



Factors Affecting the Performance of Contractors on Road Projects Supervised by the National Agency of Public Works in Gabon.

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DECLARATION

I confirm that this research project report is my original work being submitted for the degree of Master of Science (Building) Project Management and has not been submitted for any other degree or examination at any other university

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ABSTRACT

This research investigates the performance of contractors in timeously delivering road construction projects in Gabon. Road infrastructure is the backbone of economic development of any country. A good road network facilitates trade and cooperation. It also provides access to markets in addressing socio-economic challenges by providing access to employment opportunities (World Bank 2014).

The study was motivated by the fact that despite the government of Gabon's efforts to improve the delivery of road projects by initiating a National Infrastructure Master Plan (NIMP) and creating a National Agency of Public Works (ANGT) to supervise the construction of national roads, the performance of contractors involved on these projects remains unsatisfactory in delivering road projects within the time frame proposed.

The objective of the study was to establish the effect of finances on the performance of contractors in the road construction sector, to assess the effect of skilled manpower on the performance of contractors in the road construction sector, to examine how organization structure affect the performance of contractors in the road construction sector, and to establish the effect of client support on performance of contractors in the road construction sector.

The study uses a cross sectional descriptive survey design since it is an investigation of an individual group of respondents. The purposive sampling technique was used in coming up with a sample size. The study relied mostly on primary data source and 65 questionnaires were used as source of data collection. From the questionnaires sent 54 respondents returned their questionnaires cutting across professionals from the contractors and the ANGT directly involved in road construction projects these included Project Managers, Planners, Engineers, Site Managers, and Site Supervisors.

The data collected were both qualitative and quantitative. Collected data were coded and entered into Statistical Package for Social Scientists SPSS Version (20.0). The data were analysed to test the hypotheses using the Chi-Square statistical method. The calculated Chi-Square values in all four cases were found to be less than the critical value consequently the null hypotheses were accepted in all four cases as per the study objectives.

The findings were presented descriptively in forms of tables while explanation was presented in prose. The main findings were that all the 4 factors as per the study objectives had influenced the performance of contractors delivering road project on time. It was noted that finance and organization structure have the highest influence followed by skilled manpower and client support according to the number of respondents.

The recommendations for improvement in finances included that contractors should form public private partnerships with financiers and government who may be willing to finance major road construction projects, legislation be put in place to ensure clear

timelines for payments and spell out penalties for default and the establishment of a bank to serve the construction industry. The recommendations included training and skill upgrading within construction firms and establishment of more middle level technical colleges in order to improve availability of skilled manpower. Also recommended was that construction firms also need to have a flexible dynamic organizational structure as the existence of such was found to be the core from which the successful implementation of road construction projects was founded. In addition, client support in form of prompt payments and approvals, involvement of stakeholders, early land acquisition and project coordination are necessary to ensure enhanced performance of contractors in the road sector. This would ensure timely, cost effective and quality completion of road projects.

Keywords: Client Support, Organization Structure, Performance Measurement, Project Finances, Skilled Manpower.

DEFINITION OF SIGNIFICANT TERMS

Gabon Master Plan: The Gabon National Infrastructure Master Plan (NIMP) was developed to respond to President Ali Bongo Ondimba's vision for the country's infrastructure: to make Gabon an emergent country by 2025. This vision rests on the following three pillars: Industrial Gabon, Green Gabon, and Service Industry Gabon. It aims to increase growth and diversify the economy while ensuring prosperity for all citizens (Angt.ga).

Organization Structure: The organization structure defines how individuals and groups are organized or how their tasks are divided and coordinated (Mintzberg, 1983).

Performance measurement: Is a systematic process of assessing and quantifying past behaviours and activities Project performance measurement is essential in order to determine whether or not project goals have been met for both the client and the contractor (Neely, 1999).

Project Finances: Project financing is raising of funds to finance an economically viable capital investment project which the providers of funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the returns of equity invested in the project (Chiocha, 2011).

Skilled Manpower: Individuals who are knowledgeable about specific construction skills gained from training or from practical experience in construction can be defined as skilled manpower (Medugu *et al.*, 2011).

ABBREVIATIONS AND ACRONYMS

ACN: African Cup of Nations

ADB: African Development Bank

ANGT: National Agency of Public Works (*Agence Nationale des Grands Travaux*)

CRBC: China Road Bridge Corporation

DBSA: Development Bank of Southern Africa

FCFA: *Franc Communauté France-Afrique*

FR: Fond routier (Roads Funds)

GDP: Gross Domestic Products

IMF: International Monetary Fund

IFC: International Finance Corporation

MOU: Memorandum of Understanding

MTPEC: Ministry of Public Works, Equipment and Construction

NIMP: National Infrastructure Master Plan

NGO: Non-Government Organization

PAP: Project Affected Person

PARR: Road Network Development Program

PPP: Private Public Partnership

PMI: Project Management Institute

PWTS: Public Works Technicians' School in Fougamou

ROI: Return on Investment

SPSS: Statistical Package for Social Sciences

SETRAG: *Société d'Exploitation du Transgabonais*

TQM: Total Quality Management

VFM: Value for Money

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter outlines the research background, the need for the study, the problem statement, the aim and objectives of the study, the research questions, and hypotheses, the significance and limitations of the study.

1.2 Background of the study

Defining project performance is complex (Fouché and Rolstadås, 2010). The three main components of project management success include time, cost and quality, are usually used to measure project performance (Harrison and Lock, 2004). Determining project goals and, therefore the indicators to be used to measure project performance is vital in assessing and quantifying project performance. This then form the basis for determining the factors that affect project performance.

Many studies have been conducted in order to determine the factors that affect the contractor performance in developing countries (Sweis *et al.*, 2014). A study done by Faridi and El-Sayegh (2006) in the United Arab Emirates (UAE) shows that shortage of skilled labour, poor supervision and site management, inadequate leadership and equipment failure have contributed to delays in construction projects. In Kenya, a study conducted by Mwangi (2016) shows that issues related to project finances, the availability of skilled manpower, the contractor's own organization structure and the client support, affected the performance of road contractors.

In Gabon, one of the main problems facing road construction project and hampering the entire country's economic development is the poor performance of contractors in delivering projects on time. A report on challenges facing Gabon construction industry by the National Agency of Public Works (ANGT, 2012) singled out finances, the availability of skilled manpower, the organizational structure and the client support as the 4 main factors affecting the Gabonese road construction sector. This study will assess the extent to which these factors are affecting the road construction in Gabon.

Gabon master plan vision 2025 identifies infrastructure development as one of the most crucial pillars to economic growth. The master plan aspires for a country firmly interconnected through a network of roads, railways, ports, airports, water and sanitation facilities, and telecommunications (African Development Bank, 2009). One of the goals of the government is to ensure that by the year 2025 no region in the country will be deemed to be remote. For this reason, Gabon has invested heavily in infrastructure according to the Road Sector Investment Plan 2010-2025.

Despite the importance of the economy and the social value of reliable and efficient infrastructure, many road projects in Gabon have experienced delay in timely completion. ANGT (2012) noted that only 20.8 per cent of the projects in Gabon were implemented on time and within budget, while 79.2 per cent exhibited some form of failure. According to the study, the major causes of failure were insufficient implementing capacity, poor project management, weak project design and political interference. In order to sustainably implement infrastructure projects, it is necessary for the construction industry to build sufficient capacity to undertake the projects. This will ensure timely, quality and cost effective implementation of these development projects.

Construction of a structured, continuous road network all over Gabon will have a major impact on the economy because it will provide opportunities for interconnectivity both within the nation and with bordering countries, supporting development in industries and agriculture. Consequently, costs within the country and export prices for Gabon's products, such as transformed timber and farm products, will be more competitive. The Belinga Corridor routes will allow exploitation of the iron ore deposits to begin. On the main Corridor, competing with the railway, the road will be a valuable alternative means of transport for goods and people ANGT (2012).

This research will propose a course of action by which clients involved in construction project will understand what affects the performance of contractors in the road sector; and come up with policies that can ensure growth and strengthen the contractors to undertake future projects in a timely and cost-effective manner.

1.3 The Statement of the problem

The problem statement of the research is that despite the Government of Gabon's effort to improve the delivery of road construction projects, the problem of poor contractor performance in delivering road construction project on time remains acute. Many studies have been conducted in order to determine the factors that affect contractor performance in developing countries (Sweis *et al.*, 2014).

1.4 The Research Aim

The aim of this research is to investigate factors affecting the performance of contractors on road projects supervised by the National Agency of Public Works in Gabon.

1.5 The Research Objectives

1-To establish the extent to which factors related to finances affects the performance of contractors in delivering road project in Gabon.

2- To assess the extent to which factors related to skilled manpower affects the performance of contractors in delivering road project in Gabon.

3- To examine the extent to which factors related to the organization structure affects the performance of contractors in delivering road project in Gabon.

4- To establish the extent to which client support factors affects the performance of contractors in delivering road projects in Gabon.

1.6 The Research Hypothesis

The study will be guided by the following null hypothesis:

1. H1: Project finances factors significantly affect the performance of road contractor in Gabon.

2. H2: The availability of skilled manpower significantly affects the performance of road contractor in Gabon

3. H3: Organizational structures factors significantly affect the performance of road contractor in Gabon

4. H4: Client support factors significantly affect the performance of road contractor in Gabon.

1.7 The Significance of the study

Flyvbjerg (2008) stated that contractor performance with regard to time has not significantly improved over time; little learning seemed to have occurred in eight decades.

This research will assist the government in addressing the factors affecting the performance of road contractors and effectively improve the Gabonese road construction industry. It is hoped that the government and relevant parties will adopt and implement the necessary plan of action in order to reduce the late delivery of road construction projects.

This study could contribute to the understanding of the critical challenges contractors are facing that inhibit their performance on projects in the road sector in Gabon and other developing countries. Kamanga and Steyn (2013) studied the causes of delay in road construction projects in Malawi and revealed that the following were the

major causes of delay: Shortage of fuel; insufficient contractor cash flow / difficulties in financing projects; Shortage of foreign currency (importation of materials and equipment); Slow payment procedures adopted by client in making progress payments; and Insufficient equipment.

Wafula (2017), in studying the factors influencing the performance of roads contractors in Kenya and revealed that the following factors were the major causes of delay: Capital availability, managerial skills, organization culture and technical skills.

The findings may be used by governments to provide the necessary incentives and regulations to ensure sustainable growth, capacity building and policy framework to regulate the construction industry toward achieving millennium goals such as Vision 2025. The study can be merged with others done in other nations for comparison of factors affecting performance of contractors in the road sector in order to facilitate worldwide exploration on strategy to improve performance of contractors.

1.8 Limitations of the study

A study conducted by Cheung *et al.*, (2004) found that there are seven main key performance indicators, namely time, cost, quality, client satisfaction, client changes, business performance, and health and safety. This study is focused on factors affecting the prompt delivery of road projects. The study is further limited to investigating the extent to which the following factors are influencing the performance of contractors:

- 1- Project Finances Factor
- 2- The Availability of Skill Manpower
- 3- The Contractor Organization Structure
- 4- The Client Support

1.9 Organization of the Study

This research report is organized into five chapters:

Chapter one is the introduction which includes the background of the study, the need for the study, the statement of the study, the aim and objectives of the study, the research questions and hypotheses, the significance of the study and the limitations of the study.

Chapter two gives a conceptual framework for this research and how it fits into the existing body of knowledge. It provides intellectual context for the research. Discussions on findings and gaps from previous related studies are also made reference to.

Chapter three entails the methodology to be used in the research. This chapter gives a description and justification of the procedures and instruments utilised to conduct the research. It also discusses the approach adopted to analyse the research data.

Chapter four discusses the interpretation and presentation of the findings obtained from the field. The chapter presents the background information of the respondents, findings of the analysis based on the objectives of the study. Descriptive and inferential statistics have been used to discuss the findings of the study.

Chapter five presents the result of the discussions of key data findings, conclusions and interpretation from the findings highlighted and recommendations made thereto. The conclusions and recommendations drawn focused on addressing the objective of the study.

1.10 Chapter Summary

This introductory chapter highlighted the role of road construction in the economic development of any nation. Equally important is timeous delivery of road projects to enable governments to meet strategic development goals. The study proposed to investigate the predominant factors affecting the performance of road contractors in Gabon.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews past literature on factors affecting the performance in the construction sector with particular focus on factors affecting the performance of road contractors in Gabon. Similar research project have been conducted in developing countries Atibu (2015) ; Ondari and Gekara(2013); Wafula (2017). This study is different from other similar local ones like ANGT (2012) as it provides an in-depth analysis on the effect of different organization structure as defined by (PMI, 2013) on the contractor performance in Gabon .Some of the key concepts used in the research are highlighted including some theoretical contributions from literature. A literature review helps in the development of understanding of the previous research that has been done relating to the objectives and helps in the refinement of the ideas to which the research will be built. The Literature review involved sources such as relevant magazines and journals, institutional research publications and reports, financial text books, Gabonese government and Ministry publications and projects, among others.

2.2 Brief Overview of Gabon Road Network

Gabon, a country along the Atlantic coast of Equatorial Africa, has a population of 1.98 million (2016), has an area of 270 000 Square Kilometres with an economy based on the exploration of crude oil, mineral resources and timber processing. The Gabonese economy is dependent upon oil production (crude oil accounts for over 80% of the country's exports, 43% of GDP, and 65% of state revenue (World Bank 2013). Gabon is sub-Saharan Africa's third-largest crude oil producer and exporter, although there are concerns that proven reserves are declining and production has declined as well (World Bank 2013). The current government is working to reduce dependence on oil and to diversify the economy by spending on a massive road construction program hence the significance of this study (ANGT,2012).

