

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

**RISK MANAGEMENT IN THE PROCUREMENT OF ROAD WORKS  
IN THE PUBLIC SECTOR  
A CASE STUDY OF THE DEPARTMENT OF FEEDER ROADS**

**BY  
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(BSc. (Hons) Construction Management)**

**A Thesis submitted to the School of Graduate Studies, Kwame Nkrumah University**



**NOVEMBER, 2014**

## DECLARATION AND CERTIFICATION

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

# KNUST

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Date

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Prof. Joshua Ayarkwa

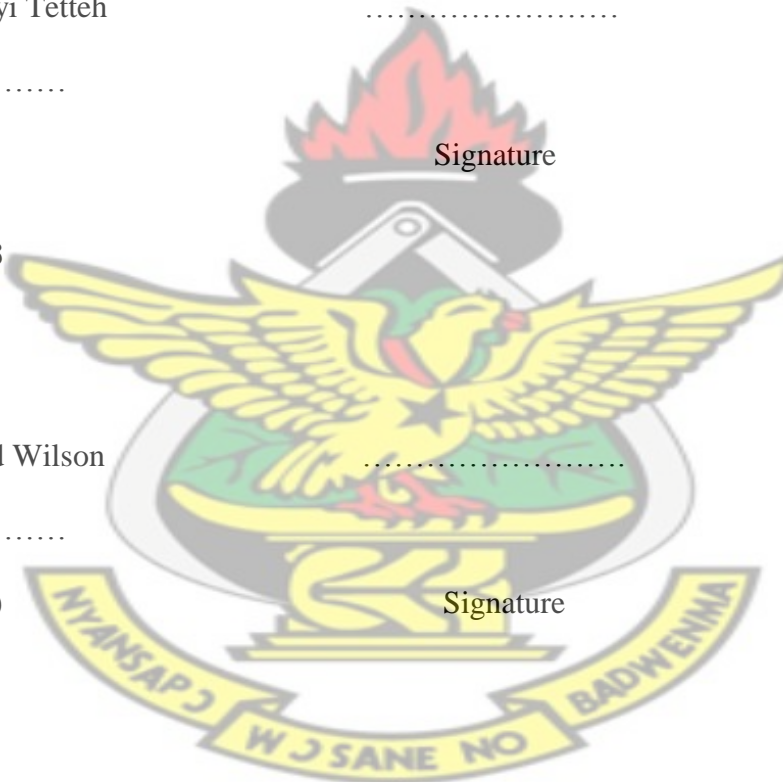
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(Head of Department)

Signature

Date



## DEDICATION

I dedicate this work firstly to the Almighty God for the gift of life and how far he has brought me. It's also to my dear wife Miranda Tetteh, my sister Beatrice Aryeetey and my children Quality Jeremina Naa Tetteh and Alexander Nii Dowona Honger Tetteh.

God bless you all.

# KNUST



## ABSTRACT

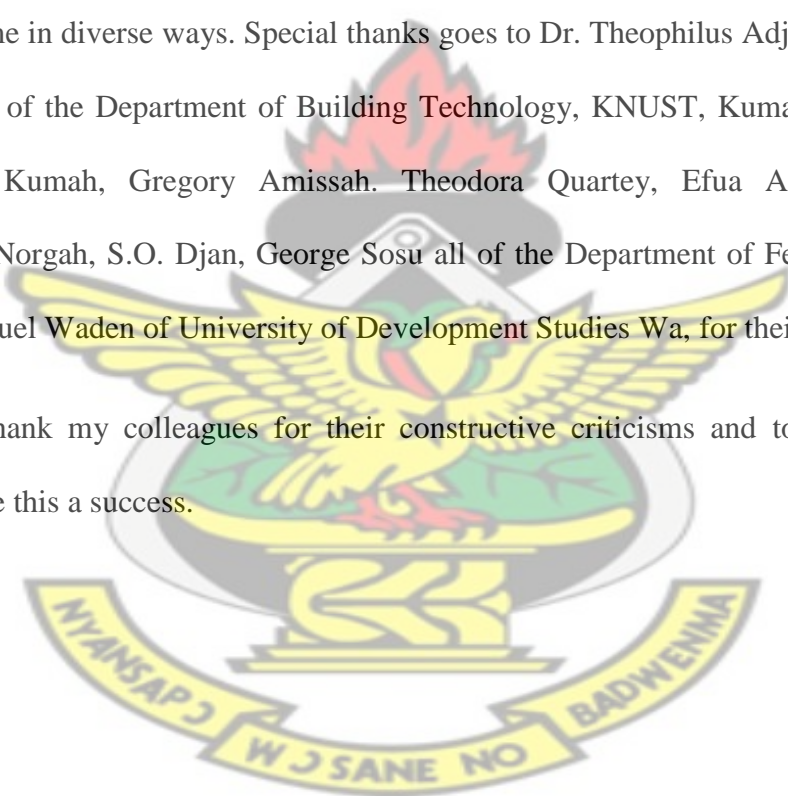
In Ghana one of the most available forms of transport infrastructure is the road. Undisputedly, road infrastructure provides means of access to all major cities, towns and villages. The procurement of this important infrastructure is characterised by a lot of risk. The identification of these risks, the extent and the degree of severity, should they occur, have a bearing on the success of the procurement activity. Adopting a mix methodology approach, the prime purpose of this research was to identify the risk management practices used in the procurement of road works in the public sector. The literature review conducted explored various risk management practices used in the procurement of road works. Through the literature review the scope of the study was limited to four aspects of the procurement process. These included planning the procurement process; procurement documentation; contract management and evaluating the whole procurement. Data was also gathered using survey questionnaires and the results were analyzed using descriptive and relative importance index. The findings show that the highest risk in the procurement process is variations in prices and foreign exchange and the second is lack of technical know-how by consultants. The study also showed that the most employed risk management practice was the use of risk limitation. The second most practice risk management practice was transfer of risk. The least practice risk management tool was the use of public-private partnership and acceptance of risk. The study like any other had limitation and this included only focusing on how significant a risk is in terms of importance relative ranking but did not explore their significance in terms of their impact on the procurement process. Future research could explore the effect of risk on the procurement process and the impact of risk management practice on the procurement process.

**Keywords:** Risk Management, Procurement Process, Road Infrastructure

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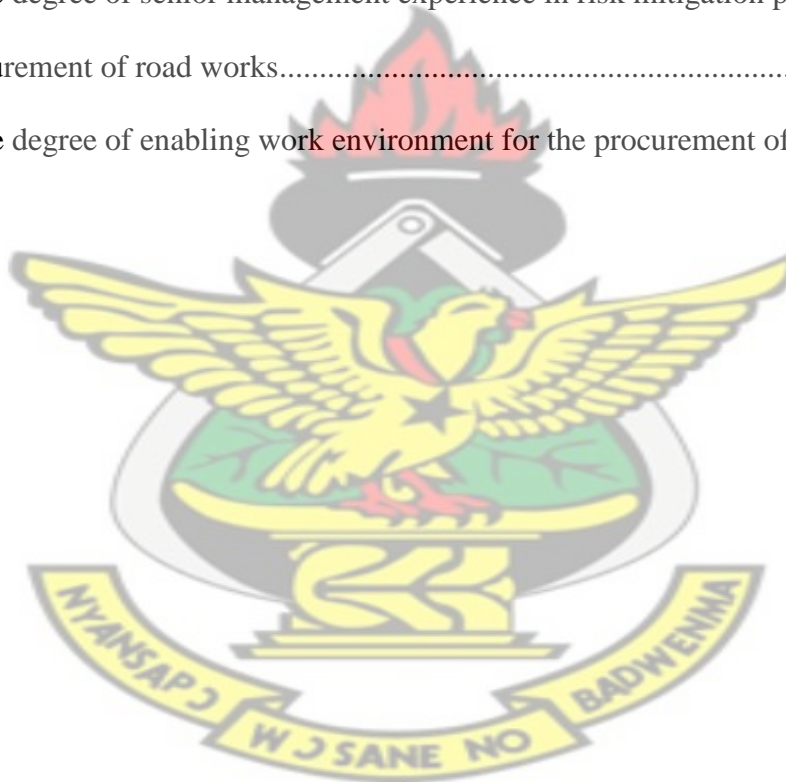
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## LIST OF ABBREVIATIONS

<i>ISO</i>	-	-	-	<i>-International Standard Organization</i>
<i>PMI</i>	-	-	-	<i>-Project Management Institute</i>
<i>DFR</i>	-	-	-	<i>-Department of Feeder Roads</i>
<i>PMBOK</i>	-	-	-	<i>-Project Management Body of Knowledge</i>
<i>UNPP</i>	-	-	-	<i>-United Nations Procurement Practitioners</i>
<i>MRH</i>	-	-	-	<i>-Ministry of Roads and Highway</i>
<i>PPA</i>	-	-	-	<i>-Public Procurement Act</i>
<i>PP</i>	-	-	-	<i>-Public Procurement</i>
<i>VfM</i>	-	-	-	<i>-Value for Money</i>
<i>GHA</i>	-	-	-	<i>-Ghana Highway Authority</i>
<i>DUR</i>	-	-	-	<i>-Department of Urban Roads</i>
<i>PUFMARP</i>	-	-	-	<i>-Public Financial Management Reform Programme</i>
<i>GoG</i>	-	-	-	<i>-Government of Ghana</i>
<i>PE</i>	-	-	-	<i>-Procurement Entity</i>
<i>PPB</i>	-	-	-	<i>-Public Procurement Board</i>
<i>OAG</i>	-	-	-	<i>-Office of the Auditor – General</i>
<i>WTO</i>	-	-	-	<i>-World Trade Organization</i>
<i>OECD</i>	-	-	-	<i>-Organization for Economic Co-operation Development</i>
<i>ABA</i>	-	-	-	<i>-American Bar Association</i>
<i>PPI</i>	-	-	-	<i>-Public Private Initiative</i>
<i>PPP</i>	-	-	-	<i>-Public Private Partnership</i>
<i>CIPS</i>				<i>Chartered Institution of Procurement and Supply Chain Management</i>
<i>NIGP</i>	-	-	-	<i>-National Purchasing Institute of Ghana</i>
<i>APM</i>	-	-	-	<i>-American Project Management</i>
<i>ODPP</i>	-	-	-	<i>-Office of the Director of Public Procurement</i>



## CHAPTER ONE

### 1.0 INTRODUCTION

Risk management is defined by International Standards Organization (ISO) as “the effect of uncertainty on objectives, whether positive or negative. It includes the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities” (ISO 31000:2009). Risk management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level (PMI, 2008). Risk management in road construction industry is considered as an important part of the management process. Since risks in construction projects are associated with three major principles, which are Time, Cost and Quality (Khumpaisal, 2008).

Public Procurement, as defined by the Public Procurement Act, 2003 (Act 663), is ‘the acquisition of goods, works and services at the best possible total cost of ownership, in the right quantity and quality, at the right time, in the right place for the direct benefit or use of governments, corporations, or individuals, generally via a contract’ (PPA Module, 2007). Procurement encompasses the whole process of acquiring goods and/or services. It begins when an organization has identified a need and decided on its procurement requirement. Procurement covers the complete range of events from the identification of a need for a good, works or service through to its disposal

Road works is defined as “works for road purposes” (Road and Street Act 1991). Road works occur when part of the road, or in rare cases, the entire road, has to be occupied for work relating to the road, most often in the case of road surface repairs.



Public Sector is defined as “all organization which are not privately owned and operated, but which are established and financed by Government on behalf of the public”. In general terms, the public sector consists of governments and all publicly controlled or publicly funded agencies, enterprises, and other entities that deliver public programs, goods, works or services.

The Public Procurement Act, 2003 (Act 663) was enacted by the Government of Ghana to address the real and perceived weaknesses in the public procurement of goods, works and services. Its main objective was reducing or at best eliminating corruption in public procurement, achieving value for money and efficiency in the procurement process among others. Public sector procurement demands the highest integrity and efficiency in the eventual realization of the procurement need (PPA, 2010). The procurement of infrastructure projects in Ghana is largely undertaken by the Government of Ghana. From the identification of need to the disposal of the need is a cycle always undertaken by public entities in Ghana in order to fulfil their procurement needs. The procurement cycle is characterized with a lot of risk. Risk is part of every business and serves as a significant and permanent reality faced by virtually every organisation (Segeberberg et al, 2010).

‘Risk’ is defined in the Havard dictionary as “the possibility of something bad happening at some time in the future, a situation that could be dangerous or have bad results” (Hornby, 2000). The Project Management Body of Knowledge (PMBOK) defines risk as “an uncertain event or condition that, if it occurs, has an effect on at least one project objective” (PMBOK 2008; p.275). Risk management is useful in all public procurement projects. Of course, the amount of time and resources spent on risk management should be proportional to the level of uncertainty involved in the procurement project. Risk management is therefore an important step in every project’s success (Rezakhani, 2012). The road construction industry world-wide is undergoing major transformations in the

area of procurement due to the ever changing client requirements and desire to reduce excessive cost and production time.

Procurement decisions globally have a profound impact on the balance of risk and reward on construction projects and the role of the parties involved. Internationally, procurement has increasingly become an issue of public attention. The choice of a procurement method is a critical decision that must be taken into consideration during the procurement process, especially in the procurement of works, as it can ultimately mitigate or exacerbate project risks (NSW Government, 2008). The procurement process is noted to have a lot of risk associated with it. The identification of these risks, the extent and the degree of severity, should they occur, have a bearing on the success of the procurement activity (PMI, 2004).

United Nations Procurement Practitioners (UNPP,2006) indicates some of the risks as: Insufficient funding, Inadequate statement of requirements, Biased specification, Selecting inappropriate procurement method, Providing inadequate information, Selecting inappropriate supplier, Inadequate administration of the contract, Failure to identify and address problems, Inadequate tender management etc.

The stages of the procurement process consist of:

- Identifying the need and planning the procurement
- Developing the specification
- Selecting the procurement method
- Procurement documentation
- Inviting, clarifying and closing offers
- Evaluating offers
- Selecting the successful tenderer
- Negotiations

- Contract management
- Evaluating the procurement process (UNPP, 2006)

Zou et al (2006) have noted significantly that in the achievement of project objectives in terms of cost, time, quality, safety and environmental sustainability, it is important to manage risks in the procurement process through a holistic and systematic approach to the identification, analysis, occurrence and impact of these risks. Procurement processes and procedures in Ghana have gone through a number of changes. One of these changes was the Government establishment of a comprehensive public financial reform programme designed to strengthen its Public Financial Management System.

This reform programme known as Public Financial Management Reform Programme (PUFMARP), became operational in 1995. The objective of PUFMARP was to promote efficiency, transparency and accountability in the public financial management system. To achieve this, PUFMARP recommend the review of Public Procurement system.

The Government of the Republic of Ghana, realizing these inefficiencies of procurement practices and the construction industry's significance has, as part of a required paradigm shift, formulated the Public Procurement Act, (2003) Act 663 (Ajdei, 2006; Anvuur et al., 2006) as cited by Awuah (2014). This provides the legal framework by which public procurement should take place (Anvuur et al., 2006; Glavee-geo, 2008) as cited by Awuah (2014). Again, it was intended that the procurement processes in Ghana were discharged with transparency, competitiveness, fairness and in a manner that will ensure best value for public money (World Bank, 2008).

Despite the introduction of the Public Procurement Act, 2003 (Act 663), the road construction industry continues to experience notable deficiencies in the area of procurement practices (World Bank, 2006). It is therefore necessary to assess the extent

and impact of risk in the procurement process in Ghana. This research is therefore intended to identify the risks and Risk Management practices use in the Procurement process of Road works in the Public Sector using the Department of Feeder Roads as a case study.

## 1.1 PROBLEM STATEMENT

One objective of procurement is to ensure early competition of a contract to serve the intended need.

There have been quite a number of road construction contract failures, emanating from poor procurement practices based on ignorance of the mandatory procurement procedures to be followed (Aquaye, 2011). The Public Sector procurement still faces enormous predicaments. These include, among others:

- lack of proper knowledge, skills and capacity
- inadequate planning and the linking of demand to the budget
- accountability, fraud and corruption
- inadequate monitoring and evaluation of the Procurement process (Migiرو and Ambe 2008).

Migiرو and Ambe (2008) affirm that many Procurement managers in the Public Sector have attended a number of training workshops on Procurement Management, but they still lack the appropriate knowledge for proper implementation. McCarthy (2006) contends that there is a lack of capacity and knowledge by Procurement managers to handle procurement processes that have led to bad governance in the Public Sector. According to Acquaye (2011) ‘the consequences of poor procurement of works, goods and services are very grave and may not be able to achieve the intended objectives’.

The Department of Feeder Roads (DFR) was established to ensure that feeder roads in the country are made accessible all year round. Government of Ghana's investments in feeder roads in nominal terms increased from GH¢13.2 million in 2002 to GH¢73.4 million in 2007(Auditor-General, 2010).

Development Partners have also invested in the development of feeder roads in the road sector. In spite of the investments, there have been project cost overruns, delays and public outcries on the poor state of feeder roads (Auditor-General, 2010). Daily Graphic of Thursday October 25, 2012 reported on the poor state of the Kasoa- Ashalaja - Amasaman feeder road, after demonstrators prevented heavy duty trucks from using the already weak bridge. Road users on countless occasions have expressed their displeasure on the state of feeder roads in the country through the media (Auditor-General, 2010).

Fraud, corruption and unprofessional conduct can enter into any stage of the procurement process, producing the risk of loss of organizational resources and budget for inappropriate supply, with corresponding great damage to the image of the organization (UNPP, 2006). Dias and Ioannou (1996), emphasize that financing of road construction projects need identification and analysis of risk and uncertainty during different phases of the project (cited in Zayed et al., 2008, p.409). This research study identifies the risk and Risk Management practices used in the Procurement process of Road works in the Public Sector using the Department of Feeder Roads as a case study.

## **1.2 AIM**

To identify risks management practices used in the procurement process of road works at the Department of Feeder Roads.



### 1.3 OBJECTIVES

- To identify the significant risks in the procurement process.
- To identify the risk management practices used

### 1.4 RESEARCH QUESTIONS

“Risk identification, assessment, mitigation and monitoring are important elements of a successful project risk management system” (Kpodo, 2011). Risk management is therefore an important step in every project’s success (Rezakhani, 2012).

Some likely questions that one will ask are:

- i. What are the significant risks in the procurement process?
- ii. What are the risk management practices used in the procurement process of road works in the Department of Feeder Roads?

### 1.5 THE SIGNIFICANCE OF THE STUDY

The procurement processes in the Road Sector is noted to have a lot of risk associated with the various stages.

The study seeks to identify the risk management practices in operation within the Department of Feeder Roads and recommend other practices that can be inculcated.

Procurement entities and organizations acquiring critical construction projects may collapse completely or be put out of business by the cost of poor procurement which is not easily noticeable (Acquaye, 2011). The procurement of works, especially road construction projects, by virtue of their complex nature, poses a great deal of risk (Kpodo, 2011). Conducting a risk analysis can identify the areas of concern or weaknesses and avoid greater problems in the future. The right risk management practices will go a long



way in curbing unforeseen events in the future and reduce the likelihood of some of the risks occurring.

## **1.6 RESEARCH METHODOLOGY**

The methodology for the study will be as follows;

- i. Identification of potential risks from both literature review and discussions with construction professionals at the Department of Feeder Roads. Other sources from the author's own experience would form the basis for the questionnaire. The relative importance index would be used for the identification for the potential risks after the respondents have scored on a Likert scale.
- ii. The researcher will collect primary data for analysis.
- iii. Questionnaires will be sent to professionals and consultants in the Department of Feeder roads.
- iv. The researcher will make use of the Relative Importance Index (RII) to analyze the data that will be collected.

