

**IMPROVING SUSTAINABLE PROCUREMENT PRACTICES IN ROAD
PROJECTS IN ACCRA METROPOLIS**

By

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MASTER OF SCIENCE IN PROCUREMENT MANAGEMENT

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DECLARATION OF AUTHENTICITY

I hereby declare that this submission is my own and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at the Kwame Nkrumah University of Science and Technology, Kumasi or any other educational institution, except where due acknowledgment is made in the thesis.

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ABSTRACT

While sustainable procurement practices within the road sector are common in many developed countries, its awareness and implementation is still comparatively low in most developing countries of which Ghana is not an exception. Recognising the important role that sustainable procurement activities can play to support sustainable development, this project aims to examine ways of improving sustainable procurement practices in the road sector of Ghana. To achieve this, questionnaires were administered to professionals from three (3) agencies of the Ministry of Roads and Highways i.e. Ghana Highway Authority (GHA), Department of Urban Roads (DUR) and Department of Feeder Roads (DFR) in the Accra Metropolis of the Greater Accra Region. These professionals included Quantity Surveyors, Civil Engineers, Construction Engineers, Procurement and Administrative officers of these agencies. The questionnaires were carefully designed to extract information from the professionals in meeting the objectives of the research which includes identifying the current sustainable procurement practices in road projects, identifying factors influencing the introduction of sustainable procurement practices in roads projects as well as identifying ways of improving lapses in sustainable procurement practices within the sector. The data collected from these professionals was then analysed using the Statistical Package for Social Scientist (SPSS) Version 21 software. The findings indicated that inadequate funding, logistical limitations, limited knowledge and deficient staff strength are some of the major challenges to the attainment of sustainability within the road sector. Recommendations provided for the advancement of sustainable construction to include training on sustainability issues, the need to emphasise sustainability at all stages throughout the procurement process and a proposed framework for implementing, monitoring and evaluating sustainable construction along the procurement route.

KEY WORDS

- Sustainable
- Procurement
- Practices
- Road Projects
- Accra Metropolis

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DEDICATION

This research work is dedicated to my lovely wife Miss. Priscilla Naa Kordey Quaye, my mother: Madam Mary Owusuaa Fordjour, my late father: Mr. Benjamin Agyei Fordjour and the entire Adjei Fordjour family, whose encouragement, love, spiritual and moral support has brought me this far in my educational pursuit.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

The construction industry is a major contributor to environmental impacts (Balfors and Faith-Ell, 2009). Instance, during the construction of buildings, the main environmental aspect is often energy consumption in the finished building, followed by the use of materials and harmful substances. For civil engineering constructions, use of materials and harmful substances during construction works and maintenance, transport during construction and the use of energy during maintenance have been identified as the most important environmental facets. Application of green procurement preferences in order to promote environmental initiatives especially in the construction sector is being encouraged by the authorities in many countries, as well as by researchers (Balfors and Faith-Ell, 2009).

Sustainable procurement can be described as giving due consideration to the impact of the procurement on the environment, on the economy of the community and on the social conditions of those delivering or receiving the product of the service (Mansi, 2015). In other words, green public procurement refers to integration of environmental considerations into purchasing policies, programs and actions. According to some studies, integrating environmental preferences in the purchase of products, works and services, both public and private organizations can improve their environmental performance and at the same time influence their suppliers to improve the economic performance of their products and production processes, a shift that has affected infrastructure projects of which developing countries, such as Ghana, are not exception.

The construction industry is considered as one of the most highly regulated industries in Ghana due to the impact of the sector on the national economy (Kwaw and Yang, 2012). According to

the Ghana Statistical Service, the Gross Domestic Product (GDP) from the Construction industry averaged GH¢2745.12 Million between 2006 and 2018, reaching an all-time high of GH¢3587.37 Million in the third quarter of 2018. The industry contributed 16.73 per cent to the country's GDP in 2017, ranking it as the third largest economic sector. This assertion is important for the construction sector, given the huge expenditure on infrastructure development. The government's spending on these infrastructures, accounts for more than 70% of annual national budget (MOFEP, 2017).

Despite the strategic role of construction in economic and social development of many countries, construction projects causes considerable damage to the environment (Fugar and Adjei-Kumi, 2018). However, most developing countries have put economic development above meeting sustainability requirements (Banihashemi et al., 2017). Such trend has resulted in construction organisations lagging in full fusion of sustainable practices in their procurement decisions (Islam et al., 2017) and thus the industry lags behind other industries with respect to the adoption of sustainable practices and its implementation (Brennan and Cotgrave, 2014) of which public institutions in Ghana is not an exception. The Public Procurement Authority (PPA) act, Act 663 (2003) was propagated as a new legal framework to regulate, develop, streamline and strengthen as well as harmonize all government and public procurements activities and processes. However, the said Act is limited on detailed compliance to sustainable procurement practices in public sector Organizations, hence the need for the Amendment Act 914 (2016) to include sustainability among others. Extant literature defines Green public procurement (GPP) as “a method to reduce environmental impact of purchased products through their whole life cycle by encouraging manufacturers to implement environmentally friendly product design and production through public purchasing effort” (Parikka- Alhola, 2008). Although, sustainable procurement has gained

increased attention in the past few years, studies on GPP practices are still limited, especially in the construction industry. Most GPP studies are qualitative with a descriptive focus and a few quantitative survey-based studies (Geng, & Sarkis, 2013).

Additionally, most studies have focused on the construction sector of developed countries (Ruparathna and Hewage, 2015) with less emphasis on sustainable procurement practices in developing countries. Admittedly, some studies have been carried out regarding green procurement of works and services within the construction sector of these developing countries, however, most of the green procurement literature discusses the purchase of product (Balfors and Faith-Ell, 2009) . This study, however, focuses on current practices, problems and opportunities concerning green procurement of construction contracts in public sector organisation in Ghana with the view to developing strategies to improve performance.

1.2 PROBLEM STATEMENT

The construction industry is a major contributor of Gross Domestic Product in both developed and developing countries (Osei-Tutu et al. 2010; Agbesi et al. 2018). However, a wide range of adverse impacts can result from construction activities (Akadiri & Fadiya 2013; Agbesi et al. 2018) but most studies on environmental issues have focused on manufacturing sectors and relatively, little attention has been paid to other sectors such as the construction industry (Evangelista, 2014). Thus, the need for deliberate studies to minimise the negative impacts of construction activities through proactive environmentally sustainable strategies and actions during the design and construction process (Akadiri et al., 2012). Unfortunately, the Ghanaian construction requires all contracts to be awarded through the process of bidding, focusing on the bidding price as reinforced in the promulgation of the PPA Act 663, with less emphasis on sustainable procurement practices as key requirement in construction contracts (Agbesi et al., 2018).

The preceding facts expose a significant opportunity to explore one of the most controversial issues in construction, sustainable development, a process whereby the client and participating organisation in collaboration with other stakeholders meet design and development requirements. Also, given the critical role that Ministries, Departments and Agencies (MDA's) play in a country's construction drive, pursuit of sustainable procurement practices in infrastructure projects could result in considerable progress towards attaining sustainability (Wong et al., 2016) in Ghana.

This study attempt to examine sustainable procurement practices in road projects using Ghana Highway Authority, Department of feeder Roads and Department of Urban Roads with the view to developing strategies for improvement from initiation to the implementation phases of sustainable procurement practices in Ghana.

1.3 RESEARCH QUESTIONS

1. What factors drives integration of sustainable procurement practices in the construction of roads in Ghana?
2. How does sustainable procurement practice affect Ghana Highway Authority, Department of feeder and Urban Roads sustainability performance?
3. What are the barriers associated with sustainable procurement practices in the case study institutions?
4. How can the Ghana Highway Authority, Department of feeder Urban Roads improve sustainable procurement performance and rating?

1.4 RESEARCH AIM

The aim of the study was examining ways in improving sustainable procurement in the delivery of road projects in Accra metropolis.