According to a report by the African Development Bank (ADB, 2007) the road network is 9170 km, of which 1055 km is paved (about 11% of the National Network), and 8115 km is unpaved. The spatial organization is far from taking into account the dialectic infrastructure-networks, since the review of traffic lanes reveals the same as incomplete and poorly coordinated (Djeki, 1997; Le Commissariat General au Plan et au Development, 1999).The road network is the starting point for all of Gabon's development. Before building new roads, however, it is vital to deal with the problem of the log carriers. These heavy goods vehicles do not comply with the tonnage restrictions that would ensure proper operating life and optimal maintenance for roads. So while international standards set maximum laden axle weights of 10 tonnes, and 50 tonnes carried per lorry, in the absence of any controls,

these vehicles are actually carrying loads of 20 tonnes per axle and up to 80 tonnes altogether per truck. This significantly reduces the life expectancy of the roads used (ANGT, 2012).

The Development corridors provide a context for configuring, selecting, prioritizing and promoting the infrastructure needed for investment projects by sector of activity, depending on local potential, resources and opportunities as part of a national network as illustrated in the Figure 2.1 (ANGT ,2012)



Figure 2.1: Gabon Major Roads Network (Source: ANGT 2012)

2.3 The Concept of Performance

Performance measurement is described by Neely (1998) as the method of evaluating previous activities to ascertain present performance. Contractor performance is defined as a factor of time, sustainable development, quality and construction cost, the idea being that the attainment of one facet of performance must not be at the cost of another (Hong and Proverbs, 2003). The performance definitions reviewed in this paper articulate the concept in achieving and accomplishing the planned targets.

For instance, the National Institute of Standards and Technology (NIST, 2009) defines performance as “outputs and outcomes from processes, products and services that allow assessment and comparison relative to set goals, standards, past results, and other specifications”. For a long time, performance assessment has remained a problem for the construction industry. Various concepts and measures have been experimented to assess and measure performance of projects.

Alarcon (1994) observed that most of these measures inhibit their assessment to preferred standards such as, time, cost or output. Contractors are required to evaluate performance and upgrade strategies to gain competitive advantage. To lift competitiveness, construction firms have to utilize performance evaluation mechanisms to ensure sustainable performance.

Rose (1995) observed that performance measurement is the expression of progress. Expansion in business cannot be achieved if its performance is not evaluated (Baldwin *et al.*, 2001). Poor performance, shown by substandard quality of work and low production, is widespread in construction projects. Other challenges linked with inadequate performance include poor work ethic and miscommunication among stakeholders, late completion, cost increase, very high accident occurrences, and lack of consideration of ecological issues (Allens *et al.*, 1994; Alinaitwe *et al.*;2013).

2.4 Contractor Performance in Construction

The Construction is viewed as an industry that the public economy relies upon, (Ejaz *et al.*, 2013). Construction contracts cause mutually contractual and legal commitments on partners that are hard to modify based on fiscal exchanges (Thomas & Ellis, 2007). The client employs the services of a construction firm to execute a contract in order to deliver a project on an agreed timeline. Kulatunga *et al.*, (2005) proposes that contractors have to gauge their performance to get a reasonable market share. Cost-effective expansion and the competitive environment of the construction sector has required construction firms to trim down their mark-ups to continue thriving (Grogan, 1995). The connection between employers and their consultant’s calls for an evaluation process that is price-based, as Tao and Kumaraswamy (2012) noted. Even then, the least offer frequently results in challenges such as substandard quality, cost increase, as well as lateness. This generally brings about massive contractual and fiscal challenges among parties, as evidenced by (Memon, 2014; Palaneeswaran *et al.*, 2007).

These challenges for the clients and owners also influence project performance in construction, the requirement to improve is necessary since clients need better value from their projects, and contractors require good profits to guarantee their long-term future (Egan, 1998). Improved performance by contractors leads to better client satisfaction, reputation, and competitiveness (Xiao and David, 2003). Many

researchers have conducted detailed investigations on performance. Hatami and Behsan (2012) found that contractors are more tolerant of risks that are included in contracts than of additional types of risk. In researching contractor performance in Saudi Arabia, Assaf *et al.*, (1996) focused on the nature of each project, the extent of contractors' involvement, and how that affects contractor performance. Abbasnejad and Mood (2013) noted that most projects in Iran suffer from delays, causing serious problems to contractors, and that these problems were intolerable and acutely affect contractor performance, which vary among nations (Proverbs, 1998). A research done in Jordan (Rateb *et al.*, 2014) investigated the factors affecting contractors' performance on public construction projects. In this investigation, contractors, consultants, and owners agreed on the most important factors affecting contractors. First among these important performance factors are contractors' financial difficulties, shortage of manpower, and too many change orders. These outcomes agree with the results of research conducted in a three-year study of contractor performance in Japan, the UK, and the USA by (Atibu, 2015 ; Xiao and Proverbs,2003)

Similar outcomes were found in developing countries by several researchers who carried out studies concerning the contractor performance. For example, a study in Ghana found widespread failures in meeting performance milestones in the construction sector. On several occasions, contractors were held responsible for poor performances and criticized for having limited technical expertise in the use of necessary organization techniques. Small and large contractors in Ghana find it difficult to access funds (Badu *et al.*, 2012). Pending bills for executed tasks is extensive and is the chief reason of incomplete projects (Adams,2008).In spite of major achievements in performance enhancement in the construction firms of industrialized nations, the construction sector in Ghana cannot be compared (Ofori *et al.*, 2012). Ghanaian contractors are perceived to be below performance and construction of several mega projects are implemented by non-citizen contractors (Mwangi, 2016;Tawiah, 1999).

(ANGT, 2012) identified 4 factors affecting the performance of road contractor as illustrated in figure 2.2.

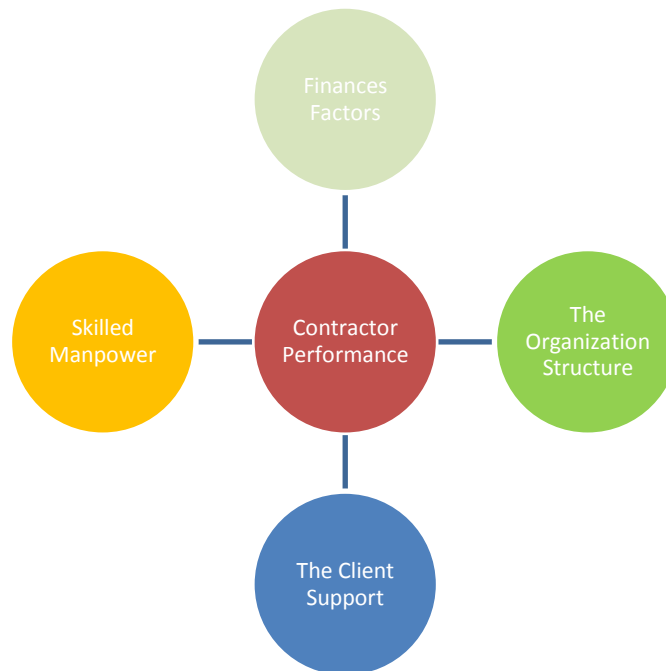


Figure2.2: The Framework of factors affecting the performance of Contractor in Gabon

2.5 The finances and the contractor performance

2.5.1 Definition of Project Finance

The term project finance is often interpreted incorrectly as the generic financing of a project. However, project financing is a specialised funding structure that relies on the future cash flow of a project as primary source of repayment, and holds the project's assets, rights and interests as collateral security. It is also referred to as non- or limited recourse finance, i.e. lenders have no- or limited recourse to the sponsors or shareholders of the project company for repayment of the loan. (DBSA Report ,2003)

Chiocha (2011) defines project financing as the raising of funds to finance an economically separable capital investment project which the providers of funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the returns of equity invested in the project. Matesehe (2013) also defines project financing as financing a particular economic unit in which a lender is satisfied to look initially to the cash flow and earnings of that economic unit as the source of funds from which a loan will be repaid and to the assets of the economic unit as the collateral for the loan. Financing of construction projects like roads,

railway, port harbours and many more is therefore expected to be an economic investment.

In a country's economy, the construction industry helps in creating wealth and employment opportunities (Olatunji, 2010). It helps build and or expand infrastructure that facilitates the service industry. This way it can spur economic growth across the board. Further in the development of any country, the construction industry plays a vital role in transforming the aspirations and the needs of its people into reality by implementing various physical structures (Bundi, 2011). As such, government agencies prioritise investments in construction projects like roads and other transport projects not only to spur economic development but also to have the wider associated benefits reach the citizens.

2.5.2 The Contractor Financial Management

The financial strength of a firm plays an important role in the success of a project. Gunham and Ardit (2005) state that construction firms that are financially sound are able to take higher risks with prospects of higher returns, and enjoy higher credibility and reputation among clients and suppliers. In a study of 13,219 construction projects that were executed between 2004 and 2009 in southern Africa, Valentin and Vorster (2012) established that cash flow management is a critical element. Although timely and accurate financial information is vital for construction firms, various business owners underestimate how much money will be needed, not only to start a business, but also to sustain it as it struggles to gain financial strength.

Generally, the smaller the tangible working capital as a percentage of annual turnover, the higher the probability of failure, especially if there is no credit facility from banks (Valentin and Vorster, 2012). Another contributing factor to the cash flow problems is the manner in which a contractor finances its long-term assets as this can severely impair the ability of a firm to continue with its operations (Davidson and Maguire, 2005). Gacheru (2015), in studying projects delayed in East Africa, focused on major road projects that link Kenya, Tanzania, Uganda and by extension Burundi in 2011. He found out that the governments of Kenya and Uganda were affected up to the tune of 45% road construction projects. Among the cited hindrances include poor financial management, corruption, and limited financial resources due to the diversion of project finances. The overall lack of finance to complete a project, or delays in the payment of the services by the project owners or clients can lead to significant problems (Gacheru 2015; Hussein and Omran, 2012)

In Gabon, there are many cases of construction projects that have failed to meet timely completion. It has been contended that the diverse and multifaceted nature of construction projects makes it "difficult to plan for, forecast, manage and control" (Ganiyu & Zubairu, 2010). Given the fact that a construction project is an investment

that should ultimately make economic sense, it is critical that construction professionals offer tangible solutions that actually overcome construction delays. Projects are strategic activities “initiated to create economic value and competitive advantage” (Dolage and Rathnamali,2013;Olatunji, 2010). It therefore follows that sustainability is vital for the financing of projects.

2.5.3 Access to Credits for Road Project in Gabon

According to Miller (1977), credit provides the means for the temporary transfer of assets from an individual or organization to one which has not. Credit may be described as a facility extended from the lender to the borrower and is repayable at maturity, which may range from a few days to several years. For a credit transaction to be completed, the borrower must provide some evidence of debt obligation in return for the loan where the loan is based solely on good reputation, financial position of the borrower and trust. Credit can also be extended to the borrower in the form of assets possessed by the lender i.e. in cash (Miller 1977; Abayomi and Salami, 2008). Chilipunde (2010) reported that access to finance remains a dominant the main challenge facing small- and medium-sized enterprises as they have limited access to capital in Malawi.

The main challenge to developing the transport sector in Gabon is financing. The state’s funds are limited and major infrastructure projects are costly. With the low price of oil, it is very difficult to carry out public investments (Oxford business group, 2016).Olatunji (2010) identifies project finance as one of the constraints or circumstances/situations which, although outside the immediate control of the parties to the contract, nonetheless still affect the smooth flow of scheduled activities. Many observers agree that if payment by project owner is slow, the contractor may begin to commit fewer resources to a project, and may even cease work if cash flow becomes a problem. The same applies to finances for management, risk mitigation, contracting and many more, as observed by scholars like Wambugu (2013).

Chepkoech (2012) and Desai (2013) have identified the major areas where finances become relevant. While studying the multimillion Kericho-Miruka-Chabera-Ahero-Kisumu road, Chepkoech (2012) argues that the road that should have been completed between 1999 and 2002 took two and half years longer and was only completed in mid-2005. This was caused by the government withdrawing the funds allocated to the project, purely on political grounds. An African Development Bank (ADB, 2007) report on the transport sector financing shows that between 1980 and1990, Gabon allocated close to half of its public investment budget to this sector and mainly to the railway sub-sector to the detriment of the road sub-sector. Consequently, paved roads currently represent barely 11% of the national network despite catch-up efforts initiated over the past ten years. It was only from 1998 that

road investments were ranked among leading national priorities. The Government, with donor support, is trying to rationalize such investments. A review of the 2002-2005 period shows real road investments of F.CFA 118.41 billion for the paving of 318.5 km of road, with an estimated Government contribution of F.CFA12.51billion, or 10.57% of investments made during the period under review (ABD, 2007).

Gabon's Road Fund (Fonds Routier, FR), the national fund responsible for road maintenance and development, also saw its investment budget for 2014 reduced by 39% year-on-year (y-o-y) to F.CFA147bn (€220.5m). The decline in available public funds for transport infrastructure development means that authorities are increasingly seeking external funds to pursue their goals of expanding and improving the country's transport network (ABD, 2007).

2.5.4 Types of project finances

According to a report by the Development Bank of Southern Africa (DBSA, 2003) the traditional forms of financing projects have been equity and debt. However, in the recent past innovative ways of financing projects have come up and these include special project vehicle and venture capital, among others. Construction projects are also funded by multilateral bodies and foreign aid. Contributions to the delay emanating from the government/owner of these road projects can include late release of funds. If the owner/government does not pay the services of the contractor in time, then the project implementation may greatly be affected by contractors' poor cash flow. This will affect the contractors' ability to ensure sustained supply of the construction materials. Clearly therefore, owners' financial position will greatly affect project finance flows and which will influence construction project completion.(Wong and Vimonsatit, 2012).