## **1.7 SCOPE OF STUDY**

The study is to carry out the identification of risks management practices in the procurement process with particular reference to the Traditional procurement route. Construction professionals at the Department of Feeder Roads as well as their consultants would form the basis of this research. The scope of study is limited to the following stages of the procurement process:

- Identify the need and planning the procurement process
- Procurement Documentation
- Contract management

- Evaluating the procurement process

### 1.8 PROPOSED PROGRAMME OF WORK

ACTIVITIES	J	F	M	A	M	J	J	A	S	O	N	D
Final Draft Synopsis												
Literature Review												
Daft questionnaire												
Test of Questionnaire												
Data collection												
Data analysis												
Writing of project report												
Submission of Draft report to supervisor												
Corrections ( if any)												
Final submission of project report												

## 1.9 DETAILED PROGRAMME OF WORK

<u>MONTHS/ YEAR 2014</u>	<u>TASK</u>
24 MAY 2014	Submission of Synopsis
25 MAY- 21JUNE 2014	Introduction and background to the problem
	Review of literature
23 JUNE– 19 JULY 2014	Literature review and Methodology
	Preparation and delivery of questionnaire to professionals and consultants
20 JUL - 5 AUG 2014	Collection of questionnaire and data
6 AUG – 16 AUG 2014	Analysis of the data and discussion
17 AUG - 3 SEPT 2014	Conclusion and recommendations and final draft to supervisor
4 SEPT – 12 SEPT 2014	Corrections, binding and submission of dissertation

**A table showing the programme of work for dissertation starting from May 2014**

## 1.10 ORGANIZATION OF STUDY / STRUCTURE

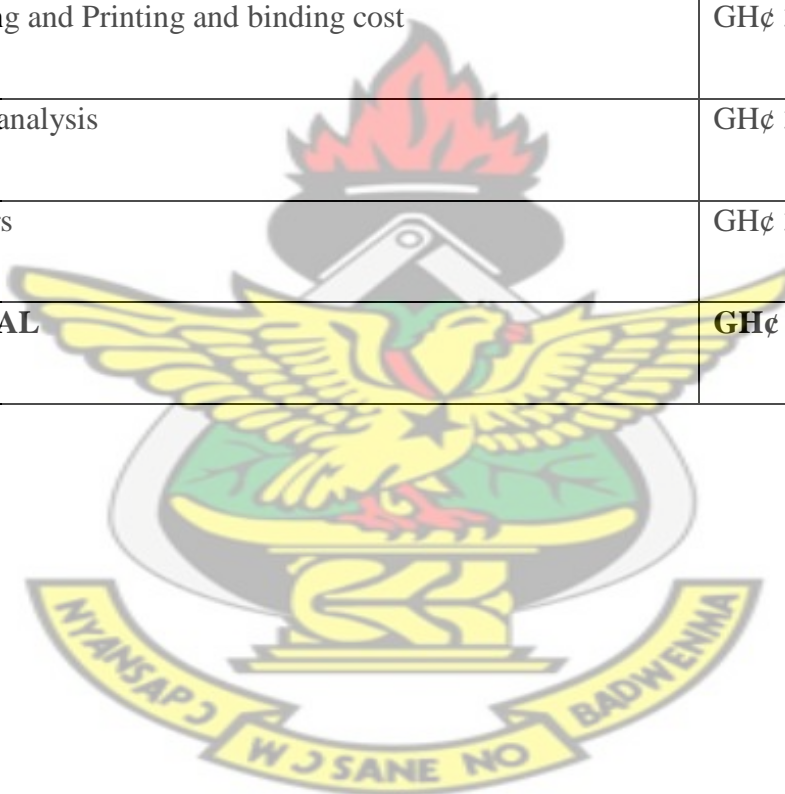
This piece of work consists of five (5) chapters:

- Chapter One (1) will be the introduction and background, problem statement, the goal of the study, significance of the study and the research methodology used.
- Chapter Two (2) will appraise literature and substantiate the sources of the literature. It concentrates on the following :  
Identify general risk associated with road works in general.  
Discuss the standard ways of mitigating such risk generally.
- Chapter Three (3) research method: this chapter will deliberate on the various methods used to collect data for the project.
- Chapter Four (4) discusses the data analysis and presentation of findings. It concentrates on risk management in the procurement of road works at Feeder roads. Discusses the specific risk identified in Feeder Roads and their relationship with general road sector risk. Review how such risks are currently managed through various contracts at Feeder Roads.

Chapter Five (5) discusses the recommendations for the future as follows; recommending possible risk mitigating management plans that can be adopted by the feeder roads Dept to improve the current systems identified and conclusion.

### 1.11 PROPOSED BUDGET

S/N	ACTIVITY	AMOUNT
1.	Transportation (data collection)	GH¢ 900.00
2.	Questionnaire Administration	GH¢ 500.00
3.	Internet browsing	GH¢ 300.00
4.	Stationery	GH¢ 200.00
5.	Typing and Printing and binding cost	GH¢ 300.00
6.	Data analysis	GH¢ 300.00
7.	Others	GH¢ 300.00
	<b>TOTAL</b>	<b>GH¢ 2,800.00</b>



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

An effective public procurement system is essential for the smooth running of a country's institutions and thus its economy. A poor procurement system results in higher costs to government and the public. It interrupts the implementation of projects, and increases costs. It also dampens the possibility of either national or international competent firms from participating in tenders; this goes a long way to rob an economy of receiving the best goods, works and services and the best price (World Bank, 2000). Effective management of procurement risks is therefore imperative for its minimization or elimination in procurement activities. The focus of this chapter is to review existing literature on Risk Management in the Procurement of Road works. More specifically, the study examines Risk Management in the Procurement process of Road works in the Public Sector using the Department of Feeder Roads as a case study.

#### **2.2 PUBLIC PROCUREMENT**

Public procurement is increasingly recognized as a profession that plays a significant role in the successful management of public resources. In the last decade reform efforts have often occurred in cycles, as public procurement has gone through substantial changes in terms of priorities, needs and capacity. In many cases these reforms have been driven by ad hoc scandals. Moreover, public procurement has been identified as the government activity most vulnerable to corruption. Public procurement provides multiple opportunities for both public and private actors to divert public funds for private gain. For example, bribery by international firms in countries is more pervasive in public procurement than in utilities, taxation, judiciary and state capture, according to the 2005



Executive Opinion Survey of the World Economic Forum (Organization for Economic Co-operation and Development (OECD), 2007).

### **2.2.1 Public Procurement Overview**

The Ghana Supply Company Limited (GSCL) was the agency in charge of all public goods purchases since January 2000. However, lack of a proper database, and delays in the acquisition of government subventions led to extended delivery times. Because of these problems, other Ministries decided to implement their own procurement. Further reading proved that the solutions enacted by the Ministries were not successful; each Ministry dealing with buying of goods and services for the good of all does not help the country (Gnanih, 2012). The government is obliged to serve the ministries. Thus each ministry having its own procurement process meant the government had to provide each ministry with its needs separately, thereby creating inefficiencies in the system. From 1999, the Ministry of Finance took the development of a national procurement procedure importantly, in an effort to mend the situation (Gnanih, 2012).

The Ministry of Health was the first ministry to remedy its procurement practices. Decentralization was one of their key strategies because they understood shifting responsibilities from the national level down to the sub-district level, would help ease the burden of procurement activities. The research suggested that it was a good idea because it meant that more responsibility was given to the people that were in charge of the health sector and not to those who knew little about the health sector. This may have allowed and given more opportunity for quality planning and execution. However, shortcomings were still identified in this procedure. Few of them were unqualified personnel, lack of procurement procedures and organizations and inadequate policy strategy (Gnanih, 2012).

To combat these problems, the Ministry of Health collaborated with the World Bank to set up a Procurement Unit in 1997. Interestingly the procurement guidelines and procedures that were laid out were not just a replication of the ones the World Bank issued (World Bank, 1997) but addressed problems faced in Ghana as and when procuring was needed.

### **2.2.2 Definition of Public Procurement**

There have been many and varying definitions of public procurement. The Office of Government Commerce (2008) defines public procurement as the process whereby public sector organizations acquire goods, services and works from third parties. It includes much that supports the work of government and ranges from routine items (e.g. printed forms, temporary office staff, stationery or furniture), to complex spend areas (e.g. construction, Private Finance Initiative projects, aircraft carriers or support to major change initiatives). Such services may also be provided directly, by the public sector, and in some cases even this public provision can be handled through procurement mechanisms. A public body may tender for government work against private sector firms through a formal competitive process. On the other hand, Edquist, (2011) noted that public procurement means that a public organization buys a product (a good or a service or a combination of the two, which might be called a system). In addition to the above definitions, United Nations (2014) ascertained that procurement or public procurement means the acquisition of goods, construction or services by a procuring entity.

### **2.2.3 Stages in the Public Procurement of Works**

The contrasts demonstrated above regarding the definition of public procurement may be great, but despite the differences in terminology and scope, some common elements or themes emerge. Nearly all definitions and roles established for public procurement

include the following activities/stages or responsibilities involved in public procurement activities:

- Planning procurement actions
- Publicizing upcoming solicitations
- Preparing and issuing solicitations
- Evaluating tenders , proposals, and quotations
- Conducting tender openings or negotiations
- Analyzing contractor capabilities
- Awarding contracts
- Monitoring contractor performance
- Modifying contracts
- Extending or terminating contracts
- Closing out completed contracts
- Evaluating contractor past performance (Lloyd and McCue, 2004)

Most of the differences in definitions and responsibilities concern the “before and after” problem. McCue *et al.*, (2003) noted that, activities that occur before actual purchasing takes place (such as defining needs), as well as those occurring after the purchasing is completed (like inventory control), can arguably be included in the definition of public procurement, especially if it is viewed as a sub-set of material management. The dominance of the service economy, however, and its expansion in public procurement, raise questions as to whether the material management model is the best way of viewing public procurement. In addition, whether a given public procurement office is willing or able to perform all of these functions is often a question of resources. The effectiveness of

a broad definition hinges at least in part on the ability to provide a division of labour with skilled employees within the governmental unit (Lloyd and McCue, 2004).

Public procurement processes have different phases and each phase has a risk. Three main phases of procurement process which include procurement planning and budgeting, procurement solicitation and contract award and performance was proposed by Matechak (2002). Szymanski (2007) identified five stages of procurement process: procurement planning and needs assessment, documentation and product design, tender and evaluation processes, contract award and execution, and auditing and accounting process. Ware et al. (2012) contended that procurement needs to be viewed as the four stages of project identification and design: advertising, prequalification, tender document preparation, and submission of tenders; tender evaluation, post-qualification and award of contract; and contract performance, administration and supervision.

Weele, (2010 p. 29) stated that the process of procurement has six different stages from specification, select suppliers, give contract or ordering, expediting to the evaluation of the entire procurement process. Monczka et al, (2003) as cited in Abunyewah et al, (2013) argue in the same direction as Weele, the only difference was that their procurement process cycle has five stages instead of six presented by Weele. Emmett and Crocker (2008; p 4) suggested that procurement process has ten stages from need identification to payment for the respective procurement. According to United Nations Procurement Practitioners, (2006) the stages of the procurement process consist of:

- Identifying the need and planning the procurement
- Developing the specification
- Selecting the procurement method
- Procurement documentation

- Inviting, clarifying and closing offers
- Evaluating offers
- Selecting the successful tenderer
- Negotiations
- Contract management
- Evaluating the procurement process

The stages in the procurement process will differ depending on the type of procurement and the individual organizational needs. This means that, in procurement of road works the stages in the procurement process will exclude disposal stage. For example in road construction, roads are maintained instead of disposal.

However, in procurement of goods products are disposed of after their whole life usage. Again most organizations combine some stages in the process to reduce the lead time and other administrative cost. Based on the above facts and others, there is no unique number of stages of the procurement process. Most researchers in this discipline agree the fact that, some of the stages will not necessarily feature in every procurement activity.

An illustration of a particular problem for practitioners in defining public procurement revolves around the task of defining requirements or determining what the government needs before the contracting process begins. There are at least three good reasons to include this task within the definition of public procurement, which are:

- To encourage public procurement officials to take responsibility for the complete contract, not just the process or the clauses;
- To promote better cooperation and better working relationships among the parties to the contract; and



- To enhance the knowledge of the client, under the theory that one who knows the item being bought can make a better buy (Lloyd and McCue, 2004).

There are also at least three good reasons not to include specification writing as part of a definition of public procurement, for instance:

- Lack of internal control that may exist if the same person defines the requirement, makes the purchase, inspects the work, and authorizes payment;
- potential resignation of responsibility of the client of the contracting office, with the former hoping that the latter can cure all problems, even if they are of a technical nature not normally susceptible to a “procurement solution” (Lloyd and McCue, 2004).

Often, the legal definitions will tell public procurement officials what they should do, but in the area of specification, the need for a coordinated, cross-functional, or team-based approach, in which the customer and the contracting officer share duties, is especially apparent. There is no universal description of the work of public procurement; however, a certain amount of congruence has been noted. For an academic public administration program on public procurement to be successful, it should concentrate on the core, commonly held duties. Otherwise, separate courses may need to be developed for Federal acquisition in contrast to state and local public procurement.

#### **2.2.4 Characteristics of Road Works Procurement**

Transport infrastructure is among the most important driving forces for economic growth. Globally, rural road accessibility remains a challenge. Majority of people residing in rural areas had to spend more than 30 minutes to access paved roads. Public procurement is an important policy instrument to use resources wisely and efficiently (Estache and Iimi, 2011). Competition is the most important factor to bring down the cost of road



procurement. The level of competition is usually insufficient in some public tenders. To attract more interest and tenderers for road works, tender notices should be distributed widely and at low costs, which will eventually bring down the cost of entry for tenderers. Public tenders can be advertised on national newspapers, rather than local ones. E-tender or e-procurement can distribute tender information even more widely and in a timely manner.

Public procurement is an important instrument to use resources wisely and efficiently (Iimi, 2006; Estache and Iimi, 2011). “The best way to find fiscal space for public investment is to eliminate waste and improve technical efficiency in public expenditure (World Bank, 2005)”. However, designing an efficient procurement system is still a demanding task, particularly in the infrastructure sector. Infrastructure projects are mostly technically complex, highly customized and most especially, politically sensitive. As a result, competition for public contracts tends to be limited, and the procurement markets are usually vulnerable to collusive tender and corruption. The lengthy tender evaluation process is of great concern. It will lesson transparency of the process and increase the risk of anticompetitive practices and cost overruns (Ware *et al.*, 2007).

#### **2.2.5 The Ghana Procurement Act in Road Works Procurement**

The Public Procurement Law, 2003 (Act 663) is a comprehensive legislation designed to eliminate the shortcomings and organizational weaknesses which were inherent in public procurement in Ghana. The government of Ghana, in consultation with its development partners had identified the public procurement system as an area that required urgent attention in view of the widespread perception of corrupt practices and inefficiencies, and to build trust in the procurement system. A study by the World Bank (2003) reported that about 50-70% of the national budget (after personal emoluments) is procurement related.

Therefore an efficient public procurement system could ensure value for money in government expenditure, which is essential to a country facing enormous developmental challenges. The Public Procurement Law, 2003 (Act 663) was established to regulate all activities involved in the procurement of goods, works and service including road works in the country (Ghana).

## **2.3 ROAD WORKS**

### **2.3.1 Characteristics of Road Works;**

The management of roads in Ghana is the responsibility of the Ministry of Roads and Highways, which performs this function through three (3) main departments; namely the Department of Feeder Roads, Department of Urban Roads and Ghana Highway Authority (Ministry of Roads and Highways, 2010). Roads in Ghana have been classified under three categories,

- 1) Trunk highway road;
- 2) Urban road; and
- 3) Feeder road.

#### **Trunk Highway Road**

National road network classified as strategic roads which are very important for the development of national economy and wider region, including connections between the national capital and Regional capitals; roads to international borders; and roads of socio-economic or defence security importance.

The Ghana Highway Authority is in charge of trunk roads in Ghana.

### **Urban Road**

Urban roads are roads within urban areas those are located in the Municipal and Metropolitan areas. Due to the low level of infrastructure development in Ghana, there are not so many areas considered as urban, municipal and metropolitan. Currently, only few areas have been classified as urban, municipal and metropolitan. The Department of Urban Roads is in charge of the urban roads network in the cities, metropolitans and the municipalities in Ghana.

### **Feeder Road**

Feeder roads are roads that connect villages to one another and to the main road accessing to markets, or to connect related production or service to particular centers. Due to the real situation of rural dominance of the country's economy; and the fact that most poor people live in rural areas, Feeder roads have been considered very important and play significant role in poverty reduction through linking rural farming to market, improve their productivity and increase income levels. District roads connect the district centers to villages, tourist and historic sites and special economic zones of the district. The Department of Feeder Roads is in charge of the feeder roads systems within the districts.

Roads must create a flat surface for vehicle travel on sloped land. To do this, part of the hill slope is cut away (the cut slope) and the removed soils are placed below (the fill slope) and compacted to create a flat bench or travelled way. Ideally, a road should consist of three layers. The sub grade is the bottommost layer at the level of the in-place material. The base course is the main load spreading layer and typically consists of gravels or gravelly soils, with sand and/or clay intermixed. The surface course or

surfacing may consist of native materials, imported rock, or asphalt. It is placed on top of the base course to improve rider comfort, provide structural support, and weatherproof the road for wet season use. As a practical matter, many rural roads are not constructed in this way but consist entirely of native materials encountered during grading. This can be a factor contributing to poor performance. All roads must incorporate features to drain water off the road surface and allow it to cross from one side to the other.

### **2.3.2 Understanding road works; Feeder Roads**

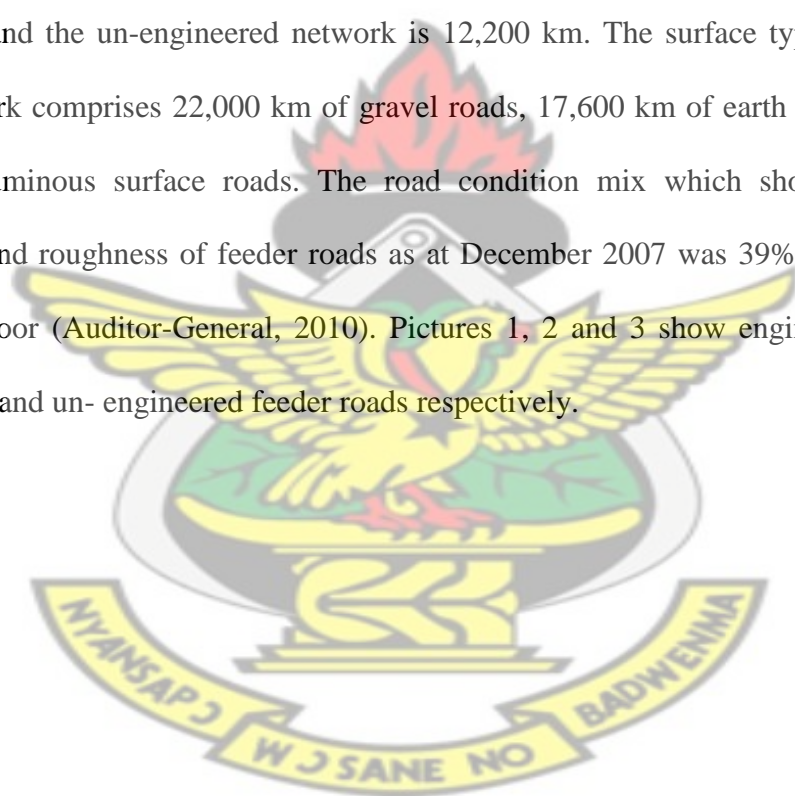
According to the Auditor-General's report on the maintenance of feeder roads in Ghana (2010), feeder roads are roads that link rural communities and farmlands to areas of socio-economic importance. The Department of Feeder Roads (DFR) is the agency responsible for the maintenance of 41,000 kilometres of feeder roads in the country. The DFR is to ensure that feeder roads in the country are made accessible all year round. Government of Ghana's investments in feeder roads in nominal terms increased from GH¢13.2 million in 2002 to GH¢73.4 million in 2007.