1.5 RESEARCH OBJECTIVES

In achieving this aim, the following objectives were advanced:

- To identify current practises of sustainable procurement into road projects.
- To identify factors influencing the introduction of sustainable practises in the road project procurement.
- To identify ways to improve lapses in sustainable practises in the road project procurement

1.6 SIGNIFICANCE OF STUDY

Sustainable procurement, in addition to its benefits of minimizing the impact on the environment, also provides the vehicle for the construction industry to address economic advancement and social equity while contributing to the larger effort of achieving sustainable development (Meehan and Bryde, 2015). The findings from the this study will help inform policy formulators, project implementers, consultants and contractors on the factors and challenges to be addressed before project initiation and during project execution within the Ghanaian settings and the effect of these factors in terms of sustainable performance. It will also allow all stakeholders to take an informed decision during the planning stages of projects.

Furthermore, the findings of this study will be a source of information for external contractors and consultants bidding for future infrastructure project. The findings will also provide information about the peculiar nature of managing project successfully. It will also serve as a guild for foreign companies to effectively manage contracts and in preparing adequately for any contingencies.

Finally, the findings of this study will add to existing literatures in the area of improving sustainability in the road sector of the country.

1.7 METHODOLOGY

A review of both primary and secondary data as well as a field research was adopted as the methodology for purposes of this study. A quantitative approach of enquiry was used for the research. Relevant literature such as journals, books and publications were reviewed to discover the theoretical principles supporting the study as well as gathering secondary information to identify the current sustainable practises in the construction of roads in the Accra metropolis. Primary data involving the use of a self-administered questionnaire was sent to stakeholders in the road projects and their responses was collated, computed and analysed using SPSS. The tools for the analysis consists of descriptive statistics and relative importance index for ranking the various occurrences quantified. The results was then analysed using Microsoft Excel 2016. A detailed discussion of the research methodology is done in chapter three (3).

1.8 SCOPE OF STUDY

Geographically, the scope of this study was restricted to public road projects within the Accra Metropolis of the Greater Accra Region. This included carefully selected road projects supervised by Ghana Highways Authority, Department of Urban Roads and Feeder Roads Department. Being the Region which host the capital city of Ghana, a lot of government businesses including procurement of works, goods and services especially in the road sector take place and could therefore presents the best option to the researcher for a successful studies.

1.9 RESEARCH STRUCTURE

The research was structured in five (5) main chapters: Chapters One, Two, Three, Four and Five.

Chapter one consists of the background of the study, statement of the problem, aim and objectives followed by the research questions and then significance of the study. It also includes the methodology, scope of the study and limitations to the study.

Chapter Two reviews relevant literature on the significance of sustainable procurement practices in road projects in the Accra metropolis. Literature from other parts of the world relevant to the area of study was equally reviewed.

Chapter Three described the research methodology including sources of data, sampling techniques and size, mode of data collection and instrumentation. Chapter Four dealt with the analysis of data collected and the discussions thereof while Chapter Five, being the last chapter contains the conclusion and recommendations consequential to the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

A literature review of the subject under discussion has been presented in this chapter with a focus on defining terminologies, their origin and the fundamental concept as well as conventional views on sustainability, while focusing on sustainable procurement practices in the road sector. It portrays the adverse effects of road projects on the environment and the society as well as recapitulation of some of the major challenges of the practice of sustainability in procurement in the Ghanaian road sector. Major topics discussed include sustainable procurement as well as the role of public entities within the road sector in ensuring sustainability among other subjects. This chapter will end by establishing through existing literatures, the relationship between procurement and the attainment of sustainable development in the road sector.

2.2 SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

Scholars and researchers have many times differentiated the terms ‘sustainable development’ and ‘sustainability’. While others believe that ‘sustainable development’ is primarily concern with the development of the economy and ‘sustainability’ focuses on the environment and nature (Wass et al., 2011), some stress that sustainability is the state of being mankind and offers harmless productive lifestyle with regards to nature, culture and spiritual values, contrary to sustainable development which must be pursued in order to achieve the state of sustainability (Du-Plessis, 2003). However, it is obvious that these two terms definition complement each other. As such, the two terms are used synonymously. It is also cited that, sustainability is commonly used an abbreviation of sustainable development largely by German speaking countries (Brand, 2004: in

Otto, 2010). It must therefore be noted that the two terms i.e. ‘sustainability’ and ‘sustainable development’ have been used interchangeably with no effort of differentiating in meaning.

2.2.1 Sustainable Development (SD)

Various definitions have been attributed to sustainable development with different assumptions on how it relates to society and nature (Elliot, 2006). Over 200 definitions of sustainable development exist according to Parkin et al, 2003.

According to Sourani (2008), the numerous definitions is due to increasing understanding of the principles. However, despite the numerous definitions associated with sustainable development, there are widespread converging views about the meaning of the concept. Most definitions of sustainable development evolves or relates to that of the Brundtland Commission which defines it as *“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”* (WCED, 1987). The term ‘development’ contained in the definition refers to institutions, people, natural resources and the environment that is put into practice in a collective manner and focuses on the future (Munier, 2005). The operational definition of sustainable development is however given as, *‘a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhances both current and future potential to meet human needs and aspirations’* (WCED, 1987).

According to Zhou et al. (2006), the two definitions stated above then suggest that sustainable development considers what has already happened, the current and what is likely to happen as a whole system and grants the same amount of focus to people, development of both their social and economic status and the preservation of natural bio space.

2.2.2 Concept of Sustainable Development

Although sustainable development is largely seen as a new development model which gained much attention during the mid of the 20th century, the module has been in existence for a long time (Waas et al., 2011). Munier (2005) explained that the module is complex and comprehensive. This was seconded by Phillis et al., (2014) who described sustainable development as ambiguous, indefinite and multiform concept, which main description and domain still lacks acceptance by many.

There are diverse interpretation of the module for which a number of explanations can be assigned. According to Waas et al., (2011), the normative nature of sustainability, the varied disciplines and professional orientation of scholars' investigating the subject, the struggle for control over the meaning of the concept, its application, the importance of the concept for future development of the society and the environment as well as its significance in numerous discourse are all contributing factors.

However, most of these concepts evolve around the *environment*, *economy* and *social sustainability*. It must be noted that these pillars are mutually dependent on each other and they are usually referred to as "triple bottom line". The term 'triple bottom line' has been accepted by many researchers of various fields and professional background (Barbier 1987).



Figure 2.1 Concept of the three interlocking circles as presented by Elliot (2006)

Making the most benefit across all these three systems is the main objective of sustainable development. It has even been suggested and strongly argued that, sustainable development that provides jobs and eventually causes harm to the environment or the development of renewable energy is a setback to the concept and defeats its purpose. It can therefore be said that sustainability must seek to achieve an integrated and holistic principle that results in continuous agreement and equilibrium between the three circles.

2.2.3 History behind Sustainable Development

Sustainability is generally seen as a recently discovered model that gained much prominence during the mid of the 20th century. Modern studies of sustainability was highlighted after the end of World War II, in the 1950s, when economic progression, led to a steady growth in the living standards across the whole world. This resulted in many countries, particularly in Europe, recording remarkable progress in development in the latter part of the 20th century (Waas et al., 2011). Economic prosperity and increased economic production gained prominence as well as

became attractive as the center for development. During the 1970s, the widening difference between the poor and the rich among the first and third world countries as well as unfair apportioning of the gains in economic growth between nations, resulted in a revived action for more equitable social security propagation. By the 1980s, the major focus of development was environmental protection as it was evident that human activities threatened the existence of the environment due to unsustainable consumption behaviour (Wass et al., 2011).