Two key aspects to every construction contract, according to the World Bank (2012), are time and money. According to Dissanayaka and Kumaraswamy (2009), with the items of time and money, the essence of a construction contract can be defined. For a specified sum of money, a road construction contractor will, for instance, be required to perform within a specified period of time (Chism and Armstrong,2010). Therefore, when any investor ventures into a construction project and invests money therein, there will be a time specified for him to realize the return on his investment (ROI).

As such timely completion of the project ensures the cost incurred to be the necessary project cost. Any delay leads to cost overruns which raise the project cost.Indeed, Hussein and Omran (2012) state that 70% of the projects abandoned in Malaysian transport construction projects were due to financial problems of developers, contractors, the local and national governments, stakeholders like the donors and many more. In a similar study carried out by Piper (2011) in Malaysia

and Madagascar, it was found out that between 1999 to 2007 up to 71% of the roads and other construction projects that in a way failed or took longer than planned for or changed the dates of commencement did so as a result of squeezed financial allocation and the contractual times agreements that were never practical. In that study, he cites the project for the repair of the main road linking the major international airport in Madagascar and the capital city. The project took 3 years longer than planned (2008 and 2011) due to limited financial resources and the then political unrests due to coups. The African Development Bank (ADB,2007) indicates that the government is increasingly looking to public-private partnerships (PPPs) to develop major projects in Gabon. The government is currently in the process of developing a regulatory framework for PPPs. A PPP with China Road and Bridge Corporation (CRBC) has enabled a project to build the country's first inland link between Libreville and Port-Gentil, which is currently accessible only by sea and air.

While the government will provide a subsidy to finance the rehabilitation of rail platforms and bridges, the railway operator Société d'Exploitation du Transgabonais (Setrag) has also applied for a loan from the International Finance Corporation (IFC) to help fund infrastructure upgrades, with an estimated total investment of CFA205bn (€307.5m). The IFC is considering financing 50% of the programme, which is expected to run from 2015 to 2022 and aims to double the railway's capacity and as well as reduce delays. In an effort to cover the costs of needed upgrades and ensure financial sustainability of the railway, a revised pricing structure is being considered, which would see mining companies and the state share the costs of the efforts to increase capacity Memon (2014).

2.5.5 The Project Cash Flow Management

According to Harris and McCaffer (2005), the contractor's cash flow or finance is the resource he requires to smooth the progress of implementation of the construction work on site. It is made up of money at hand, bank credit, overdraft, credit purchases, and work-in-progress and invoiced amount. Working capital also includes resources needed to grease the daily business of the construction firm. Pilcher (1992) defined working capital as the difference between current assets and current liabilities. Working capital requirements, its composition and use, tend to change as progress of construction work is achieved. Akinsulire (2002) compared blood which flows continuously in a human body to working capital, which is required to flow throughout the construction period. The management of cash flow includes planning, sourcing, and controlling the use of working capital during construction. The sufficiency of working capital depends on the correct composition and correct financing at all times during construction Asiamah and Asiamah (2013).

Nwude (2010) observed that it requires a determined positive effort by the contractor as mismanagement can weaken productivity and profit level. Management of working capital is very critical. To ensure that the level of working capital is maintained and that there is sufficient provision of funds to finance current assets to facilitate projects to completion, within cost and time, it is necessary to establish the optimum level of working capital needs of a project. It is equally necessary to continuously check and monitor the quantum of individual parts that comprise the working capital to ensure that the requirements are not exceeded.

Awards of major construction contracts in developing countries are skewed in favour of foreign counterparts against citizen contractors since the foreign firms are considered more technically and managerially advanced and well-organized in funds acquirement as well as more competent. In comparison with this, citizen contractors have over the years had challenges related to inadequate working capital, poor project performance in terms of adhering to completion deadlines, poor work quality and capital management which has in many cases led to bankruptcy and in extreme cases, abandonment of projects. In other words, majority of citizen contractors usually do not complete construction contracts within initial contract terms and hardly within scheduled completion times. Ogbemor (2002), Oseni (2002) and Akintude (2003) in their studies in the Nigerian construction industry confirmed that indigenous construction companies have challenges of under-capitalization.

To ensure successful project execution there must be adequate working capital. Rahman (2013) observed that monetary strength of contractors and sufficient cash flow is critical in keeping construction progress as planned. Ameh (2011) observed that inadequate funds lead to time overrun and sufficient funding guarantees reasonable cash flow. Kenyatta *et al.*, (2015) carried out a study on the influence of payment default to contractors in the Kenyan construction industry and found that late payment of one or several certificates, underpayment or paying intermittently and non-payment have led to cash flow hardships to contractors. This has led to late completion of projects, disputes in construction and even bankruptcy. The study recommended industry players to consider legislating on a payment specific regime similar to one implemented in other countries. Other factors noted by many other studies which have been eroding working capital during construction include access to credit, diversion of contract funds for other use as opposed to the project, poor project planning and control, foreign exchange fluctuations, and high cost of finance Mustapha(2013).

2.6 The influence of Skilled Manpower on the Contractor Performance

2.6.1 Definition of Skilled Manpower

Individuals who are knowledgeable about specific construction skills gained from training or from practical experience in construction can be defined as skilled manpower (Medugu *et al.*, 2011). Africa is facing a critical development phase and is at the brink of an economic explosion. The need for skilled and experienced contractors to successfully complete various types of projects, ranging from small projects and partnership projects to mega government projects, in diverse business sectors will only continue to grow in the foreseeable future (World Bank, 2016). Rafee (2012) noted that skilled manpower in the construction industry play a very critical function to the survival and growth of the sector as they are directly involved in the construction process. In Gabon there is an acute shortage of skilled manpower despite the many construction projects that the government is undertaking. Elevation of middle-level colleges to universities has further eroded the development of skilled manpower creating a major shortage of skilled manpower.

Wang (2010) indicated that labour shortage is a problem faced by many countries all over the world. In the construction industry framework, the purchasing power of the end user influences quality work production. Hence, additional skilled workforce is needed. Medugu *et al.*, (2011) observed that where highly capable workforce is utilized, the effect of skilled manpower in the construction sector is very visible in its end products. This is because they are directly involved in the early realization of construction projects' completion since they handle the technical phase of such contract. Reduction in poor quality, low productivity, late project completion, cost and time overruns in projects is notable where trained skilled manpower is involved.

Abiola (2004) believe that rework of defective or unsatisfactory work is mostly attributed to poor level of workmanship which normally results from involvement of unskilled manpower. Skilled manpower also helps to raise efficiency, decrease the number of accidents, and reduce supervision while increasing organizational stability. Trendle (2008) stated that there are several causes of labour shortages; increases in the demand for labour arising from continuing infrastructural expansion. Hanim (2010) observed that recruitment costs of foreign labour is high owing to payment for the tax, health check, security bond and medical costs leading to labour shortage in Malaysia. Sweis *et al.*, (2008) also indicated that shortage of manpower including skilled, semi-skilled and unskilled labour causes delays in construction projects. This is further endorsed by Sambasivan and Yau (2007) who carried out research in Malaysia and established that labour supply is ranked number seven out of twenty eight causes of construction delay. It indicates that labour supply is the chief cause of delay in the construction industry in Malaysia.

2.6.2 The Availability of Skilled Manpower

The effect of availability of skilled manpower has been adequately reported in the literature with the ever rising pressure on construction contractors to execute projects of high quality, cost and on time (Medugu, 2011). The significance of more skilled manpower in the industry cannot be ignored as they have the possibility of reducing inefficiencies owing to poorly constructed projects.

Bustani (2000) concluded that quality and availability of skilled labour force is considered a vital factor in the effectiveness of the construction sector. The problem of shortage of skilled manpower is a serious threat to the economic wellbeing of many nations around the world. Medugu *et al.*, (2011) mentioned that the shortage of skilled manpower has effect on many areas of construction activities and affects time, cost and quality of work. He noted that the shortage could adversely affect the realization of financial wealth for which such projects are planned. According to Dantong *et al.*, (2011), shortage of skilled manpower is not a shortage of workers; rather it is a shortage of sufficiently trained, skilled, and industrious workers available for particular type of work.

Attar *et al.*, (2012) enumerated reasons for the shortage of skilled manpower such as lack of training and retraining, an aging labour force, and an industry that does not attract youth as potential manpower. Bustani (2011) pointed out that the quality and availability of skilled manpower is considered a vital factor towards the efficacy of the construction sector. Reasons credited for shortages include aging of skilled manpower in the industry, reduction in the number of new entrants into skilled trades, poor financial support and ineffective state of professional education and training / retraining scheme in the country.

Unfortunately, the situation in sub-Saharan Africa shows an acute shortage of qualified employees, although there is an abundant supply of unskilled labour in most African countries (Muya *et al.*, 2006). In a study that analysed the craft skills requirements of Zambia, Muya *et al.*, (2006) found that there is an acute shortage of skilled craftsmen in the industry, and construction firms are not investing in the training of craftsmen due to high employee turnover as firms do not have property rights over human capital. In a similar study in Tanzania, Kikwasi (2011) analysed the employment procedures of several construction firms.

2.6.3 Manpower Training Programme

To sustain economic expansion and growth training for capacity building is crucial since human capital is the most precious asset of any contractor (Long *et al.*, 2012a: Long *et al.*, 2012b). Most contractors focus on the financial gains while, somehow, forgetting those who are really contributing to production of work and profit. Dantong

(2007) observes that these are among the numerous problems of manpower training as most contractors in Nigeria rarely bother about training of their workers.

Onuka *et al.*, (2012) claims that lack of manpower training and re-training programme in construction firms often results in lack of skill, lack of productivity and ineffectiveness. It follows therefore that without a training policy provided by contractors these problems will be imminent. In that study it is recommended that training and manpower development should be viewed as necessary ingredients that assist to improve the outdated nature of the construction industry into a current construction industry through upgrading of workers and manpower development. Labour is a major component of construction work in Nigeria.

Similarly, the attainment of project quality objectives can become a daunting task in a developing country. Kikwasi (2011) reports that one of the reasons for poor quality is the limited opportunity for skilled labour to access formal training. In fact, studies carried out in several countries have revealed that most of the skilled labour force learned their trade on the job or were trained by a relative. The high illiteracy level in sub-Saharan Africa has also made formal training difficult for most skilled tradesmen. In addition, Kikwasi (2011) argues that the quality of work delivered depends mainly on the procurement of appropriate skills for supervision purposes. Kikwasi (2011) contends that poor quality of constructed work and low levels of productivity are among a number of problems affecting project performance in southern Africa.

Unlike in developed economies such as the UK, USA and Germany where operations on construction sites are highly mechanized, construction work in developing countries and in particular Gabon, are still labour intensive. This agrees with a study carried out by Alinaitwe *et al.*, (2007) which ranked incompetent supervisors and lack of skills of the workers as the two most significant causes of low productivity of construction workers in developing countries. Several researches conducted in developing countries on shortage of skilled labour found that the contributing factors include high labour turnover, lack of appreciation function of manpower development, low level of education, lack of training programmes and high cost of training programmes.

In Gabon the Ministry of Public Works Equipment and Construction (MPWEC) has a Public Works Technicians' School (PWTS) in Fougamou whose vocation is to train public works technicians and provide further training. The current state of this infrastructure does not enable it to fully play its role and address sector needs. The complexity and scope of studies and infrastructure works under the Ministry of Public Works, Equipment and construction requires skilled staff and more advanced training. The MPWEC has a coherent training program whose implementation requires support from development partners (ADB, 2007).

2.6.4 The Competence of the Management Team

Many authors attribute project performance to the contractors' competence (Hanson *et al.*, 2003); Iyer and Jha, 2005; Faridi and El-Sayegh, 2006). The competence of the project manager during project implementation will also affect the timely completion of a project. The positive attitude of the project manager and project participants has emerged to be the most important success attribute for quality compliances at project sites (Kenig *et al.*, 2012). The authors additionally observed that some of the attributes that are of high importance are all related to the project manager. These include effective monitoring and feedback by the project manager, project manager's technical capability, and leadership quality of the project manager, effective monitoring and feedback by the project team members. Also reviewed is the authority to take day to day decisions by the project managers' team at site. Furthermore, the success of a project hinges on the efficacy of the project team in managing the process (Olatunji, 2010). This indicates adequate capacity of the project manager as well as the project team to ensure proper inspection on site.

According to McMiniminee *et al.*, (2010), a weak link in the process, such as lack of project management experience, could adversely affect timely execution/timely completion of the projects. When there is no proper inspection/supervision, quality control is greatly compromised. Chism and Armstrong (2010) agree by stating that inspection and workmanship standards are quite important to achieve quality. Fapohunda and Stephenson (2010) state that to achieve the pre-determined project objectives, the construction site manager should have a significant influence over cost, time, scope and quality which make it paramount for the manager to have the ability of exercising authoritative and absolute control.

Wambugu (2013) concluded in a study that inadequate supervision and inspection of work in construction projects led to re-work in instances of poor workmanship and this led to delay in timely completion of projects. This also leads to project cost overrun and may result in project abandonment. Inadequate site inspection is one of the factors identified as causing project delays in timely completions. Proper site identification, inspection and continuous monitoring becomes effective when it is carried out by the present, continuous monitoring, supervision and evaluation but not absentee monitoring and supervisors as witnessed by almost 42% of construction projects in Kenya and Nigeria (Mwangi, 2016).

A study carried out by *Omran et al.*, in 211 road projects in Kenya, southern Sudan, and Malawi states that occasions of rework are mainly attributed to incompetent craftsmen because of insufficient working skills and knowledge of drawings or to incompetent supervisors because of lack of experience leading to deficient supervision. The study clearly emphasized the impact of management and supervision on the overall success of the construction project. If there is no proper

supervision, workers will tend to take a break whenever they desire and work will tend to delay. Timely inspection is of great importance to ensure effective operation, material quality, and timely progress of the project schedule. Subsequent activities on a construction schedule may not be carried out before the required inspection is carried out on the preceding activities. Chai and Yusuf (2013) identify poor site management and supervision as ranking high in the order of causes of construction project delay.