Development Partners have also invested in the development of feeder roads in the road sector. In spite of the investments, there have been public outcries on the poor state of feeder roads. Daily Graphic of Tuesday June 24, 2008 reported on the poor state of the Akyem-Anyinase junction- Pawudu feeder road. Road users on countless occasions have expressed their displeasure on the state of feeder roads in the country through the media (Auditor-General, 2010).

The Department of Feeder Roads (DFR) was established on 1 July 1981 with the responsibility of administering, developing and maintaining the network of rural roads. The feeder roads network increased from 24,000 km in 2000 to 41,000 km in 2007. DFR is now present in all the 10 regions and 90 area centres out of the 138 District Assemblies

(DAs) in the country. DFR has grouped its feeder roads into three types, namely: engineered, partially engineered and un-engineered feeder roads. Engineered feeder roads are feeder roads that have been uplifted from earth surface to gravel or bitumen surface and provided with drainage structures such as culverts, ditches and drains. Partially engineered feeder roads are those that have been uplifted by providing ditches and blading of the surface. Un-engineered feeder roads are farm tracks that lead to villages but have not received any engineering intervention (Auditor-General, 2010).

The engineered feeder road network is 23,700 km. The partially engineered network is 5,100 km and the un-engineered network is 12,200 km. The surface type of the feeder road network comprises 22,000 km of gravel roads, 17,600 km of earth roads and 1,300 km of bituminous surface roads. The road condition mix which shows the surface condition and roughness of feeder roads as at December 2007 was 39% good, 29% fair and 32% poor (Auditor-General, 2010). Pictures 1, 2 and 3 show engineered, partially engineered and un-engineered feeder roads respectively.





**Picture 1: Engineered Road**



*Source: Audit Service field inspection (Bediako-Kasapin-Adiembra road, Brong Ahafo Region, 2008)*

**Picture 2: Partially-Engineered Feeder Road**



*Source: Audit Service field inspection (Pong-Gaa road, Northern Region, 2008)*

**Picture 3: Un-Engineered Feeder Road**



*Source: Western Regional Office (DFR) feasibility studies (Sekyere Obuasi Jn – Sekyere Obuasi road, Western Region, 2012)*

Feeder roads in the fair and poor condition are often difficult to use especially during the rainy season. The poor state of most feeder roads leads to:

- Foodstuffs getting stuck and rotten on farmlands;
- High vehicle operating costs;
- High transportation costs; and
- High prices of foodstuffs in the country.

However, Feeder roads in good condition are vital in ensuring access and movement of people and goods from one community to the other. Feeder road maintenance is important in protecting the roads all year round to facilitate movement of foodstuffs from rural to urban centres (Auditor-General, 2010).

### 2.3.3 Characteristics of Road Works; Feeder Roads

Feeder roads are classified into two categories: *access feeder roads (spurs)* and *connectors* (Fan and Chan-Kang, 2004). *Access feeder roads (spurs)* connect to only one road, and such roads normally connect a few communities to another road. These roads are relatively short in length and carry relatively low volumes of motorized traffic. *Connectors*, on the other hand, are roads which have their ends connected to two other roads. In addition to providing access to communities along the road, connectors form part of routes followed by motorists making long journeys that do not terminate in the road corridor (Fan and Chan-Kang, 2004). The function of these roads is principally traffic related and they carry relatively high volumes of traffic.

Much research conducted on feeder roads have revealed the physical characteristics of feeder roads to be in poor conditions. A study conducted by the then Ministry of Road Transport in 2006 in the Upper Denkyira East Municipality on the physical characteristics of feeder roads in the district revealed that the district has a length of 606km of feeder and highway roads. There are about 47 feeder roads with a total length of 390km. However, there is still the need for construction of additional feeder roads to improve the internal linkages between settlements to reduce travel time and cost. For instance it takes one hour to drive between Buabin and Imbraim, over a distance of 5km because of poor access. Some of the feeder roads (e.g. Asikuma to Akwabo in the Western Region) have been rehabilitated under Cocoa Roads Rehabilitation Project.



## 2.4 RISK MANAGEMENT

Risk management is a process of thinking systematically about all possible risks, problems or disasters before they happen and setting up procedures that will avoid the risk, or minimize its impact, or cope with its impact. It is basically setting up a process where you can identify the risk and set up a strategy to control or deal with it. It is also about making a realistic evaluation of the true level of risk (Chapman, 1997)

Risk management begins with three basic questions:

- What can go wrong?
- What will we do to prevent it?
- What will we do if it happens?

This part of the study takes a look at a thorough review of extant literature on risk management.

### 2.4.1 The Concept of Risk

The term risk is used universally, but different audiences often attach different meanings to it (Kloman, 1990). In fact, the details about risk and how it supports decision making depend upon the context in which it is applied (Charette, 1990). Although risk is widely studied, it still lacks a clear and shared concept definition: risk is often only perceived as an unwanted, unfavourable consequence (Klemetti, 2006). Such a definition embodies two misleading concepts: first, among professionals there is an established consensus that risk needs to be viewed as having both negative and positive consequences. Second, risk is not only related to events, i.e. single points of action, but risk also relates to future project conditions. Conditions may turn out to be favourable or unfavourable (Klemetti, 2006).

## 2.4.2 Risk Classification and Perception

Risks can be classified in a number of ways according to the level of detail or a selected viewpoint or perception (Klemetti, 2006). Some of these later presented classifications are merely a risk lists, while some of these classifications are formed based on the source of risk, by impact type or by project phase.

One of the most typical risk classifications is presented in Table 2.1 below. This four-level classifications is presented by Artto and Kähkönen (2000). This classification tries to fade a project type and be a general classification. Risks are divided into pure risks (e.g. hazards and weather conditions), financial risks (e.g. cash flow or credit risk), business risks (almost anything that can happen in a project) and political risks, which refer to the certain political environment and risks that are caused mostly by extreme conditions, such as, among others, war. Risks in the project network can relate to any one of this list's classifications. Project actors can cause hazards to one another because of inexperience, lateness of their products, delivery failure or unmade payments (bankruptcy) or new government laws either in favour or disfavour of the project.

**Table 2.1: Typical risk classification**

<i>Pure risks</i>
<i>Business risks</i>
<i>Financial risks</i>
<i>Political/country risks</i>

*Source: Artto and Kähkönen, 2000.*



Turner (1999) suggested that risks can be divided either according to their impact or by where the control lies. Thus these classification can be further divided into business risks, insurable risks, external risks and internal risks, for example bad weather is external risks since it can't be controlled by a project manager and business risks are those risks that in generally have to be accepted in order to have an opportunity to take advantage of positive outcomes of a risk. Again, Miller and Lessard (2001) studied large engineering projects (for example constructing a new factory) and categorized risks according to their source (table 2.2).

Market, completion and institutional risks are divided into three categories. Market risk is mainly caused by the demand uncertainty, completion risks refer to technical risks during and after the completion of a project (for example, will the capacity of a factory be as designed and planned). Institutional risks are related to the political uncertainties in a specific situation. They see that the whole project network should be utilized to manage risks, but their perspective is not that much co-operation than financially efficient risk allocation. They propose “a layering process” to systemically transfer, diversify and sell risks with financial instruments, real options and contract incentives.

**Table 2.2: Risk classification according to Miller and Lessard**

<i>Market</i>	<i>Completion</i>	<i>Institutional</i>
<i>Demand</i>	<i>Technical</i>	<i>Regulatory</i>
<i>Financial</i>	<i>Construction</i>	<i>Social acceptability</i>
<i>Supply</i>	<i>Operational</i>	<i>Sovereign</i>

*Source: Miller and Lessard, 2001.*

Classifications help to form risk lists that are useful when identifying risks, but are inadequate when forming the whole picture. Obviously, many of the Finnerty's and Miller and Lessard's risks relate to the network structure; supply risks and political risks are the best examples of the risks that are caused by the other than the main contractor. Both of these lists are done from the main contractor's perspective, and are not that much concerning the optimisation of the whole network.

### 2.4.3 Risk Management Process and Model

Risk management should be its own process in organizations, but at the same time be closely tied in all organizational processes and phases (Klemetti, 2006). There are several suggestions to improve the project risk management process, three popular process models are compared in table 2.3 below.

**Table 2.3: Comparison of typical Risk Management Processes**

<i><b>Project Business</b></i>	<i><b>PMBok Guide</b></i>	<i><b>APM</b></i>
<i>Identification</i>	<i>Risk management planning</i>	<i>Define</i>
	<i>Risk identification</i>	<i>Focus</i>
<i>Estimation</i>	<i>Qualitative risk analysis</i>	<i>Identify</i>
	<i>Quantitative risk analysis</i>	<i>Structure</i>
<i>Response planning</i>	<i>Risk response planning</i>	<i>Ownership</i>
<i>Risk management control</i>	<i>Risk management and control</i>	<i>Estimate</i>
		<i>Evaluate</i>
		<i>Plan</i>
		<i>Manage</i>

*Sources: Chapman, 1997; Artto et al., 2005; Floricel and Miller, 2001*

All of these processes basically have the same phases; only the level of detail in describing the processes varies. All of them are meant to be iterative processes where risk management phases are kept ongoing during the whole project life-cycle (Klemetti, 2006).

According to Banaitiene and Banaitis (2012), the risk analysis and management techniques have been described in detail by many authors. A typical risk management process includes the following key steps.

- Risk identification;
- Risk assessment;
- Risk mitigation; and
- Risk monitoring (Banaitiene and Banaitis, 2012).

Finally, Artto and Kähkönen (2000) concluded various risk management processes generally to include three core processes, namely risk identification, risk estimation and risk response planning and execution. They also differentiate five accessory processes: risk management planning, risk communication, risk ownership development, risk management strategy and risk management control.

#### **2.4.4 Risk Identification**

Risk identification is the first and perhaps the most important step in the risk management process, as it attempts to identify the source and types of risks. It includes the recognition of possible risk event conditions in the every project and the clarification of risk responsibilities. Risk identification develops the basis for the next steps: analysis and control of risk management. Correct risk identification ensures risk management effectiveness (Banaitiene and Banaitis, 2012). Carbone and Tippet (2004) stated that the

identification and mitigation of project risks are crucial steps in managing successful projects.

The identification phase is stressed by many researchers. It is quite obvious that if we are unaware of the risks, it is difficult to manage them. Chapman (1997) points out that since the risk management process builds heavily on the primary identification phase, the success of later risk management phases is directly comparable to the quality of the first identification phase. Skitmore and Lyons (2004) conclusions contrast previous statements. Their study showed that risk management processes are applied the most in the execution phase, not in the conceptual phase. Still their study and usage of different risk management techniques showed that identification is the most frequently used risk management element. This proves that risk identification needs to be a continuous process and an efficient identification process requires many iterative rounds in even the later stages of project execution to successfully meet the expected targets.

However, detailed steps and methods in identifying and categorizing risks are presented in many literature sources. Methods generally include brainstorming, risk checklists, expert analysis/interviews, modelling and analyzing different scenarios and analyzing project plans (Klemetti, 2006). Additionally, sources of risk or uncertainty and sources of known unknowns should be listed. Ward and Chapman (2003) emphasize using an uncertainty perspective in the project risk identification phase, since they consider such an approach to be the best way to determine all possible sources of opportunities (positive risks), not just threats.

## **2.4.5 Risk Analysis/Quantification**

Risk analysis is the estimation of the risk associated with the identified hazards. It is the qualitative or quantitative process of linking the likelihood of occurrence and severity of harms. In some risk management tools, the ability to detect the harm (detectability) also factors in the estimation of risk (U.S. Department of Health and Human Services, 2006).

### **2.4.5.1 Qualitative risk analysis**

Qualitative Risk Analysis assesses the impact and likelihood of the identified risks and develops prioritized lists of these risks for further analysis or direct mitigation. Each identified risk is assessed for its probability of occurrence and its impact on project objectives. Project teams may elicit assistance from subject matter experts or functional units to assess the risks in their respective fields (WSDOT, 2013). Qualitative analysis provides a convenient and “user-friendly” way to identify, describe and characterize risks.

### **2.4.5.2 Quantitative risk analysis**

Quantitative Risk Analysis is a way of numerically estimating the probability that a project will meet its cost and time objectives. Quantitative analysis is based on a simultaneous evaluation of the impacts of all identified and quantified risks (WSDOT, 2013). Quantitative techniques, such as Monte Carlo simulation, can be a powerful tool for analysis of project risk and uncertainty. This technique provides project forecasts with an overall outcome variance for estimated project cost and schedule. Probability theory allows us to look into the future and predict possible outcomes.



## **2.4.6 Risk Treatment**

Risk treatment is the process of selecting and implementing measures to modify risk. Risk treatment have different methods of handling risks, as: risk acceptance, risk avoidance and risk transfer (Toosarvandani *et al.*, 2012).

### **2.4.6.1 Risk acceptance**

To accept the risk and continue operating or to implement controls to lower the risk to an acceptable level. Selecting a set of risk acceptance criteria based on the goals and objectives of the organization is important to have as an integral part of the ISMS. This assists in the development of risk treatment plans.

### **2.4.6.2 Risk avoidance**

Risk avoidance means performing methods to consider the risk treatment and abolishing an operation or discarding information assets to avoid a risk if it is impossible to prevent it adequately for a reasonable cost or no appropriate measures for dealing with it are found.

### **2.4.6.3 Risk limitation**

In the real world, risks cannot be completely removed by taking measures. In many cases, a measure is performed by investing enough to keep any risks which may occur under the acceptable level. To limit the risk by implementing controls that minimizes the adverse impact of a threat's on an asset.

### **2.4.6.4 Risk transfer**

Risk transfer means transferring risks to other parties or other organizations by concluding a contract. Risk transfer can be divided into two main categories: outsourcing

measures for information assets and information security, and using an insurance system as a kind of finance for risks (Toosarvandani et al., 2012).

#### **2.4.7 Risk Management Standard and Tools**

Risk management is a constantly evolving discipline. Standards, frameworks and tools are modified periodically in the light of new research or innovative practices, making it difficult for risk managers to stay current (COSO, 2004). However, it is important to know what risk management standards and tool are and what they are not. There is a lot of confusion as to what a standard is and what a tool (which is typically voluntary) is. In practice, standards often are used by auditors to determine whether a company is complying with these best practices (seen by some as equal to controls (COSO, 2004). On the other hand, the risk management tool is an instrument to identify the risks, and administer the ownership, mitigation plans, and risk management strategy (PPI, 2014).

Dreyer (2010) reviewed risk management standards and found that all of the reviewed standards were in alignment with an organization's objectives, adherence to controls as a means of managing risk and the need to meet regulatory requirements. Dreyer (2010) also found that the primary focus of one standard/tool versus another tended to be weighted more in one area than another. This is important for the risk practitioner because depending on the primary risk management strategy and objective desired, one standard/tool may be better suited for an organization's purposes. On that basis, Dreyer (2010) grouped the reviewed standards accordingly in Table 2.4 below.

**Table 2.4: Comparing Risk management Standards**

<i>Strategy focus</i>	<i>Description</i>	<i>Standard/tool</i>	<i>Primary challenge</i>
<i>Organizational objectives</i>	<i>Designed to improve an organization's ability to meet or exceed its objectives through enhanced decision making and activities that address key uncertainties.</i>	<i>ISO 31000:2009 BS 3100:2008</i>	<i>Harmonizing approaches, blending the "soloed" strategies through common elements as found in RIMS Risk Maturity Model (RIMS RMM)</i>
<i>Compliance and control objectives</i>	<i>Seek to assure the transfer or other mitigation of risks primarily through compliance and control objectives and activities; often based on historic losses, near misses etc.</i>	<i>OCEG "Red Book" 2.0:2009</i>	
<i>Regulatory</i>	<i>Used when an organization must apply a designated practice and/or standard and provide evidence in order to meet regulatory requirements.</i>	<i>SOLVENCY II BASEL II</i>	

Source: Dreyer, 2010

## **2.5 Risk Management in the Procurement of Works**

Procurement should identify risk factors associated with each procurement, analyze the probability of the risk occurring and consider the potential impacts. Risk management plans should then be developed, based on the decision to avoid, assume, or transfer the identified risks (CIPS and NIGP, 2012).

### **2.5.1 Risk management in stages of Procurement Process**

In any procurement there are a variety of risk factors that arise from external and internal sources that must be assessed. A precondition to overall risk management is the risk assessment. Risk assessment involves analyzing the probability, the impact, and the effect of every known risk on the achievement of established objectives, as well as the corrective action to take should that risk occur (CIPS and NIGP, 2012). The risk assessment is therefore a prerequisite for determining how the risks should be managed and mitigated. Mitigation seeks to put measures in place to lessen the severity of a risk event, should that event occur.

Risk management is useful in all public procurement projects. Of course, the amount of time and resources spent on risk management should be proportional to the level of uncertainty involved in the procurement project (Public Procurement of Innovations Consortium, 2014). In less complex projects with few stakeholders, risk management can contribute to successful and efficient implementation, minimizing delays and lower costs. In innovative and complex projects such as road works with many stakeholders, risk management can make the difference between failure and success of the project in many different dimensions: quality and fit of the solution, efficient delivery on time, the costs of the solution, etc.

Risk management is essential for all stages in the procurement process. For risk management in the procurement stages, the following actions must be taken:

- Identify risks beforehand and include them in a Roadmap;
- Allocate risks: who is responsible for which risks;
- Mitigate threats beforehand as much as possible and take advantage of the opportunities;
- Monitor risks by using the Roadmap; and
- Take action in case of threats and opportunities (PPI, 2014).

These steps should be repeated continuously throughout the lifecycle of a (procurement) project: when moving into a new project phase, when risks materialize, and simply when time progresses. Public authorities can work out these steps for their own projects with the risk management tool. However, the risk management tool deals with the risks in the following stages of the procurement process:

- Strategy identification: the public authority develops a procurement strategy, ideally for each market segment for a longer period instead of per project;
- Specification of strategy and demand through market interaction: a dialogue with representatives from one market segment about the public authority's procurement strategy and the market segment's ideas;
- Specification of the scope of the works and the supplier selection: put assignment to tender and award it to one or more suppliers;
- Verification / User test: testing prototype on technical details and market requirements; and
- Realization and implementation: execution of the assignment and delivery of the product.



### **2.5.2 Risk associated in the procurement of works**

Based on the results an early study conducted by the Organization for Economic Co-operation and Development (OECD) 2007, this part provides an inventory of the risks to integrity at each stage of the public procurement process that have been identified in countries. It is important to recognize that risks may stem from a simple mistake in performing an administrative task to a deliberate transgression of relevant laws and related policies. The inventory highlights that there are critical risks to integrity at all stages of the public procurement process, from the needs assessment through the tender to contract management and payment. The following tables indicate the particular risks for each stage of the public procurement process.