According to Rockstrom (2009), it is clear that scientific studies and technological advancement, together with unparalleled increase in population growth, resulted in humanity exceeding the carrying capacity of the Earth during the last decades of the 20th century. Humanity became alarmed of these imminent threats posed by their activities; leading to a new orientation with respect to what constitutes successful development (De-Plessis, 2006). As a matter of fact, various ideas regarding economic growth and development resulted in the development of sustainability (Du-Plessis, 2006). Modern description of sustainable development is therefore a product of many studies and investigations by various scholars (Waas et al., 2011). By the end of the 20th century, international communities across the world had adopted sustainability as a leading development model (Rogers et al., 2008). This called for a vigorous action to undertake a focused orientation of human attitude. Subsequently, global sustainability has been widely accepted as the best policy objective among many institutions who undertake various research into global resources (Elliot, 2006). Consequently, it has been accepted that sustainable development does not only present solutions for environmental and socioeconomic problems but it also provides sets of principles that have the potential to impact positive objectives, and practices (Waas et al., 2011).

Most third world countries such as Ghana are endowed with both renewable and non-renewable resources i.e. forest, water, coast land, soil among others. However, it has become necessary for

sustainable interventions to be put in place to ensure a sustainable future as these resources are under serious threat mainly due to activities of human.

2.3 ACCEPTANCE OF SUSTAINABILITY AS A GLOBAL ORDER

Following the introduction of the concept of sustainable development as established by the Brundtland Commission in 1987, numerous activities were undertaken with the purpose of ensuring increased awareness of socioeconomic and environmental sustainability (Abidin, 2010). Sustainable development has gained prominence in the agenda of most international organizations such as the United Nations and there is a growing commitment in reversing unsustainability trends and attitudes for development (Halliday, 2008). Apart from sustainable development being accepted by international organizations, governments world over have also lent their support to it by developing detailed policies regarding sustainability. Both the World Bank and World Trade Organization (WTO) have developed comprehensive policy goals for sustainable development. This has resulted in most international businesses developing new ways of operations with the aim of reducing adverse impact on the environment as well as being socially responsible (Brand, 2004). Most consumers in recent times also prefer sustainable products, thereby encouraging more businesses to focus on green products as it is considered as the future market (Rogers et al., 2008).

Sustainability is increasingly becoming the central development agenda of most countries in the world. According to a report published in 2013 by the Department of Economics and Social Affairs (DESA), it observed that some third world countries such as Ecuador have undertaken initiatives which are far advanced as compared to some developed countries with respect to sustainability. Ecuador is reported to have built their own sustainable lifestyle and consumption behaviour, by enshrining the “*rights of nature*” in their constitution.

Most governments and multinational institutions are therefore gradually becoming conscious of the relationship between economic development and sustainable development.

The construction industry is a major contributor to economic development hence the need to analyze how activities in the sector affect sustainability.

2.4 PROCUREMENT

According to Walker and Rowlinson (2008), the term procurement is generally defined as “*the act of obtaining by care, acquiring or bringing about*”. The Chartered Institute of Procurement and Supply (CIPS) further defines procurement as “*the business management function that ensures identification, sourcing, access and management of the external resources that an organization needs or may need to fulfill its strategic objectives*” (CIPS, 2006). Procurement is also defined as “*the process of acquiring goods, works and services, covering both acquisition from third parties and from in-house providers*” (Berry and Macthy, 2011). Procurement therefore encompasses the terms “buying, contract management, supply chain management as well as purchasing (CIPS, 2006). CIPS further explains that procurement involves the whole series of activities from needs of assessment (identification of needs) for goods, works or services through the acquisition to its disposal (end of the useful life of an asset or the end of a service contract) as well as after the signing of a contract (CIPS, 2006).

It can therefore be said that procurement activities are at the core of organizational functions hence, decisions taken throughout the procurement process are likely to have direct impact on the organization, its shareholders and the community.

2.5 SUSTAINABLE PROCUREMENT

The common definition of sustainable procurement is given as “procurement that is consistent with the principles of sustainability i.e. tracking the cycle of sustainable development objectives along

the process of procurement which involves balancing the objectives of the environmental, economic and social factors as a whole” (Walker and Brammer, 2011).

However, CIPS defines sustainable procurement as “a process whereby organizations meet their needs for goods, services, construction works and utilities in a way that achieves value for money on a whole-life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst remaining within the carrying capacity of the environment” (CIPS, 2013).. Sustainable procurement also ensures organizations become innovative by undertaking activities outside its own business in the attainment of the objectives of sustainable development (Belfitt et al., 2011).

2.6 RELATIONSHIP BETWEEN SUSTAINABLE DEVELOPMENT AND SUSTAINABLE CONSTRUCTION.

Following the above discussions on sustainability, it is critical that the concept of sustainable development is deliberated within the construction of roads and also to advance an understanding of the term “sustainable construction”.

2.6.1 Construction

Stakeholders in the road sector include all who plan, develop, produce, design, build, alter or maintain the built environment. Suppliers and manufacturers of construction products and materials, clients, consultants, contractors as well as the final users of the facility are also recognized as stakeholders (Baloi, 2003). Road construction is a major contributor to economic development as it provides the needed infrastructure and physical edifice critical for both economic and social activities, including services and utilities. The sector produces enormous employment opportunities as well as pumps capital into the economy through both foreign and local investments (Agung, 2009). Therefore, there is the need to focus on the concept of sustainable

development within the context of the road construction, in order to enhance the numerous benefits that can be realized from it.

2.6.2 The Concept of Sustainable Construction

The “triple bottom line” concept for sustainable development also extends to sustainable construction. As noted by many authors, the under listed are the main pillars that forms the concept of sustainable construction:

- Economic Sustainability
- Social Sustainability
- Environmental Sustainability

2.6.2.1 Economic Sustainability

Economic sustainability is concerned with the fiscal gains that can be made from a project to the advantage of the client, public, government and other stakeholders in the construction industry, through improved project delivery, resulting in high productivity to propel a high or stable growth in the economy (Parkin et al., 2003). According to Baloi (2003), it also addresses economic prospects such as job creation, enhances competitiveness while reducing the cost of operation and maintenance.

It has been observed that the construction industry, with the right principles, can enhance economic sustainability through its structure, conduct and performance. Efforts in achieving sustainable development in the construction sector are biased towards the environment in comparison with the social and the economic aspects (Beheiry et al., 2006: cited in Opoku, 2011). This is due to the fact that issues relating to the environment are well understood and easy to measure by players in the industry, compared to the social and economic sustainability (Adetunji et al., 2003). However, there is the need for all stakeholders in the industry to have a good understanding of both social

and economic sustainability as well. This will help them appreciate the inter-linkages between the three pillars.

2.6.2.2 Social Sustainability

It is believed that many stakeholders in the construction sector find it difficult to appreciate the social aspect of sustainable construction (Parkins et al., 2003). According to Jones et al (2010), social sustainability within the construction sector involves the undertaking of works or services in a responsible manner based on the principles of ethics, legal and moral obligations by all stakeholders within the environment they operate. Its objective is to enhance the quality of life of humanity (Baloi, 2003). Social sustainability focuses on the feelings of humans i.e. security, safety, health, skills, knowledge and motivation (Abidin, 2010). Social sustainability demands that the execution of design and construction are done to allow for cultural continuity, social inclusion and other quality of life issues (Du-Plessis, 2002).

The construction industry has the ability to fast track the attainment of social sustainability due to its labour intensive nature and the opportunities it presents for poverty alleviation. However, least attention is often paid to this aspect of sustainable construction (Du-Plessis, 2002).

2.6.2.3 Environmental Sustainability

This aspect of sustainable construction is interested in the built and natural environment, as well as the subsequent impact of activities undertaken by industry players in the construction sector (Abidin, 2010). The built environment comprises of the activities undertaken during the implementation of construction projects, while the natural environment is concerned with the bio-space in which these activities are undertaken. Environmental sustainability campaigns against the harmful deterioration and irreversible damage to the environment and the ecosystem through a considerate reduction and use of natural resources, minimizing waste and disposal, energy and

water efficiency among many others, hence decreasing the adverse impact on the environment today in order to preserve it for the next generations (Jones et al., 2010).

2.7 PROCUREMENT PRACTICES IN THE ROAD PROJECTS

Procurement of road projects is an essential activity in the delivery of infrastructure process in most countries including Ghana.

- Alteration, maintenance, extension or demolition of an existing road facility and
- The construction of new roads including all associated site works.