2.7 Organization Structure and Contractor Performance

2.7.1 The Contractor Organization Culture

Organisational culture is in essence the personality of the organization. Cameron and Quin (2006) noted that most organisational observers recognize that organisational culture has a powerful effect on the performance and long term effectiveness of organisations. Organisational culture is vital to the organisation success and performance. According to Sun (2001), organisational culture refers to the pattern of beliefs, values, and learned ways of coping with experience that have developed during the course of an organisation's history, and which tend to be manifested in its material arrangements and in the behaviours' of its members.

Wolf (2002) observed that efficient organization structure has a positive impact in the implementation culture of a firm, it guides the firm's productivity, including the performance process. Clemmer (2003) was of the opinion that organizational structure improves performance. Communication between staff of an organization is improved and leads to better performance of contractors. Walton (1986) associated structure to effectiveness, noting that organization restructuring is designed to boost not only the competence but also the productivity of the construction firm. Poor organization structure of many construction firms in the developing countries have contributed to low production of work and generally poor performance of the contractors. Organizations of both client and contractors should be well designed to alleviate these organization challenges. Task responsibility and decision making is given to individual's members and teams and arrangements are made to plan, direct, organize and control them (Armstrong & Stephens, 2008). Their organization structures must provide the frame in which organization processes achieve the best chance of achieving maximum performance in the interest of firms' objective hence performance of construction industry.

Mintzberg (1983) states that organization structure defines how individuals and groups are organized or how their tasks are divided and coordinated. He defines the organization structure as the sum total in which its labour is divided into distinct tasks and then its coordination is achieved among these tasks. Task allocation should be carried out efficiently in order to improve contractor productivity Atibu (2015).

Ubani (2012) stated that organization structure is the framework adopted to manage the various activities of a construction project or other activities of an organization. A suitable organization structure assists the project organization team to achieve high performance in the project through gains in efficiency and effectiveness. This is supported by a study done Maduenyi (2015) on the impact of organization structure on organizational performance.

2.7.2 Effective Coordination within the Firm

Coordination among departmental heads in a construction firm improves firm productivity. According to Tran and Tian (2013) regarding the purpose of the organization's beginning, they can be described as doing well (profitable) or not a success (non-profitable) ones. To attain these goals, organizations generate inner order and relations between organizational parts that can be described as organization structure. In an organization, the manager establishes the schedule of activities to get the job completed, prepares job descriptions, and organizes staff into teams and allocates them to supervisors (Ganesh, 2013). He fixes schedules and establishes standards of performance.

Defined work plans assist organization processes in achieving maximum performance in the interest of the firm's objective hence performance of construction industry. Winfred (2011) reports that an appropriate managerial structure could support teams in management in attaining enhanced performance in the project by increasing in productivity. Individual members including teams should be involved in decision making enabling specific project objectives to be achieved at the end of each project. Yinghui and Cheng (2004) studied the impact of organizational structure on project performance which was limited to the construction site. Poor performance has been attributed to lack of proper coordination among staff in road construction contracts.

2.7.3 The Types of organisational structures

The complexity of the construction industry demands appropriate coordination of activities and resources. This is driven through structured management systems unique to specific establishments Project Management Institute (PMI,2005). Larson and Gobeli (1989) argue that project success is influenced by the nature of project management structure. They observed that this influence is in the magnitude of 7% - 22% of the factors that affect project performance. There are three types of project management organisational structures: Functional organisations, Projectised organisations and Matrix organisations (PMI, 2005), Larson and Gobeli, 1989).

2.7.3.1 Functional organisations

Jameson (2007) states that a functional organisation is structured hierarchically with a strong concept of subordination. Specialisation is centralised. Each job becomes the focal point of the functional unit or department. Similar skills are classified into one unit or department. Each department concentrates on its core activities. Resources are allocated according to each department's needs and roles. This type of organisation gives the Project manager restricted authority. The ultimate authority lies with the top management. Most companies in the modern era rely on this type of structure. Jameson (2007) outlines the benefits of functional organisational structure as follows:

- The chain of command is linear and sound.
- Concentrated tutoring, leadership and guidance consistently nurture the human resources' abilities.
- Grouping of similar professionals together enhances development of professional expertise.
- The structure provides an easy path for the employees to grow within the organization sideways as well as upwards in the organization tree.

Jameson (2007) gives the under listed drawbacks of functional organizational structure

- Slow decision making process lead to slow speed in resolving problems therefore may causes inefficiency in the system
- Grouping of similar skills together leads to lack of broader vision of the overall organization objectives
- There is a complication in the flow of communication and information synchronization between functional units

Ferraro (2012) states that projects undertaken in functional organizations under achieve their objectives by between 20%-70%. He mentions that managers of projects in these types of organization are regarded as project coordinators because they represent the management of their establishment on issues relating to projects but are not given the authority to make decisions as illustrated in the figure 2.2.

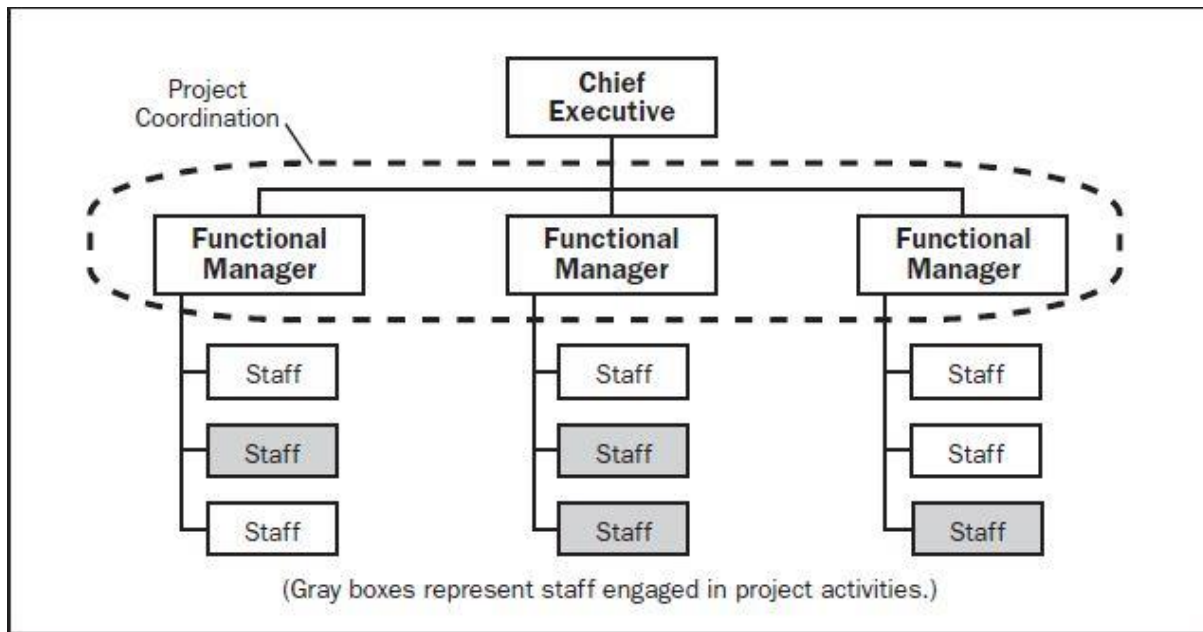


Figure 2.3: Functional Organization Structure (Source: PMI, 2013)

2.7.3.2 Projectised Organization Structure

Projectised organisations carry out their activities around projects and programmes. Their managers have authority over resources relating to the project (Larson and Gobeli, 1989).

The project manager is responsible for planning and implementing an assigned project up to its completion using relevant skills and resources. He selects his team and receives relevant resources to execute the project. The team members are loyal to the Project Manager.

There is little or no bureaucracy in this type of organization. In fact, most private contracting firms operate this type of organization structure illustrated in figure 2.3.

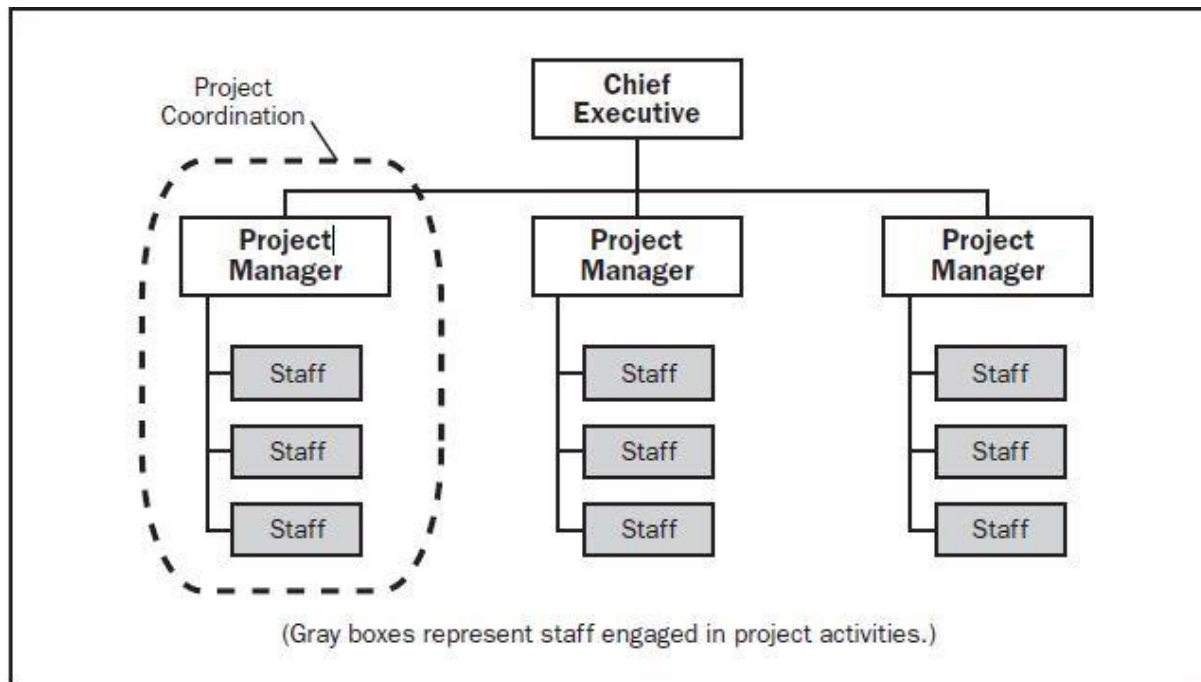


Figure 2.4 Projectised Organization Structure (Source: PMI, 2013)

2.7.3.3 Matrix Organization Structure

In a matrix organization structure the project manager exercises some form of authority over the project. There are two channels of lines and along the project lines. Katz and Allen (1985) observed that there is a tendency for projects to perform better in matrix organization than in the other organization. This is because in a matrix organization the benefits of the other two types of organization are shared while their disadvantages are reduced. In a matrix organization, the project manager shares equal authority with the functional manager.

The Project Manager is responsible for what is to be done, and the functional manager on how things are to be done. This calls for collaboration among them to ensure actualisation of the projects objectives. This type of organization, illustrated in figure 2.5, is mostly operated by multinational companies.

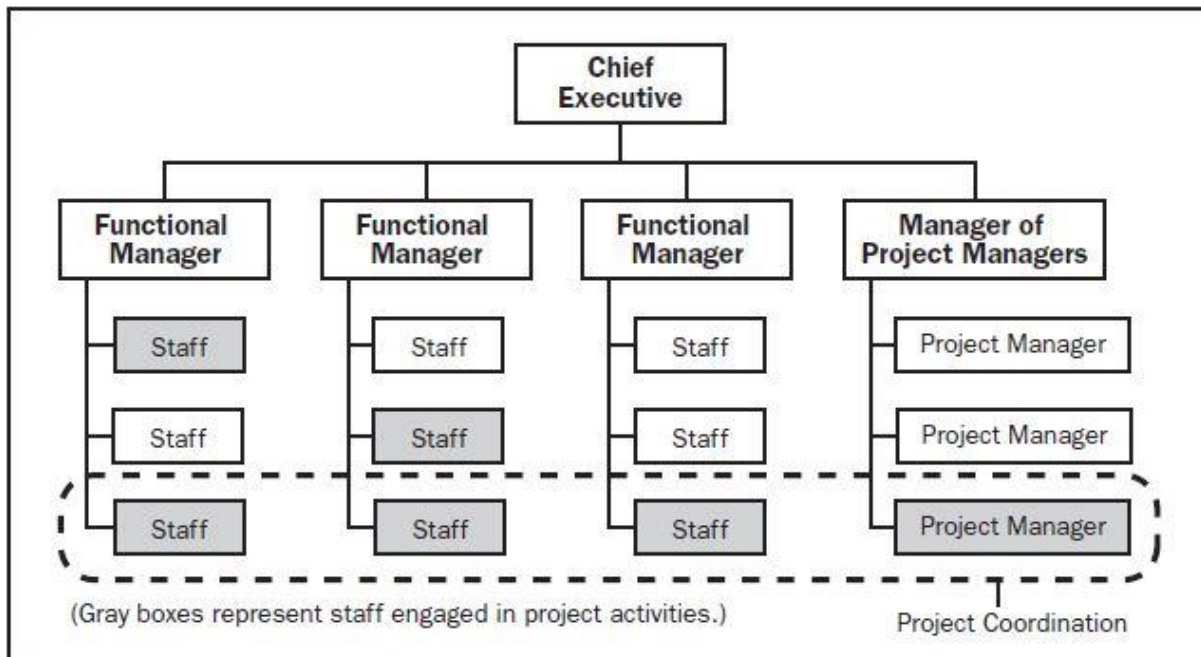


Figure 2.5: Matrix Organization Structure (Source: PMI, 2013)

2.8 Client Support and Contractor Performance

2.8.1 Definition of Client Support

Latham (1994) maintains that clients have a substantial role to play in setting demanding standards and insisting upon improvements. The Business Round Table (1994) maintains that cost effectiveness has been enhanced when clients have exercised leadership and when there has been client/contractor co-operation. Client support includes the implementation of the role that a client is expected to play to ensure timely and cost effective completion of road projects which has a bearing on performance of contractors. Such roles include but are not limited to; provision of accurate project designs, budget allocation and prompt payments of interim progress payments, prompt issue of instructions to commence the construction work, prompt approvals of variations to the contract, early land acquisition of areas required for the construction of roads, ensuring stakeholder involvement, project supervision to ensure quality including achievement of value for money and timely taking over inspection and certification of works once project is completed.

