.766	0.000	**15th**
16. The proposed project completion schedule or date	4.25	0.687	0.000	**16th**
17. External Conditions	4.19	0.677	0.000	**17th**
18. Availability of labour and productivity	4.19	0.720	0.000	**18th**
19. Environmental regulations	4.18	0.687	0.000	**19th**
20. Nature of technology	4.15	0.716	0.000	**20th**
21. Contractor's characteristics	4.14	0.792	0.000	**21st**
22. Client or owners' competence	4.11	0.695	0.000	**22nd**
23. Project characteristics	4.08	0.761	0.000	**23rd**

24. Climatic Condition	4.05	0.657	0.000	**24th**
25. Type of procurement system for the project	4.04	0.680	0.000	**25th**
26. Social Condition	4.01	0.745	0.000	**26th**
27. Nature of project planning	3.98	0.791	0.000	**27th**
28. Acts of God	3.96	0.737	0.000	**28th**
29. Client representation characteristics	3.85	0.796	0.000	**29th**
30. The condition of the ground	3.69	0.775	0.016	**30th**

Source: Field Survey, 20th August, 2014.

From table 4.1 above, top Management support had a mean of 4.57, a standard deviation of o.756, significant test value of 0.000 and was ranked 1st ,Availability of fund was ranked as 2nd and had a mean of 4.54, a standard deviation of 0.626 and significant test value of 0.000, project team performance (experience) had a mean of 4.44, a standard deviation of 0.641, significant test value of 0.000 and was ranked 3rd,availability of plants and equipment had mean of 4.43, a standard deviation of 0.655, significant test value of 0.000 and was ranked 4th, Economic condition had mean of 4.41, a standard deviation of 0.637, significant test value of 0.000 and was ranked 5th, Means of communication had mean of 4.39, a standard deviation of 0.665, significant test value of 0.000 and was ranked 6th ,Decision making had mean of 4.38, a standard deviation of 0.632, significant test value of 0.000 and was ranked 7th.

Design team characteristics had mean 4.38, a standard deviation of 0.722, significant test value of 0.000 and was ranked 8th,project manager`s coordinating and leadership skills had mean of 4.38, a standard deviation of 0.850, significant test value of 0.000 and was ranked 9th,Political interest in the project had mean of 4.37, a

standard deviation of 0.720, significant test value of 0.000 and was ranked 10th.Also coordination among project participants had mean of 4.37, a standard deviation of 0.787, significant test value of 0.000 and was ranked 11th .Also, project manager`s competence had mean of 4.33, standard deviation of 0.652, significant test value of 0.000 and was ranked 12th, Monitoring and feed back by participants had mean of 4.32, standard deviation of 0.649, significant test value of 0.000 and was ranked 13th,Availability and quality of materials had mean of 4.32, standard deviation of 0.766, significant test value of 0.000 and was ranked 14th ,Disputes and conflicts had mean of 4.28, standard deviation of 0.766, significant test value of 0.000 and was ranked 15th, The proposed project completion schedule or date had mean of 4.25, standard deviation of 0.687, significant test value of 0.000 and was ranked 16th,External condition had mean of 4.19, standard deviation of 0.677, significant test value of 0.000 and was ranked 17th, Availability of labour and productivity had mean of 4.19, standard deviation of 0.720, significant test value of 0.000 and was ranked 18th,Environmental regulation had mean of 4.18, standard deviation of 0.687, significant test value of 0.000 and was ranked 19th,Nature of technology had mean of 4.15, standard deviation of 0.716, significant test value of 0.000 and was ranked 20th. Contractor`s characteristics had mean of 4.14, a standard deviation of 0.792, significant test value of 0.000 and was ranked 21st, Client or owner`s competence had mean of 4.11, standard deviation of 0.695, significant test value of 0.000 and was ranked 22nd, Project characteristics had mean of 4.05, standard deviation of 0.796, significant test value of 0.000 and was ranked 23rd,Climatic condition had mean of 4.05, standard deviation of 0.657, significant test value of 0.000 and was ranked 24th.Type of procurement system for the project had mean of 4.04, standard deviation of 0.680, significant test value of 0.000 and was ranked 25th,Social

condition had mean of 4.01, standard deviation of 0.745, significant test value of 0.000 and was ranked 26th,Nature of project planning had mean of 3.98, standard deviation of 0.791, significant test value of 0.000 and was ranked 27th ,Acts of God had mean of 3.96, standard deviation of 0.737, significant test value of 0.000 and was ranked 28th, Client representation characteristics had mean of 3.85, standard deviation 0.761, significant test value of 0.000 and was ranked 29th and finally the condition of the ground had mean of 3.69, standard deviation of 0.775, significant test value of 0.016 and was ranked 30th. From the above table all the factors had means above 3.5 therefore it means that respondents considered those factors to be important. Again using T-Test all the factors had their significant test values to be less than 0.05 thus it can be concluded that all the thirty (30) factors affecting road project delivery are significant.

4.5 Risk Associated With Public – Private Partnership in Road Infrastructure Delivery

Table 4.2 indicates the extent to which respondents see the risks associated with Public - Private Partnership as evident. It is worth knowing that the high the mean above 2.5 the respondents are indicating that the particular risk often affects PPP in road infrastructure development and a mean below 2.5 (average mean) indicates how less often that risk occurs in such road infrastructure development through the use of PPP. A mean of 2.5 signifies that the risk in question is considered to be happening often by respondents.

Table 4.3 – Evidence on the Risks Affecting PPP in Road Infrastructure Development

Risks associated with PPP in road infrastructure development	Mean	Standard deviation	Significant Test Value	Ranking
1.Political risk	4.03	0.989	0.000	**1st**
2.Operations and Maintenance risk	4.01	1.078	0.000	**2nd**
3.Regulatory risk	4.00	0.974	0.000	**3rd**
4.Permitting risk	3.94	0.962	0.000	**4th**
5.Financing risk	3.91	1.138	0.000	**5th**
6. Site risk	3.77	0.93	0.005	**6th**
7. Project completion/project availability risk:	3.75	1.226	0.044	**7th**
8. Appropriations risk	3.68	1.246	0.152	**8th**
9.Residual value risk	3.66	1.191	0.182	**9th**
10. Construction costs risk	3.57	1.320	0.597	**10th**
11.Design risk	3.26	1.211	0.050	**11th**
12.Latent defect risk	2.92	1.300	0.000	**12th**
13.Technical risk	2.73	1.384	0.000	**13th**
14.Force Majeure risk	2.69	1.212	0.000	**14th**
15.Traffic risk	2.46	1.275	0.000	**15th**
16.Procurement risk	2.45	1.359	0.000	**16th**

Source: Field Survey, 20th August, 2014.