It can be noted that procurement practices within the road sector is quite peculiar as compared to the conventional procurement of goods and/or services, due to the direct adverse impact it can have on the economy, social and tangible products (Kadefors et al., 2006). The level of complexity involved in the procurement of road projects is also a major factor that differentiates it from the traditional procurement of goods and services (CIOB, 2010). The complexity involves the commissioning of collaboration between the client, design team, contractor(s), suppliers and statutory bodies for the purpose of achieving a specific solution.

Factors such as ground condition, survey features, logistics, weather, technology, capital, labour and services greatly affect the delivery of road projects, hence affecting the choice of procurement practice. The collaboration among professionals such as planners, architects, engineers and surveyors in ensuring that procurement procedures and documents accelerate the attainment of the intent design also distinguishes road projects procurement practices (Chavet, 2000). Also, the required skills and knowledge needed for a successful procurement practice in the delivery of a road project is broader than the conventional procurement of goods and services. The skills and knowledge is developed through a practical experience in road design and management as well as general procurement practices. In some instances, there is the need to contract a specialist

procurement consultant to aid in the delivery of road projects (Sourani and Sohail, 2008). There are different procurement strategies employed in the delivery of road projects and each strategy has its own values and goals which ought to be carefully calculated.

2.8 IMPROVING LAPSES IN SUSTAINABLE PROCUREMENT PRACTICES IN ROAD PROJECTS

It has been widely acknowledged that the choice of a procurement strategy adopted by an agency of the government in the delivery of road projects has a great influence towards the achievement of sustainable development (Ofori, 2006). In Ghana, attempts have been made by major stakeholders in the road sector to include sustainability requirements in the procurement of roads (Opoku, 2012). These attempts have been undertaken by the government through its agencies in the road sector i.e. Ghana Highways Authority (GHA), Urban Roads and Feeder Roads.

The government by including sustainable development goals into procurement policies and procedures in road projects, helps to create the enabling environment in improving sustainable procurement practices among other stakeholders in the industry.

Ofori (2006) further acknowledges that government agencies in Ghana are gradually adopting sustainability into the process by which roads are designed and constructed by:

- Identifying sustainable procurement practices targeted at lean pollution occurrences, setting targets for aggregates recycling or enhancing biodiversity.
- Adopting the principles of sustainability in construction
- Amendments to the appraisal framework and procurement practice to include objectives of sustainability.

According to Opoku (2012), the government of Ghana, being the biggest client in the road sector has become more conscious of its obligations towards the achievement of sustainable procurement

practices in the sector, hence, has ensured its agencies have incorporated sustainable considerations into their procurement policies. This affirms the government's commitment towards sustainable procurement practice in the road sector hence having a rippling effect on other stakeholders in the industry.

2.9 SUSTAINABLE PROCUREMENT PRACTICES WITHIN THE ROAD SECTOR

Sustainable procurement practices within the road sector encompasses a number of themes, most of which can be executed as an individual theme or together with others such as waste minimization, cost reduction, energy efficiency among others, all geared towards specific objectives which are not limited to sustainable construction (Elliot, 2006). Each theme is however placed under one of the three pillars of sustainability i.e. social, environmental or economic.

From 2012 – 2015, the UK government produced “the sustainable action plan” for road projects as a measure to ensure sustainable development within the sector. Some of the themes contained in the said action plan includes the following:

2.9.1 Lean Construction

Lean construction focuses on drastically reducing waste and other processes which do not add value to the supply chain process, leading to the production of products that better meet the requirements of the clients across its life span (Cartlidge, 2004). Lean construction provides a crosscutting theme (Sourani and Sohail, 2013). Sustainable construction can therefore be achieved through lean construction. Some scholars have also identified lean construction as the solution to the challenges associated with the triple bottom line of sustainability.

2.9.2 Green Theme

Green theme encompasses green architecture, green design, green construction and many similar themes. These are the themes currently influencing trends in the construction of roads (Abidin,

2009). The common objective that all these themes seek to achieve is to put premium on the environmental performances of road facilities, using activities that ensure low emission of carbon and low energy technologies. Some institutions such as the Royal Institute of British Architects (RIBA) have incorporated the teaching of sustainable designs of roads in their curriculum as a measure to encourage the interest of young architects, engineers and students, from transforming their knowledge in environmental design into action. This has been praised by many as a measure of involving professionals in ensuring sustainable development (Waas et al., 2011).

2.9.3 Life Cycle Costing (Whole Life Costing)

According to a green report published in 2011, life cycle costing was presented as a critical strategy for promoting sustainable development in the construction sector. It is argued that it is a critical tool for the design of construction products that are more consistent with the concept of sustainable construction (Akbiyikli and Eaton, 2006).

2.10 MAKING SUSTAINABLE PROCUREMENT PRACTICE INEVITABLE

It is widely acknowledged that the construction of roads plays a critical role in achieving socioeconomic developmental goals through the provision of employment and infrastructure, among many others (Rockstrom, 2009). Settlement of humans is the beginning of development in the society, hence undertaking a significant role in achieving sustainability goals, through the processes of creating and operating these settlements (Reid, 2005). According to Du-Plessis (2002), the construction of roads presents a holistic process and major progression towards the achievement of sustainable development, as well as sustaining equilibrium between the natural and the built environment, while creating settlements that assert human dignity and encourage economic harmony.

However, the sector has been heavily criticized by many for the continuous practice of unsustainable patterns of development by most of the players in the industry. This has resulted in a major campaign in promoting sustainable construction (Dobson et al., 2013). The following factors have been attributed as the main influencers of making sustainable construction a necessity:

2.10.1 Consumption of Resources

Du-Plessis (2002) stressed that the construction sector is noted for the consumption of about 40 percent of combined resources, as well as contributes about 40 percent of combined waste production, through practices which comprises of manufacturing of materials to operations, on and off the site. Research has also proved that the industry is noted for the consumption of most of the unrecoverable resources including about 1/6th of fresh water, 1/4th of global timber and 2/5th of global materials and energy flow (Zahihi et al., 2012). In the light of the increasing world population and rate of depletion of global natural resources, it has become critical and inevitable to balance the increasing consumption of global natural resources with the ‘carrying capacity’ of the physical bio-space.

2.10.2 Generation of Global Waste

When compared to other sectors, it was noted that the construction sector generates huge volumes of waste (Ebohon et al., 2002). Studies have shown that activities within the construction sector accounts for about 30 percent of waste disposed-off globally in landfills, hence a major contributor to environmental problems globally (Fishbein, 1998). In the year 2011 for instance, an estimated amount of 120 million tons of waste is reported to have been generated by the industry in UK alone (Ebohon and Rwelamila, 2002), making sustainable construction a necessity in reducing the adverse effects of these waste on the environment.

2.10.3 The Neglect of the Environment

Research suggest that about half of the total carbon dioxide emitted and a little over 1/4th of the depletion of the ozone layer gases is linked with the preparation of materials, extraction and activities on and off site (Ebohon et al., 2002). The sector has also greatly resulted in the loss of farm lands and deforestation (Jones and Greenwood, 2009).

2.10.4 Negative Perception of the Industry

The construction industry is known to be characterized by corruption and greed as well as unfair labour practices, according to a report by Transparency International in 2012. According to a research by the International Labour Organization (ILO), the sector is running out of options in terms of resources and most of the employees in the industry are engaged under unequitable conditions, mostly to the disadvantage of the employee. Any effort therefore by industry players to undertake initiatives leading to sustainable construction will be hailed as a contribution towards sustainable development, giving some credibility to the stakeholders in the sector.

2.10.5 Poor Safety Records

The International Labour Organization (ILO) has noticed that the industry has a poor record in safety, especially in the developing countries where due to lack of adequate insurance policy for the employees, most of the accidents that occur are not recorded. Jones and Greenwood (2009) observed that injuries and fatality rate recorded within the industry is usually above average. Lack of formal training and failure to adhere to instructions have been noticed as a major contributor to the high fatality rate. Although sustainable approach in the construction industry has the potential to minimize most of these occurrences, the industry is slow in its adoption (Leiper et al., 2003, cited in Opoku, 2011).