To improve cost effectiveness requires clients to budget for the project as one of their main roles. The impact of design on contractor performance is universally acknowledged. Effective organization of the design process is crucial for the success of projects. This includes, among others, the development of an accurate design brief to confirm client requirements and integration of the work of designers, variations, which result in out of order operations (Lathan, 2004). Generally, construction projects will present several instances that bring about variations.

2.8.2 Client Processing of Invoices

One of the most important client support role is the payment for work done by a contractor in a project initiated by the client. Both Siti and Rosli (2010) illustrate payments in the construction industry as “a monetary consideration for the contractors” performance for work done”. According to Kenyatta *et al.*, (2015) cash flow is undoubtedly the bloodline that drives projects in the construction industry. Any obstruction in its smooth flow may therefore lead to an undesirable outcome. The conclusion of their study was that, non-payment to contractors in the form of late payments of one or more certificates, underpayment, intermittent payments and non-payment have resulted to cash flow challenges to contractors, late completion of projects, construction disputes and even liquidation (Alinaitwe *et al.*,2013) .

Kenyatta *et al.*, (2015) reviewed the case of Kundan Singh Construction International Limited vs Commercial Bank of Africa Kenya Ltd, (2015) and another, where the contractor borrowed project funds from commercial banks on the strength of the awarded contracts from the government. The contractor went into liquidation due to failure of the client to pay. Dissanayaka and Kumaran (1999) noted that the cost of providing adequate financing can be quite high and therefore governments or owners of projects should allocate more budgets to the projects to enable their completion. This is critical because otherwise the project cannot continue without adequate financing, which in turn affects the performance of contractors to meet planned targets (Ibironke *et al.*, 2013).

The government is also responsible for approval of the projects which facilitates contractor performance. The government approves the cost, the design and the different phases of the project being implemented. This also affects the project construction period. Variations in the scope of project naturally increase the cost of the project and normally lead to both cost and time overruns. When the scope increases it requires the client to budget for the extra cost of increased work. This in itself has the potential to cause disputes, arbitration costs, litigation and project abandonment and claims on prolongation costs which lead to distortion of project budgets. Insufficient support causes project costs overrun. Tran and Carmichael (2013) concluded that late and intermittent payments and/ or non-payments can critically affect performance of contractors.

Fleming and Koppelman (2008), Ramachandra (2013), Uff (2009), Ansah (2011) and Ashworth (2012) observed that the character and the diverse types of contractual payments that might be delayed or defaulted by the employer may additionally be classified as interim, stage or milestone, advance payments, payment of retention monies and final payments. These factors influence contractor performance mainly in the road sector where the majority of the projects are financed by the government as the client.

A review of the critical challenges faced by Kenyan contractors by (ProInvest, 2011), noted that payments were delayed for more than 5 years from government clients with very high likelihood of going out of business due to late payments. Cash flow problems may drive a contractor into bankruptcy with the penalty of abandonment of the project work (Uff, 2009). A related but separate survey in Ghana seems to confirm this view, where financial difficulties was ranked among the top three most probable effects of late payments to contractors (Ansah, 2011). While in Malaysia it was likewise reported that financial difficulties arising from late payments were top among the three most severe effects of late and non-payments, (Danuri, *et al.*, 2006).

2.8.3 Client Decision Making

Mwangi (2016) observed that the prompt issue of instructions to contractors to commence the works is considered vital to facilitate implementation of construction works within the market prices at the time of tendering. Client delays in the issue of instructions to commence the works puts the contract to fluctuation in the cost of materials and labour which have an effect on the total cost of project. This eventually influences the performance of contractors due to the need for additional unforeseen resources. Fluctuations in prices can be brought about by changes in legislation of a country or depreciation of currency in use and also inflation, among other factors. For a project to commence and progress as planned there is a need for contractors to be given maximum support, for example, possession of land for the construction without any encumbrances (Desai, 2013; Memon, 2014).

The process of land acquisition in Gabon is both challenging in terms of the process as well the cost of the land. The Constitution of Gabon 2010 requires the project-affected persons to be compensated in terms of payment before the government takes possession of their land (ANGT, 2012). This has presented severe challenges to the implementation of projects and has caused serious delays to completion of projects in view of the fact that land has become very expensive and the government does not budget adequately for the compensation payments. Failure to get possession of land has meant that contractors have to wait for inordinate periods without adequate activity and use of equipment which remain idle hence heavy cost implications to them causing them to perform poorly on the project Dolage and Rathnamali (2013).

Supervision and/or management of road projects is an important client support role without which the Value For Money (VFM) cannot be assured. This includes checking of work quality according to the required standards and specifications and approval of various activities and materials as construction progresses. This role by

the client can be undertaken in-house by the client or outsourced to private consultants depending on the complexity of the construction or inadequate capacity of the client. Poor supervision or project management leads to overrun in cost and completion time of projects which directly impacts performance of contractor Baloyi and Bekker (2011).

2.8.4 The Stakeholders Influence

Mbaabu (2012) observed that stakeholders' involvement is paramount in development projects. Stakeholders' involvement aids in smooth project implementation. He opined that stakeholder participation is warranted when decisions on complex situations with far-reaching impacts on the project area are to be made by clients. According to Hartman (2000), stakeholder satisfaction is an indication of project performance. The stakeholder participation should be done proactively, rather than in response to a problem to avoid unforeseen problems. It is the client's responsibility to involve the stakeholders in good time to avoid delays in the project. The stakeholders could include the community where the project road is being constructed, agencies providing water, electricity, and communication systems, national and rural roads including county governments (Kholif *et al.*2013).

According to Mbaabu (2012), the Constitution of Kenya (2010) empowers citizens with the right to participate in matters that affect their lives. If stakeholder participation is not handled appropriately it could have serious impact in performance of contractor. Stakeholders are individuals or organizations who influence project execution or who are influenced by its implementation and outcome. They are people or organizations who have investments or interests in the project.(PMI, 2005) Mintzberg (1995) comments that stakeholders interact with the project through the forces of conflict and cooperation. Therefore, balancing these forces is vital to project success it therefore implies that project success depends on the extent to stakeholders are satisfied and are made to cooperate with each other (Odeyinka and Yusuf 1997). Stakeholders could be internal or external.

Internal stakeholders are those directly involved in the project execution they include project managers, project team, project sponsor or clients, consultants and contractors. External stakeholders are those who are not directly involved in projects execution but their action influence projects executions. Examples of external stakeholders are communities and political leaders in the project location. Stakeholders' conflicting interest is a major challenge against timely completion of projects as it affects the contractor performance (Odeyinka and Yusuf, 1997). The onus lies on the project manager to apply skills and relevant resources to manage stake holders effectively. (Nyandika and Ngugi, 2014) conducted a study on the effect of the stakeholder's participation on the performance of road contractor in Kenya the study revealed that enough financial resource, donor support, availability

of human resource and provision of resources on time influence positively to the performance of road projects .

Newcombe (2003) proposed two principles to effective management of stakeholders:

- A Project Manager must treat all stakeholders fairly and ensure that projects objectives drive every action.
- Project Manager must at all time act as an agent of all stakeholders.

Most causes of project delays and poor contractor performance are directly or indirectly connected to the stakeholders (Odeyinka and Yusuf, 1997). Stakeholders' involvement is paramount in development projects. Even though, minor decisions and emergency situations are generally not appropriate for stakeholder participation, a complex situation with far-reaching impacts warrant stakeholder involvement and when done proactively, rather than in response to a problem, helps to avoid problems in the future (Maina, 2013). They may also exert influence over the projects objectives and outcomes. This influence is high at the beginning of the project but decreases as the project progresses, however, the impact of the stake holders influences on projects increases as the project progresses this is represented in fig below 2.6

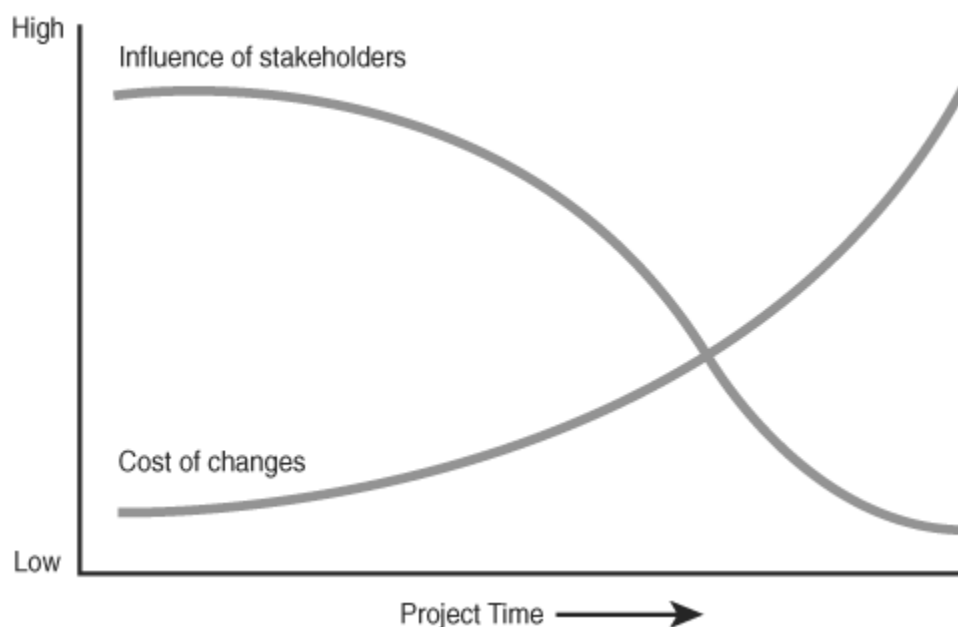


Figure 2.6: Stakeholders' Influence (PMI, 2013)

2.9 The Conceptual Framework

The Conceptual Framework gives a depiction on how the variables relate to each other. The variable distinct here is the independent, dependent and moderating

variable. Independent variable affects and determines the effect of another variable. The independent variables in this study are working capital, skilled manpower, organization structure and client support. The dependent variable is contractor performance in the road sector. The moderating variable is measured and manipulated to discover whether or not it modifies the relationship between the independent variable and dependent variable. Government policies and construction laws are identified as moderating variables. Performance of contractors could be researched and examined by means of many indicators of performance, articulated by factors such as quality, time, client satisfaction cost, including environmental impacts, safety and health. The conceptual framework is shown in Figure 2.7

Independent variable

Moderating variable

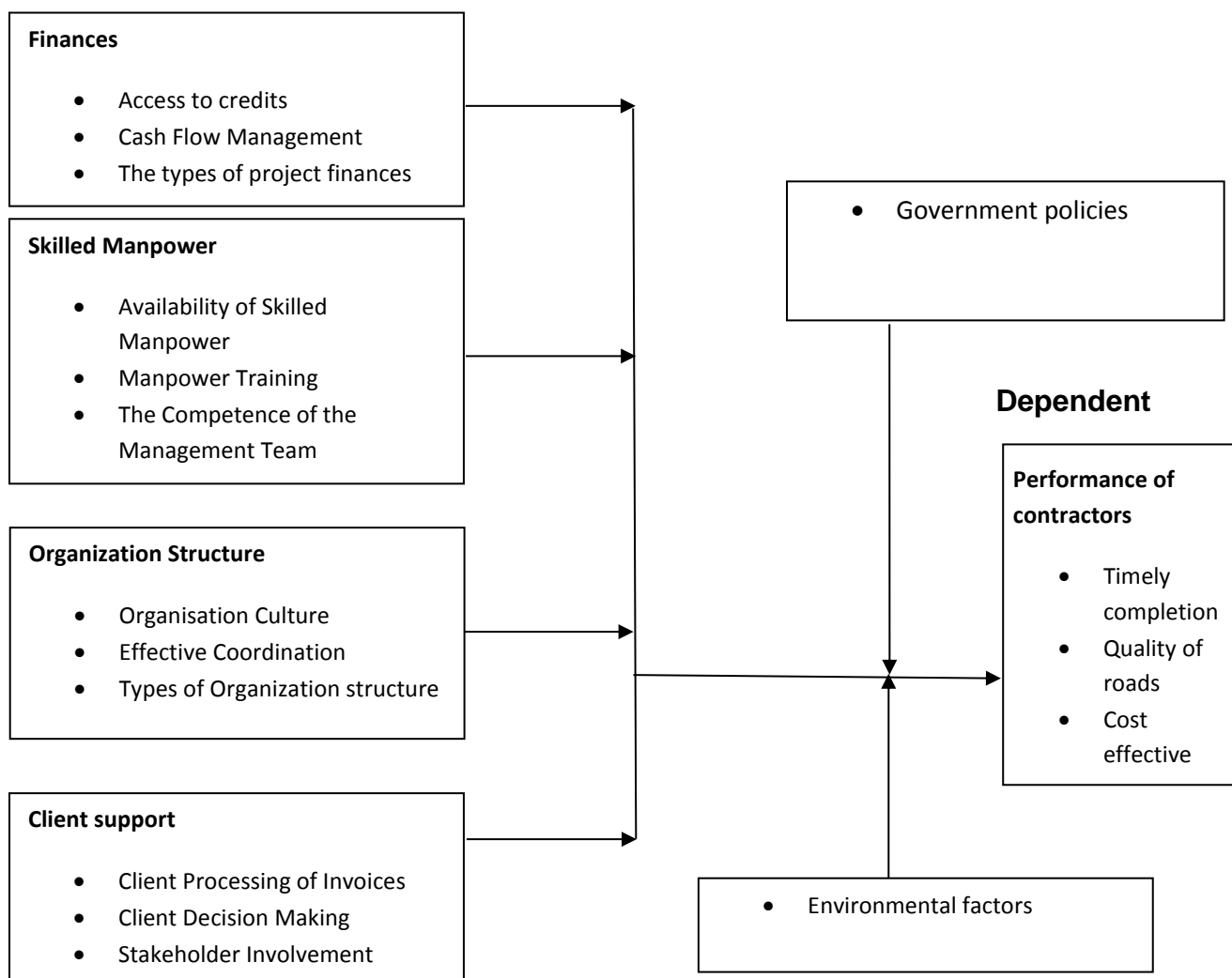


Figure 2.7: Contractor Performance Conceptual Model

There is a vast amount of literature on factors influencing performance of contractors in many developing countries as illustrated in table 2.1