From table 4.2 above it is indicated that Political risk which had mean and standard deviation of 4.03 and 0.989 respectively with the significant test value being 0.000 and was ranked 1st ,Operation and maintenance risk had mean of 4.01, standard deviation of 1.078 , significant test value of 0.000 and was ranked 2nd,Regulatory risk had mean of 4.00, standard deviation of 0.974, significant test value of 0.000 and was ranked 3rd , Permitting risk had mean of 3.94, standard deviation of 0.962, significant test value of 0.000 and was ranked 4th ,Financing risk had mean of 3.91, a

standard deviation of 1.138, significant test value of 0.000 and was ranked 5th ,Site risk had mean of 3.77, standard deviation of 0.90, significant test value of 0.005 and was ranked 6th,Project completion or project availability risk had mean of 3.75, standard deviation of 1.226, significant test value of 0.044 and was ranked 7th, Appropriation risk had mean 3.68,standard deviation of 1.246, significant test value of 0.152 and was ranked 8th.

Residual value risk had mean 3.66, standard deviation of 1.191, significant test value of 0.182 and was ranked 9th,Construction cost risk had mean of 3.57, standard deviation of 1.32, significant test value of 0.597 and was ranked 10th ,Design risk had mean and standard deviation of 3.26 and 1.211 respectively as well as significant test value of 0.050 and was ranked 11th.Also Latent defect risk had mean of 2.92, standard deviation of 1.30, significant test value of 0.000 and was ranked 12th, Technical risk had mean of 2.73, standard deviation of 1.384, significant test value of 0.000 and was ranked 13th, Force majeure risk had mean of 2.69, standard deviation of 1.212, significant test value of 0.000 and was ranked 14th, Traffic risk had mean of 2.46 standard deviation of 1.275, significant test value of 0.000 and was ranked 15th and finally procurement risk had mean of 2.45, standard deviation of 1.359, significant test value of 0.000 and was ranked 16th.

From table 4.2 above it can concluded that procurement risk, traffic risk, had their means being less than mean of 3.5 therefore respondents are of the view that such risks do not often happen during the provision of road infrastructure projects through PPP. Also latent defect risk, technical risk had their means just little above the average mean which is 2.5 and this indicates that respondents are of the view that these risks only fairly occur when road infrastructure projects is delivered using PPP. However it can be concluded that all the other risks had their means far beyond the

average indicating that those risks observe with PPP project often, very often or always.

4.6 Respondents Perception on Management of the Risks Associated with Public

- **Private Partnership in Road Infrastructure Delivery**

Table 4.3 indicates respondent`s perception on how the risk associated with PPP in road infrastructure development. Respondents were to indicate the extent to which they agree to the risk sharing strategies proposed through literature review. It is important to note that a mean of above 2.5 indicate that respondents agree or strongly agree to the mode of risk sharing proposed by the researcher. On the other hand mean of below 2.5 indicates that respondents disagree or strongly disagree to the mode of risk sharing proposed.

Table 4.4 – Ranking on the Extent to Which Respondents Agree to How the Risks Associated with PPP in Road Infrastructure Development may be Shared or Managed

Risks	How the Risk Is Managed Or Shared	Mean	Standard Deviation	Ranking
1.Site Risks	The government of the home country of PPP project should ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project.	4.69	0.526	**1st**
2.Force Majeure risk	Offsetting this risk through insuring the project with an insurance company to indemnify the insured	4.61	0.618	**2nd**
3.Operations and Maintenance Risks	A comprehensive plan and program for operating and maintaining the PPP project must be ensured by both parties to the contract.	4.40	0.636	**3rd**
4.Construction costs risks	Performance bonds and completion guarantees should be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, whiles reducing contract price.	4.40	0.682	**4th**
5.Traffic Risks	Initial traffic projections should be subjected to a thorough vetting by lenders. This vetting should require a review of the initial projections by an independent expert, to the risks associated with the quality of the projections	4.38	0.648	**5th**
6.Procurement Risks	PPP legislation or guidelines should include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial, innovation criteria and no misprocurement.	4.38	0.693	**6th**
7. Design risk	Experts and experienced designer must be charged with the responsibility for the design giving them adequate time to design. The design must be checked again and again to ensure completeness and accuracy by sourcing and award of contract.	4.36	0.704	**7th**
8.Regulatory Risks	provisions in PPP legislation should include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall.	4.33	0.697	**8th**

9. Technical Risk	construction and technical specification should cleanly stated and must work together	4.30	0.759	**9th**
10.Appropriations Risks	-Draft national policy to follow no matter the government in power. -There should be an economic stability to allow recouping of investment.	4.28	0.637	**10th**
11.Political Risks	Draft national policy to followed no matter the government in power	4.28	0.830	**11th**
12.Financing Risks	There should be clearly defined concessionary agreement and commitment to it as well as transparency and predictability and accountability.	4.25	0.642	**12th**
13.Permitting Risks	PPP projects is tied to the ability of the private sector entity to receive the required federal state, and local permits	4.23	0.750	**13th**
14.Project completion/project availability risk:	Construction contracts should make the design - build contractor liable for completing behind schedule The public partner should provide the environment to assist the design-build contractor to complete the project on schedule.	4.22	0.760	**14th**
15.Latent defect risk	Construction contracts should make the design - build contractor liable for such defects, and should include penalties and revenue caused by the underperformance or lack damages to compensate the owner and operator against lost of availability of the facility	4.21	0.686	**15th**
16. Hand back Risk or Residual Value Risk	Conditions, requirements and procedures governing the condition in which the private partner is to deliver the asset to the public sector upon the expiration of the PPP agreement should be clearly defined.	4.20	0.829	**16th**
17.Refinancing Risks	PPP projects should be hedged against high and unstable interest rate especially if the concessionaire has entered into a floating rate loan and have opted not to hedge. Loan agreements should not carry mandatory refinancing provisions which exposes the project to financing risk when it seeks to refinance its existing loan	4.16	0.721	**17th**

Source: Field Survey, 20th August, 2014

From table 4.3 above it is indicated that for site risk which it was proposed can be managed by the government of the home country of PPP project having to ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project had mean of 4.69 and standard deviation of 0.526 was ranked 1st ,force majeur risk which it is proposed can be managed by Offsetting the risk through insuring the project with an insurance company to indemnify the insured in the event of the eventuality occurring had mean of 4.61 and standard deviation of 0.686 was ranked 2nd.

Operation and maintenance risks which it was suggested can be managed by ensuring a comprehensive plan and program for operating and maintaining the PPP project by both parties to the contract had mean of 4.40 and standard deviation of 0.636 was ranked 3rd ,Construction cost risk which it was suggested can be managed by introducing performance bonds and completion guarantees to be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, whiles reducing contract price. had mean of 4.40 and standard deviation of 0.682 was ranked 4th ,Traffic risk for which it was proposed can be managed by ensuring that initial traffic projections be subjected to a thorough vetting by lenders.

This vetting should require a review of the initial projections by an independent expert, to the risks associated with the quality of the projections had mean of 4.38 and standard deviation of 0.648 was ranked 5th,Procurement risk to manage which it was proposed that PPP legislation or guidelines to include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial, innovation criteria and no mis-procurement had mean of 4.38 and standard

deviation of 0.693 was ranked 6th.Again design risk which it was proposed could be managed by experts and experienced designer being charged with the responsibility for the design giving them adequate time to design and the design being checked again and again to ensure completeness and accuracy by sourcing and award of contract had mean of 4.36 and standard deviation of 0.704 was ranked 7th ,Regulatory risks which it was proposed could be managed by provisions in PPP legislation made to include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall had mean of 4.33 and standard deviation of 0.697 was ranked 8th . Technical risk which the researcher proposed could by managed by ensuring that construction and technical specification are cleanly and clearly stated and made to work together had mean of 4.30 and standard deviation of 0.759was ranked 9th ,Appropriation risk which as a means of solution was suggested that a national policy be drafted to be followed no matter the government in power as well as ensuring economic stability to allow recouping of investment had mean of 4.28 and standard deviation of 0.637 was ranked 10th ,Political risk which it is proposed can be managed by drafting a national policy to be followed no matter which government is in power had mean of 4.28 and standard deviation of 0.830 was ranked 11th.