### **2.5.3 Pre-tendering: starting from needs assessment**

In the pre-tendering, the most common risks include:

- The lack of adequate needs assessment, planning and budgeting of public procurement;
- Requirements that are not adequately or objectively defined;
- An inadequate or irregular choice of the procedure; and
- A timeframe for the preparation of the tender that is insufficient or not consistently applied across tenderers.

**Table 2.5: Risks in Pre-tendering**

<i><b>Pre-tendering</b></i>	<i><b>Risks identified</b></i>
<i>Needs assessment, planning and budgeting</i>	<ul style="list-style-type: none"> <li>-The lack of adequate needs assessment, deficient business cases, poor procurement planning (e.g. in the Netherlands, New Zealand, Spain, Turkey);</li> <li>- Failure to budget realistically (e.g. in the United Kingdom), deficiency in the budget (e.g. in Spain);</li> <li>- Procurements not aligned with the overall investment decision-making process in departments (e.g. in Canada);</li> <li>- Interference of high-level officials (e.g. in the Czech Republic, Poland, the Slovak Republic) in the decision to procure;</li> <li>- Informal agreement on contract (e.g. in Brazil).</li> </ul>
<i>Definition of requirements</i>  <i>Definition of requirements contd</i>	<ul style="list-style-type: none"> <li>- Technical specifications: <ul style="list-style-type: none"> <li>a) Tailored for <i>one company</i> (e.g. in Belgium, Canada, Poland, Spain and the United Kingdom);</li> <li>b) Too vague or not based on performance requirements (in countries such as Chile and Germany).</li> </ul> </li> <li>- Selection and award criteria: <ul style="list-style-type: none"> <li>a) Not clearly and objectively defined (in countries such as Poland and Slovenia);</li> <li>b) Not established and announced in advance of the closing of the tender (for instance in New Zealand);</li> <li>c) Unqualified companies being licensed, for example through the provision of fraudulent tests or quality assurance certificates (for instance in the United Kingdom).</li> </ul> </li> </ul>
<i>Choice of procedure</i>	<ul style="list-style-type: none"> <li>- Lack of procurement strategy for the use of non-competitive procedures based on the value and complexity of the procurement which creates administrative costs (for instance in Canada);</li> <li>- Abuse of non-competitive procedures on the basis of legal exceptions (e.g. in Belgium, Finland, Netherlands and Slovenia) through: <ul style="list-style-type: none"> <li>a) Contract splitting on the basis of low monetary value contracts;</li> <li>b) Abuse of extreme urgency;</li> </ul> </li> </ul>

<b><i>Pre-tendering</i></b>	<b><i>Risks identified</i></b>
	<i>c) Abuse of other exceptions based on a technicality or exclusive rights, etc;</i> <i>d) Untested continuation of existing contracts.</i>
<i>Time frame for preparation of tender</i>	- A time frame that is not consistently applied for all tenderers, for example information disclosed earlier for a specific tenderer (in countries such as Belgium and Norway); - A time frame that is not sufficient for ensuring a level playing field (for instance in New Zealand).

***Sources: Country responses to the OECD Questionnaire. Discussions at the OECD Symposium, Mapping out Good Practices for Integrity and Corruption Resistance in Public Procurement, November 2006.***

#### **2.5.4 Tendering**

In the tender phase, countries indicated the following risks:

- Inconsistent access to information for tenderers in the invitation to tender;
- Lack of competition or in some cases collusive tender resulting in inadequate prices;
- Conflict-of-interest situations that lead to bias and corruption in the evaluation and in the approval process; and
- Lack of access to records on the procedure in the award that discourages unsuccessful tenderers to challenge a procurement decision.

**Table 2.6: Risks in tendering**

<i><b>Tendering</b></i>	<i><b>Risks identified</b></i>
<i>Invitation to tender</i>	<i>- Information on the procurement opportunity not provided in a consistent manner;</i> <i>- Absence of public notice for the invitation to tender (e.g. in Finland);</i> <i>- Sensitive or non-public information disclosed (e.g. in Belgium, Mexico, the United Kingdom, the United States);</i> <i>- Lack of competition or in some cases collusive tender that leads to inadequate prices or even illegal price fixing (e.g. in Austria, the United Kingdom).</i>
<i>Award</i>	<i>- Conflict of interest and corruption (e.g. in Canada, Germany, New Zealand, Norway, the United Kingdom) in:</i> <i>a) The evaluation process (e.g. familiarity with tenderers over the years, personal interests such as gifts or additional/secondary employment, no effective implementation of the “four-eyes” principle, etc.);</i> <i>b) The approval process: no effective separation of financial, contractual and project authorities in delegation of authority structure;</i> <i>- Lack of access to records on the procedure.</i>

*Sources: Country responses to the OECD Questionnaire. Discussions at the OECD Symposium, Mapping out Good Practices for Integrity and Corruption Resistance in Public Procurement, November 2006.*

### **2.5.5 Post tendering: taking in contract management and payment**

In the post-tender phase, the most frequent risks to the integrity of the public procurement process include:

- The insufficient monitoring of the contractor;
- The non-transparent choice or lack of accountability of subcontractors and partners;
- Lack of supervision of public officials; and
- The deficient separation of financial duties, especially for the payment.

**Table 2.7: Risks in Post Tendering**

<i>Post tendering</i>	<i>Risks identified</i>
<i>Contract management</i>	<ul style="list-style-type: none"> <li>- Failure to monitor performance of contractor (e.g. in Ireland, Norway, New Zealand, Mexico, Slovenia, Spain), in particular lack of supervision over the quality and timing of the process that results in: <ul style="list-style-type: none"> <li>a) Substantial change in contract conditions to allow more time and higher prices for the tenderer;</li> <li>b) Product substitution or sub-standard work or service not meeting contract specifications;</li> <li>c) Theft of new assets before delivery to end-user or before being recorded in the asset register;</li> </ul> </li> <li>- Subcontractors and partners are chosen in a non-transparent way, or not kept accountable.</li> </ul>
<i>Order and payment</i>	<ul style="list-style-type: none"> <li>- Deficient separation of duties and/or lack of supervision of public officials (e.g. in Belgium, Italy, the United Kingdom) leading to: <ul style="list-style-type: none"> <li>a) False accounting and cost misallocation or cost migration between contracts;</li> <li>b) Late payments of invoices, postponement of payments to have prices reviewed so as to increase the economic value of the contract;</li> <li>c) False or duplicate invoicing for goods and services not supplied and for interim payments in advance of entitlement.</li> </ul> </li> </ul>

**Sources: Country responses to the OECD Questionnaire. Discussions at the OECD Symposium, Mapping out Good Practices for Integrity and Corruption Resistance in Public Procurement, November 2006.**

Several countries emphasised that the phases before and after the tender are not regulated by procurement laws but rather by civil and contract law. Therefore they are often less subject to transparency and accountability requirements, which entail risks to integrity in public procurement. Similar results from a study conducted by the United Nations and documented as a guideline handbook for United Nations Procurement Practitioner (UNPP) 2006. This guideline handbook provides an inventory of the risks to integrity at each stage of the public procurement process that has been identified. The inventory highlights that there are critical risks to integrity at all stages of the public procurement



process, from the needs assessment through the procurement documentation to contract management and evaluation of the procurement process. The table below indicate the particular risks for each stage of the public procurement process.

**Table 2.8: Risks in procurement process**

***Identifying the need and planning the procurement***

<i>Risk</i>	<i>Likely Consequences</i>
<i>Understatement of the need</i>	<i>Procurement of unsuitable product or service</i> <i>Money wasted</i> <i>Need not satisfied</i>
<i>Overstatement of the need</i>	<i>Greater expense</i> <i>Poor competition</i>
<i>Insufficient funding</i>	<i>Delay in procurement</i> <i>Additional costs for re-tender</i>
<i>Probity issues</i>	<i>Increased procurement costs</i> <i>Misuse of resources</i> <i>Most suitable product not obtained</i> <i>Unethical conduct</i>

***Developing the specification***

<i>Risk</i>	<i>Likely consequences</i>
<i>Narrow definition or commercial specification (eg. use of brand name)</i>	<i>Fewer alternatives</i> <i>Most suitable product or service may not be obtained</i> <i>Increased costs</i>
<i>Biased specification</i>	<i>Inadequate responses from tenderers</i> <i>Claims of unfair dealings</i>
<i>Inadequate statement of requirements</i>	<i>Variety of offers</i> <i>Products offered not meeting needs</i> <i>Difficult to evaluate</i>

### ***Selecting the procurement method***

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Failure to identify potential sources</i>	<i>Lack of offers from suitable tenderers</i>
<i>Selecting inappropriate method</i>	<i>Need to seek offers again</i> <i>Possible cost variations</i> <i>Failure to obtain value for money</i>

### **Procurement documentation**

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Terms and conditions unacceptable to tenderers</i>	<i>Loading of costs in offers</i> <i>Having to modify tender terms and conditions</i> <i>Disruption</i> <i>Low response</i>
<i>Providing inadequate information</i>	<i>Loading of costs in offers</i> <i>Variations in offers</i> <i>Having to provide clarifying information, causing delays in tender closing</i> <i>Additional costs</i>

### **Inviting, clarifying and closing offers**

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Failure to adequately address enquiries from tenderers</i>	<i>Claims of unfair practices</i> <i>Offers with qualifications by tenderers</i> <i>Withdrawal of offers</i>
<i>Actual or perceived favouritism in providing information</i>	<i>Complaints from tenderers</i> <i>Withdrawal of offers</i>
<i>Actual or perceived breach of confidentiality</i>	<i>Complaints from tenderers</i> <i>Mistrust by tenderers</i>

<i>Insufficient number of responses</i>	<i>Need to undertake process again</i> <i>Increased costs</i> <i>Delayed delivery to the client</i> <i>Poor value for money due to limited competition</i>
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### Evaluating offers

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Failure to follow effective evaluation procedures</i>	<i>Inconsistent evaluations</i> <i>Possible complaints from tenderers</i> <i>Subjective not objective evaluation of offers</i>
<i>Failure to identify a clear winner</i> <i>Decision made on subjective grounds</i>	<i>Claims of unethical and unfair behaviour</i> <i>Complaints from tenderers</i>

### Selecting the successful tenderer

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Selecting an inappropriate supplier</i>	<i>Failure to fulfil the contract</i>
<i>Selecting inappropriate product</i>	<i>Failure to meet the client's need</i>

### Negotiations

<b><i>Risk</i></b>	<b><i>Likely consequences</i></b>
<i>Deadlock on details of agreement</i>	<i>Delays in delivery</i> <i>Need to restart procurement</i> <i>Possible cost of legal action</i>
<i>Unfair or onerous requirements on the tenderer in the contract conditions</i>	<i>Contract disputes</i> <i>Invalidity of contract</i> <i>Legal action</i> <i>Poor supplier/customer relationship</i>
<i>Failure to reflect the terms offered and agreed in the contract</i>	<i>Contract disputes</i> <i>Legal action</i> <i>Poor supplier/customer relationship</i>

## Contract Management

<i><b>Risk</b></i>	<i><b>Likely consequences</b></i>
<i>Failure of either party to fulfil the conditions of the contract</i>	<i>Contract disputes</i> <i>Failure to satisfy needs</i> <i>Delays in delivery</i> <i>Legal action</i>
<i>Inadequately administering the contract</i>	<i>Cost increases</i> <i>Failure of contract</i> <i>Full benefits not achieved</i> <i>Delivery of unsatisfactory product</i> <i>Contract/supply disputes</i>
<i>Commencement of work by the supplier before contract is exchanged or letter of acceptance issued</i>	<i>Potential liability to pay for unauthorised work</i> <i>Possibility of legal action for perceived breach of contract</i>
<i>Unauthorised increase in scope of work</i>	<i>Unanticipated cost increases</i> <i>Contract disputes</i>
<i>Failure to meet liabilities of third parties (eg. royalties or third party property insurance)</i>	<i>Legal action</i> <i>Damage to the agency's professional reputation</i>

## Evaluating the procurement process

<i><b>Risk</b></i>	<i><b>Likely consequences</b></i>
<i>Failure to evaluate procurement and management processes</i>	<i>Failure to improve procurement and management processes</i>
<i>Failure to identify and address problems</i>	<i>Procurement objectives not achieved</i> <i>Possible failure in the future</i>

**Source:** *(UN Procurement Practitioner's Handbook produced by the*

*Interagency Procurement Working Group (IAPWG) in 2006. [www.ungm.org](http://www.ungm.org)*

*Accessed 22/06/2014)*

### 2.5.6 Risk associated with construction of road works

Risk is an inherent part of any construction project especially the road construction industry, which has been plagued with risks due to project size and cost (Hashern and Guggemos, 2013).

Research study conducted by Mahamid, (2013) aimed at identifying the significant risks affecting road construction projects in the West Bank in Palestine. 45 risk factors in road construction projects were defined through a detailed literature review. The analysis of the survey indicated that the six top risks affecting road construction projects in Palestine are: financial status of the contractors, payment delays by the owner, the political situation and segmentation of the West Bank, poor communication between construction parties, lack of equipment efficiency and high competition in tenders.

In Malaysia, Sambasivan and Soon (2007) concluded that the ten most important causes of delays the construction industry were: contractor's improper planning, contractor's poor site management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labour shortages, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage.

According to Zayed et al.(2008) highway construction projects exposed to high risks which needs special attention. They emphasized that highway construction projects carry high risks than the traditional construction. They argued that highway construction projects entail high capital outlays and complex site conditions (Zayed et al.2008). They identified ten (10) significant risks factors in highway construction projects in China. These were in macro and micro level areas. Macro level risks were: Financial, market risk, political and cultural risk.



The financial risk includes variations and foreign exchange rate increases. The micro risks were: Emerging technology usage (technical know-how of consultants and contractors), design stage, contract and legal issues, resources, quality of work and weather conditions (Zayed et al.2008). Dias and Ioannou, (1996) in their research into significant risks factor affecting highway construction projects, identified ten (10) sources of significant risks which includes: Procurement, development, financial, promoting, force majeure, physical damages, construction, country (Political and regulator) and operating risks (cited in Zayed et al. , 2008, p.409).

El-Sayegh (2008) identified ten (10) most significant risks out of forty-two (42) in the UAE (Dubai). These risks were ranked in order of importance by constructional professionals as shown below.

**Table 2.9: Most significant risks in UAE (Dubai) construction industry**

<b>Risks</b>	<b>Rank</b>	<b>Relative Importance Index</b>
Inflation and sudden changes in prices	1	15.48
Clients unreasonable imposed tight schedule	2	13.32
Subcontractors' poor performance and management	3	13.20
Delay of material supply by suppliers	4	12.80
Change of design required by clients	5	12.63
Clients improper intervention during construction	6	12.38
Shortage in manpower supply and availability	7	12.37
Delays in approval	8	12.32
Lack of departure of qualified staff	9	12.15
Shortage in material supply availability	10	11.83

*Source: Adapted from El-Sayegh (2008) p.435*

Construction projects are perceived to have more inherent risks due to the involvement of many contracting parties (El-Sayegh, 2008) and ‘procurement of road works projects’, is no exception. These associated risks with projects is echoed by Mills (2001) who indicated that the road construction industry is one of the most dynamic, risky and challenging businesses. Dias and Ioannou (1996), emphasize that financing of road construction projects need identification and analysis of risk and uncertainty during different phases of the project (cited in Zayed et al., 2008).

According to PMI (2004), ‘risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective’.

Risks are threats to project success (Barber 2005) and can potentially have damaging consequences for construction projects (Mills 2001). Failure to adequately deal with risks has been shown to cause cost and time overruns (ANDI, 2006) and therefore leading to project failures. To eliminate all risks in construction projects is impossible and there is therefore the need for a formal risk management process to manage all types of risk (El-Sayegh 2008).

According to Wang et al (2004), risk management is a formal and orderly process of systematically identifying, analysing and responding to risks throughout the lifecycle of a project to obtain the best degree of risk elimination, mitigation and or control. They further indicated that the risk management process begins with the initial identification of the relevant and potential risks associated with the road construction project. This according to them is of considerable importance since the process of risk analysis and response management may only be performed on identified potential risks.

### **2.5.7 Role of Management in handling risk**

Managing and handling risks in an organization remains the function of every individual involved in the organization with management performing the key roles. There should be a policy on the management and handling of risk. The development of and adherence to management and handling of risk policy in the organization is part of demonstrating good governance by management. This policy should:

- Lay out how the organization will meet the requirements set out in the policy;
- Be developed in consultation with staff within the organization; and
- Be realistic and reflect actual practice.

However, the development of this policy does not remain the only role of management in handling risks in the organization but management must also ensure the effectiveness of the policy in the day to day administration of the organization.

### **2.5.8 Current Studies on Risk Management Practices in Procurement**

As suggested by literature of previous studies on risk management practices in procurement, Sodhi et al., (2011) in the study averred that procurement risk management is still at a nascent stage. This section explores current studies on risk management practices. Existing literature on risk management in procurement can be classified according to four key elements: (1) risk identification; (2) risk assessment; (3) risk mitigation; and (4) responsiveness to risk incidents, the last one subdivided into responsiveness to(a) operational risks (frequent risk events stemming from inherent supply-demand uncertainty); and (b) catastrophic risks (caused by natural or man-made disasters).

From the review of literature it was observed that there is a dearth of research on procurement risk management practices for the Ghanaian context.

## **2.6 Relational Contracting and Partnering**

Over the last decade, it has been recognised that the relationship between the client and the contractor play a significant role for successful project implementation. Relational contracting is a concept that concentrates on the relationship between the contracting parties. It recognises mutual benefits and win-win scenarios through cooperative relationship. Studies indicate that UK contractors are positive about collaborative relationships thus leading to cost and risk reduction.

## **2.7 Public Private Partnership**

Private involvement could take the form of Private Public Partnerships (PPPs). PPPs are arrangements typified by joint working between the public and private sector. In the broadest sense, PPPs can cover all types of collaboration across the interface between the public and private sectors to deliver policies, services and infrastructures.

## **2.8 Joint Risk Management**

During the project life cycle the nature and extent of identified risks may change and new risks may appear. Sometimes new risks may require joint efforts to manage them effectively. Joint risk management is about working together at mitigating unforeseen projects risks at the post contract stage.

## **2.9 Conclusion and Chapter Summary**

This chapter provided an extensive review of pertinent literature on the topic. Explanations of public procurement and risk management were presented in the chapter. Risk management process, strategies and tools for public procurement projects were also

identified with a touch on feeder roads also given. The chapter concluded by identifying the roles of management in handling risks. The next chapter is devoted to the research methodology adopted for this study.

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## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter discusses the research methodology adopted for the study. The systemic rules and procedures upon which this research agenda is based and against which the data collected is interpreted and the findings evaluated are detailed here. The purpose of this study was to identify the current practices employed by the Department of Feeder Roads in the procurement of feeder roads. The data collection procedure is also described in this chapter. Subsequently, the relevant information on the potential respondents, the sampling frame, the sample size and the field work are presented. The chapter concludes with a commentary on how the data collected was analysed.

#### **3.2 RESEARCH PARADIGM**

Philosophical design and methodological approach are issues that have to be taken into consideration in a research. Philosophical questions of existence, knowledge and value, have significant impacts in the research design (Tashakkori and Teddlie, 1998).

The key research questions involved in the study suggested that either surveys or case studies could have been suitable as the research method. The survey technique was chosen as the most appropriate research method due to the theoretical basis of this study which involved collecting data to draw deducting conclusion.