Table 2.1: Summary of Literature Review

Authors	Study Title	Findings	Knowledge Gap
Sweis <i>et al.</i> , 2014	Factors affecting contractor Performance on Public Construction Projects	Financial difficulties, manpower shortages, excessive owner change orders, are leading factors directly affecting contractor performance on construction projects	Study was undertaken in Jordan and it did not specify any construction sector. There is therefore a need to do for a specific construction sector
Ofori <i>et al.</i> , 2014	Factors affecting Ghanaian Contractor Performance	Access to credit, lack of capacity to compete with foreign contractors, low technology, poor project preparation and contracts awarded based on political considerations had the greatest effects on performance of Ghanaian contractors	It was carried out in Ghana as an industry-wide survey which did not specify any construction sector. There is therefore a need to do for a specific construction sector.
Muguiyu (2012)	Factors Influencing Performance of Contractors of Government Funded Building Projects in Kirinyaga County, Kenya	Human resource conditions and design quality aspects are the prime factors that affect contractor performance	It focused on building contractors in Kirinyaga County. There is a need to carry out a similar study for the road construction sector
Kahura (2014)	Factors influencing effective and efficient delivery of road construction projects. A case of	He concluded that benchmarking, inappropriate procurement system, time, information	The study focused on delivery of road construction projects. There is need for a refined

	Nairobi county.	technology and poor project management influence effective and efficient delivery of roads construction projects	explanation on factors that affect contractors" performance in road construction sector
Kamanga and Steyn (2013)	Causes of delay in road construction projects in Malawi	The shortage of fuel, insufficient contractor cash - flow, shortage of foreign currency for importation of materials and equipment, slow payment procedures adopted by the client in making progress payments, insufficient equipment, delay in relocating utilities, shortage of construction materials, delay in paying compensation to land owners, and shortage of technical personnel	The study focuses on Government road projects only a similar studies should be carried out on PPP and private projects
Ondari,& Gekara(2013).	Factors influencing successful completion of roads projects in Kenya	The study concluded that the Ministry lacks the necessary human and financial capacity to implement projects in a timely manner. It recommends the need for the Ministry to review its strategies with a view to further enhancing commitment in the areas of management support, design specifications, The contractor's	The study was carried out in Kenya and did not specify the sector there is a need specify the sector

		supervision	
Atibu(2015).	An investigation into factors causing delays in road construction projects in Kenya	payment by client, slow decision making and bureaucracy in the client's organization, inadequate planning, project scheduling, and delays caused by rain	The study was carried in Kenya
Gacheru (2015)	Determinants of projects delay in the in the construction industry inKenya;The case of selected road projects implemented by Kenya National highways authority in Kenya's coast region	Finances, planning ,contractors experience, supervisor competence	The study focused on selected road projects implemented by Kenya National highways authority a similar study should be conducted for other government projects
Mwangi (2016)	Factors Influencing the performance of contractors in the road construction sector:Case of selected contractors in Kenya	Working Capital, Skilled manpower, Organization structure ,client support	The study only focused on selected road projects in Kenya .A similar study should undertaken for all road country wide
Wafula (2017)	Factors influencing road projetcs performance in Kenya: A case of road contractors in Machakos County	Capital availability,managerial skills,organisational culture and technical skills	The study focused on road construction in the Machakos County
Wambui et al., 2015	Factors Affecting Completion of Road Construction Projects in Nairobi City County: Case Study of Kenya	Project Equipment, Project Managers Competency, Project Funds, Project Technology.	The study focused on roads in Nairobi under the Kenya urban roads

	Urban Roads Authority		
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2.10 Summary of Literature Review

The review of the literature revealed that many studies were conducted on factors affecting the performance of contractor in West and East Africa (Mwangi 2016; Ofori *et al.*, 2014; Wafula, 2017; Wambui *et al.*, 2015) however very few studies have been conducted within the Gabonese construction road sector. The local study like (ANGT, 2012) did not extensively highlight the importance of the manpower training programme on the contractor performance. The researcher reviewed the literature based on the study objectives in question. This was done to establish what are the underlying concepts in the area as well as what other researchers have found in their previous studies. The chapter also presented a theoretical review: the study was grounded on Agency theory as one in which one or more principal (s) engages another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent. The conceptual framework was outlined showing the relationship existing between independent variables and dependent variables under study.

CHAPTER THREE: RESEARCH DESIGN METHODOLOGY

3.1 Introduction

This chapter gives the details of the research approach. The research design is explained and illustrated. The target population is described as well as data collection instruments. Also included in the chapter is data collection procedures, methods of data analysis, and ethical issues observed in the research.

Trochim (2006) suggests that an appropriate research methodology should provide solutions to the statement of the problem and produce results that would meet the research objectives. This chapter gives a description and justification of the procedures and instruments utilised to conduct the research. It also discusses the approach adopted to analyse the research data.

3.2 The Research Process

According to Unwana (2012) research consists of the application of several processes and skills to investigate a problem in order to proffer scientific solutions. It is a complex endeavour and thus requires proper coordination of activities and available resources. This research is a project characterised by specific objectives and end date, therefore, a summary of the research process is illustrated in the table 3.1

Table 3.1: The Research Program

Research Sequences	Delivery
Define Goals and Objectives	The first step to conduct the research was to define specific, measurable and achievable goals and objectives
Survey the Existing Literature	Preliminary review of relevant literature that could address the research objectives was carried out
Design an appropriate methodology to be adopted in the study	Steps and tools required to carry out the research were listed. Frameworks for the research processes and procedures were considered
Determine the feasibility	Availability of financial, technical, time and other resources were considered to determine the research scope
Develop Instrument	Questionnaire was developed after review of literature on the research objectives, and survey design
Conduct Pilot Test	Pilot survey was conducted on 4 members of staff involved in road construction at the National Agency of Public Works in Gabon.
Revise the Instrument	Inputs from the pilot study were used to

	produce a revised questionnaire for data collection
Select Sample	Professional involved in road project were randomly selected as research participants
Questionnaires Administration	Questionnaires were hand-delivered or emailed to research participants
Collect Responses	Completed questionnaires were collected for data entry analysis and report presentation
Analyse Data	Data were categorised, tabulated and analysed using statistical tools
Present the Research Report	A research report was presented using guidelines stipulated by the faculty of engineering and the built environment at the university of the Witwatersrand

3.3 Types of research methodology

Research methods are broadly classified as quantitative and qualitative methods. A particular research could involve a combination of the two methods (Fellows and Liu, 2003). When the two methods are combined in a research study for the purpose of cross-checking findings, it is called triangulation (Holden and Lynch, 2004). In a research study, data collection may be qualitative but analyses could be quantitative. It all depends on the research objectives (Aiyetan, 2010). The mixed design method approach is used in this study to have a more in-depth information and knowledge of the delay factors affecting roads construction as well as provide rich datasets. It also assists to increase findings reliability and credibility through the triangulation of the difference evidence results. Through this a reliable generalisation of the study findings can be proposed. The data collection through questionnaires and the Chi-Square statistical data analysis has helped in assessing the effect of the delays factors on the contractor performance. The differences between the two types of research methodologies are shown in the table 3.2

Table 3.2: Comparison of Quantitative and Qualitative Research

	Quantitative	Qualitative
Philosophical foundation	Deductive, reduction list	Inductive, holistic
Aim	To test pre-test hypothesis	To explore complex human issues
Study Plan	Step-wise, predetermined	Iterative, flexible
Position of the Researcher	Aims to be detached and objective	Integral part of the research process
Assessing quality of outcomes	Direct tests of validity and reliability using statistics	Indirect quality assurance methods of trustworthiness
Measures of utility of results	Generalizability	Transferability

(Source: Marshall, 1996)

Improper matching of methodology to a research problem might produce spurious results which could have negative impacts on the researcher's professionalism and the authority of research science (Holden and Lynch, 2004). Therefore, none of the two methods is superior to the other. What is important may include: suitability of the chosen approach to address the research objectives, characteristics of the research subjects, and the environment in which the research is conducted (Hughes and Sharrock, 1997).

3.3.1 Quantitative research methodology

Quantitative methods involve data collection through measurements, observations and using existing quantitative data. Quantitative methods came from the objectivity school of thought. Remenyi, *et al.*, (1998), remark that in a quantitative methodology, a researcher sets up a study so as to reject or not reject hypothesis. The research starts with a review of existing theory and proposition of hypothesis based on established truths. Data is then collected using appropriate instruments. The results from the data analyses can then validate or reject the pre-determined hypotheses. Generalizations are therefore drawn from the results. Holden and Lynch (2004) describe quantitative methodology as a hypothetico-deductive approach. Researchers adopt quantitative methods whenever they want to gain an understanding on "what phenomenon" is occurring (Denzin, *et al.*, 2005).

3.3.2 Qualitative research methodology

Qualitative approaches use inductive reasoning. Here, a researcher starts the investigation by making generalizations, and propounds hypothesis or theory based on the findings. The inferences due to pattern(s) observed from the results. Qualitative methods are used to gain insight into people's motivations, beliefs, behaviours, concerns, value system, culture or lifestyles. Qualitative approach helps a researcher to obtain in-depth information or insight about a phenomenon of interest. It is used to inform business and policy decisions and to conduct research (Ereaut, 2011). It is subjective in nature (Remenyi, *et al.*, 1998). Trochim (2006) refers to qualitative research methodology as a "bottom up" approach of conducting research. Lynch (2004) describes qualitative approach as "interpretativism". The advantage of qualitative method over quantitative approach is that, it provides research participants an opportunity to explain phenomenon from their own point of view. Denzin, *et al.*, (2005) and Leedy, (1997) argue that qualitative research methodology is used to determine "why" and "how" a phenomenon exists.

3.3.3 Data Required and Source of Data

For the purposes of obtaining reliable data 65 questionnaires which were administered to various categories of respondents and the results analysed. Out of the 65 questionnaires sent, 54 were received giving a return rate of 83% of the questionnaires issued.

Unwana (2012) stated that people are generally very busy; therefore, in designing a questionnaire, a researcher must ensure that questionnaire completion will not require unnecessarily long time. This could be achieved when factors to be investigated are adequately researched; and presented in a clear and precise manner hence the research questionnaire was only presented the most prominent factors affecting the road construction delivery.

According to Unwana (2012) when the study objectives are of interest to the respondents, they could spend more time than usual to provide required answers. The participants in this survey were project professionals who desired solutions to improve the delivery of roads construction thus the respondents return rate of 83% percent was achieved as participants demonstrated a high interest in improving the successful completion of roads project in Gabon.

3.4 Research Design

Research design is the scheme, outline or plan that is used to generate answers to research problems. This research problem was studied through the use of descriptive research design. According to Kothari (2007), descriptive survey research design is a type of research utilized to find data that can assist to establish the exact character of a cluster. A descriptive survey involves getting answers to

questions (often in the form of a questionnaire) from a large cluster of persons either by mail, telephone or in person. According to Nardi (2018), the main benefit of descriptive survey research is that it contains potential to grant us a lot of information from a fairly huge sample of individuals. Using the research design, this study focused on acquisition of quantitative and qualitative data from a cross-section of people involved in the road construction sector (Creswell, 2017). The researcher used simple random sampling procedure to select a sample that represented the entire population. This procedure will be preferred since all the target population had an equal chance of being selected.

3.5 Target Population

According to Borg and Gall (2009) target population is a universal set of research of all members of actual or imaginary set of people, events or objects to which an investigator wishes to generalize the result. The target population of this study were the road contractors in Gabon participating in project implemented and supervised by the National Agency of Public Works. Mugenda and Mugenda (2003) explained that the target population should have observable characteristics to which the study intends to generalize the result of the study. This definition assumes that the population is not homogeneous. ANGT (2012) report on road contractors in Gabon indicated there are less than 10 contractors registered for the road construction sector. The target population in this study are professionals directly involved in the road construction and ANGT employees assigned to the road construction. The total number of contractors and ANGT employees made up the target population of 65 professionals as shown in Table 3.3 below:

Table 3.3: Target Population

Category	Frequency	Percentage
ANGT Engineers	9	13.8%
ANGT Project Managers	7	10.76%
ANGT Planners	5	7.69%
Contractors Project Managers	10	15.38%
Contractors Site Managers	12	18.46%
Contractors Planners	8	12.30%
Contractors Site Supervisors	14	21.53%
Total	65	100%

3.6 Sampling and Sample Size

This section presents the methods and techniques that were used for sampling, the procedure of sampling and eventually how the final study sample was reached from the target population and the details of how data was obtained, processed and analysed.