Financing risk which suggested can be managed by clearly defining concessionary agreement and commitment to it as well as transparency and predictability and accountability had mean of 4.25 and standard deviation of 0.642 was ranked 12th ,Permitting risk which it is proposed can be managed by ensuring that PPP projects is tied to the ability of the private sector entity to receive the required federal state,

and local permits had mean of 4.23 and standard deviation of 0.750 was ranked 13th ,Project completion or project availability risk which it was proposed can be managed by construction contracts being made to render the design - build contractor liable for completing behind schedule as well as the public partner providing the environment to assist the design-build contractor to complete the project on schedule had mean of 4.22 and standard deviation of 0.760 was ranked 14th.

Latent defect risk which it is proposed can be managed by ensuring that construction contracts are made to render the design - build contractor liable for such defects, and should include penalties and revenue caused by the underperformance or lack damages to compensate the owner and operator against lost of availability of the facility had mean of 4.21 and standard deviation of 0.686 was ranked 15th, Hand back or Residual Value risk which it was proposed could be managed by construction contracts being made to render the design - build contractor liable for completing behind schedule and also the public partner provider being made to provide the environment to assist the design-build contractor to complete the project on schedule had mean of 4.20 and standard deviation of 0.829 was ranked 16th.

Finally refinancing risk which it was proposed can managed by PPP projects being hedged against high and unstable interest rate especially if the concessionaire has entered into a floating rate loan and have opted not to hedge as well as loan agreements not carrying mandatory refinancing provisions which exposes the project to financing risk when it seeks to refinance its existing loan had mean of 4.16 and standard deviation of 0.721 was ranked 17th.From table 4.3 above all the risks sharing strategies proposed as solution to the risks associated with PPP had their

means being above 2.5 which is the average. This means that respondents agree to the proposed means through which the identified risks could be managed or shared.

4.7 Summary

It is interesting to know that most of the respondents had their ages between 41 – 50 and they constituted 50% besides the fact that the road sector in Ghana is male dominated with the males alone constituting 86% and remainder representing the female class. Most respondents had their education up to first degree and they constituted 50% while the remaining 50% was distributed among diploma, masters' degree and doctorate degree holders. Most of the respondents were road contractors and are in private sector with a few from the public sector road agencies. The working experience of most of the respondents was between 5-10years. Most of the respondents (91%) admitted they were fairly conversant and with the concept of PPP. Also 80% of the respondents indicated they had witness up to three (3) PPP projects in road infrastructure development not necessarily in Ghana alone.

The entire factors affecting road infrastructure delivery had all their means above 2.5 which is above the average therefore to those respondents all those factors are important although not exactly of the same level of importance. Regarding the risk associated with PPP in road infrastructure development, procurement and traffic risks had their means below 2.5 (the average) therefore respondents did not see these factors as often occurring during the delivery of road infrastructure project through the use of PPP but all the other risks were seen as often occurring. The means of managing the identified risks with PPP had their means beyond 2.5 which is the

average thus respondents indicated that they agree to those risk sharing mechanisms proposed.

CHAPTER FIVE

FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

The aim of this study has been to indentify the factors affecting road infrastructure delivery, indentify the risks associated with the Public – Private Partnership (PPP) in road infrastructure development and how to manage or share those risks. Three objectives were set to achieve the aim of the research. However, a number of research questions were posited to guide the accomplishment of the aim and objectives. This chapter seeks to recall the research questions and the objectives in order to address the extent to which the aim and objectives of the study have been achieved. Also in this chapter recommendations to the research are presented for further action. The recommendations made are however, based on the findings of the study.

5.2 Research Questions

The following are the research specific questions posed and addressed by the study:

1. What significant factors affect road infrastructure delivery?
2. What are the risks associated with Public Private Partnership in road infrastructure development.
3. How are those risks managed or shared between the parties?

The research questions directed the study to achieve its aim and purpose. The objectives as revisited were commented on in an attempt to adequately respond to the research questions.

5.3 Findings

5.3.1 Objective One

The first objective set was 'To identify the significant factors that affect the delivery of road infrastructure projects. This objective was achieved through the review of relevant literature on delivery of infrastructural projects. It is rather unfortunate that these factors affecting road infrastructural project delivery are not being adequately considered and addressed leading projects being completed behind schedule, increase in cost, and low quality in Ghana. Literature on success factors of road project delivery has also indicated the need for providers of road infrastructural projects to be aware of those factors so as to help them make a well informed decision. Thus there is the need for awareness to be created of those factors that affect the delivery of road infrastructure projects.

The significant factors that affect the delivery of road infrastructure projects resulting from the findings are as follows:

- Availability of fund
- Type of procurement system for the project
- Project characteristics
- Client representation characteristics
- Project team performance (experience)
- Client representative's characteristics
- Contractor's characteristics
- Design Team characteristics
- External conditions
- Project Manager's Competence

- Top Management support
- Project manager's coordinating and leadership skills
- Monitoring and Feedback by the participants
- Decision making
- Coordination among project participants
- Client or owners' competence
- Social condition
- Economic condition
- Climatic condition
- Availability of plants and equipment
- The condition of the ground
- Availability and quality of construction materials
- Disputes and conflicts
- Availability of labour and productivity
- Nature of project planning
- Environmental regulations
- Nature of technology
- Political interest in the project
- The proposed project completion schedule or date
- Means of communication.

5.3.2 Objective Two

The second objective is 'To identify the risks associated with Public Private Partnership in road infrastructure development. To achieve this objective, respondents, some of which were key staff in the road sector agencies in Accra (Ghana Highways Authority, Department of Feeder Roads and Department of Urban Roads) and road contractors in Accra were questioned on the number of years they had practiced, they were also asked question concerning the number of projects they had worked on and which required the use of PPP. Besides, respondents were asked as to indicate how conversant they were with the concept of PPP as applied to the road sector. It can be concluded that although majority of the respondents were conversant with the concept of PPP they had worked on only few projects that required the employment of PPP.