The research was conducted among various professionals that work on feeder road projects. The survey is conducted exploring the practices that these professionals engage in relation to identification of risk and risk management. This was structured objectively and measured statistically in the study. A structured and statistically controlled research analysing method was also used in analysing the data. The researcher was of the view that

the choice of what to study or how to study could be examined by both subjective and objective criteria

The study used a quantitative research method for an accurate measurement and description of the various risk management practices conducted by the construction professionals engaged in feeder road projects. The main variables were various procurement and the risk management practices.

### **3.3 SOURCES OF DATA**

Primary data was mainly collected and analysed for the purpose of this research through the use of questionnaires. This data made it possible to gather professionals' activities in relation to risk management in procurement of road works in the Department of Feeder Roads.

### **3.4 UNIT OF ANALYSIS**

The unit of analysis refers to the major entity that is being analyzed in a study. It is the analysis that is done in the study that determines what the unit is. It defines the 'what' or 'who' that is being studied. In social science research, typical units of analysis include individuals, groups and social organizations. The unit of analyses in this study are key professionals in the Department of Feeder Roads and private consultants that have worked on feeder road projects.

### **3.5 POPULATION AND SAMPLE FRAME**

A population refers to the complete set of cases or elements from which a sample is taken (Saunders *et. al.*, 2007). Since the research was limited to the Department of Feeder Roads, the population for this research from which the sample was drawn was the total number of key professionals in the Department of Feeder Roads and consultants that have

worked on feeder road projects. There are approximately 150 professionals, including quantity surveyors, civil engineers, etc. in the Department of Feeder Roads and approximately 20 private consultants' sourced by Feeder roads Department (DFR HR, 2014).

It was therefore very difficult to collect data from all members of the population due to the enormity of its size and the lack of resources. For this reason a sample size must be drawn in order to carry out this research.

### **3.6 SAMPLING SIZE**

Sampling is defined as a process of selecting a section to represent a whole. In most instances it is impractical to conduct a census as conducting a census could be very expensive and time consuming.

### **3.7 THE SAMPLING TECHNIQUE**

The sampling techniques adopted in this study for the selection of the respondents were purposive and convenient. The respondents were purposively selected because specific data and information were needed by the researcher to measure the involvement level of the respondents.

Significantly, the process of obtaining the members to be involved in the study was very critical and central to ensuring that each unit within the sample population has an equal chance of being selected. The core principle is that, the sample size should have features which reflect the entire population, such that conclusions can be generalized for the entire population. Based on the Taro's formula below the sample size for the study was determined;

$$n = \frac{N}{1+N\alpha^2}$$

Where; n=Sample Size, N=Sample Frame (Key Professionals in Feeder Roads and Consultants on Feeder Roads projects-170)

$\alpha$  = Confidence Level (which will be 10% or 0.1).

$$n = \frac{170}{1 + 170(0.1)^2} = 62.96$$

A sample size of 63 professionals and consultants were obtained from using the Taro's formula. However, for the purpose of time and inability to retrieve some of the questionnaires from some of the respondents; a sample size of 60 professionals and consultants were used in this study.

### **3.8 DATA COLLECTION INSTRUMENT**

Questionnaire was prepared for the primary data collection. A questionnaire is a pre-formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives (Sekaran, 2003). The questionnaire was designed specifically to solicit responses from professionals and consultants that have been engaged on feeder road projects.

Questionnaires were self-administered by people of officer status. Questions in a questionnaire could be open-ended, close-ended or a mixture of the two (Frazer and Lawley, 2000), based on the expected outcome. Due to the research paradigm adopted the main questions in the questionnaire were designed to be close ended.

The questionnaire used in this research was divided in three sections: Section 'A'; Section 'B'; and Section 'C'. Section 'A' sought to investigate characteristics of the professionals; their institution of work; position held amongst other issues. Section 'B' investigated the risks that usually occur in the procurement process. The professional were asked to rank based on the likert scale how significant the risks were. Section 'C'

investigated the various risk management practices used and the respondents were asked to rank the level of frequency in which they were used. The last section also had an open ended question. The researcher sought to solicit recommendations from the respondents on risk management practices engaged in the procurement of road works.

### 3.9 DATA ANALYSIS

Data analysis can be defined “as consisting of three concurrent flows of activity: data reduction, data display and conclusion drawing/verification” (Saunders et. al., 2007). Data analysis of this thesis was based on the three steps defined by (Saunders et. al., 2007), data reduction, data display and conclusion. After completing the data collection the researcher organized the data for the survey based on the issues that have been selected according to the research question and literature review.

Data was analysed using both descriptive data and adopting the relative importance index to find the ranking factor among all the factors articulated from the literature review.

$$\text{Relative importance index} \quad RII = \frac{\sum W}{A \times N}$$

*W – the weight given to each factor by the respondents and ranges from 1 to 5;*

*A – the highest response integer (5); and*

*N – the total number of respondents.*

### 3.10 BRIEF PROFILE OF THE CASE

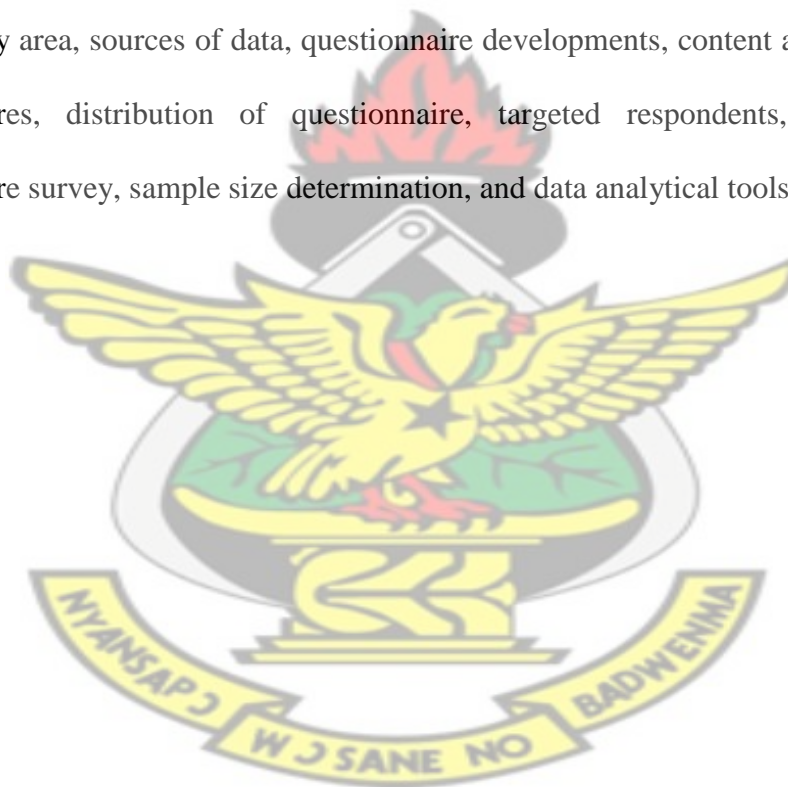
In order to reduce the possibility of getting incorrect answers, attention was paid to issues of validity and reliability. Validity is concerned with whether the findings are really about what they appear to be about. Reliability defined as the extent to which data collection method or methods accurately measure what they were intended to measure (Saunders et.



al., 2007).The needed data were collected in the format of a questionnaire that had been designed based on the literature related to perceptions, attitude and behaviour of customers in relation to store image, involvement and brand equity studies.

### **3.11 CHAPTER SUMMARY**

This chapter addressed the various methodologies available for the research and the reason for the adoption of the methodology used for this research. The research approach used and the method of data collection was discussed i.e. the use of survey questionnaires. The chapter concluded with the research process and covered issues such as; the study area, sources of data, questionnaire developments, content and design of the questionnaires, distribution of questionnaire, targeted respondents, the scope of questionnaire survey, sample size determination, and data analytical tools.



## CHAPTER FOUR

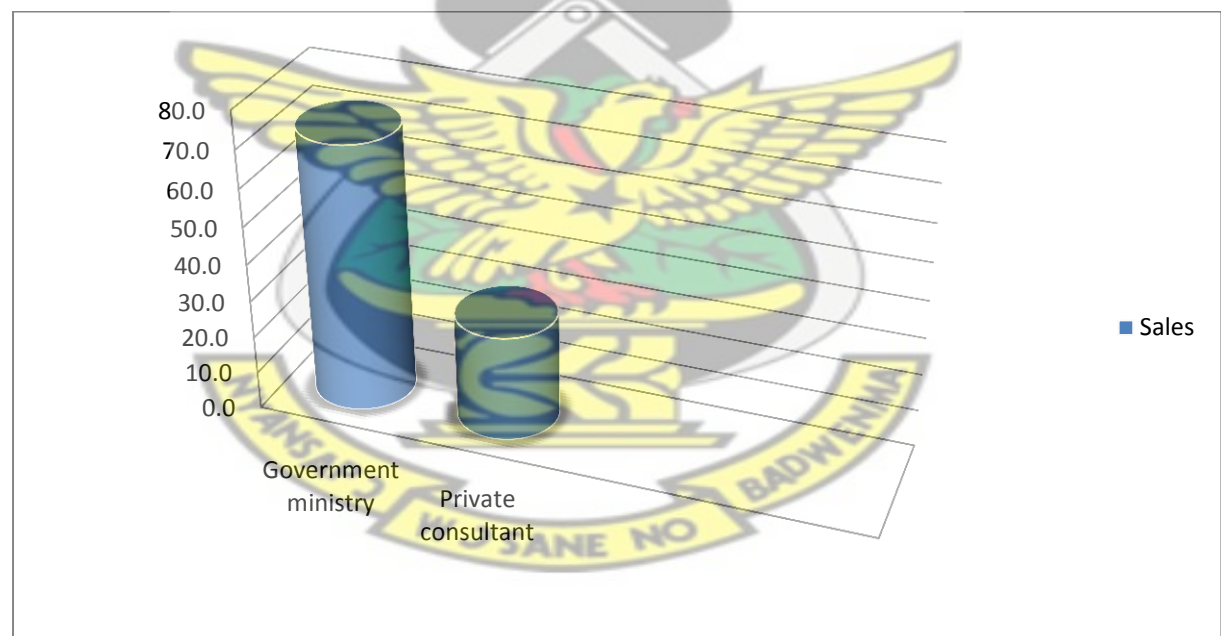
### RESULTS AND DISCUSSION

#### 4.1 INTRODUCTION

This section contains discussions on the findings of the study. The findings are analysed in line with the objectives that were set out in this study.

A total number of sixty three (63) questionnaires were administered, out of which sixty (60) were obtained and valid for the data analysis. These valid questionnaires used for the analysis yielded 95% of response rate. This indicates that, the response rate was quiet high and reflects the views of the entire population.

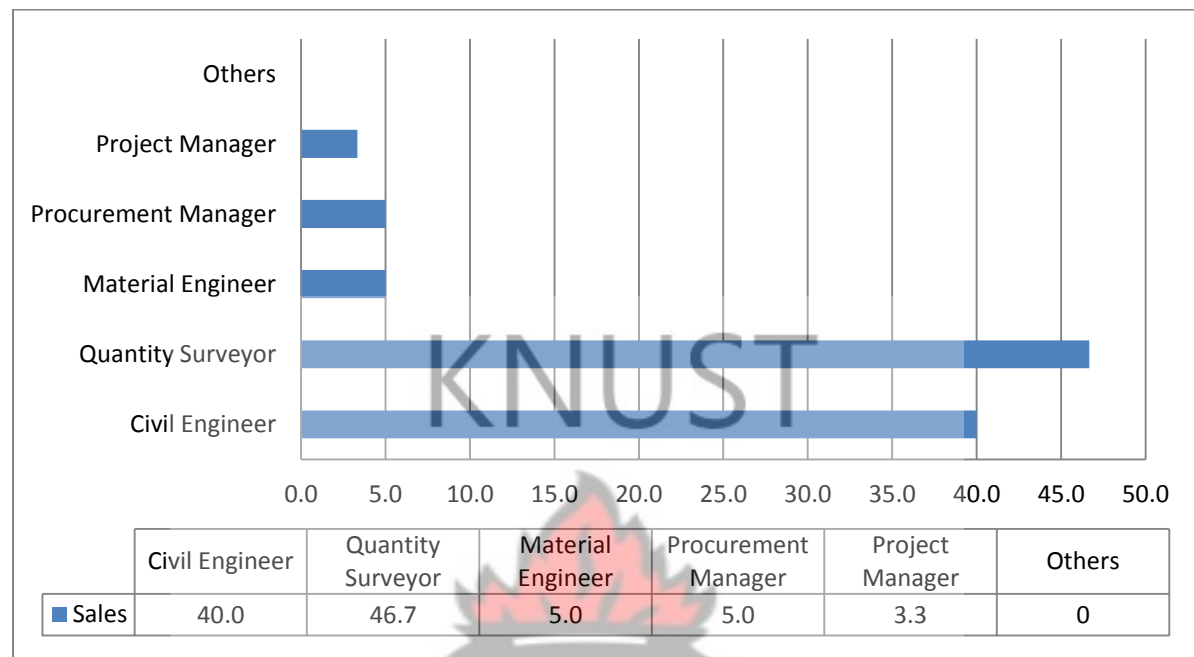
#### 4.2 SECTION- 'A' BACKGROUND DETAILS OF RESPONDENTS



**Fig 4.1: Institution of Work**

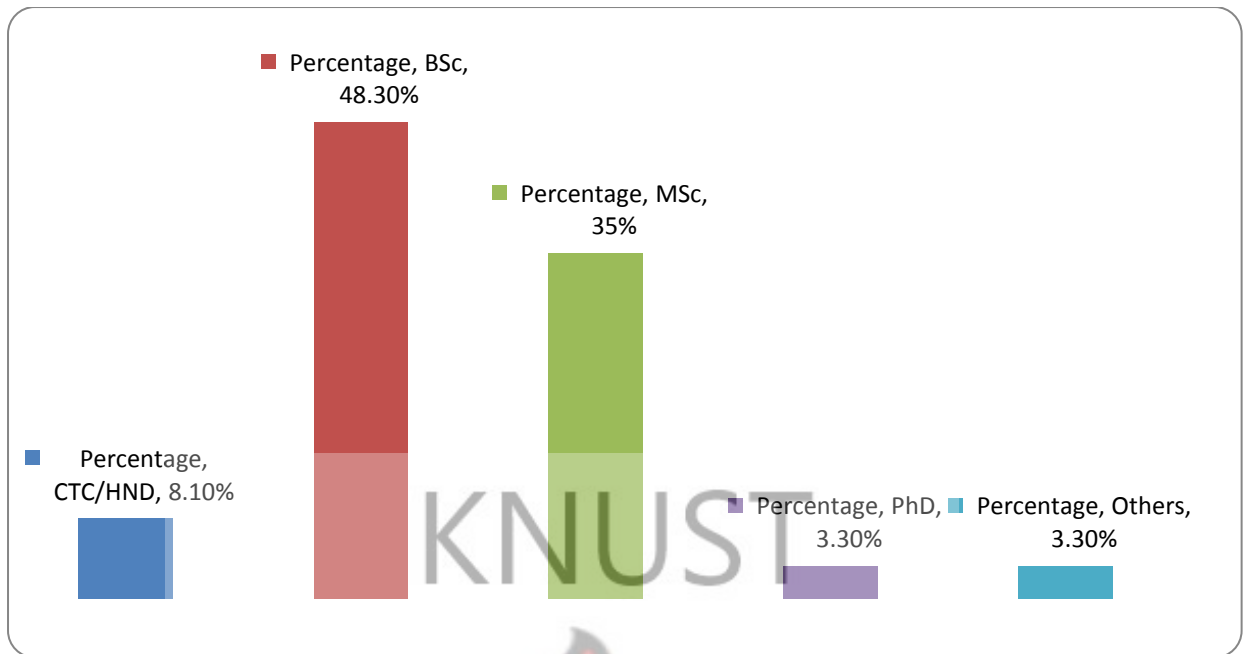
Fig 4.1 above shows that 72% of the respondents were professionals in the Government ministry and 28% were private consultants sourced by the

Department of Feeder Roads. Thus the findings of the study reflect more of the views of those in the public sector than those in the private sector.



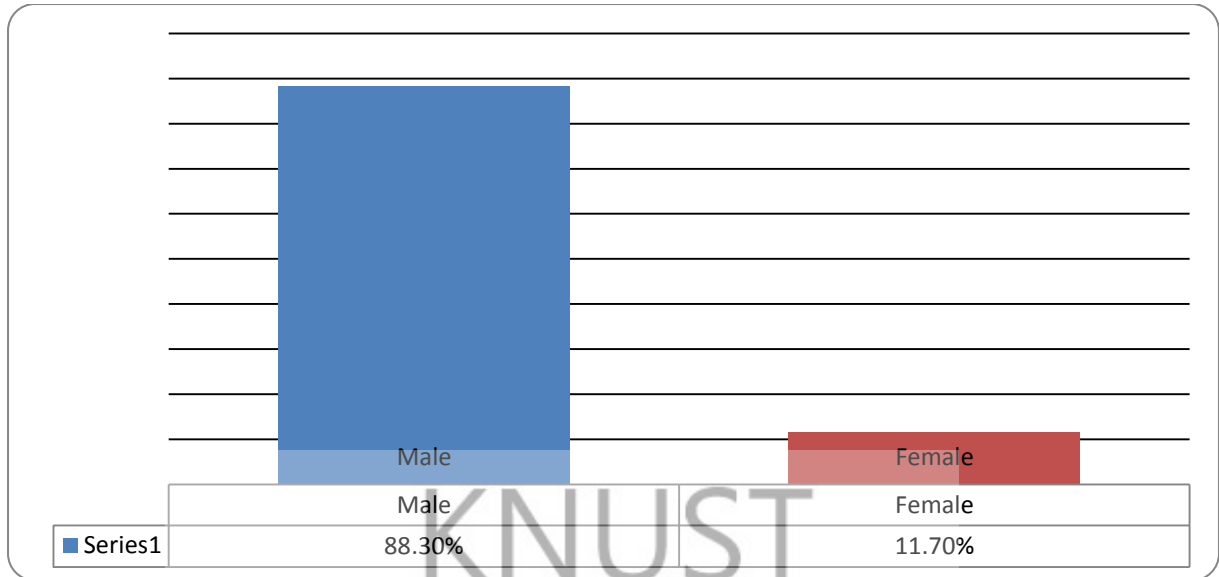
**Fig 4.2: Respondent's Profession**

Fig 4.2 shows that the profession of the respondents included Civil Engineering, Quantity Surveyors, Material Engineers, Procurement Managers and Project Manager. 47% of the respondents were Quantity Surveyors, 40% were Civil Engineers and 3% represents Project Managers. This shows that most respondents were mainly Quantity Surveyors and Civil Engineers, and least been Project Managers.