3.6.1 Sample Size

The sampling frame describes the list of all population units from which the sample will be selected (Fugar and Adwoa, 2010). Sampling is selecting a given number of subjects from a defined population as representative of that population. From the target population of construction professionals involved in road construction projects and registered with ANGT and other participants, the researcher purposively sent questionnaires to specific respondents working in specific areas concerned and handled by ANGT in Gabon. These respondents having been in construction sector and directly working in the selected roads projects supervised by the national agency of Public Works therefore aligned to the study research objectives hence the research implications and recommendations will become a useful in the successful completion of road projects in Gabon.

3.6.2 Sampling Procedure

The sampling procedure describes the list of all population units from which the sample will be selected (Fugar and Adwoa, 2003). It is impossible to access every member of a population being studied. A researcher is required to select an appropriate and adequate number of participants from a research target population. This process is called sampling (Trochim, 2006). Sampling enables a researcher to make generalisations to cover the whole population of the study. Therefore, sample selection must be appropriate in size and characteristics. This contributes to credibility of a research (Walonick, 1997).

The study makes use of questionnaires which were sent to the people concerned with roads construction since the number is small. Sample of responding staff was drawn from all contractors involved in the construction of the roads supervised by the ANGT. Hence stratified random sampling technique was used in coming up with a sample size of respondents from a total of respondents from specific individual concerned in road construction. Contractors Projects Managers, Site Mangers, Projects Planners, Site Supervisors from Libreville region. Gay (2001) pointed that a sample of 10-40% is representative.

In this study, 83% of the sample was considered. The technique applied so as to obtain a representative sample of 54 respondents when the population does not constitute a homogeneous group. In stratified random sampling, subjects are selected in such a way that the existing sub-groups in the population are more or less represented in the sample (Mugenda and Mugenda, 2003). The table 3.4 illustrates the number of respondents:

Table 3.4: The Respondents

Category	Frequency	Percentage
ANGT Engineers	8	14.8%
ANGT Project Managers	7	12.96%
ANGT Planners	3	5.55%
Contractors Project Managers	8	14.81%
Contractors Site Managers	8	14.8%
Contractors Planners	7	12.96%
Contractors Site Supervisors	13	24.07%
Total	54	100%

3.7 Research Instruments

The instruments used in this study include questionnaires administration. Primary data was collected by the use of questionnaires. The questionnaires were used to collect data from the respondents. The questionnaires were divided into subheadings that touched on the basic information of the respondents, the items on objectives as discussed in the literature. Walonick (1997) suggests that items in structured questionnaires must be exhaustive; otherwise the instrument may not generate sufficient data to address the research objectives. In this study piloting was done to test the validity and reliability of the instruments.

According to Starbuck and Mezias (1996) perceptions are influenced by biases, inclinations and experiences of respondents in a study. The instruments were piloted with selected respondents and the procedure repeated. The respondents of whom the piloting was done are part of the study sample to avoid biased results of the study. Both open-ended and close-ended questions were used since the respondents involved are learned and being given the freedom to give the wider view of their thinking did not compromise the findings. The questionnaire was administered by the researcher.

3.8 Piloting the Research Instruments

The questionnaire was reviewed by the research supervisor and then tested on a small pilot sample of respondents with similar characteristics as the study respondents. The pilot sample consisted of 4 members of staff involved in road construction which were selected randomly. The piloting was done in Gabon. Piloting helps in revealing questions that could be vague which allows for their review until they convey the same meaning to all the subjects (Mugenda and Mugenda, 2003). Validity and reliability are two important factors to consider in a research instrument (Leedy and Ormrod, 2005).

Creswell (2003) notes that validity is about whether one can draw meaningful and useful inferences from scores on the instrument. Validity is therefore about the usefulness of the data and not the instrument. There are different types of validity: Face validity, content validity and criterion related validity (Mouton, 2001). In face validity, a researcher employs his judgement to scrutinize and modify questions to be answered to ascertain their suitability to the research objectives. In content validity, the researcher relies on experts' judgement and literature searches to ascertain if an instrument provides adequate coverage of a study. Criterion-related validity involves the use of mathematical model to predict the dependent variable or groups of variables in a dependent/independent variable relationship (Leedy and Ormrod, 2005). Response options were provided for most of the questions to ensure that the answers given are in line with the research questions they are meant to measure.

3.9 Reliability of Research Instruments

Reliability indicates the extent to which an instrument could be used repeatedly in similar research without errors in the results. It is a measure of the consistency of a research instrument (Creswell, 2002). According to Marshall (1996), reliability of the interval is a function of how representative a sample is, as regards to the entire population and the various subgroups expected to be investigated. In a qualitative study, a research instrument could be considered reliable if can be used repeatedly without giving variance results (Trochim, 2006).

For a quantitative data, reliability can be estimated statistically by calculating Cronbach's Alpha coefficient (α) for the factors investigated. Cronbach's Alpha coefficient (α) is a measure of internal consistencies or how closely related a set of items are, in a group of factors being investigated. It is determined for questions with two possible responses or multi-scaled questions such as those with Likert scales. Nunally (1978) gives the lowest acceptable reliability as 0.7. However, his earlier works gives lower values. Aiyetan (2010) gives an interpretation of the alpha (α) values as stated below:

- Alpha values less than 0.5 imply poor reliability.

- Alpha values between 0.5 and 0.7 indicate sufficient reliability.
- Alpha values above 0.7 imply good reliability.

Reliability is concerned with the question of whether the results of a study are repeatable. A construct composite reliability co-efficient (Cronbach alpha) of 0.6 or above, for all the constructs, was considered to be adequate for this study. The acceptable reliability coefficient is 0.6 and above (Rousson *et al.*, 2002). Cronbach Alpha was used to test the reliability of the research instrument.

3.10 Data Collection Procedure

After approval of the Proposal by the University of the Witwatersrand to collect data, the researcher coordinated data collection process after seeking permission from ANGT. The researcher emailed questionnaires to selected employees of the ANGT while some questionnaires were administered face to face to contractors.

3.11 Data Analysis Techniques

The study generated both qualitative and quantitative data. Quantitative data was coded and entered into Statistical Packages for Social Scientists (SPSS Version 20.0) and analysed using descriptive statistics. Qualitative data was analysed based on the content matter of the responses. Responses with common themes or patterns were grouped together into coherent categories. The hypothesis was tested using the Chi-Square as illustrated by the performance indicators table 3.5 below.

Table 3.5: The Contractors Performance Indicators

Research objectives	Independent variable:	Indicators	Level of Scale	Level of Analysis
To establish the extent to which construction project financing factors influence the performance of contractor	Projects Financing	Access to Credits. Cash Flow Management. Types of Finances. Financial Management	Ordinal scale	Descriptive Central Tendency
To investigate the extent to which the skilled manpower factors influence the performance of roads	Skilled Manpower	Availability of Skilled Manpower Training The competence of supervisor	Ordinal Scale	Descriptive Central Tendency

contractor				
To find out the extent to which extent contractor's organization structure influences the contractor performance	Contractors organizationa l structure	Organization Culture Effective Coordination within the firm Types of organization structure	Ordinal Scale	Descriptive Central Tendency
To find out the extent to which extent does the client support structure influences the contractor performance	Contractors organizationa l structure	Stake holders Involvement The processing of invoices The client decision making	Ordinal Scale	Descriptive Central Tendency

3.11.1 The Chi-Square Method

The Chi-Square statistic is most commonly used to evaluate tests of independence when using a cross tabulation (also known as a bivariate table). Cross tabulation presents the distributions of two categorical variables simultaneously, with the intersections of the categories of the variables appearing in the cells. The test of independence assesses whether an association exists between the two variables by comparing the observed pattern of responses in the cells to the pattern that would be expected if the variables were truly independent of each other. Calculating the Chi-Square statistic and comparing it against a critical value from the Chi-Square distribution allows the researcher to assess whether the observed cell counts are significantly different from the expected cell counts.

The calculation of the Chi-Square statistic is as follows:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where O_i = the Observed frequency (the observed counts in the cells)

And E_i = the Expected frequency if NO relationship existed between the variables

As depicted in the formula, the Chi-Square statistic is based on the difference between what is actually observed in the data and what would be expected if there was truly no relationship between the variables.

a) Calculation of the Expected Frequency

The calculation of the Expected numbers for each individual cell is done by multiplying the row sum by column sum and dividing by the total number.

b) Calculation of the Degree of Freedom

$DF = (\text{Number of Rows} - 1) \times (\text{Number of Columns} - 1)$

c) The significance level Alpha

The significance level, also denoted as alpha or α , is the probability of rejecting the null hypothesis when it is true and it varies between 1 and 10 percent. For example, a significance level of 0.05 indicates a 5% risk of concluding that a difference exists when there is no actual difference. The Chi-Square test is used for the data analysis to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories. The purpose of the test is to evaluate how likely, the observations that are made would be, assuming the null hypothesis is true.

3.12 Ethical Issues

Ethics in research should be viewed as integral part of the research planning and implementation, not viewed as an afterthought or a burden (Gakuu and Kidombo, 2013). The University of the Witwatersrand has a clear policy on all research conducted by members of its community. The research is classified as human (Non-medical), human (medical) and non-human subjects. Each category has a committee which receives applications from investigators and reviews their Submissions prior to issuance of ethics' clearance certificate. The policy stipulates that a clearance be sought prior to conducting any research in the above named categories. This is to ensure that relevant ethical issues are adequately considered in the research methodology adopted.

This policy is in line with conventional research ethics observed worldwide as described by Saunders, et al (2007). This research has humans as subjects; therefore, all research ethics' protocols of University of the Witwatersrand, Johannesburg was observed. The University's research policy stipulates that all human survey research must be reviewed and approved by the relevant research committee before its commencement. In this study, application for ethics' clearance was submitted to the University's Research Committee on human (non-medical) for

its consideration and approval of the research instrument and methodology. The ethics' application forms was filled and submitted with the required back-up documents such as sample copy of the questionnaire, copy of informed consent sheet seeking Participants consent to participate in the research, copy of Participants' information sheet which formally invites the Participants to participate in the survey and a brief introduction of the study (the introduction contained background information on the study, objectives of the research, the names of the investigator and supervisor, a guarantee of anonymity and confidentiality). Contact details of the supervisor were also provided. The signed ethics clearance certificate is attached as appendix C of this research report.

3.13 Chapter Summary

This chapter captured method analyses, justification for adopting chosen methodology and the research instrument. Analyses were made on design parameters for the research instrument, design and construction of the questionnaire, pilot testing of the questionnaire and administration of the questionnaire. Strategies for sample selection were discussed.. Finally, concepts on selected method of data analysis were discussed. The researcher believes that, the adopted approaches were sufficient to generate reliable and valid results that could address the research's objectives.

CHAPTER FOUR: FINDINGS AND DATA ANALYSIS

4.1 Introduction

The data collected was keyed and analysed by simple descriptive analysis using Statistical Package for Social Scientists (SPSS) version 20.0 software. The data was then presented through frequency tables and narrative analysis. The chapter presents data in different sub-sections that are in relationship with the objectives and the items asked in the questionnaire. Data was then analysed using the Chi-Square statistical analysis to test the hypothesis.

4.2 Response Rate

The study generated 65 questionnaires which were administered to various categories of respondents and the results analysed. Out of the 65 questionnaires issued, 54 were returned giving a return rate of 83%.

4.3 Basic Information of the Respondents

The study sought to find out the age brackets of the respondents in the study and the results were as shown in Table 4.1:

Table 4.1 Age Distribution of Respondents

Age	Frequency	Percentage
18-30 Years	10	18.5%
31-40 Years	11	20.4%
30-39 Years	12	22.2%
41-50 years	15	27.8%
51-60 years	06	11.1%
Total	54	100%

From the table 4.1 it can be concluded that the majority of the personnel involved in the roads construction project are in the middle age bracket of 41- 50 years which indicates an experienced site supervision that combines locals and expatriate workforce. The age bracket is also an indication that companies prefer hiring a more experienced workforce.

4.4 Educational Level of Respondents

The study sought to establish the level of education of the respondents and the results indicated by the table 4.2:

Table 4.2: Academic Qualifications of respondents

Education level	Frequency	Percentage
No formal training	4	7,4%
High School Graduate	7	13,0%
Diploma	10	18,5%
Degrees	20	37%
Masters	6	11.1%
Others	7	13%
Total	54	100%

The majority of respondents are holders of Bachelor's degrees. Gabon is a French-speaking country where the entry requirement for any management position in a construction firm is a university degree.

4.5 Assessing the impact of finances factors on the performance of contractors

For objective 1 aimed at investigating the impact of project finances factors in the performance of roads contractors. The respondents were asked to state if the finances factors had affected the performance of road contractor as illustrated in table 4.3.

Table 4.3: Respondents Perception on Financial Factors

Structural Difference	Frequency	Percentage
No	5	9.3%
Yes	45	83.3%
Not Sure	4	7.4%
Total	54	100%

The majority of respondents believed that the project finances factors listed in the questionnaire had affected the contractor performance.

4.5.1 Degree of Rating of the Financial Factors

The respondents were asked to indicate the extent to which the factors whose results are tabulated in Table 4.4 had a greater effect on the contractor performance:

Table 4.4: Rating the degree of influence of financial factors

Factors	Mean Score	Std Deviation
Access to Credits	4.22	0.92
Cash Flow Management	4.41	0.90
Types of Finances	4.18	0.91

From the findings, the finance factors that affected the contractor performance to a great extent include access to credit as illustrated by a mean score of 4.22, cash flow management as illustrated by a mean score of 4.41, and types of finance as illustrated by a mean score of 4.18. From the findings we can conclude that contractor lacked the financial knowledge and expertise.