The Significant Risks Associated With PPP in Road Infrastructural Development are:

- Political risk
- Regulatory risk
- Site risk
- Permitting risk
- Procurement risk
- Financing risk
- Design risk
- Latent defect risk
- Force Majeure risk

- Traffic risk
- Operations and Maintenance risk
- Project completion/project availability risk
- Technical risk

The Less Significant Risks Associated with PPP in Road Infrastructure Development are:

- Construction costs risk
- Residual value risk
- Appropriations risk

5.3.3 Objective three

The third objective set was to 'To determine how those risks associated with PPP in road infrastructure development could be managed or shared among the parties involved. For this to be achieved respondents were asked to rate (Strongly Agree, Agree, Fairly Agree, Disagree and Strongly Disagree) some perceived general risk sharing or management strategies. The research findings revealed that respondents' response to the perceived risks pointed to an appreciable value. To great extent respondents placed adequate value on all the risk sharing strategies identified. The risks and perceived sharing strategies on which respondents opinion was sought on are displayed in the table below:

Table 5.1-Phroposed strategies for managing the risks associated with PPP

Risks	How the Risk is Managed Or Shared
1.Political Risks	Draft national policy to followed no matter the government in power
2.Regulatory Risks	Provisions in PPP legislation should include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall.
3.Site Risks	The government of the home country of PPP project should ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project.
4.Permitting Risks	PPP projects is tied to the ability of the private sector entity to receive the required federal state, and local permits
5.Procurement Risks	PPP legislation or guidelines should include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial, innovation criteria and no misprocurement.
6.Financing Risks	There should be clearly defined concessionary agreement and commitment to it as well as transparency and predictability and accountability.
7. Design risk	Experts and experienced designer must be charged with the responsibility for the design giving them adequate time to design. The design must be checked again and again to ensure completeness and accuracy by sourcing and award of contract.
8.Construction costs risks	Performance bonds and completion guarantees should be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, whiles reducing contract price.
9.Latent defect risk	Construction contracts should make the design - build contractor liable for such defects, and should include penalties and revenue caused by the underperformance or lack damages to compensate the owner and operator against lost of availability of the facility
10.Force Majeure risk	Offsetting this risk through insuring the project with an insurance company to indemnify the insured
11.Traffic Risks	Initial traffic projections should be subjected to a thorough vetting by lenders. This vetting should require a review of the initial projections by an independent expert, to the risks associated with the quality of the projections
12.Operations and Maintenance Risks	A comprehensive plan and program for operating and maintaining the PPP project must be ensured by both parties to the contract.
13.Appropriations Risks	-Draft national policy to followed no matter the government in power -There should be an economic stability to allow recouping of investment.
14.Refinancing Risks	-PPP projects should be hedged against high and unstable interest rate especially if the concessionaire has entered into a floating rate loan and have opted not to hedge. -Loan agreements should not carry mandatory refinancing provisions which exposes the project to financing risk when it seeks to refinance its existing loan
15. Hand back Risk or Residual Value Risk	Conditions, requirements and procedures governing the condition in which the private partner is to deliver the asset to the public sector upon the expiration of the PPP agreement should be clearly defined
16. Technical Risk	construction and technical specification should be clearly stated and must work together
17.Project completion/project availability risk:	-Construction contracts should make the design - build contractor liable for completing behind schedule -The public partner should provide the environment to assist the design-build contractor to complete the project on schedule.

5.4. Recommendations

It is recommended that the factor below should be considered as the significant factors affecting road infrastructure project delivery: Availability of fund; type of procurement system for the project; Project characteristics; client representation characteristics; project team performance(experience); client representative's characteristics; contractor's characteristics; Design Team characteristics; external conditions; project Manager's Competence; top Management support, project manager's coordinating and leadership skills; monitoring and Feedback by the participants; decision making; coordination among project participants; client or owners' competence; social condition; economic condition; climatic condition; availability of plants and equipment; the condition of the ground; availability and quality of construction materials; disputes and conflicts; availability of labour and productivity; nature of project planning; environmental regulations; nature of technology; political interest in the project.; the proposed project completion schedule or date and means of communication.

It is also recommended that there should be sufficient education on the factors affecting road infrastructure project delivery among those in the road sector.

It is again recommended that risks that affect road infrastructure delivery using Public – Private Partnership approach should be categorizes as significant and less significant risks and they are as follows:

Significant Risks Associated with PPP in Road Infrastructure Delivery

- Political risk
- Regulatory risk
- Site risk
- Permitting risk
- Procurement risk
- Financing risk
- Latent defect risk
- Force Majeure risk
- Traffic risk
- Operations and Maintenance risk
- Project completion/project availability risk
- Design risk

Less significant Risks Associated with PPP in Road Infrastructure Delivery

- Appropriations risk
- Residual value risk
- Construction costs risk

The research recommended that the risks associated with PPP should be managed using the risks management strategies proposed below:

Risks	How the Risk Is Managed Or Shared
1.Political Risks	Draft national policy to followed no matter the government in power
2.Regulatory Risks	Provisions in PPP legislation should include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall.
3.Site Risks	The government of the home country of PPP project should ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project.
4.Permitting Risks	PPP projects is tied to the ability of the private sector entity to receive the required federal state, and local permits
5.Procurement Risks	PPP legislation or guidelines should include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial, innovation criteria and no misprocurement.
6.Financing Risks	There should be clearly defined concessionary agreement and commitment to it as well as transparency and predictability and accountability.
7. Design risk	Experts and experienced designer must be charged with the responsibility for the design giving them adequate time to design. The design must be checked again and again to ensure completeness and accuracy by sourcing and award of contract.
8.Construction costs risks	Performance bonds and completion guarantees should be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, whiles reducing contract price.
9.Latent defect risk	Construction contracts should make the design - build contractor liable for such defects, and should include penalties and revenue caused by the underperformance or lack damages to compensate the owner and operator against lost of availability of the facility
10.Force Majeure risk	Offsetting this risk through insuring the project with an insurance company to indemnify the insured
11.Traffic Risks	Initial traffic projections should be subjected to a thorough vetting by lenders. This vetting should require a review of the initial projections by an independent expert, to the risks associated with the quality of the projections
12.Operations and Maintenance Risks	A comprehensive plan and program for operating and maintaining the PPP project must be ensured by both parties to the contract.
13.Appropriations Risks	-Draft national policy to followed no matter the government in power -There should be an economic stability to allow recouping of investment.
14.Refinancing Risks	-PPP projects should be hedged against high and unstable interest rate especially if the concessionaire has entered into a floating rate loan and have opted not to hedge. -Loan agreements should not carry mandatory refinancing provisions which exposes the project to financing risk when it seeks to refinance its existing loan
15. Hand back Risk or Residual Value Risk	Conditions, requirements and procedures governing the condition in which the private partner is to deliver the asset to the public sector upon the expiration of the PPP agreement should be clearly defined
16. Technical Risk	construction and technical specification should be clearly stated and must work together
17.Project completion/project availability risk:	-Construction contracts should make the design - build contractor liable for completing behind schedule -The public partner should provide the environment to assist the design-build contractor to complete the project on schedule.

It is further recommended that there should be an effective training on risk management among parties involved in road infrastructure delivery using the PPP approach beginning with the identification of the risks with the project, assessment

of the risks and prescribing the most appropriate strategies to either transfer, share, absorb or prevent the identified risks from happening. Whiles the project is on going the risks should be reviewed constantly and management strategies accordingly adjusted.

Besides, it is recommended that government should increase the road infrastructural base of the country by opting for the PPP approach since it is usually intensive capital (Owusu, 2010) and therefore there is the need for the private sector to come in to assist the government in such provision.