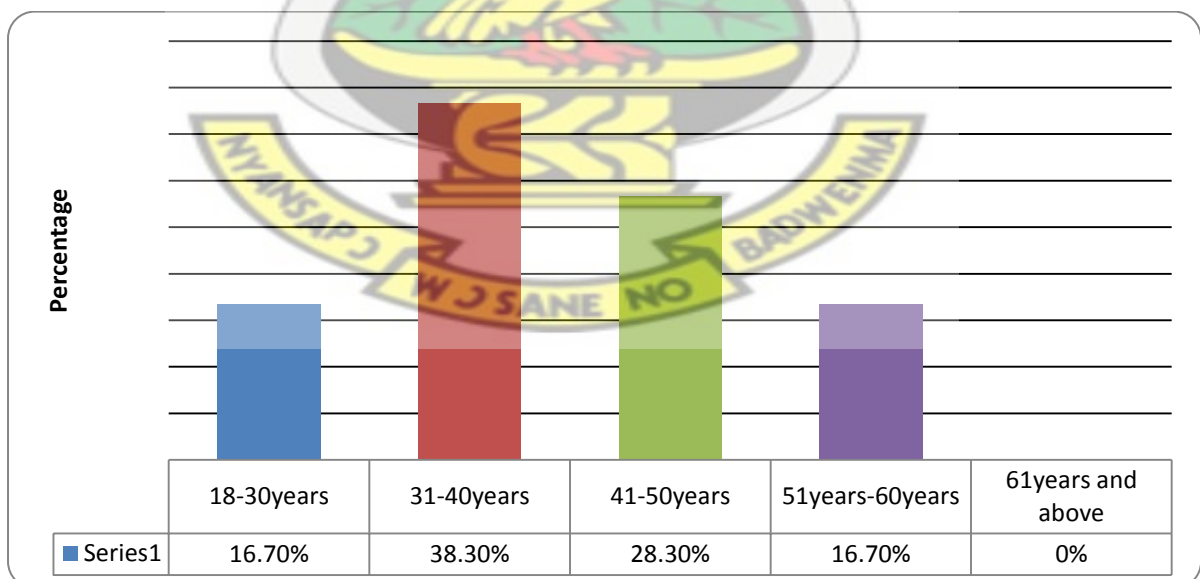
**Fig 4.3: Respondent's Highest Education Qualification**

Fig 4.3 indicates that, all the respondents selected were educated, this was expected, since the respondents were already working in the departments which have a required educational level for its minimum qualification. From Fig 4.3, it was found that, majority of the respondents attained Bachelor of Science Degree (BSc), which constitutes 48.3%, this was followed by Master of Science Degree (MSc) holders which also constitutes 35.0%. 10.0% attained CTC and HND certificates, PhD holders and the holders of EMCM/CILT (others) constitute 3.3% each. All the respondents have knowledge in public procurement of road works and can really give good assessment of the risks management practices in the procurement process.



**Fig 4.4: Respondent's Gender**

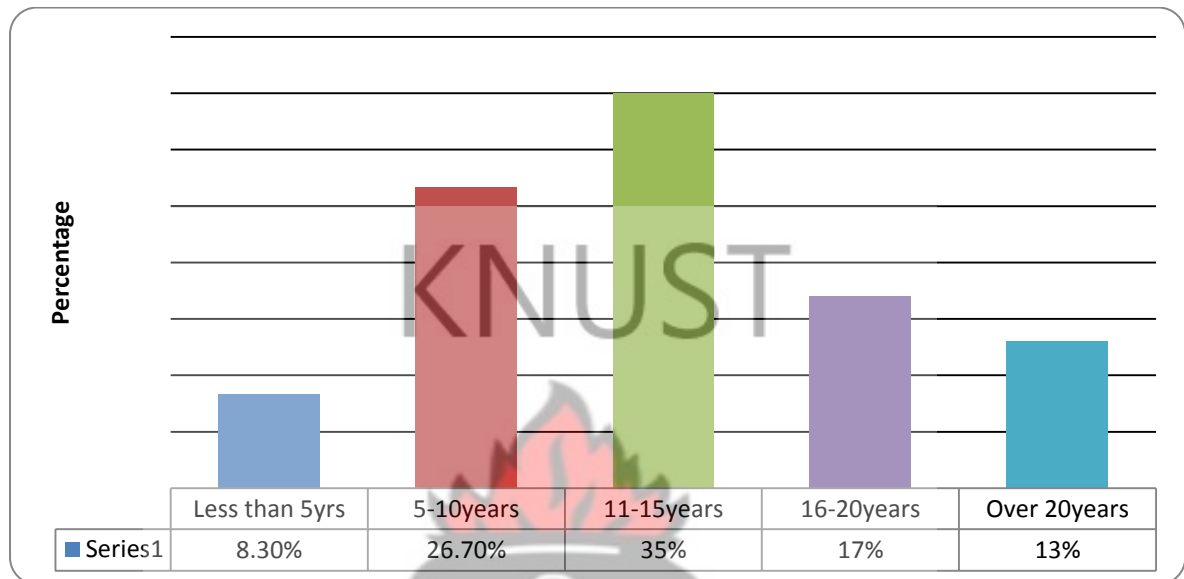
Fig 4.4 shows that out of the 60 responses, fifty-three (53) respondents were male which represents 88.3% and the remaining seven (7) were female representing 11.7%. However, it should be noted that, across the sections of the Department of which the sample were taken, were heavily male dominated.



**Fig 4.5: Respondent's Age Group**

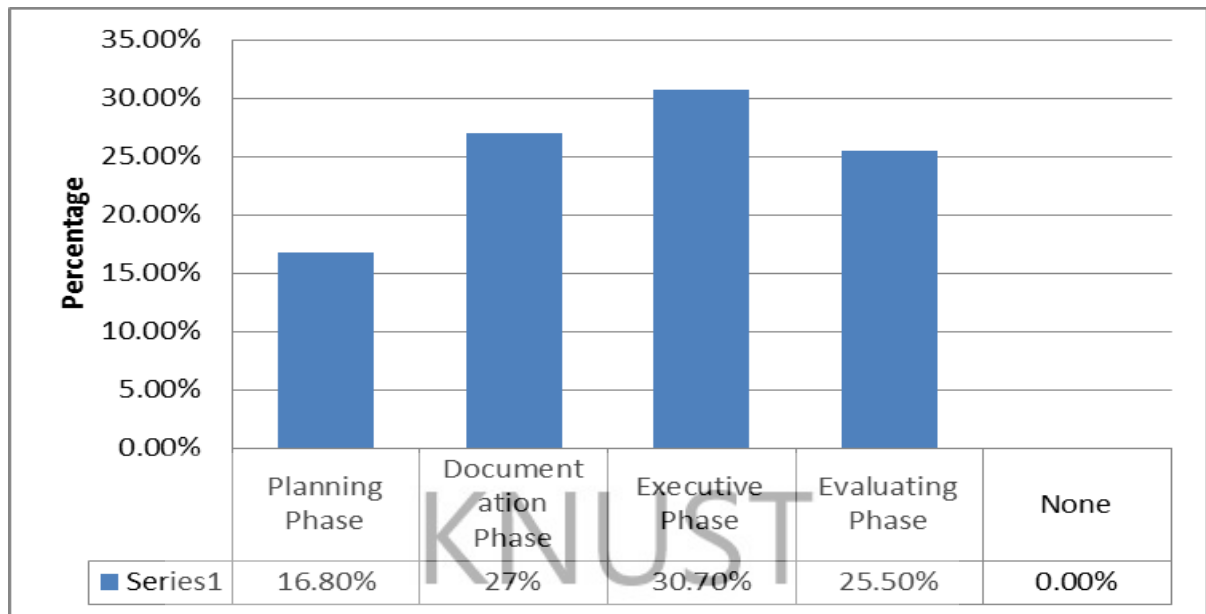


Fig 4.5 indicates that most of the respondents were between the age group of 31-40 year representing 38.3% followed by respondents with the age group of 41-50 representing 28.3% and 16.7% representing both 18-30 and 51-60 age groups.



**Fig 4.6: Years of Experience in this road construction industry**

According to Fig 4.6, the survey conducted indicated that most of the respondents had worked between the periods of 11 -15 years in the road industry representing 35% and 8.3% representing those who have worked for less than 5 years.



**Fig 4.7: Stages of the Procurement Phase Respondent Is Involved In**

The various stages that respondents were involved in the procurement phases include the following: planning phase, documentation phase, execution phase and evaluating phase. It was discovered that 30.70% of respondent were involved in the execution phases and whilst 16.80 % representing respondent involved in the planning phase. This is illustrated in Fig 4.7 above.

#### **4.3 SECTION- 'B' IDENTIFYING RISKS IN ROAD PROCUREMENT**

This section had respondents rank their perception of how significant of these risks in the Procurement Process of road works in the Public Sector on a Likert rating scale of 1 to 5 with 1 = 'Not Significant', 2 = 'Slightly Significant', 3 = 'Moderately Significant', 4= 'Very Significant and 5 = 'Extremely Significant'. This 5 point scale was chosen to prevent respondents from providing neutral answers. These risks were ranked in order of importance significant by constructional professionals as shown below.

#### 4.3.1 Planning the Procurement Process

**Table 4.1: Planning the procurement process**

No.	Planning the Procurement Process	Frequency of Ranking					Weighting	RII	Rank
		1	2	3	4	5			
1	Understatement of the Need	2	6	10	20	22	234	0.78	2
2	Overstatement of the Need	4	13	21	12	10	191	0.64	5
3	Misinterpretation of user needs	1	6	19	19	15	221	0.74	4
4	Insufficient Funding	0	6	7	26	21	242	0.81	1
5	Impractical timeframe	0	7	15	26	12	223	0.74	3

***Source: Researcher's Field Survey, August. 2014***

Table 4.1 summarises the results of the analyses. The table shows that for all the risks identified in Planning the Procurement Process, 'Insufficient funding' stood out to be the highest- ranking risk factor (RII = 0.81). This is because of the economic situations in Ghana. The road construction industry is currently one of the most expensive infrastructures in, and the Government being the sole financier can no longer fund. The table 4.1 indicated that the respondents ranked 'Understatement of the Need' second highest factor with (RII = 0.78). 'Impractical Time Frame' and 'Misinterpretation of User Need' were ranked third (RII = 0.74) and fourth (RII = 0.74) respectively by respondents. The least risk in planning the procurement process as per the survey study was 'Overstatement of the need' (RII = 0.64).

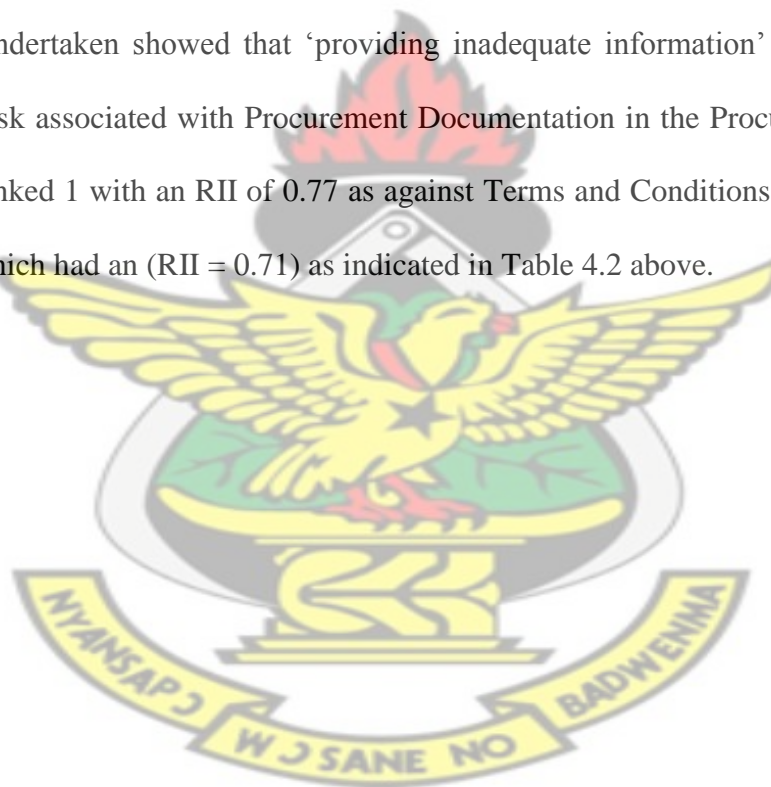
#### 4.3.2 Procurement Documentation

**Table 4.2: Procurement Documentation**

No.	Procurement Documentation	Frequency of Ranking					Weighting	RII	Rank
		1	2	3	4	5			
1	Terms and conditions unacceptable to tenderers	3	5	16	26	8	205	0.71	2
2	Providing inadequate information	0	6	12	24	15	219	0.77	1

**Source: Researcher's Field Survey, August. 2014**

The study undertaken showed that 'providing inadequate information' was the highest significant risk associated with Procurement Documentation in the Procurement process. It was ranked 1 with an RII of 0.77 as against Terms and Conditions Unacceptable to Tenderers which had an (RII = 0.71) as indicated in Table 4.2 above.



### 4.3.3 Contract Management

**Table 4.3: Contract Management**

No.	Contract Management	Frequency of Ranking					Weighting	RII	Rank
		1	2	3	4	5			
1	Variations in price and foreign exchange	1	3	8	26	22	245	0.82	1
2	Unwillingness of the bidder to accept the contract	7	8	23	15	7	187	0.62	8
3	Failure of either party to fulfil the conditions of the contract	2	4	11	26	17	232	0.77	4
4	Inadequately administering the contract	1	8	10	30	11	222	0.74	7
5	Commencement of work before contract is exchanged or letter of acceptance is issued	2	11	5	24	18	225	0.75	6
6	Unauthorised increase in scope of work	1	8	10	16	25	236	0.79	3
7	Loss of intellectual property	3	8	23	7	5	141	0.61	9
8	Failure to meet liabilities of third parties (e.g. Royalties or third party property insurance)	3	14	23	17	3	183	0.61	9
9	Poor quality works	0	4	13	23	20	239	0.80	2
10	Fraud	1	6	10	22	20	231	0.78	5
11	Lack of technical know-how by Consultants	0	6	6	25	23	245	0.82	1

**Source: Researcher's Field Survey, August. 2014**

Based on the results, the relative importance index (RII) was calculated for each risk based on significant impact rating. These risks were then ranked according to their RII. Table 4.3 presents the top 11 risks in the contract management based on risk rating. According to risk rating values, the most significant risk is 'variation in price and foreign exchange'. The RII is 0.82. Variation of prices and foreign exchange are key risks in Ghana. These lead to increases in prices during the contract management stage, which



eventually causes cost overruns and delays in major projects. This was ranked first as can be seen in table 4.3.

Lack of technical know-how by consultants also rank the most significant risk in the road construction industry, RII is 0.82. This means that, progress on project would be disrupted because of less expertise or non-availability of key personnel on the projects.

The second risk is 'poor quality of works', RII is 0.80. Jwaro (2012) mentioned that poor quality workmanship leads to project failure. The third risk is 'unauthorized increase in scope of work' (RII = 0.79). This risk especially causes unanticipated cost increases which eventually lead to Contract disputes and delays in project completion.

Fraud is ranked 4th (RII = 0.78). This is a common risk in the procurement process in the Public Sector. This risk associates with misuse of resources, legal action and cause disruption to procurement activities. 'Failure of either party to fulfill the conditions of the contract' is also an important risk (RII = 0.77). Again this risk causes Contract disputes, failure to satisfy project needs, delays in project completion and legal action.

Respondents ranked 'commencement of work before contract is exchanged or letter of acceptance is issued' the 6th risk (RII = 0.75). This risk has a potential liability to pay for unauthorized work and the possibility of legal action for perceived breach of contract.

'Inadequately administering the contract', a management risk that is ranked 7th (RII = 0.74). This risk causes cost increases, failure of contract, full benefits of project objectives not achieved, delivery of unsatisfactory product and contract disputes.

'Unwillingness of the tenderer to accept the contract' is ranked 8th (RII = 0.62). This brings about delays in project completion or need to restart procurement process. The

study revealed that ‘failure to meet liabilities of third parties’ and ‘losses of intellectual property’ were the lowest ranked risks

#### 4.3.4 Evaluating Procurement Process

**Table 4.4: Evaluating Procurement Process**

No.	Evaluating the whole Procurement Process	Frequency of Ranking					Weighting	RII	Rank
		1	2	3	4	5			
1	Failure to evaluate procurement and management process	0	7	10	30	13	229	0.76	2
2	Failure to identify and address problems	1	4	13	26	16	232	0.77	1

*Source: Researcher’s Field Survey, August. 2014*

Table 4.4 indicates that the respondents ranked Failure to identify and address problems the most significant risk factor to Failure to evaluate procurement and management process. (RII 0.77 and RII 0.76) respectively. This means that Failure to identify and address problems causes procurement objectives not being achieved and possible failure in the future procurement process. Failure to evaluate procurement and management process also causes failure to improve procurement and management processes.

#### 4.4 SECTION ‘C’: RISK MANAGEMENT PRACTICES

Risk management is an important part of a decision – making of all construction institution. Risk cannot be eliminated, but can be minimised, transferred or retained (Burchett, 1999 as cited in Mills, 2001).

This section had respondents rank their perception of how often these identify risk management practices used in the procurement of road works in the Department of Feeder Roads on a Likert rating scale of 1 to 5 with 1 = ‘Never’, 2 = ‘Rarely’, 3 = ‘Sometimes’, 4 = ‘Often’ and 5 = ‘Always’. This 5 point scale was chosen to prevent

respondents from providing neutral answers. These risks mitigating practices were ranked in order of importance by constructional professionals as shown below.

#### 4.4.1 Risk Management Practices

**Table 4.5: Risk management practices**

No.	Risk mitigation Practices	Frequency of Ranking					Weighting	RII	Rank
		1	2	3	4	5			
1	Prevention of Risk	4	5	25	19	7	200	0.67	4
2	Avoidance of Risk	4	11	24	16	5	187	0.62	5
3	Risk Limitation	4	7	17	23	11	216	0.70	1
4	Transfer of Risk	1	10	20	18	11	208	0.69	2
5	Acceptance of Risk	6	19	22	12	1	163	0.54	8
6	Contingency of Risk	3	9	17	21	10	206	0.69	3
7	Monitor Risk	3	14	22	8	5	154	0.59	6
8	Relational Contracting and Partnering	5	17	23	14	3	179	0.58	7
9	Public-Private Partnership (PPP)	19	19	11	10	1	135	0.45	9

Respondents to the survey were asked to score how often these nine identified risk management practices were used in procurement of road works at the Department of Feeder Roads, as ‘never’, ‘rarely’, ‘sometimes’, ‘often’ or ‘always’. The list of nine methods was drawn up with reference to literature on risk analysis and response in construction development (Byrne, 1996, pp. 1–16; Havard, 2002, pp. 361–375; Millington, 2000, pp. 219–228). Respondents were given the opportunity to add further methods, but no significant extra tactics emerged.

The study revealed that the 9 risks management practices were based on risk response rating. According to risk mitigating rating values, the most risk management practice

often used in the Department of Feeder Roads was '**risk limitation practice**'. The RII is 0.70. This means the Department undertakes activities which reduces the impact of risk should that risk occur.

The second risk management practice often used is '**transfer of risk**', RII is 0.69. This means construction risk is transfer to the one who is better to manage it. Mills 2001 contended that the most efficient response to risk is to transfer the risk to the party that is in the best position to accept or manage it.

The third risk management practice as summarized in table 5, is '**contingency risk**' (RII = 0.69). This risk mitigating practice is a plan which can be brought in to play should risk occur. The development of contingency plans for an example, possible political instability, such as plan for emergency evacuation and seek incorporation of termination or delay clauses in contract. Obtain insurance for political risks and be informed of political developments using information sources (Wang et al 2008).

'**Prevention of risk**' was ranked 4th (RII = 0.67). This is a risk mitigation action which reduces the likelihood of risk occurring. '**Avoidance of risk**' is also an important risk response ranked fifth by the respondents in the study, (RII = 0.62).