2.11 SUSTAINABLE PROCUREMENT PRACTICES IN DEVELOPING COUNTRIES

In addressing the unique challenges of the third world economies which are noted for their different characteristics in terms of climate, culture as well as differences in the appreciation of sustainable procurement, “Agenda 21” was formulated to serve as a guide for sustainable procurement for the construction industry for third world countries. Agenda 21, was published by the International Council for Research and Innovation (Shafii et al., 2006).

The proposals contained in the document constitutes a broader action driven plan for the implementation of sustainable procurement in developing countries. Agenda 21 concentrates on issues that can be addressed through the implementation of sustainable inventions within the construction environment. The main objectives for the publication of the document includes but not limited to the following:

- *To identify the key issues and challenges facing sustainable procurement in the construction industry in the developing economies, coupled with the major hindrance to practicing sustainable construction.*
- *To assist in more international investments in third world economies.*
- *To stimulate debates and encourages the exchange of learning on sustainable procurement in the construction sector in the developing world,*

Reffat (2004) stresses the need for third world countries to undertake sustainable procurement inventions, stating the rapid growth in urbanization in most cities in this part of the world coupled with its attendant pressure on resources as the reasons.

In order to avert developing countries facing similar challenges currently being experienced in the developed countries, there is the need for developing countries to incorporate the principles of sustainable development in their developmental path (Du-Plessis, 2002).

2.12 PRACTICING SUSTAINABLE PROCUREMENT IN GHANA

Ghana, like most developing countries is not exempted from the degradation of the environment and the practice of unsustainable design and construction processes (Djoko et al., 2014).

2.12.1 Barriers to Sustainable Procurement Practices in Ghana

A comprehensive review of the main barriers to the implementation of sustainable procurement practices in Ghana is discussed below:

2.12.1.1 Perceived High Cost

The high initial cost of sustainable construction, resulting in low profit margins is a major standing block to the adoption of sustainable construction in most under developed countries of which Ghana is no exception (Halliday, 2008). The primary excuse that most stakeholders cite for the non-compliance of standards and practices of sustainable principles is the additional investments in equipment and training of employees to adopt new trends (Reffat, 2004). This has prevented many players in the industry from being committed to the concept of sustainable construction. It is believed that many stakeholders will be attracted to the principles of sustainable construction if they can make some savings on their investments.

However, Miranda and Marulanda (2002) argued that although the initial investment in sustainable construction is high, there are associated savings that can be gained throughout the life span of assets as a result of the effective use of resources, higher productivity and reducing risks. Recommendation are that the focus should rather be on exploiting the benefits of sustainable development for higher profitability. According to Sourani and Sohail (2011), some scholars have argued that sustainable construction does not necessarily lead to an increase in capital investment when compared with the operational cost of facilities.

2.12.1.2 Perceived Luxury

Sustainable development is relatively a new phenomenon in the construction sector. It is therefore seen by many as a luxurious addition to the regular activities, rather than a necessity as it is yet to form an integral part of the sector (Shafii, 2006).

2.12.1.3 Lack of Capacity

A major barrier to the attainment of sustainable construction is lack of capacity. This refers to the number of human resources and their level of skills. According to Shafii (2006), there are not adequate professionals or stakeholders with the requisite skills and technical knowhow needed to undertake sustainable construction in all levels of the construction process. Most organizations within the construction sector in Ghana are of either small or medium enterprises hence unable to retain a large number of workforce for a long period. Most enterprises therefore depend largely on casual workforce. This situation does not encourage the in-depth training of the workforce as there is no assurance of maintaining them after the completion of a project. Sustainable construction on the other hand requires time and constant training of the human resource, in order to catch up with modern trends being practiced in developed countries.

2. 12.1.4 Inadequate Awareness of the Concept

Inadequate awareness and understanding of sustainable development by industry players is a major barrier to the implementation of the principles of sustainable construction (Abidin, 2009). Many stakeholders do not appreciate the concept of sustainable construction and the opportunities it presents hence they are simply not interested in adopting these new trends.

2.12.1.5 Inadequate Review of Colonial Codes and Standards

Du-Plessis (2002) observed that the lack of local and regulatory authorities to continuously ensure improvement in standards and amending various codes of ethics governing the construction

industry and their inability to enforce the concept of sustainability is a major barrier in making sustainable construction a necessity in Ghana. There is therefore the need for regulators of the industry to develop the requisite knowledge and skills as well as focus on the provision of tools needed to practice sustainable construction.

2.13 ADVANTAGES OF SUSTAINABLE CONSTRUCTION

Advantages obtained in the practice of sustainable construction concepts include the following; process and product payback. Process payback refers to savings on materials mainly as a result of re-use, re-cycling, reduction in the production of waste as well as the conversion of waste products into useful products and services, It must be noted that, sustainable construction which many stakeholders in the industry perceive to be expensive have been proven to be cost effective in most circumstances (Dobson et al, 2013). Berry (2008) confirms the economic benefits of sustainable construction citing savings on cost of energy, cost of water and reduction in the use of mechanical equipment.

Shafii (2006) also emphasized that the advantages of sustainable construction accrues in various forms such as capital cost savings, reduction in running costs, higher investment returns, better productivity, efficient use of resources as well as better corporate image.

Benefits to contractors within the industry includes savings made on the reduction of waste, reduced risk of legal and insurance cost and savings on reduction of resources (Halliday, 2008). It also has the potential of enhancing better company profile and improve the tender opportunities of contractors.

2.14 CONCLUSION

The road sector of most developing countries, including Ghana, have been under immense pressure to improve on sustainable procurement practices in its line of operations as part of efforts to

achieve sustainable development. Sustainable procurement practice seeks to achieve social, environmental and economic balance during the delivery of road projects. The call to improve sustainable procurement practices is mainly due to the high consumption of both renewable and non-renewable resources of the processes leading to the procurement of roads, its adverse impact on the society, poor safety records and high volumes of waste generation during the delivery of road projects. Research suggests that most developed countries have made major strides in improving sustainable procurement practices within the construction sector, with special attention on road construction. However, very little is said about the achievements by developing countries with respect to sustainable procurement in the road sector.

Literature in this chapter reviewed the terminologies ‘sustainability’ and procurement practice as well as the relationship between the terms. It also reviewed some of the current sustainable procurement themes and some of the major factors influencing these practices. It also gave an account of how sustainable procurement can be achieved through the implementation of sustainable procurement themes and some of the major factors hindering the implementation of sustainable procurement practice.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter will comprise of two parts, the methodology and the research design. The chapter also will describe the methods and the tools that will be employed in collecting data and how the objectives of the study will be investigated. The chapter gives the procedures and techniques which is used in the collection of data. It informs readers on the strategies, designs, methods, population and the sample as are described. Mainly two different methods will be used in achieving the stated objectives. Firstly, important information was gathered from literature review and secondly through questionnaires, observations and informal interviews of some targeted respondents to obtain their responses. Also once this data is collected, data is then analyzed with outputs made and the outcome of the results interpreted and discussed, and finally with ethical considerations being made. All the methods and techniques are used to determine the sample, collect data, analyse the data and then interpret the results with intention that either approving or rejecting hypotheses previously formulated comprises the research methodology.

3.2 STUDY SETTING

This study attempt to examine sustainable procurement practices in infrastructure projects using Ghana Highway Authority and the Departments of Urban and Feeder Roads with the view to developing strategies for sustainable procurement practices in road projects in Ghana.

3.3 RESEARCH METHOD

Research method have been explicated and categorised differently by various authors in research (Saunders *et al.*, 2011). This study will employ the quantitative approach to conduct an investigation on how sustainable procurement practices improve on performance for a road project.