Moreover, it is recommended that the Ministry of Roads and Transports of the Republic of Ghana should ensure as a matter pre-requisite knowledge in procurement management especially in the area of Public – Private Partnership before road contractors are registered. Additionally, it is recommendable that tertiary institutions including Kwame Nkrumah University of Science and Technology as well as others should include as part of the curriculum procurement studies in their construction related programs so as to equip graduates from such institution with adequate knowledge in procurement management.

5.4.1 Future Research Needs

Based on the findings of the study, research should be conducted in the following areas:

1. Factors affecting the delivery of infrastructure project other road.
2. Financing of road infrastructural project through Public – Private Partnership approach

5.5 Conclusion

Research should be conducted in the areas stated above. There should be adequate education to increase the awareness of the factors affecting road infrastructure project delivery. Again, there should be sufficient awareness creation and training on risks and risk management among those in the road sector to ensure effective risk management. The private sector should be encouraged to come in to augment government`s effort in the provision of road infrastructure through the Public – Private Partnership approach to infrastructural provision since road infrastructure provision is capital intensive and the government being constantly budgetary constrained . The Ministry of Roads and Transport should also assess road sector contractors in the area of procurement management as part of its main criterion prior to registration. Finally, tertiary institutions should be encouraged to include procurement management as part of their curriculum in the construction related programs to equip graduates from such institution with adequate knowledge in procurement management.

BIBLIOGRAPHY

Abiodun, D. (2003). *PDP and Infrastructure Development*. Retrieved July 4, 2012 fromhttp://www.vanguardngr.com/2011/02/pdp-and-infrastructure-development/

Ahadzi, M. & Bowles, G. (2001). *The Private Finance Initiative: The Procurement Process in Perspective.* Heriot-Watt University, Department of Building Engineering and Surveying, Edinburgh, EH 14 4AS, UK.

Adu, L., (2009). *The current situation of roads in Accra and its effects on real estate development (House) within the city*. Retrieved May 9, 2012 from http://www.air.ashesi.edu.gh/bitstream/.../done%20-%20LORNA%20LISA%20L...

Akintoy, N.G., Beck, .D., Hardcastle, A. (2003) Factors Influencing Project Delivery within Construction Clients Multi-Project Environments. Engineering, *Construction and Architectural Management, 11(2), 113-125.*

Akintoye, B.,Flanagan & Mark, R. (2001) Improving Value for Money in Construction. London: Royal Institute of Chartered Surveyors.

Ahmed, T. (2000) Plans are Nothing, Changing Plans is Everything: The Impact of Changes on Project Success. *Research Policy, 3391, 1-15.*

Ahmed, M & Aziz, A. (2007). Successful delivery of public-private partnerhships for

infrastructure. Journal of Construction Engineering and Management. J. Constr.Eng. Manage.133 (12), 918–931.

Aibinu, A.A. and Jagboro, G.O. (2006) The Effects of Construction Delays on Project Delivery in Nigeria Construction Industry. *International Journal of Project* Management, *20(4), 593-599.*

Aibinu, A.A & Jagboro, H. A. (2002*), Construction Delays and Their Causative Factors in Nigeria*, Journal of Construction Engineering and Management © ASCE/July 2006 Retrieved August 7, 2012 from http://www.eprints.ulster.ac.uk/13805/

Assaf, S.A. and Al-hejji, S. (2005) Causes of Delay in Large Construction Projects. *International Journal of Project* Management, 24(7), 349-357.

Aiyetan, A. O. (2010). *Influences on construction project delivery time.* Faculty of engineering, the built environment and information technology; Nelson Mandela Metropolitan University. Retrieved June 6, 2012 from http://www.dspace.nmmu.ac.za: 8080/.../ AIYETAN%20AYODEJI%20OLATUNJI.pdf

Ameyaw, C. (2009). *Comparative Performance Evaluation of the Traditional Design-Bid-Build DBB) and Design-Build (DB) Procurement methods in Ghana. (*Department of Building Technology, Kwame Nkrumah University of Science and Technology. Retrieved July 9, 2012 from http://www.dspace.knust.edu.gh:8080/xmlui/bitstream/.../Collins%20Ameyaw.pdf?..

Amoatey, C. T. (2010). *User Finance Road infrastructure in Ghana: opportunities for Road concession*. Von der Fakultät Bau- und Umweltingenieurwissenschaften der Universität Stuttgart zur Erlangung der Würde eines Doktor-Ingenieurs (Dr. Ing.) genehmigte Abhandlung. Retrieved September 5, 2012 from http://www.elib.unistuttgart.de/.../2007/.../Amoatey_Dissertation_25042007.pdf

Andreski, A. (2008). *Case Study of Road Funds in Ghana, Malawi and Tanzania. Background paper to Module 1, Senior Road Executive Course University of Birmingham*. Retrieved May 2, 2012 from http://www.gtkp.com/sectors.asp?step=4&typeOFPage=0&contentID =2938.

Apenteng, M. (2011). *Report of public consultation meeting on Ghana PPP Programme.* Ministry of Finance and Economic Planning. Retrieved August 3, 2012 from http://www.epa.gov.gh/index.php?option=com_docman&task.

Bing, R., Gerard D., Somer, K. (2004). *Building in value Pre-Design Issues*. Arnold Publishers.

Bryde, D.J. and Robinson, L. (2005) Client versus Contractor Perspective on Project Success Criteria. *International Journal of project management, 23 (8), 622 – 629.*

Belout, A. and Gauvreau, C. (2003) Factors influencing project success: The Impact of Human Resource Management. *International Journal of Project Management, 22(1), 1-11.*

Bruxel, R. (2005*). Public Private Partnerships Convenience and Peculiarities of Brazilians PPPs*. The Institute of Brazilian Business and Public Management Issues. Retrieved June 18, 2012 from http://www.gwu.edu/~ibi/minerva/Spring2005/Romy.Bruxel.pdf

Bryan, S., Shapiro, H., & Knutson. (2003). *Design/Build And Turnkey Contracts – Pros And Cons.* Retrieved November 15, 2012 from. http://www.shk.ca/docs/design

Blackwell, H.A. (2000) Construction Delay: A Quantitative Analysis. *International Journal of Project* Management, *18, 51-59.*

Charles, A. & Andrew, M. (1990) Causes of delays in Saudi Arabian Public

Sector Construction Projects. *Construction Management and Economics, 27, 3- 23.*

Donaldson, G.A. (2003). *Marketing Research. Methodological Foundations*. Chicago Gryden Press.

Duffied, C. (2001). *Practical Research Methods*. Published by New Delhi, UBS Publishers' Distributors. Tustin, ligthelm, Martins, & Van Wyk. (2005). *Marketing Research in Practice*. Pretoria. Unisa Press.

Deloitte Research (2006). *Closing the Infrastructure Gap: The Role of Public-Private Partnerships*. Retrieved September 18, 2012 from http://www.infrastructureaustralia. gov.au/publications/.../Closing_the_Infra.

Danso, A. (2010) Strategic Planning Practice of Construction Firms in Ghana. Construction Management and Economics, 23, 163-168.

Deloitte Research (2006). *Governing forward. New directions for public leadership Global perspectives.* Retrieved March 12, 2012 from http://www.deloitte.com/assets/.../turkey(en)_ps_goingforward_240706.pd...