Respondents ranked '**monitor of risk**' the 6th risk mitigating practice engaged by the Department in response to risk in the procurement process of road works, (RII = 0.59). This means that the Department of Feeder Roads monitors the environment for changes, activities that affect the risk occurrence.

'**Relational contracting and partnering**', this risk mitigating practice was ranked 7th (RII = 0.58). This risk mitigating practice is a transaction or contracting mechanism that

seeks to give explicit recognition to parties to a contract and to minimize the incidence of risk.

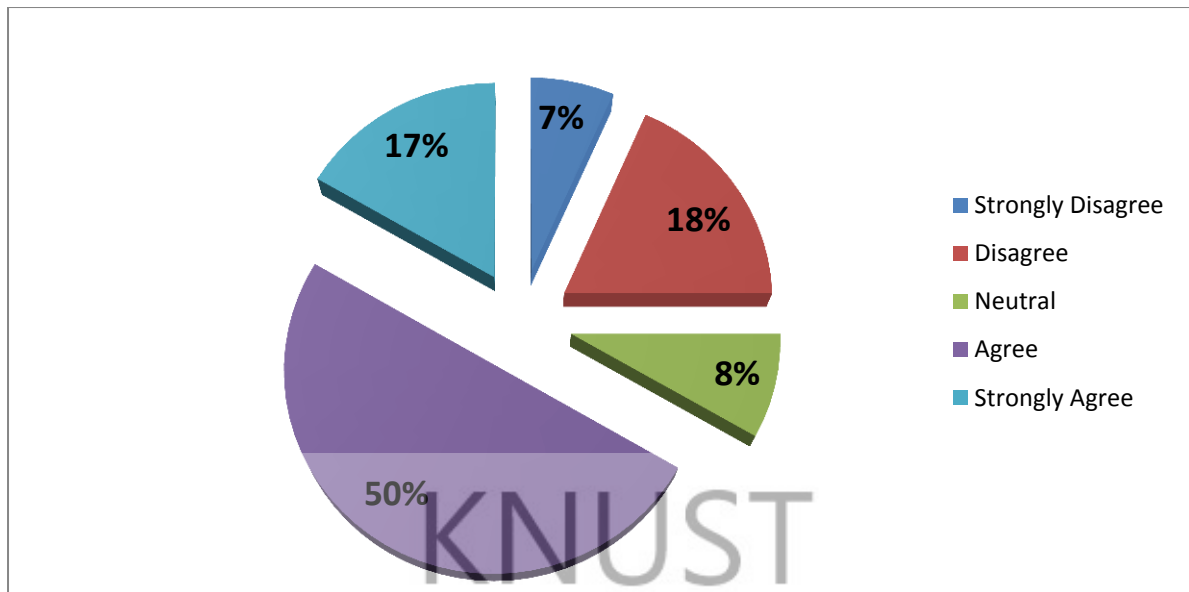
By the study, the 8th ranked risk mitigating practice adopted in the Department of Feeder Roads was '**acceptance of risk**' ( $R_{II} = 0.54$ ). This means that there are some risks when occurs the Department take no action than to accept and control the risk to its acceptable level. These are risks with opportunities which have been identified and would impact positively on the project should they emerge.

The study revealed that '**Public-Private Partnership (PPP)**' was the least risk mitigating practice often used in the Department of Feeder Roads. This was ranked 9<sup>th</sup> as can be seen in table 4.5. Public-Private Partnership means: shared responsibility for the provision of infrastructure with significant level of risk being taken by the Private Sector.

#### **4.4.2 Institution Being Led By Senior Management With Experience In Risk Mitigation Practices In The Procurement Of Road Works.**

As part of the measures to manage identified risks during the procurement of road works in the Department of Feeder Roads, the survey was conducted to cover responses about the risk mitigation practices experience of the institution of the respondents and also to find out whether the organization is led by a senior management. Response from the respondents revealed that 50% agreed to the fact that their organization is been led by a senior management with experience in risk mitigation practices in the procurement of road works and 18% disagreed that their organization was led by a senior management with experience in risk mitigation practices in the procurement of road works. This meant that most of the organization was led by adequate senior management with requisite construction procurement experience.

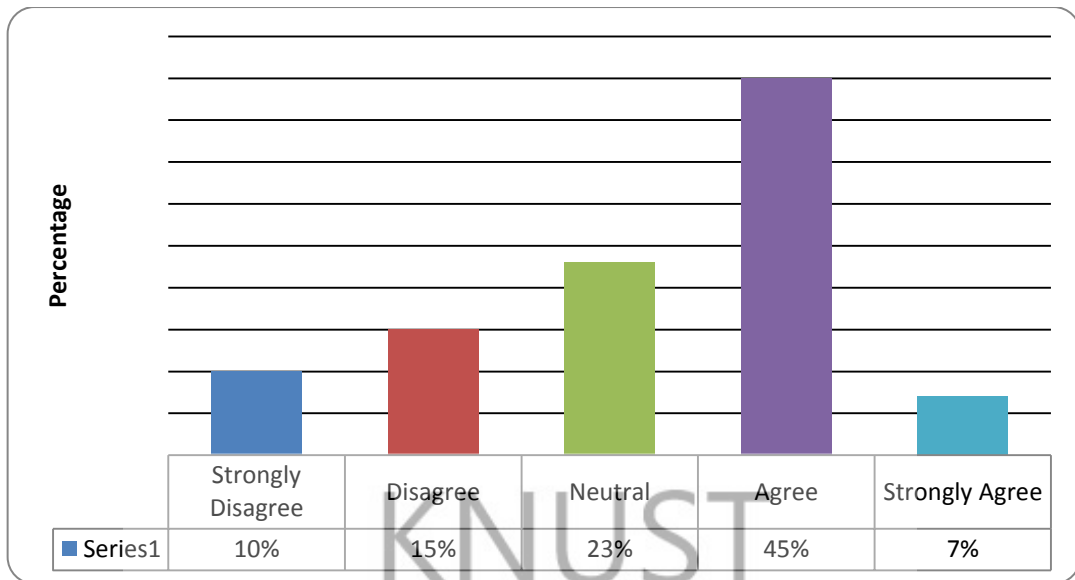




**Fig 4.8: The degree of senior management experience in risk mitigation practices in the procurement of road works**

#### **4.4.3 The Degree of Enabling Work Environment for the Procurement of Road Works.**

Respondents were requested to rank whether they were worked under conducive and enabling working environment for participating in risk management during the procurement of road works. The study revealed that 45% respondents agree that, there was conducive and enabling work environment for participating in risk management during the procurement road works, 23% responded neutral whiles 10% strongly disagrees. This is shown in Fig 4.9 below.



**Fig 4.9: The degree of enabling work environment for the procurement of road works**

#### **4.5 RISK IDENTIFICATION FOR PROCUREMENT PROCESS OF ROAD WORKS: FEEDER ROADS**

Risk identification can be divided into groups within the various stages in the procurement process (Emmett and Crocker 2008; p 4, Lloyd and McCue, 2004, Weele, 2010 p. 29, UNPP, 2006). The procurement process contains in each of its stages, multiple specific risks and consequences (UNPP, 2006). All the likely risks identified to associate with the procurement process of road works at the Department of Feeder Roads.

**Table 4.6: Risk identification in stages, of the procurement process of road works**

<b>PROCUREMENT PROCESS RISKS</b>				
<b>Risk identification and in stages of the procurement process of road works</b>				
<b>Procurement planning process</b>	<b>Procurement Documentation</b>	<b>Contract Management</b>	<b>Contract Management (contd)</b>	<b>Evaluating Procurement Process</b>
Understatement of the need	Term and conditions unacceptable to tenders	Variations in price and foreign exchange	Failure to meet liabilities of third parties (e.g. Royalties or third property insurance)	Failure to evaluate procurement and management process
Overstatement of the need	Providing inadequate information	Unwillingness of the tenderer to accept the contract	Poor quality of works	Failure to identify and address problems
Misinterpretation of user needs		Failure of either party to fulfil the conditions of the contract	Fraud and corruption	
Insufficient funding		Inadequate administering the contract	Lack of technical know-how by consultants	
Impractical timeframe		Commencement of work before contract is exchanged or letter of acceptance is issued	Loss of intellectual property	
		Unauthorised increase in scope of work		

*Sources of risks: (UN Procurement Practitioner's Handbook produced by the*

*Interagency Procurement Working Group (IAPWG) in 2006. [www.ungm.org](http://www.ungm.org)*

*Accessed 22/06/2014)*

#### 4.5.1 Risks in stages of the procurement process of road works

The Planning the Procurement Process category includes ‘understatement of the need’. Road construction is very expensive and currently the road construction industry one of the largest sector of the economy (Asamani and Osei Amponsah, 2007). Therefore if during the procurement process and the risk factor of ‘understatement of the need’ occur the likely consequence would be Procurement of unsuitable product, money wasted and the need will not be satisfied. The ‘overstatement of the need’ risk create greater expense. ‘Misinterpretation of user need’ causes Procurement of unsuitable product, money wasted and need not satisfied. Road construction is very complex, dynamic in nature and capital intensive would require a high capital (amount of money) in its execution. Therefore if the risk factor of ‘insufficient funding’ arises the consequences would be delay in procurement which leads to additional money for re- tendering. The tight ‘impractical timeframe’ schedules allow for completion of procurement process of a whole project might be difficult and impractical to achieve.

From the Procurement Documentation’s category, there is a risk of ‘terms and conditions unacceptable to tenderers’. When such risk crop up the procurement process would be disrupted, there will be the need to modify tender terms and conditions and possible low response from tenderers. ‘Providing inadequate information’ is among the most significant risk identified and has the consequences of variation of offers, need to provide clarifying information, causes delays in the tender closing which eventually attracts additional cost. Where inadequate information is communicated to as to what is required of tenderers, this can lead to a failure of the project objectives.

As for the Contract Management’s category, 11 risk types were identified. The most significant risks were variation in price and foreign exchange and lack of technical know-

how by consultants. Variation of prices and foreign exchange lead to increases in prices during the contract management stage, which eventually causes cost overruns and delays in major construction projects. As identified by several researchers (El-Sayegh 2008, Zayed et al. 2008, Dias and Ioannou 1996). ‘Unwillingness of the tenderer to accept the contract’ causes delay in commencement of project. ‘Failure of either party to fulfill the conditions of the contract’ is also an important risk.

Again this risk causes Contract disputes, failure to satisfy project needs, delays in project completion and legal action. ‘Inadequately administering the contract’ This risk causes cost increases, failure of contract, full benefits of project objectives not achieved, delivery of unsatisfactory product and contract disputes.

The risk factor of ‘commencement of work before contract is exchanged or letter of acceptance is issued’ has a potential liability to pay for unauthorized work and the possibility of legal action for perceived breach of contract. ‘Unauthorized increase in scope of work’ is another risk identified under contract management. This causes unanticipated cost increases which eventually lead to Contract disputes and delays in project completion. ‘Loss of intellectual property’ cause by lack of qualified staff of contractors and consultants. Risk of ‘failure to meet liabilities of third parties’ when occur has the tendency of causing disputes which leads to legal action and damage to organization’s professional reputation.

‘Poor quality of works’, caused by poor quality workmanship leads to project failure as identified by other researchers (Jwaro, 2012, Zayed et al. 2008). Low productivity and poor quality are also potential risks in construction (El-Sayegh (2008). ‘Fraud and corruption’, this risk associates with misuse of resources, legal action and causes disruption to procurement activities. ‘Lack of technical know-how by consultants’ is a



risk when occur results in project disputes which eventually disrupts the progress project. These usually cause by because of less expertise (emerging technology) or non-availability of key personnel on the projects as identified in the highway construction projects in China (Zayed et al. 2008).

Evaluating Procurement Process's risks include 'failure to evaluate procurement and management process and 'failure to identify and address problems. These risks factors have likely consequence of no improvement in the procurement management process and the procurement objectives not achieved, possibility of failure in future procurement processes respectively. Having identified the risks, there is the need to control these risks in order to prevent any failures.

#### **4.5.2 Control Measures for Risk Management Practices**

Effective risk response can help prevent a road works projects failing or at least reduce the negative impacts of risks that affect it. The four main risk response strategies are *elimination, risk transfer, mitigation, retention* (Baker et al 1999, Mills 2001, Chapman and Ward 2003, Choi et al 2004). Mills 2001 argue that the most efficient response to risk is to allocate the risk to the party that is in the best position to accept or manage it.

##### **4.5.2.1 Risk Management for identified risks: Feeder Roads**

The following measures can be used in controlling the identified risks associated with the procurement process of road works at the Department of Feeder Roads.

##### **4.5.2.2 Understatement and Overstatement of need**

To manage these risks, there is the need to prepare structured, development and realistic Procurement Plan by the Procurement Unit, after receiving request from the various Regional offices of the Department. The scrutinized Annual Procurement Plan is

submitted together with all necessary documents and feasibility study reports in a timely manner to the Entity Tender Committee for approval. There is also the need to ensure that the procurement road works projects complies with local planning commission's development plan and maintaining good relationship with staffs and higher officials (Wang et al, 2004) can be of considerable importance. The above also manages the risk of 'misinterpretation of user need'.

#### **4.5.2.3 Insufficient Funding**

To manage this risk, there is the need for Head of the Procurement Unit of the Department of Feeder Roads to ensure that only projects within the approved procurement plan with its equivalent available budget are procured.

#### **4.5.2.4 Impractical timeframe**

Realistic completion duration should be given in order to have road works procurement process completed. Unrealistic duration may compel the contractors to request for extension of time which may result in additional costs.

#### **4.5.2.5 Terms and conditions unacceptable to tenders**

To reduce this risk, use standard conditions of contract in the preparation of the tender document and develop commercially acceptable terms. Check that responsibility for risks is not allocated to the contractors for factors outside their control. The Department of Feeder Roads ensure the use of standard conditions of contract in the preparation of documents (DFR Tender Document, 2012).

#### **4.5.2.6 Providing inadequate information**

To reduce this risk, ensure that staff are suitably trained for the task. All documents must be review by senior procurement management before issue out. The Department of

Feeder Roads ensure that documents prepared are first submitted to the Head of procurement at the Head office for review and approval before issuing them out.

#### **4.5.2.7 Variation in prices and foreign exchange**

There is the need for a contingency allowance to be made on the estimated cost of the road project. In practice a percentage of say 25-30% is added to the actual estimated cost to take care of variation in prices and foreign exchange. An incorporation of escalation clauses could be made in the contract document for the contractor to be paid the increases in prices (Wang et al, 2004). In accordance with clause 47 of the Conditions of Contract (DFR Contract Document, 2012).

#### **4.5.2.8 Unwillingness of the tenderer to accept the contract**

To reduce this risk, Tender security should be requested from the prospective tenderer to provide security if the prospective tenderer withdraws his tender within the tender period or refuses to accept the contract once awarded. An incorporation of Tender security clauses could be made in the Tender document for the prospective tenderer to provide. In accordance with clause 24 of the Instructions to Tenderers (DFR Tender Document, 2012).

#### **4.5.2.9 Failure of either party to fulfil the conditions of the contract**

To manage this risk, contractual obligations of each party should be clearly stated in the Conditions of Contract and the remedy for a breach of contract also stated clearly in the Conditions of Contract. If one party, without lawful excuse, fails to perform her contractual obligations breach the contract. Ensure that all staff working on the project know the contract conditions and the client's responsibilities. Establish appropriate record- keeping system. The Department of Feeder Roads intend to manage this risk by incorporating in the Conditions of Contract the obligations of the parties under the

contract and remedy when one fail to fulfil the conditions of contract (DFR Contract Document, 2012). Ensure proper contract management, holding regular site inspection for progress reports and maintain accurate records and documentations.

#### **4.5.2.10 Commencement of work before contract is exchanged or letter of acceptance is issued**

To mitigate this risk, there is the need to avoid this practice. This practice must not exist or practice by any procurement official. Therefore the risk management practice tool used in Feeder Roads to manage this risk is total avoidance.

#### **4.5.2.11 Unauthorised increase in scope of works**

To reduce this risk, there is the need to adopt proper control guidelines, management system and corrective measures before variation of works are requested for approval by the project manager. To reduce this risk the Department of Feeder Roads has stated clearly in the Contract Data (Clause 4.0), the responsibilities of the project manager's representative which did not include 'increase work quantities'. This among others is the sole prerogative of the Project manager (DFR Contract Document, 2012).

#### **4.5.2.12 Loss of intellectual property**

This risk enhances poor performance and management. A performance bond should be requested from the contractor or subcontractor to ensure the proper performance of the contract. There is also the need to put in measures to effectively coordinate and manage the various subcontractors (if any) involved in the construction of the road works project.

#### **4.5.2.13 Poor quality works**

To reduce this risk, Wang et al (2004) emphasise that a proper quality control procedures need to be adopted as well as undertaking probability and sensitivity analysis. They also

indicated that there would be the need to apply innovative production concepts like lean construction and total quality management, to decrease variability and rework during construction. Similar provision is made in the Contract Document, Clauses 33-36 and 48 (DFR Contract Document, 2012)

#### **4.5.2.14 Fraud and corruption**

To reduce this risk, UNPP (2006) quote “Competition, transparency and separation of functions are the foundation of risk mitigation, since they ensure any fraudulent or corrupt behaviour will not go unnoticed. These need to be linked to senior management that does not tolerate such behaviour, provides training, systems, authority and controls so staff may carry out the procurement function correctly”(UNPP,2006).

#### **4.6 SUMMARY**

This chapter dealt with the research findings, analysis and discussion of the results obtained from the questionnaire survey. The section started with a brief introduction of the survey questionnaire and the various sections involved. The analysis started with a descriptive one and then moved on to explore the relative importance index. The findings show that one of the most significant risk factor in the procurement of road works is variation in price and foreign exchange. The study also found out that the most used risk management practice is Risk Limitation.



## CHAPTER FIVE

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.0 INTRODUCTION

Risk is part of every procurement process and the management of it can never be overstated. This research explored risk management practices employed in the procurement of road works. Review of extant literature helped to identify various risk management practices use in the procurement process. Previous chapters in this study also delineated the research methodology adopted, analysis and discussion of the results. This chapter summarizes the issues raised in the study. In addition, a summary of how the main objectives were achieved is explained and thereafter the main conclusions of this research are drawn. Finally, the chapter concludes with recommendations for further study based on the conclusions reached and current study limitations. This chapter focuses on key finding of the research problem, measures to be taken in order to improve and conclusion of the study.

#### 5.1 ATTAINING THE RESEARCH OBJECTIVES

This research was initiated with the primary aim to identify the risk management practices used in the procurement of road works in the Public Sector. In order to attain the specified aim, two research objectives were customary;

- a. To identify the most significant risks in the procurement of road works in the Public Sector;
- b. To identify the risk management practices used.

## 5.2 REVIEW OF OBJECTIVES

In order to achieve the set objectives, an in depth review of literature was conducted to better position the research. The various risk management practices were identified from the literature review. The processes of procurement of public works were also described. The main aim of this research, as noted earlier, was to identify the risk management practices used in the procurement of road works in the Public Sector. Subsequently research objectives were developed in order to collectively satisfy this aim. Here, the research objectives reconsidered to highlight the extent to which they were accomplished through the various phases of the research.

### 5.2.1 Objective 1:

*To identify the most significant risks in the procurement of road works in the Public Sector*

Through the literature review the scope of the study was limited to four aspects of the procurement process. These include planning the procurement process; procurement documentation; contract management and evaluating the whole procurement. Various risks were identified under these aspects of the procurement process. The respondents were then asked to rate how significant the risk were on the likert scale. The findings show that the highest risk in the procurement process is ‘variations in prices and foreign exchange’ and the second is lack of ‘technical know-how by consultants’ which all fall under the general category of Contract management. The results show that the major risk borders on finance and knowledge.