3.4 RESEARCH DESIGN

The research design will be outlined to help in structuring and designing this research in order to be aligned with the stated objectives this research. The research design adopted will help in giving the appropriate responses to the questionnaire which governed the study. Also observations and interviews will be used as confirmation to the answers and facts gathered already from this field of study. Every research can be broadly categorized under any three major types according to its purpose; exploratory, descriptive and explanatory research (Saunders *et al.*, 2011). Schindler (2003) gives a similar categorization by stating that research can function as providing data and information for obtaining certain conclusions (reporting), describing and defining a phenomenon (descriptive) and trying to explain a phenomenon (predictive). The study will employ exploratory research to explore the extent of sustainable procurement practices. This research also seeks to explaining the relationships found among key variables raised as hypotheses within the theories obtained; hence, an explanatory research

3.5 STUDY POPULATION

Population is termed to be units with a chance of occurrence in a survey. These units could be persons, employees or members of a set (Groves *et al.*, 2009). In this study, the target population would be from governmental organizations/agencies directly involved in the award of Government contracts in the Ghana Highway Authority, Departments of Feeder and Urban Roads. Some of the stakeholders involved in the award of road projects are Civil Engineers, Quantity

Surveyors, Project Managers, Project Evaluators and Monitors, Procurement Specialist, Project Expeditors, Building Technologist and Geologist. 175 of such stakeholders in sustainable public sector procurement will be identified and considered as the population. Purposes of this work, call for the targets to be sustainable road procurement stakeholders of some ministries and departments, in that there is the need to have some knowledge in procurement strategies used in roads contracting and how they help in achieve sustainability. The target population of this study will be based on 175 professionals.

3.6 SAMPLE SIZE

According to Polit and Hungler (1999), sampling is a process of selecting a portion of the population to represent the entire population. The purposive and convenience approach will be used to locate the respondents as determined by the sample size from the population of the study by visiting government institutions involved in the procurement of road in Ghana. Convenience sampling has been adopted in that, the period required for the completion of this study is relatively limited and has a wider coverage and purposive, because these players involved with the subject matter.

According to Miaoulis and Michener (1976), as cited by Israel (1992), aside the basic factors that influence a sample size (purpose of the study and population size), three conditions generally will have to be stated to determine the appropriate sample size (the level of precision, confidence or risk, and the degree of variability in the attributes being measured. The level of precision can be termed as the sample error and it is usually expressed in percentage.

Yamane (1967) provides a simplified formula to calculate sample sizes (Israel, 1992). The formula was used for calculating the sample sizes, where a 95% confidence level and $P = 0.5$ are assumed for the equation;

$$n = \frac{N}{1+N(e)^2}$$

where

‘n’ represents the sample size,

‘N’ stands for the population size, and

‘e’ is the level of precision

$$n = \frac{175}{1+175(0.1)^2}$$

$$n = 63.64 \approx 64$$

The total sample size after the research was therefore 64 respondents.

The study targeted professionals with knowledge and experience in Public Procurement practice to eliminate sampling errors as much as possible and improve reliability of the data to be collected.

3.7 PRE-TESTING OF QUESTIONNAIRES

The study instruments underwent pre-testing before it was finally administered to respondents. This allows the discovery of errors before actual data collection begins and 20% out of the total population was considered adequate for piloting, which was 13 out of 64 of the sample where seen to be knowledgeable in sustainable procurement matters.

3.8 DATA COLLECTION PROCEDURES

After pilot testing, final adjustments will be made to obtain a more effective and credible instrument, and the questionnaires will be administered to the research participants to respond through personal contact by the researcher.

3.8.1 Questionnaire Design

This involved the design of a questionnaire to seek the views of procurement and administrative officials, engineers in the roads sector and quantity surveyors with respect to improving sustainable procurement practices in road projects. A five page questionnaire with a covering letter was administered to 64 respondents. However, 55 respondents returned the answered questionnaires. The demographic data of the questionnaire was primarily modified from an existing. Some aspects of the factors influencing the introduction of sustainable practises in the road project procurement as well as measures to improve lapses in sustainable procurement practices in the road projects were freshly developed from the literature with assistance from some of professionals from the agencies under study. The questionnaire consisted of four areas in an attempt to satisfy the research objectives. These areas are: ‘A’ The personal demographic data of respondents, ‘B’ identifying current practices of sustainable procurement in the road sector, ‘C’ factors influencing the introduction of sustainable procurement practices in the road projects ‘D’ Measures to improve lapses in sustainable procurement practices in the road projects.

3.9 DATA ANALYSIS

The techniques used for the data analysis were the Statistical Packages for Social Sciences (SPSS Version 21) together with Microsoft excel package (V. 2016). Ranking analysis such as the Relative Importance Index (RII) technique and Mean score ranking were used to rank the factors.

3.10 VALIDITY AND RELIABILITY

3.10.1 Validity

In order to counteract the threat of misrepresentation, various sources of evidence including primary and secondary data were taken into consideration, i.e. in applying triangulation. The

researcher will ensure validity of study outcome through the use of concept of triangulation, and carefully documenting the conducted field study to minimize risk of misinterpretation. This approach will ensure validity such that, if conducted by other researchers again, the same conclusions might be found.

3.10.2 Reliability of Results

The Cronbach alpha will be calculated for all the items in the data. Generally, an alpha of above 0.7 will be preferred and used to rate the reliability of the instruments (Heale and Twycross, 2015).

3.11 ETHICAL CONSIDERATIONS

Ethics that are being disclosed to various respondents on this study is purely meant in satisfying academic requirements and that information obtained is not for any other purpose. In the questionnaire names were not required and the confidentiality of respondents was strictly observed. Analysis is then made on the information obtained and used strictly for the purposes of this research only.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

This section of the study presents the output after going through systematic and various steps of operations performed on the questionnaire distributed among the sample. The results obtained for the beneath discussion was performed using statistical package; Statistical package for social sciences (SPSS) and was confirmed with excel. It is a summary of figures, values of tables and their implications. It must be noted that although 64 questionnaires were distributed among the sample, the researcher was able to retrieve 55 of these questionnaires from the respondents. This was mainly due to the inability of some of the respondents to meet the deadline given by the researcher. Hence, the total number of respondents used for the analysis is 55.

4.2 RELIABILITY AND VALIDITY TEST

In piloting the data, some adjustments were made to the questionnaire in order to obtain information that was more efficient, effective and credible. This research ensured the validity of the study outcome through the use of the concept of triangulation and carefully documenting the field study conducted, to minimize the risk of misinterpretation. This approach ensured validity such that, if conducted by other researchers again, the same conclusions might be found. Sampled data was then subjected to a reliability testing to check for the consistency of survey responses. The Cronbach alpha was then calculated. Generally, alpha values of above 0.7 was preferred.

4.3 BACKGROUND INFORMATION

This presents the background of respondents, their professional qualification, level of education and experience in the industry. This information was important because the background of the

respondents helped in generating confidence in the validity and reliability of data obtained; and also in interpreting the findings.

4.2.1 Professional affiliation

This was to determine the professional qualification of respondents. A look at table 4.1 shows frequencies and percentages obtained on the profession of the respondents. The respondents consisted of 16 civil engineers representing 29.1% of the total number of respondents. Procurement professionals were 14, representing 25.5%, quantity surveyors were 9, representing 13%, construction professionals were 8, representing 14.5% and administrative staff were 8, also representing 14.5% respectively.

Table 1: Professional qualification of respondents.

S/N	PROFESSION	FREQUENCY	PERCENT
1	Quantity Surveyor	9	16.4
2	Civil Engineer	16	29.1
3	Procurement	14	25.5
4	Construction Engineer	8	14.5
5	Administrative Staff	8	14.5
	TOTAL	55	100.0

Source: Field Survey

4.2.2 Educational Qualification.

For educational qualification of the respondents, it was noted that the level of education determines a staff's status in the institution hence influencing their level of involvement in the sustainable procurement activities. These are also key determinants of the quality of responses obtained. A look at table 4.2 reveals that 25.5% of the respondents were Diploma/Professional Certificate holders while 47.3% of the respondents are degree holders, 16.4% of the respondents are holders of Masters/Postgraduate degree with 10.9% having PHD degree.