Ellhag, P., Boussabaine. (1998), *Commissioned paper presented at Workshops on Social Impact of Roads.* Department of Transport, United Kingdom electronic. Retrieved from http://www.transport- links.org/transport

Faridi, A.S. and El-sayegh, S.M. (2006) Significant Factors Causing Delay in the UAE Construction Industry. *Journal of Construction Management and Economics, 24, 1167-1176.*

Economic and Social commission of Asia and the Pacific (ESCAP).(2011). *Guide Book on Public-Private Partnerships in Infrastructure*. Retrieved July 25, 2012 from http://www.unescap.org/ttdw/common/TPT/PPP/text/ppp_guidebook.pdf

Frimpong, Y., Oluwoye, J. and Crawford, L. (2002) Causes of Delay and Cost Overruns in Construction of Groundwater Projects in a Developing Countries: Ghana as a Case Study. International Journal of Project Management, 21, 321- 326

Flanagan, V. & Tate, N. (1997). *Ghana Infrastructure; A continental Perspective*. *The World Bank, Africa Region Policy Research Working Paper 5600*. World Bank Institute.

Ghana infrastructure plan (GIP). (2012). *Consultants Group Meeting*. Retrieved July 12, 2012 from http://www.mofep.gov.gh/CG2012/userfiles/file/ghana_infrastructure.pdf

Ghana Investment Promotion Centre, (GIPC). (2009). Retrieved March 2, 2012 from http://www.gipc.org.gh/Pages.aspx?id=81.

Gruneberg, U., Hughes,G. & Ancell, P., (2008) Practical Approaches for Engaging Stakeholders: Findings from The UK. *Construction Management and Economics, 26, 591-599*. Today's Construction Industry. *The Quantity Surveyor, 40(3), 2-6.*

Government of India, (2010). *Approaches to defining PPP Discussion note*. Ministry of Finance, Department of Economic Affairs. Retrieved June 19, 2012 from http://www. pppinindia.com/pdf/ppp_definition_approach_paper.pdf

Glasow, C. (2005) Evaluation of Construction Contractor Performance: A Critical Analysis of Some Recent Research. *Construction Management and Economics, 24, 439-445*.

Grimsey, D., & Lewis, M.K., (2002). *Evaluating the risks of public–private partnerships for infrastructure projects*. International Journal of Project Management. Retrieved July 12, 2012 from http://www.elsevier.com/locate/ijproman 0263-7863/01/ PII: S0263-7863 (00)00040-5

Gerald, K. (1999) Trends in Productivity Improvement in the US Construction Industry. *Construction Management and Economics, 18, 15-27.*

Glatzer M., (2002). *Public-Private Partnerships and the Management of Expressways in China: An Agency Theory Approach*. Delft University of Technology.

Harold, I.G. (2009*). Preparing a Road Financing Plan. Course Notes for Senior Road Executive program*. University of Birmingham, UK. Retrieved May 21, 2012 from http://www.worldbank.org/eca/trans/roadfinancing/en/add-resources.htm.

Haarhoff, J.K. (2008). A Public-Private partnership as an alternative to public service *deliveryoption: A multiple Case study in the Healthcare Sector in South Africa*; *Masters Thesis*. University of Stelenbosch. Harold Kerzner, (2009). *Project Management (Tenth Edition).* John Wiley & Son, New Jersy.

Haw, N.K.& Koppenjan, D., (2001) Conflicting Factors in Construction Project: Korean Perspective. Engineering, Construction and Architectural Management, *13(6), 543-566.*

Hart, O. (2003). *Incomplete Contracts and Public Ownership: Remarks, and an Application to Public-Private Partnerships.* Economic Journal 113.

Haris, S. (2007). *Public Private Partnership delivering a better infrastructure service.* Working Paper, Washington DC. Inter-America development Bank.

Retrieved June 17, 2012 from http://www.alide.org/DataBank2007/RecInformation/.../41PublicPPharrisBID.p.

IISD Report February, (2012). *Hrnessing the Power of Public-Private Partnerships: The role of hybrid financing strategies in sustainable development.* Samuel Colverson Summit Consulting Group with Oshani Perera, IISD.

IPFA. (2007). *The status for PPP projects in Denmark.* Retrieved May 20, From http://www.accura.dk/.../200747/ppp-contracts%20in%20denmark%20(ipf.

Idris,D., (2002) Framing of Project Critical Success Factors by a Systems Model. *International Journal of Project Management, 24(1), 53-65.*

Jha, K.N. & Iyer, K.C. (2005). *Critical Determinants of Project Coordination*. International Journal of Project Management, 24(4), 314-322.

Jiri, D.A. & Paaroublk, M. (2010). Qualitative and Quantitative Research. Grant and Evaluation office, Imperial COE. Retrieved October 20, 2012 from http://www.icoe.org/webfm send/1936

Juran J.M., (1986). *Quality Trilogy; the Universal Approach to Managing Quality*. Juran Institute. Inc., 11 River Road, Wilton CT 06897, USA.

Kartz, D. (2006). *Financing Major infrastructure Projects in Public Private Partnership*. Policy Perspective Paper, New Zealand Treasury.

Koushki, P.A. and Kartam, N. (2004) Impact of Construction Materials on Project Time and Cost in Kuwait. *Engineering, Construction and Architectural Management, 11(2), 126-132.*

Khulumane J. M., (2008). *Transport economic regulatory intervention in the transport infrastructure: Public-Private Partnership exploratory study,*

Doctoral thesis. University of South Africa. Retrieved August 20, 2012 from http://www.uir.unisa.ac.za/bitstream/handle/10500/1926/**thesis**.pdf?sequence =1

Kish, L. (1965). *Survey Sampling.* John Wiley & Sons Inc, New York. Retrieved July 17, 2012 from http://www.abacpoll.au.edu/subresearch/bf6993/chapter/.../pdf/oct3_3.pdf

Koppenjan, C.R., (2001), *Research Methodology- Methods and Techniques*. New Delhi, Wiley Eastern Limited.

Kalton, D. (1971) Management‟s Perception of Key Performance Indicators for Construction. *Journal of Construction Engineering and Management, 129(2), 142-151.*

Keralic, J. (2003). *Road Financing in Selected Countries*. Brisbane Bureau of Transport

Klign, R. (2000), *Research Methodology-A Step-by-Step Guide for Beginners, (2nd.ed.)*. Singapore, Pearson Education.

Koushki, P.A. and Kartam, N. (2004) Impact of Construction Materials on Project Time and Cost in Kuwait. *Engineering, Construction and Architectural Management, 11(2), 126 132.*

Lyer, M.(2006) Motivation: An alternative to Improve workers Performance in

Li, O. (2003) Structural Equation Model of project Planning Effectiveness. *Construction Management and Economics, 23, 215-223.*

Markus, M., (2011). *Analyzing railway Public-Private Partnership practices through project management theories: Towards efficient risk mitigation*; *master thesis*. Copenhagen Business School.

Mustafa, M. (1999) Cost Time Control Construction Projects: A Survey of Contractors and Consultants in the United Kingdom (UK). *Construction Information Quarterly, 11(2).*

Ministry of Roads and Highways (MRH). (2011*). Road infrastructure development annual report.*

Mohd. N. M., (2010). September Coursework Assignment. Open University, Malaysia.