### 5.2.2 Objective 2:

#### *To identify the risk management practices used*

The second objective of the study was to identify risk management practices employed in the procurement process. Through the literature review nine risk mitigation practices were identified. The respondents rated the frequency to which the practices were employed on a five point likert scale. The study showed that the most employed risk management practice was the use of risk limitation. The second most practised risk management practice was transfer of risk. The least practice risk management tool was the use of public-private partnership and acceptance of risk.

### 5.3 RECOMMENDATIONS

This research has identified the risks associated with the procurement process of road works. It is important that the various risks identified be controlled by the project manager (The Director of Department of Feeder Roads) in order to ensure the success of road works projects. In doing so the most significant risks which could impact negatively on the project should be prioritised and the appropriate mitigation measures discussed above put in place to annul or reduce the impacts. The other minor risks should also be borne in mind and the appropriate steps taken to eliminate or mitigate them. Where the risks can be avoided entirely or transferred such steps could be taken but still ensuring that the objectives of the project are met.

Risk management plays a pivotal role in ensuring that the objective of a procurement process is achieved. Based on the research findings the following recommendations are made:

- **Risk Management Training**

The need for continuous professional development cannot be played down in the management of risk in the procurement process. The findings show a need for continuous training of professionals in the area of risk management. The dynamic nature of risk calls for continuous training to handle the changing scope and nature of risks in the procurement process.

- **Risk Management Formalization**

Through the study the formalization of risk management in the procurement of road works is recommended. It is imperative that risk management processes be formalized in the procurement of road works to streamline the activities and improve management of procurement risk.

- **Involvement of the Private Sector in Risk Management**

The dynamic nature of risk implies the use of various strategies in its management. The study showed that one of the least management practices is the involvement of the private sector in the management of risk.

To be successful in dealing with these risks, it is important that the project manager/ risk team carries out the risk management exercise way before road projects actually commences.

In summary, the framework below can be used by the Department of Feeder Roads in deciding the method for handling risks associated with the Procurement Process of road works, depending on likelihood and severity.

**Table 5.1: Risk Management practice framework to be used by Department of Feeder Roads**

Severity	LIKELIHOOD				
	Improbable	Rare	Possible	Probable	Very likely
Not Significant	Retain	Retain	Retain	Retain	Retain
Slightly Significant	Retain	Retain	Partial insure	Partial insure	Partial insure
Moderately Significant	Retain	Partial insure	Insure	Insure	Insure
Very Significant	Insure	Insure	Insure	Insure	Insure
Extremely Significant	Insure	Insure	Cease activity	Cease activity	Cease activity

*Source: (Flanagan and Norman, 1993) cited in Baker et al 1999.*

#### **5.4 LIMITATIONS OF THE RESEARCH**

The study was conducted with certain limitations mostly due to time and cost constraints. The research focused on just some aspects of the procurement process due to time limitation. The study only focused on how significant a risk in terms of importance relative ranking but did not explore their significance in terms of their impact on the procurement process. The study did not explore the extent to which the risk management were practiced. The respondents were only asked to rank them in terms of the frequency with which they were utilized but did not explore the dimensions and situations which necessitated their practice. This limits the extent to which the findings can be applied.

#### **5.5 DIRECTION FOR FUTURE RESEARCH**

This study brought to bear a number of issues in relation to procurement in the public sector. A number of these areas are in need of further research. The following recommendations are therefore made for future research:



1. Future research in effect of risk on the procurement process
2. Future research in formalization of risk management process in public procurement and
3. Future research in the impact of risk management practice on the procurement process.

# KNUST



## REFERENCES

- Acquaye, J.A. (2011) Guide to practice of procedures in public procurement of works.  
Roystack Style Publications, Accra
- American Bar Association (ABA). (1979), Model Procurement Code for State and Local Governments, Section 1-301. Chicago, IL: ABA.
- Arizona Procurement Code, (2004), Arizona Revised Statutes, Chapter 23, Section 41-2503, <http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/02503.htm&Title=41&DocType=ARS>.
- Arrowsmith, S., (2003). Government Procurement in the WTO. New York: Kluwer Law International.
- Artto, K. and Kähkönen, K., (2000), Unknown Soldier Revisited: A Story of risk Management, Project Management Association Finland, Helsinki, 114.
- Artto, K., Kujala, J. and Martinsuo, M., (2005), Projektiliiketoiminta, Tuotantotalouden osasto, Teknillinen korkeakoulu, Espoo, 250 p.
- Asomani A.K and Osei – Amponsah C (2007), Analysis of the causality links between the growth of the construction industry and the growth of the macro-economy in Ghana. *Construction Management and Economics*, 25 (9): 951-961.
- Auditor-General on the maintenance of feeder roads in Ghana, (2010), Performance audit report of the auditor-general on the maintenance of feeder roads.

- Awuah, A.A. (2014) Enhancing Public Sector Performance Within The Framework of The Public Procurement Act, 2003 (Act 663) - Case Study of Department of Feeder Roads.in Ghana (online). MSc, Kwame Nkrumah University of Science and Technology. (Accessed 4 September 2014).
- Banaitiene, N. and Banaitis, A., (2012), Risk Management in Construction Projects. Chapter 19, available on <http://dx.doi.org/10.5772/51460>.
- Carbone, T. A. and Tippett D.D., (2004) Project risk management using the project risk FMEA. *Eng Manage J* 2004; 16(4):28–35.
- Chapman, C., (1997), *Managing Project Risk and Uncertainty*, John Wiley & Sons, Ltd., Chichester, 498 p.
- Charette, R.N., (1990), *Application Strategies for Risk Analysis*. New York, NY: McGraw-Hill Book Company, 1990.
- CIPS and NIGP, (2012), *Risk management Public Procurement Practice; principles and practices of public procurement*.
- COSO, J., (2004) *Enterprise Risk Management - Integrated Framework*.
- Edquist, C., (2011). Design of Innovation Policy through Diagnostic Analysis: Identification of Systemic Problems (or failures). *Industrial and Corporate Change* 20(6), 1725-1756.
- Emmet and Crocker, (2008)' *Excellence in Procurement*. Cambridge Academic: Gt. Sheldford, Cambridge.

Estache, A. and Iimi, A., (2011), The Economics of Public Infrastructure Procurement in Developing Countries: Theory and Evidence. Center of Economic Policy Research: London.

Fan, S. and Chan-Kang, C., (2004), Road development, economic growth, and poverty reduction in China. IFPRI DSGD Discussion Paper, 12, 86.

Ferma, C.R., (2002), A Risk Management Standard. The Risk Perspective.

Florice, S. and Miller, R., (2001), Strategizing for anticipated risks and turbulence in largescale engineering projects, *International Journal of Project Management*, 2001, Vol. 19, pp. 445-455.

Gnanih, E.L., (2012), Investigating the effect of the public procurement law on the Ghanaian educational sector. Unpublished thesis. Ashesi University College, Accra-Ghana.

Hornby A. S (2000) Oxford Advanced Learner's Dictionary 6<sup>th</sup> Edition, (Oxford University Press)

Human Resource office (HR) (2014) Department of Feeder Roads Head Office.

Iimi, A., (2006), Auction Reforms for Effective Official Development Assistance. *Review of Industrial Organization Vol. 28, pp. 109-128.*

ISO 31000:2009 Codified by the International Organization for Standardization

Khumpaisal, S. (2008) Risks in the Construction Project Procurement Process and the Mitigation Methods. Faculty of Architectural and Planning, Thammasat University

Klemetti, A., (2006), Risk Management in Construction Project Networks. Helsinki University of Technology Laboratory of Industrial Management Report 2006/2 Espoo 2006.

Kloman, H. F., (1990), "Risk Management Agonists." Risk Analysis 10, 2 (June 1990): 201-205.

Kpodo, S. (2011) General risk management principles: *The Quantity Surveyor Issue 1, June 2011*

Lloyd, R.E. and McCue, C.P., (2004), What is public procurement? Definitional problems and implications, *International Public Procurement Conference Proceedings, Volume 3, 2004.*

McCarthy, N.G. (2006)' Report of the Auditor-General, Free State, Bloemfontein, 30 June:1-7

McCue, C., Buffington, K. and Howell, A., (2003), The Fraud/Red Tape Dilemma in Public Procurement: A Study of U.S. State and Local Government. Draft: IPSERA Symposium: Author.

Migiro, S.O. and Ambe, I.M. (2008)' Evaluation of the implementation of public sector supply chain management and challenges: a case study of the central district municipality, North West province, South Africa. *African Journal of Business Management*, 2(12):230-42.

Miller, R., Lessard, D., (2001), Understanding and managing risks in large engineering projects, *International Journal of Project Management*, 2001, Vol. 19, pp. 437-443.



Ministry of Roads and Highways. (2010). Welcome to the Ministry of Roads and Highways. Retrieved August 18, 2014, from <http://www.mrt.gov.gh/index.asp?expandable=100>

National Purchasing Institute. (2004), Achievement of Excellence in Procurement, Instructional Application. <http://www.ci.tucson.az.us/procure/aep>.

New Road and Street Works Act (1991) United Kingdom, Code of Practice Fourth Edition 2012. Available online at [www.gov.uk](http://www.gov.uk) (viewed on 08/06/2014)

New South Wales Government, (2008) Procurement practice guide: Procurement Method Selection. NSW Client Support Centre, Britain

Office of Government Commerce, (2008), An Introduction to Public Procurement.

Organization for Economic Co-operation and Development (OECD). (2007). Integrity in public procurement: good practice from A to Z – ISBN-978-92-64-02750-3 © OECD 2007.

Project Management Institute (PMI), (2004) A guide to the project management body of knowledge, 3rd Edition, Project Management Institute, Inc. USA

Project Management Institute (PMI), (2008) A guide to the project management body of knowledge, 4th Edition, Project Management Institute, Inc. USA

Public Procurement Act (2003) Act 663 of the Republic of Ghana

Public Procurement Authority (PPA): (2010), Annual Report 2010

Public Procurement Board (2007), Procurement planning, Short term training manual on the Public Procurement Act, 2003 (Act 663), Manual, September 2007.

Public Works and Government Services Canada. (2003), Supply Manual.  
<http://www.pwgsc.gc.ca/sos/corporate/sm>.

Rezakhani, P. (2012) “Classifying key risk factors in construction projects”, Kyungpook National University, Korea

Saunders, M., Lewis, P., and Thornhill, A. (2007) —Research method for Business Students, 4th Edition, Pearson Education Limited, Essex.

Segeber, P., Simchi-Levi, D., and Rothstein, A. (2010) High performance in procurement risk management. Available online at [www.accenture.com](http://www.accenture.com) (viewed on 17/05/2014)

Services Acquisition Reform Act (SARA), (2003), DOD Authorization Act for Fiscal Year 2004, Public Law 108-136, Title XIV, Section 1411.

Skitmore, M. and Lyons (2004), T., Project risk management in the Queensland engineering construction industry: a survey, *International journal of Project Management*, 2004, Vol. 22, No. 1, pp. 51-61.

Sodhi, M. S., C. S. Tang. 2011. Mitigating Supply Chain Risk. Springer-Verlag, New York, USA (forthcoming).

Tashakkori and Teddlie, 1998. Handbook of mixed methods in the social and behavioural sciences. Thousand Oaks, CA; Sage

The Public Procurement of Innovations Consortium (PPI). (2014), Introduction to risk management in the public procurement of innovation, 1st edition. Procurement of Innovation Platform, ICLEI – Local Governments for Sustainability (Project coordinator). Wolfgang Teubner (responsible).

- Toosarvandani, M.S., Modiri, N. and Afzali, M., (2012), The risk assessment and treatment approach in order to provide lan security based on isms standard. *International Journal in Foundations of Computer Science & Technology (IJFCST)*, Vol. 2, No.6, November 2012.
- Turner, J.R., (1999), The Handbook of Project-Based Management: Improving the processes for achieving strategic objectives, 2nd edition, McGraw-Hill, London, 529p.
- U.S. Department of Health and Human Services. (2006), Guidance for Industry Quality Risk Management. <http://www.fda.gov/cder/guidance/index.htm>.
- U.S. Office of Management and Budget. (2003), Circular A-11, Preparation, Submission and Execution of Budget, <http://www.whitehouse.gov/omb/circulars/a11/03toc.html>.
- United Nations (UN). (2014), Uncitral Model Law on Public Procurement. United Nations Commission on International Trade Law.
- United Nations Procurement Practitioner's (UNPP). (2006)' Handbook produced by the Interagency Procurement Working Group (IAPWG). [www.ungm.org](http://www.ungm.org) Accessed 22/06/2014)
- Van Scoy, R. L., (1992), "Software Development Risk: Opportunity, Not Problem," Software Engineering Institute, Pittsburgh, PA CMU/SEI-92-TR-030.
- Ward, S. and Chapman, C., (2003), Transforming project risk management into project uncertainty management, *International Journal of Project Management*, 2003, Vol. 21, pp. 97-105.

Ware, Glenn, Shaun Moss, Edgardo Campos, and Gregory Noone, (2007), Corruption in Public Procurement: A Perennial Challenge. In The Many Faces of Corruption: Tracking Vulnerabilities at the Sector Level, ed. Edgardo Campos and Sanjay Pradhan, 295–334. Washington, DC: World Bank.

Washington State Department of Transportation (WSDOT). (2013), Project Risk Management Guidance for WSDOT Projects.

Weele, V. J.A. (2010)' procurement and supply chain management, 5th Edition Cengage: learning, Singapore

World Bank (2005), Project Appraisal Document: Rural Access Improvement and Decentralization Project. Report No. 31624-NP. The World Bank.

World Bank (2008): Ghana 2007 external review on public financial management, Vol. 2, Public Procurement Assessment Report

World Bank, (2000), International Cooperation and the Reform of Public Procurement Policies. World Bank, 2000. PDF file.

Zou, P.W.X., Zhang, G., Wang, J. (2006) Identifying key risks in construction projects: life cycle and stakeholder perspective. Sydney: Faculty of Built Environment, University of New South Wales

## APPENDIX

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF BUILDING TECHNOLOGY

MSc. PROCUREMENT MANAGEMENT

*Confidential questionnaire survey*

**Topic: Risks Management in the Procurement of Road works in the Public Sector.**

**A Case Study of the Department of Feeder Roads**

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### Introduction:

The researcher is a post-graduate student at the Kwame Nkrumah University of Science and Technology studying for a Master of Science Degree in Procurement Management. The researcher is conducting a research into risk management in the procurement of road works. The aim is to **identify risks management practices used in the procurement of road works at the Department of Feeder Roads**. This survey is intended to add to the continuing knowledge that will lead to better planning for project outcomes for procuring road works.

With this background, kindly answer the questions in this questionnaire as accurately as you possibly can. Your response to this research will be confidential and will be used exclusively for academic purposes. The questionnaire is divided into three main sections.

Thank you for agreeing to participate in this survey. Please, if you have any questions regarding the completion of this questionnaire, please do not hesitate to contact the address and telephone numbers at the bottom of this survey.



Please select appropriate box - example ☒

## SECTION A: BACKGROUND INFORMATION

---

Q.1. Please indicate institution of work

Government ministry ☐ Private Consultant ☐

Q.2. Job Title/Position: .....

Q.3. What is your profession?

Civil engineer ☐ Quantity Surveyor ☐ Material engineer ☐ Procurement

Manager ☐

Project Manager ☐ Other (*Please Specify*).....

Q.4. What is your highest educational qualification?

CTC/HND ☐ BSc. ☐ MSc. ☐ PhD. ☐

Other (*Please Specify*).....

Q.5. Gender:

Male ☐ Female ☐

Q.6. Age Group:

18–30 yrs ☐ 31–40 yrs ☐ 41–50 yrs ☐ 51–60 yrs ☐ 61yrs and above ☐

Q.7. How long have you worked in this road construction institution?

Less than 5 years	5 – 10 years	11 – 15 years	16 – 20 years	Over 20 years
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.8. Which stage of the procurement phases are you involved? *[Tick all that apply]*

Procurement Planning phase	Procurement Documentation phase	Execution Phase	Evaluating Procurement Process phase (the whole procurement process)	None
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## SECTION B: IDENTIFYING RISKS IN ROAD PROCUREMENT

How significant are these risks in the procurement process. Please tick as appropriate

Not Significant – (1);                      Slightly Significant - (2);                      Moderately

Significant– (3);                      Very Significant– (4);                      Extremely Significant – (5)

Risks in Road Procurement Process		1	2	3	4	5
<b>Planning the Procurement Process</b>						
1.1	Understatement of the Need	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	Overstatement of the Need	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Misinterpretation of user needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Insufficient Funding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	Impractical timeframe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Procurement Documentation</b>						
2.1	Terms and conditions unacceptable to tenderers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Providing inadequate information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Contract Management</b>						
3.1	Variations in price and foreign exchange	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Unwillingness of the tenderer to accept the contract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Failure of either party to fulfil the conditions of the contract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	Inadequately administering the contract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.4	Commencement of work before contract is exchanged or letter of acceptance is issued	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5	Unauthorised increase in scope of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6	Loss of intellectual property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7	Failure to meet liabilities of third parties (e.g. Royalties or third party property insurance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8	Poor quality of works	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9	Fraud	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.10	Lack of technical know-how by Consultants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Evaluating Procurement Process (the whole procurement process)</b>						
4.1	Failure to evaluate procurement and management process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Failure to identify and address problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## SECTION C: RISK MANAGEMENT PRACTICES

1. How often are these risk mitigation practices used in the procurement of road works in the Department of Feeder Roads? Please tick as appropriate.

Never – (1); Rarely - (2); Sometimes – (3); Often – (4); Always – (5)

Risk Mitigation Practices		Never (1)	Rarely (2)	Sometim es (3)	Often (4)	Always (5)
1	<b>Prevention of Risk:</b> an action which reduces the likelihood of risk occurring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<b>Avoidance of Risk:</b> a different course taken so that the likelihood of the risk is reduced to zero	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<b>Risk Limitation:</b> an action which reduces the impact should risk occur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<b>Transfer Risk:</b> Transfer the risk to one who is better able to manage it effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<b>Acceptance of Risk:</b> No action will be taken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<b>Contingency of Risk:</b> a contingency plan which can be brought in to play should risk occur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<b>Monitor Risk:</b> monitor the environment for changes that affect the risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



9	<b>Relational Contracting and Partnering:</b> is a transaction or contracting mechanism that seeks to give explicit recognition to parties to a contract and to minimize the incidence of risks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<b>Public-Private Partnership (PPP):</b> Shared responsibility for the provision of infrastructure with significant level of risk being taken by the private sector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Others Please Specify:</b>					
11		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tick appropriate box to indicate your level of agreement or disagreement with the following statement:

2. 'Your institution is led by senior management with experience in risk mitigation practices in the procurement of road works'

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. 'There is a conducive and enabling work environment for participating in risks management during the procurement of road works functions'

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Please do you have any recommendation for the management of risk in the procurement of road works? Kindly indicate below

.....

.....

***Please return or direct any enquiries to:***

***Ebenezer Ayi Tetteh (Student)***

***Department Of Feeder Roads,***

***P.O Box TF 89,***

***Trade Fair, Greater Accra Region,***

***Ghana West Africa***

***Tel: +233-244213390/+233-208300266***

***Email: eben\_t63@yahoo.com***

***: tettehebenezer63@gmail.com***

**Thank you very much for your time and cooperation.**