Table 4.2: Educational qualification of respondents.

S/N	EDUCATIONAL QUALIFICATION	FREQUENCY	PERCENT
1	Diploma	14	25.5
2	Bachelors	26	47.3
3	Masters	9	16.4
4	Doctorate	6	10.9
	TOTAL	55	100.0

Source: Field Survey

4.2.5 Experience of Respondent

Generally, the results in Table 4.3 below show that respondents have some reasonable level of expertise in procurement activities, with respect to their respective units in the institution. It can therefore be concluded that the respondents are sufficiently experienced in the sustainable procurement practices in road projects due to the fact that most of the respondents have above 4 years of experience.

Table 4.3 Respondents Years of Experience

S/N	WORKING EXPERIENCE	FREQUENCY	PERCENT
1	Less than 1 year	7	12.7
2	Between 2- 3 years	12	21.8
3	Between 4 -5 years	14	23.6
4	Above 5 years	22	40.0
	TOTAL	55	100.0

Source: Field Survey

4.3 ANALYSIS OF DEPENDENT VARIABLES

Respondents were asked to rank various factors and their level of knowledge using the Likert scale. The five-point Likert scale illustrates, a factor is significant if it has a mean of 3.0 or more. Where more than one factor have the same mean, the factor with the lowest standard deviation is assigned the highest significance ranking (Ahadzie, 2007). Standard deviation values of less than 1.0 indicates consistency in agreement among the respondents of the reported level of results (Ahadzie, 2007). This was altogether used in assessing the various variables under consideration. The procedures, research findings and discussions that are of relevance are as follows.

4.3.1 Current practices of sustainable procurement into road projects.

In an attempt to assess the current practices of sustainable procurement in road projects, this was necessary to determine the level of knowledge of the respondents. In view of this, seven current practices were identified from the literature of the study and respondents were asked to rate these

factors in accordance with their awareness on the factors using a five-point Likert scale. (Highly disagree, disagree, uncertain, agree, and highly agree).

From the table below, respondents indicated that they had some level of agreement of the current practices of sustainable procurement in road projects. Regular monitoring, control, and review methods for greenhouse emissions was ranked first with a mean score of 4.0182 and a standard deviation of 1.16255.

The second factor in ranking was regular training for the managers of the procurement process with a mean of 3.9636. As has already been indicated, a mean of less than the neutral 3.0 indicates that a criterion is not significant. From the analysis, involving sustainability consultants during monitoring and supervision of projects, incentives for GHGe reduction in all contracts and the rest of the factors were all major current practices of sustainable procurement in road projects in the order of ranking respectively with all means value above 3.0. The least current practice was Standardized procedures and guidelines for Greenhouse gas emissions (GHGe) assessment and reduction in contracts with a mean of 3.4182. The analysis above is in line and confirms the findings of Osei- Tutu et al (2010).

Table 4.4 Ranking of current sustainable procurement practices in the road sector

S/N	CURRENT PRACTICES	MEAN	SD	RANK
1	Regular monitoring, control and review methods for GHGe	4.0182	1.16255	1 st
2	Regular training for the managers of the procurement process	3.9636	1.08804	2 nd
3	Involving sustainability consultants during monitoring and supervision of projects	3.9091	1.05887	3 rd
4	Incentives for GHGe reduction in all contracts	3.9091	1.19059	4 th
5	Environmental sustainable (green) procurement measures are practiced on our projects	3.8000	1.20800	5 th
6	Environmental criteria in our design and procurement processes through to contractor selection	3.6909	1.16861	6 th
7	Standardized procedures and guidelines for greenhouse gas emission (GHGe) assessment and reduction in our contracts	3.4182	1.35661	7 th

Source: Field Survey

4.3.2 Factors influencing the introduction of sustainable practices in road projects.

In assessing the factors influencing the introduction of sustainable practices in road projects, it was also necessary for these respondents to have some level of knowledge on the factors influencing sustainability. With this in view, eight factors were identified from the literature of the study and respondents were tasked to rate these factors in accordance to their knowledge on the factors using a five-point Likert scale. (Highly disagree, disagree, uncertain, agree, and highly agree). The means and standard deviations were also adopted in the analysis.

From the table below, respondents had indicated that they had some level of awareness of the factors influencing the introduction of sustainable practices. Commitment to reduce waste generation in road projects was ranked first with mean score of 4.2727 and a standard deviation of 0.80403.

The next factor in terms of ranking is increase in consultants in sustainable procurement with a mean of 4.1636 and standard deviation 0.97684. As has already been indicated, a mean of less than 3.0 indicates that a criterion is not significant. From the analysis, Commitment by the stakeholders to help achieve global sustainability, reducing cost of delivering road projects, existing legislation to ensure sustainable procurement practices, Consumption of natural resources, top management support in sustainable procurement and Increase understanding of the concept of sustainability by industrial players were all other major factors influencing the introduction of sustainable practices in the order of ranking respectively, with all means of the factors value above 3.0. The least factor was Increase understanding of the concept of sustainability by industrial players with a mean of 3.1636. It was therefore observed from the findings that although all the factors are essential, the first two are the most critical as suggested by Otto (2010)

Table 4.5 Ranking of factors influencing the introduction of sustainable practices in road projects

S/D	FACTORS	MEAN	SD	RANK
1	Commitment to reduce waste generation in road projects	4.2727	0.80403	1st
2	Increase in consultants in sustainable procurement	4.1636	0.97684	2nd
3	Commitment by stakeholders to help achieve global sustainability	4.0727	1.05153	3rd
4	Reducing cost of delivering road projects	3.9455	1.06141	4th
5	Existing legislation to ensure sustainable procurement practices	3.9091	1.07622	5th
6	Consumption of natural resources	3.8000	1.09545	6rd
7	Top management support in sustainable procurement	3.6727	1.26278	7th
8	Increase understanding of the concept of sustainability by industrial players	3.1636	1.34390	8th

Source: Field Survey

4.3.3 Measures to improve sustainable practices in road project procurement

With the measures taken into consideration in improving sustainable practices in road project procurement, six measures were investigated and rankings presented in Tables 4.7. The mean score of the measures to improve sustainable practices in road project procurement are higher than the neutral value of 3.0, indicating that they are all of significance. In using the table below, the highest measure was that Career development plan should be developed and strictly implemented with a mean value of 4.2592 and Standard deviation of 0.80529. Other measures includes Sustainable

procurement procedures should be clearly spelt in both tender and contract documents, Political interference should be avoided among others as indicated in the table were all significant.

Table 4.6 Ranking of measures to improve sustainable practices in road project procurement

S/N	MEASURES	MEAN	SD	RANK
1	Career development plan should be developed and strictly implemented	4.2593	0.80529	1 st
2	SP procedures should be clearly spelt in both tender and contract documents	4.1636	0.97684	2 nd
3	Need to procure sustainably to secure the future	4.1273	0.96330	3 rd
4	Ethics training and seminars should be provided to sharpen the skills of procurement professionals	4.0182	0.93276	4 th
5	Political interferences should be developed and strictly implemented	3.8000	1.09545	5 th
6	Successive governments should provide adequate funding for planned projects	3.7778	1.16013	6 th

Source: Field Survey

4.4 CHAPTER SUMMARY

This chapter was devoted to the analysis, results and discussions obtained from the survey. Firstly, a brief discussion of the survey questionnaires was made and descriptive statistics of the results obtained from the survey. The study then adopted the use of mean score and standard deviation to analyze the results of the survey. Lastly, a discussion of the current practices of sustainable procurement into road projects, factors influencing the introduction of sustainable practices and measures to improve sustainable practices in the road project procurement where all discussed.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In this studies, the researcher focused on examining ways of improving sustainable procurement practices in the road sector of Ghana. Review of literature led to the concept of sustainability and sustainable development, acceptance of sustainability as a global order, concept of procurement, sustainable procurement, relationship between sustainable development and sustainable construction, procurement practices in the road projects, role of public agencies in improving sustainable procurement practices, sustainable procurement practices in the roads sector, making sustainable procurement practice inevitable, sustainable procurement practices in developing countries, practicing sustainable procurement in Ghana, advantages of sustainable construction and a brief conclusion. Adopting the quantitative research approach, questionnaire survey was employed to assess measures used by procurement practitioners, administrative officers, quantity surveyors and engineers in roads sector in attaining the research objectives. The previous chapter analysed and discussed the results of the study. This chapter presents the findings of the study in relation to its laid out objectives. Recommendations from the study are put forth. The study directions for future research was also presented. The objectives are as follows:

- To identify current practises of sustainable procurement into road projects.
- To identify factors influencing the introduction of sustainable practises in the road project procurement.
- To identify ways to improve lapses in sustainable practises in the road project procurement

These research aim served as guideline in achieving the stated objectives. The research results were then discussed in relation to the objectives of the study.