Nana-Benyin, D. E., (2011). *Factors affecting delayed payments on Donor Funded Projects in Ghana; Master Thesis.* Department Of Building Technology, Faculty of Architecture And Building Technology College Of Architecture And Planning Kwame Nkrumah University Of Science And Technology .

Newcombe, R.,Moon, N., & Yorm, G., (1990) From Client to Project Stakeholders: A stakeholder Mapping Approach. *Construction Management and Economics, 21, 841-848.*

Naoum.R.,(2001) Causes of Delays in the Construction Industry. *ASCE Journal of the Construction Division, 92, 177-187.*

Newman, M. & Idras S., G. (2001) Trends of Skills and Productivity in UK Construction Industry. *Engineering, Construction and Architectural Management, 15(4), 372-382.*

Owusu G. A., (2010). *Looking at the PPP and the traditional way of construction of projects in Ghana*. The University of Agder, Kristiansand. Retrieved May 4, 2012 from http://www.brage.bibsys.no/hia/.../URN.../George%20Owusu%20Afriyie_rett.pdf

Osborne, S.P., (2000). *Public–Private Partnerships: Theory and Practice in*

International Perspctive. London Routledge.

Oladapo, A.M. (2005) Project Performance in a Changing Environment. AACE International Transactions, INT09.1-INT09.10.

Pushak, S. (2011) Critical Path Method: A tool for project Delay Control. *The Quantity Surveyor, 44(3), 2-5.*

New South Wales Treasury, (2009). *New South Wales Public-Private Partnerships – An Evolution.* Retrieved July 17, 2012 from http://www.treasury.nsw.gov.au/__data/assets/pdf_file/.../TRP09-1_dnd.pdf

Palmer (2009). *Public-Private Partnerships - Literature Review – Draft*. Retrieved June 17, 2012 from http://www.periglobal.org/.../PERI%20Bibliography%20-...

Project Management Institute (2008). *A guide to the Project Management Body of Knowledge, Fourth Edition*. Project Management Institute.

Rohaniyati S., (2009). *Critical Success factors of Project management for Brunei Construction Projects: Improving Project Performance*. Queen's University of Technology. Retrieved May 9, 2012 from http://www. eprints.qut.edu.au/38883/1/Rohaniyati_Salleh_Thesis.pdf

Road Infrastructure Definition. Retrieved June 21, 2012 from http://en.wikipedia.org/wiki/Infrastructure.

Rwelamila P. D. & Hall, K.A. (1995). "*Total system intervention, an integrated approach to time, cost and quality management"*. Construction Management and Economics, Vol. 13. Economics.

United Nations Economic Commission for Europe, (2008). *Guidebook on Promoting Good Governance in Public-Private Partnerships.* United Nations; New York and Geneva.

World Bank institute, (2012). *Public-Private Partnership Reference Guide. Version 1.* World Bank institute.

Stocker, C., (1985) Time – Cost Relationship of Public Sector Projects in Malaysia. *International Journal of Project Management, 19(4), 223 – 229.*

Teisman, H. A. (2005) Construction Delays a Quantitative Analysis. *International*

Touche, C. (2006) Evaluation of Construction Contractor Performance: A Critical Analysis of Some Recent Research. *Construction Management and Economics, 24, 439-445.*

Teisman, C., (2005) Time – Cost Relationship of Public Sector Projects in Malaysia. *International Journal of Project Management, 19(4), 223 – 229.*

World Bank report, (2011). *Country Brief*. Retrieved October 12, 2012 from http://www.worldbank.org/en/country/ghana.

Widdus,.G., (2001) Constructability Implementation: A Survey in the Malaysian Construction Industry. Construction Management and Economics, 19, 819-829.

World Bank, (2008). *Africa infrastructure diagnostic study*. World Bank Institute.

Yescombe, E.R., (2007). Public-Private Partnerships. Oxford: Elsevier.

Yescombe, (2007). Euroroads: Understanding the nature of PPPs. E.R. Yescombe Consulting Ltd., London. Retrieved from http://www.yescombe.com.*Journal of Project Management, 18, 51-59.*

Yuan, F.J. ,Hinds, M.F. and Moody, N.F. (2009) The Time and Cost Performance of Building contracts 1976-1986. *The Australian Institute of Quantity* Surveyors, Sydney.

APPENDIX

QUESTIONAIRES

QUESTIONNAIRE

QUESTIONNAIRE FOR ROAD SECTOR STAFF IN ACCRA

RESEARCH TOPIC: Public – Private Partnership in Road Infrastructure Development in Ghana: Factors Affecting Project Delivery and Associated Risks

INTRODUCTION

The researcher is a final year student of Kwame Nkrumah University of Science and Technology-Kumasi and from the Department of Building Technology. He intends to execute this research as part of the university's academic requirement for the completion of his degree of Masters of Procurement Management. Your objective response to this questionnaire is an invaluable aid to this research work. All information provided would be treated as confidential and for academic purposes only. There are no rights or wrong answers.

In case of any doubt/s or need for clarification, please contact any of the addresses given below.

Thank You.

Supervisor

Mr. Peter Amoah,

Student

Ampah Delvin Abraham

Mob: 0244421715

E-mail: ampahdelvin36@gmail.com

SECTION A – DEMOGRAPHIC QUESTIONS

Below are some demographic questions. Kindly respond appropriately by ticking.

1. What is your age? (18-30)Yrs.[ ] (31-40)Yrs. [ ] (41-50)Yrs. [ ]

Above 50 Yrs.[ ]

2. What is your sex? [ ] **Male [ ] Female [ ]**

3. What is the highest level of education you have attained?

PhD [ ] (MSc) [ ] BSc [ ] Diploma[ ]

Others, Please specify…… [ ]

Others, Please specify …… [ ]

4. How would you describe your current employment status?

Private (Road contractor) **Public Servant**

5. For how long have you been practicing in the road sector?

[0-4] yrs[ ] [5-10] yrs [ ] [11-15] yrs [ ] [Above 15] yrs [ ]

6. How conversant are you with the concept of PPP?

Very Conversant [ ] Conversant [ ] Not Sure [ ]

Fairly Conversant [ ] Not Conversant [ ]

7. How many road infrastructure projects have you worked on that required using Public - Private Partnership (PPP) approach?

[0 - 3] [ ] [4 - 6] [ ] [7- 9] [ ] [Above 9] [ ]

SECTION B –FACTORS THAT AFFECT ROAD PROJECT DELIVERY

Below are some factors the affect road project delivery. Please from your experience, express your opinion on (**how important**) they are by ticking the appropriate cell.