5.2 REVIEW OF OBJECTIVES

The aim of this study is to examine ways of improving sustainable procurement practices in the road sector of Ghana. The Research objectives were subsequently developed in order to achieve the stated aim. Here, the research objectives are highlighted to the extent to which they were accomplished through the various phases of the research. The study employed the use of mean score and standard deviation in the analysis.

5.2.1 To identify current practices of sustainable procurement in the road sector

In an attempt to identify current practices of sustainable procurement in the road sector, seven factors were identified from the literature. From the analysis the mean score for the following factors were above 3.0; the use of environmental criteria in the sourcing or selection process, standard guidelines and procedures for assessment of greenhouse gas emission to attain maximum reduction in all contracts, regular training and retraining for stakeholders in procurement which includes sustainability consultants during monitoring and supervision phase of the contract greenhouse gas emission reduction incentives in all forms of contracting. The standard deviation for all of the variables identified was above 1 showing a high degree of agreement within the respondents. This finding were consistent to the existing studies (Ofori, 2006).

5.2.2 Identifying factors influencing the introduction of sustainable procurement practices in the road projects.

In identifying factors influencing the introduction of sustainable procurement practices in the road projects, eight factors were identified; Commitment to reduce waste generation in road projects was most recognised by the respondents. Other factors include increase understanding of the concept of sustainability by industrial players, top management support in sustainable procurement, increase in consultants in sustainable procurement, consumption of natural

resources, commitment to reduce waste generation in road projects, commitment by the stakeholders to help achieve global sustainability, existing legislation to ensure sustainable procurement practices and reducing cost of delivering road projects. Also, all the means of the factors were above the neutral 3.0 indicating a high level of agreement on the significance of these factors by the respondents. These results were not consistent with any material in the possession of the researcher.

5.2.3 Measures to improve lapses in sustainable procurement practices in the road projects.

The respondents were asked to rate the level of agreement with six identified measures in improving lapses in sustainable procurement practices in the road projects. The results revealed that all the measures are key to improving sustainable procurement practices in the road sector of Ghana since their mean values are above the neutral rating of 3.0. The findings from the study show that among all the measures, career development planning and development as well as its strict implementation was most recognized. Other measures include successive governments should provide adequate funding for planned projects, sustainable procurement procedures should be clearly spelt in both tender and contract documents, political interference should be avoided, need to procure sustainably to secure the future, ethics training and seminar should be provided to sharpen the skills of procurement professionals. This is also supported by the position of Opoku (2012)

5.3 CONCLUSION

Improving sustainable procurement practices in the road sector should therefore not be overlooked in sustainable development. This study showed that ‘sustainability’ seems abstract and subjective, and that not every definition presents a clear understanding. Sustainability therefore requires a clearer conceptual framework in order to facilitate its effective implementation. The primary aim was to examine ways of improving sustainable procurement practices in the road sector of

Ghana, using some selected agencies under Ministry of Highways as case study. From the findings, a well-functioning public procurement system is critical for the improved sourcing of goods, works and services.

5.4 RECOMMENDATIONS.

The findings of the study informed the following recommendations:

1. Emphasise must be placed on sustainability at all stages in the procurement process of road projects by the sector stakeholders.
2. Sustainable procurement procedures within the road sector should be clearly spelt in both the tender and contract documents in order to serve as a guide to all industry players.
3. Continuous training of all stakeholders within the road sector in modern sustainable procurement trends within the industry through workshops and seminars by the government.
4. Provision of adequate funding to include sustainable procurement practices in the delivering of road projects. This is supported by Agbesi et al. (2018).

5.4.1 Recommendation for further research.

Research is needed to fill the gaps in relation to the perception of procuring entities in Ghana as to whether sustainability interventions are expensive and to further explore the reasons thereof. This is necessary in order to furnish motivating factors for action.

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APPENDIX

QUESTIONNAIRE.

Dear respondents

This is a questionnaire designed to collect data on exploring the potential of open competition for achieving value for money in public sector procurement: Which will be used for a dissertation in a partial fulfilment of Master of Science in Procurement programme.

This study is for academic purposes only and all information disclosed shall be treated with strict confidentiality. I implore you to be part of this survey by completing this questionnaire, with the needed information to the best of your knowledge.

- 1) Please tick the most appropriate answer to each of the question
- 2) Please tick one/more if necessary
- 3) Please state your answer in the blank space provided where applicable

SECTION A: Demographic Data of Respondent

Please tick [✓] the appropriate box that corresponds to your response.

1)) Your Profession/Occupation

Quantity Surveyor []

Civil Engineer []

Procurement/Stores []

Logistics and transport []

Administrative staff []

Other (Please specify)

2) Gender: a. Male [] b. Female []

3) Age: a. 20– 30 [] b. 31 – 40 [] c. 41 – 50 [] d. 50 years and above []

4) What is your level of education?

a. Diploma / Professional Certificate []

b. Bachelor's degree []

c. Masters / Postgraduate degree []

d. Doctorate []

5) State the number of years you have worked with your institution.

a. less than 1 year [] b. 2 – 3 years []

c. 4 - 5 years [] d. above 5 years []

6) 5. Indicate your occupational status

.....
.....

SECTION B:

Identifying current practises of sustainable procurement into road projects.

. Indicate your level of awareness of these current practises of sustainable procurement into road projects. The following are keys for the responses:

1: Highly unaware; 2: Unaware; 3: Neither aware or unaware 4: Aware 5: Highly aware

Current practises of sustainable procurement into road projects.	1	2	3	4	5
1) Standardized procedures and guidelines for Greenhouse gas emissions (GHGe) assessment and reduction in our contracts.					
2) Incentives for GHGe reduction in all contracts.					
3) Environmental criteria in our design and procurement processes through to contractor selection.					
4) Regular monitoring, control, and review methods for GHGe.					
5) Environmental Sustainable (green) procurement measures are practiced on our projects.					
6) Regular training for the managers of the procurement process.					
7) Involving sustainability consultants during monitoring and supervision of projects					

SECTION C:

Identify factors influencing the introduction of sustainable practises in the road project procurement. Indicate your level of awareness of these factors influencing the introduction of sustainable practices.

Factors influencing the introduction of sustainable practises	1	2	3	4	5
1) Top Management support in sustainable procurement					
2) Increase in consultants in sustainable procurement					
3) Consumption of natural resources					
4) Commitment to reduce waste generation in road projects					
5) Commitment by the stakeholders to help achieve global sustainability					
6) Existing legislation to ensure sustainable procurement practices					
7) Reducing cost of delivering road projects					
8) Increase understanding of the concept of sustainability by industrial players					

SECTION D: Measures employed to improve lapses in sustainable practises in the road project procurement. Indicate your level of awareness of these recommended measures to improve lapses in sustainable practises in the road project procurement

Measures to improve sustainable practises in the road project procurement	1	2	3	4	5
1) Successive Governments should provide adequate funding for planned projects					
2) SP procedures should be clearly spelt in both tender and contract documents					
3) Political interference should be avoided					
4) Career development plan should be developed and strictly implemented					
5) Need to procure sustainably to secure the future					
6) Ethics training and seminar should be provided to sharpen the skills of procurement professionals.					