Factors that affect Road Project Delivery	Very Important 5	Important 4	Fairly Important 3	Not Sure 2	Not Important 1
1. Availability of fund					
2. Type of procurement system for the project					
3. Project characteristics					
4. Client representation characteristics					
5. Project team performance (experience)					
6. Contractor's characteristics					
7. Design Team characteristics					
8. External Conditions					
9. Project Manager's Competence					
10. Top Management support					
11. Project manager's coordinating and leadership skills					
12. Monitoring and Feedback by the participants					
13. Decision making					
14. Coordination among project participants					
15. Client or owners' competence					
16. Social Condition					
17. Economic condition					
18. Climatic Condition					
19. Availability of plants and equipment					
20. The condition of the ground					
21. Availability and quality of construction materials					
22. Disputes and conflicts					
23. Availability of labour and productivity					
24. Nature of project planning					
25. Nature of technology					
26. Political interest in the project					
27. Means of communication.					
28. The proposed project completion schedule or date					
29. Environmental regulations					
30. Acts of God					
31. Other….					
32. Other….					
33. Other….					

SECTION D – RISKS THAT ARE ASSOCIATED WITH PUBLIC- PRIVATE PARTNERSHIP (PPP) IN ROAD INFRASTRUCTURE DEVELOPMENT AND HOW THEY ARE MANAGED OR SHARED

Please from your experience; express your opinion on the extent to which you **agree or not** that the risks associated with PPP in road infrastructure development can be shared or managed through the strategies proposed.

Risks	How the Risk Is Managed Or Shared	Strongly Agree 5	Agree 4	Fairly Agree 3	Disagree 2	Strongly Disagree 1
1.Political Risks	Draft national policy to followed no matter the government in power					
2.Regulatory Risks	provisions in PPP legislation should include a requirement for clear procurement guidelines and decision criteria, flexible project eligibility criteria, and the ability to revise toll rates over the project's life overall.					
3.Site Risks	The government of the home country of PPP project should ensure that the site is properly acquired and that there will not be any obstacle to the execution of the desired project.					
4.Permitting Risks	PPP projects is tied to the ability of the private sector entity to receive the required federal state, and local permits					
5.Procurement Risks	PPP legislation or guidelines should include procurement procedures for PPP that specify evaluation criteria for PPP proposals, including technical, financial, innovation criteria and no misprocurement.					
6.Financing Risks	There should be clearly defined concessionary agreement and commitment to it as well as transparency and predictability and accountability.					

7. Design risk	Experts and experienced designer must be charged with the responsibility for the design giving them adequate time to design. The design must be checked again and again to ensure completeness and accuracy by sourcing and award of contract.					
8.Construction costs risks	Performance bonds and completion guarantees should be written into the construction contract to further incentivize the construction contractor to complete work on time and to reduce risk, whiles reducing contract price.					
9.Latent defect risk	Construction contracts should make the design - build contractor liable for such defects, and should include penalties and revenue caused by the underperformance or lack damages to compensate the owner and operator against lost of availability of the facility					
10.Force Majeure risk	Offsetting this risk through insuring the project with an insurance company to indemnify the insured					
11.Traffic Risks	Initial traffic projections should be subjected to a thorough vetting by lenders. This vetting should require a review of the initial projections by an independent expert, to the risks associated with the quality of the projections					
12.Operations and Maintenance Risks	A comprehensive plan and program for operating and maintaining the PPP project must be ensured by both parties to the contract.					
13.Appropriations Risks	-Draft national policy to followed no matter the government in power -There should be an economic stability to allow recouping of investment.					
14.Refinancing Risks	-PPP projects should be hedged against high and unstable interest rate especially if the concessionaire has entered into a floating rate loan and have opted not to hedge. -Loan agreements should not carry mandatory refinancing provisions which exposes the project to financing risk when it seeks to refinance its existing loan					

15. Hand back Risk or Residual Value Risk	Conditions, requirements and procedures governing the condition in which the private partner is to deliver the asset to the public sector upon the expiration of the PPP agreement should be clearly defined					
16. Technical Risk	construction and technical specification should cleanly stated and must work together					
17.Project completion/project availability risk:	-Construction contracts should make the design - build contractor liable for completing behind schedule The public partner should provide the environment to assist the design-build contractor to complete the project on schedule.					

APPENDIX II

PPP ROAD PROJECTS,2006			
Region/ Country	Project	Amount	Type
Europe			
Austria	Ostregion 1-Ypsilon	€800m	DBFO (shadow tolls + availability
Finland	E18	€300m	DBFO
France	A19	€618m	DBFO
	A41	€840m	Concession
	Autoroutes Paris-Rhin-Rhône [APRR	$2.2bn	Franchise sale
	Eiffarie	$7.0bn	Acquisition finance for APRR
	La Société des Autoroutes du Nord et de l'Est de la France [SANE	$4.3bn	Franchise sale
Greece	Ionia Odos	€1,150m	Concession
	Thessaloniki Tunnel	€460m	Concession
Hungary	M6 Motorway	€412m	Refinancing
Ireland	Limerick Tunnel	€268m	Concession
	Wayerford Bypass	€360m	Concession
Italy	Mestre Ring Road	€750m	
Poland	AutostradaWielkopolska SA		
	A1 Gdansk-Torun	€660m	
Portugal	Azores SCUT Shadow Toll Road	€325m	DBFO (shadow tolls)
Spain	Autoviá Santiago-Bríon	€115m	Concession
	Autopista de Alicante	€383m	Concession
	Autopista de Mediterraneo	€532m	Concession
	M-407	€93m	DBFO (shadow tolls)
	Valladolid-Segovia (2 tranches)	€196m	DBFO (shadow tolls)
	Pamplona-Logroño Motorway	US$410m	Refinancing
U.K.	M6 Toll Road	£1.0bn	Refinancing
Americas			
United States	Indiana Toll Road	US$4.1bn	Franchise sale
	Pocahontas Parkway	US$420m	Transfer of franchise and upgrading
Canada	Access Roads Edmonton	C$365m	DBFO
	Golden Ears Bridge	C$1.1bn	DBFO (with tolls paid by users
Mexico	Toluca Toll Road	US$722m	Refinancing
Dominican Rep.	Santo Domingo Toll Road	US$162m	Toll road (with minimum revenue guarantee
Peru	ConcessionariaIIRSA Norte	US$213m	
Asia-Pacific			
Australia	Brisbane North-South Bypass Tunnel	A$1.8bn	
	Melbourne EastLink	A$2.1bn	
India	BalajiTollways	US$24m	Concession

	InduNavayuga Infra Projects	US$59m	Concession
	Jallandhar to Amritsar Toll Road	US$36m	Concession
	Jas Toll Road	US$41m	Concession
	Krishnagiri Toll Road	US$101m	Concession
	L&T Vadodara Bharuch Tollway	US$268m	Concession
	KumarapalyamTollway	US$75m	Concession
	L&T Western Andhra Tollway	US$60m	Concession
	Lucknow - Sitapur Expressway	US$47m	Concession
	Mumbai Nasik Expressway	US$148m	Concession
	Raipur-Aurang Road	US$44m	Concession
	Salem Tollway	US$54m	Concession
	SwarnaTollway	US$80m	Concession
	Tamil Nadu (DK) Expressways	US$50m	Concession
	TrichyThanjavur Expressways	US$57m	Concession
	TrichyTollway	US$120m	Concession
	Western U.P. Tollway	US$85m	Concession
Malaysia	Penang Bridge Extension	US$96m	
Philippines	Manila North Tollway	US$166m	

Major PPP road transactions in 2006;

Source: Yescombe, EUROROADS 2007