4.5.2 Testing of the finances hypothesis Using Chi-Square Method

For each observed response the expected response was calculated as follow: The calculation of the expected numbers (E) for each individual cell is done by multiplying the row sum by column sum and dividing by the total numbers of observations(O). The results of the calculations are summarized on table 4.5

Table 4.5 Summary of Observed and Expected Responses

Scale	VLE	LE	FE	GE	VGE
Observed(O)	4	7	9	29	5
Expected(E)	5.3	6	9.3	21.6	11.6

From the observed (O) and expected responses (E). The hypothesis was tested as illustrated in table 4.6

Table 4.6 Testing for the Finances Hypothesis

Scale	Observed	Expected	(O-E)	(O-E) ²	(O-E) ² /E
1(VLE)	4	5.3	-1.3	1.69	0.32
2(LE)	7	6	1	1	0.16
3(FE)	9	9.3	-0.3	0.09	0.0096
4(GE)	29	21.6	7.4	54.76	2.53
5(VGE)	5	11.6	-6.6	43.56	3.75
					$\Sigma=7.20$

$\chi^2 = 7.20$ is less than the critical value $\chi^2 = 15.50$ corresponding to 8 degrees of freedom and 5% level of confidence as per the critical value table. Therefore, we accept the null hypothesis. The access to finances has a severe impact on the performance of contractors.

4.6 Assessing the impact of skilled manpower factors on the performance of contractors

Objective 2 aimed at investigating the impact of skilled manpower in the performance of roads contractors. The respondents were asked to state if the skilled manpower factors had an influence on the performance of road contractor as illustrated in table 4.7:

Table 4.7: The Respondents Perception on Skilled Manpower

Response	Frequency	Percentage
No	4	7.4%
Yes	50	92.6%
Not Sure	0	
Total	54	100%

The majority of respondents believed that the availability of skilled manpower has an influence on the contractor performance

4.6.1 Degree of rating of the skilled manpower Factors

The respondents were asked to indicate the extent to which the factors whose results are tabulated in Table 4.8 had a greater effect on the contractor performance:

Table 4.8: Rating the degree of influence of Skilled Manpower Factors

Statement	Mean Score	Std Deviation
Availability of Skilled Manpower	4.71	0.46
Manpower Training Programme	4.22	0.64
Competence of the Management Team	4.53	0.67

From the study, it was noted that majority of the respondent strongly agreed that availability of skilled & semi- skilled labour helps to expedite the achievement of project goals hence performance of contractors as shown by a mean of 4.71, The training of manpower will inevitably increase the performance of contractor as illustrated by the mean score of 4.22. The performance of the management team as illustrated by the mean score of 4.53 also had an impact on the contractor performance.

4.6.2 Testing of the availability of skilled manpower hypothesis Using Chi-Square Method

For each observed response the expected response was calculated as follows: The calculation of the expected numbers (E) for each individual cell is done by multiplying the row sum by column sum and dividing by the total number of observations (O). The results of the calculations are summarized on table 4.9

Table 4.9 Summary of Observed and Expected Responses

Scale	VLE	LE	FET	GE	VGE
Observed(O)	2	5	5	14	28
Expected(E)	1.66	7	9.66	16.66	19

From the observed (O) and expected responses (E). The hypothesis was tested as illustrated in table 4.10

Table 4.10 Testing of the Skilled Manpower Hypothesis

Scale	Observed	Expected	(O-E)	(O-E) ²	(O-E) ² /E
1(VLE)	2	1.66	0.34	0.115	0.069
2(LE)	5	7	-2	4	0.57
3(FE)	5	9.66	-4.66	21.71	1.30
4(GE)	14	16.66	-2.66	7.075	0.42
5(VGE)	28	19	9	81	4.26
					$\Sigma(O-E)^2/E$ =6.62

$\chi^2 = 6.62$ is less than the critical value $\chi^2 = 15.50$ corresponding to 8 degrees of freedom and 5% level of confidence as per the critical value table. Therefore, we accept the null hypothesis. The availability of skilled manpower has an impact on the performance of contractors.

4.7 Assessing the impact of the Organization Structure on the performance of contractors

For the objective 3 aimed at investigating the impact of the organization structure on the performance of roads contractors. The respondents were asked to state if the organization structure factors had an influence on the performance of road contractor as illustrated in table 4.11

Table 4.11: The Perception on the Contractor's Organization Structure Factors

Response	Frequency	Percentage
No	4	7.4%
Yes	47	87.03%
Not Sure	3	5.55%
Total	54	100%

The majority of respondents believed that the contractor's own organization structure has an influence on the contractor performance.

4.7.1 Degree of Rating of Organizational Structure Factors

The respondents were asked to indicate the extent to which the factors whose results are tabulated in Table 4.12 had greater effect on the contractor performance:

Table 4.12: Rating the degree of influence of the Organizational Structure Factors

Statement	Mean Score	Std Deviation
The organisation Culture	4.18	0.91
Effective Coordination within the firm	4.51	0.73
Types of Organisation Structure	4.25	0.80

The analysis of the summary table indicated that the effective coordination within the firm with a mean score 4.51 was the major obstacle to the delivery of road project

4.7.2 Testing of the Organization Structure Hypothesis Using Chi-Square Method

For each observed response (O) the expected response (E) was calculated was calculated as follow: The calculation of the expected numbers(E) for each individual cell is done by multiplying the row sum by column sum and dividing by the total numbers of observations(O). The results of the calculations are summarized on table 4.13

Table 4.13 Summary of Observed and Expected Responses

Scale	VLE	LE	FET	GE	VGE
Observed(O)	2	3	5	14	30
Expected(E)	2.66	2.33	10	16	23

From the observed (O) and expected responses (E), the hypothesis was tested as illustrated in table 4.14

Table 4.14 Testing for the Organizational Structure Hypothesis

Scale	Observed	Expected	(O-E)	(O-E) ²	(O-E) ² /E
1(VLE)	2	2.66	-0.66	0.435	0.163
2(LE)	3	2.33	0.67	0.448	0.192
3(FE)	5	10	-5	25	2.5
4(GE)	14	16	-2	4	0.25
5(VGE)	30	23	7	49	2.13
					$\Sigma(O-E)^2/E$ =5.23

The Chi –Square calculated value $\chi^2_C = 5.23$ is less than the critical value $\chi^2 = 15.50$ corresponding to 8 degrees of freedom and 5% level of confidence as per the critical value table. Therefore, we accept the null hypothesis. The organization structure has an impact on the performance of contractors.

4.8 Assessing the impact of the Client Support on the performance of contractors

For objective 4 aimed at investigating the impact of the client support in the performance of roads contractors, the respondents were asked to state if the client support factors had an effect on the performance of road contractor as illustrated in table 4.15

Table 4.15: The Perception on the Client Support Factors

Response	Frequency	Percentage
No	5	9.25%
Yes	45	83.33%
Not Sure	4	7.20%
Total	54	100%

The majority of respondents believed that the client support during the construction phases had an impact on the delivery of road projects.

4.8.1 Degree of Rating of the Client Support Factors

The respondents were asked to indicate the extent to which the factors whose results are tabulated in Table 4.16 had greater effect on the contractor performance:

Table 4.16: The degree of rating of the Client Support Factors

Statement	Mean Score	Std Deviation
Client Invoices Processing	4.06	1.23
Client Decision Making	3.84	1.05
Stake Holders Involvement	4.04	1.18

The analysis of the responses received indicates that the processing of invoices had a substantial impact on the performance of the contractor. The delay in payments by the ANGT impacted on the ability of the contractor to deliver projects on time.

4.8.2 Testing of the Client Support Hypothesis Using Chi-Square Method

For each observed response (O) the expected response (E) was calculated as follows: The calculation of the expected numbers (E) for each individual cell is done by multiplying the row sum by column sum and dividing by the total numbers of observations (O). The results of the calculations are summarized on table 4.17

Table 4.17 Observed and Expected Responses

Scale	VLE	LE	FET	GE	VGE
Observed(O)	1	3	5	21	24
Expected(E)	2	4.33	11	19.6	17

The table 4.17 above illustrates the summary of responses received and responses expected

From the observed (O) and expected responses(E). The hypothesis was tested as illustrated in table 4.18

Table 4.18 Testing for the Client Support Hypotheses

Scale	Observed	Expected	(O-E)	(O-E) ²	(O-E) ² /E
1(VLE)	1	2	-1	1	0.5
2(LE)	3	4.33	-1.33	1.76	0.40
3(FE)	5	11	-6	36	3.27
4(GE)	21	19.6	1.4	1.96	0.1
5(VGE)	24	17	7	49	2.88
					$\Sigma(O-E)^2/E$ =7.15

The Chi –Square calculated value $\chi^2_C = 7.15$ is less than the critical value $\chi^2 = 15.50$ corresponding to 8 degrees of freedom and 5% level of confidence as per the critical value table. Therefore, we accept the null hypothesis. The Client Support has an impact on the contractor performance.

4.9 Chapter Summary

This chapter has presented data collected for each study objectives .The effect of 3 of the most prominent factors were rated using the mean score and standard deviation. The most prominent factor for each study objectives was tested using the Chi-Square statistical analysis method. Results of the research data analyses also show that all objectives of this research study were achieved. Discussions and findings are therefore presented in chapter five.

CHAPTER FIVE: SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of key data findings, conclusion drawn from the findings highlighted and recommendations made thereto. The conclusions and recommendations drawn were focused on addressing the objectives of the study. The researcher had intended to determine the influence of finances on performance of contractors in the road construction sector, to assess the influence of skilled manpower on performance of contractors in the road construction sector, to examine how organization structure influence performance of contractors in the road construction sector and to establish the influence of client support on performance of contractors in the road construction sector in Gabon.

5.2 Summary of the findings

Respondents of the study comprised the ANGT and contractor's employees involved the road construction projects. The response rate of 83% was considered more than adequate for the study. The outcome indicated that the road construction industry is male-dominated, implying an imbalance in gender representation. The respondents had considerable experience in the road construction sector having been involved in many projects and were well educated with the majority of them at degree level and above, implying that the information obtained from them was very credible.

The study investigated factors influencing performance of contractors in the road sector in Gabon, in particular influence of finance, skilled manpower, organization structure and client support. From the findings of the research, there was an indication that the majority of the respondents agreed that the main factors influencing the performance of road contractors in Gabon were finance, skilled manpower, organization structure and client support. This denotes that the four factors are critical to the road construction sector. Finances factors had the highest influence on the performance of road contractors while client support had the least influence. The sub-sections that follow summarize the findings of the study based on the objectives of the research.

5.2.1 The Project Finances

The study established that finance was key to construction firms to function smoothly without any fiscal problem of processing the payment of immediate liabilities, procuring raw materials, payment of salaries and wages without any delay. Sufficient cash flow maintains solvency of the construction firms by providing continuous flow of operations. The study indicated that many road contractors in Gabon suffer from lack of access to credit, high cost of finance and poor cash flow. The research also

found that diversion of contract funds to other uses substantially affected contractors' cash flow. Another major finding was that delays in interim payments and settlement of contractors' claims for variations, fluctuations in prices of materials and labour substantially affect contractors' cash flow and consequently their performance.

5.2.2 Skilled manpower

The study established that availability of skilled manpower enabled the construction company to achieve overall goals of the company as skilled employees delivered quality work. Skilled employees perform quality work and can increase the number of clients more quickly than any other organization and availability of skilled manpower enhanced the performance of contractors in the road construction sector and vice versa. Lack of semi-skilled and skilled labour causes significant project delays and sometimes leads many road construction projects to stall or be abandoned altogether, thereby adversely affecting the performance of contractors.

5.2.3 Organizational structure

The study revealed that Coordination among departmental heads in a construction firm improve firm productivity. Indeed, fast and effective communication transfer among managers and participants speed up the road construction process and the performance of contractors. The findings are in line with the fact that a strong organizational structure offers a comprehensive management plan that is easier to create and execute to help maintain a strong managerial core. A suitable organization structure assists the project organization team to achieve high performance in the project through gains in efficiency and effectiveness.

5.2.4 Client support

The study revealed that client support helped to curb irregular funds disbursements with an aim of minimizing project delays and/ or stalling of construction projects. It also enhanced prompt payments and approvals facilitate timely project completion. Further, it showed that client support helped in gaining incredible expertise and that availability of client support enhanced the contractors' performance in the road construction sector. This affects the performance of contractors in meeting targets. The findings also indicate that client support in terms of engaging project beneficiaries and stakeholders throughout the project life cycle was crucial in facilitating the success of road construction projects.

5.3 Discussion of the findings

The discussion of the findings was guided by the four objectives of the study as discussed in the sub sections that follow.

5.3.1 Finance and Contractor Performance

The study noted that the following finance factors affect the contractor's performance to a great extent: poor funding and cash flow problems limited operational resources, high cost of finance, poor project planning and control as well as the diversion of contract funds for other uses other than the project. The research also noted that foreign exchange fluctuations had an effect on the contractor cash flow. These findings are in line with the research by Akinsulire (2002) who opined that sufficient cash flow maintain solvency of the industry by providing smooth flow of operations.

The study also revealed that the following factors affect the amount of cash capital in construction to a great extent: delays in interim payments and settlement of claims for variations, fluctuations, loss and expense, advance down payments at the start of project and inflation in prices of construction resources. These findings are in agreement with Rahman (2013) who observed that financial stability of contractors and adequate cash flow is critical in keeping construction progress as planned. Ameh (2011) opines that inadequate funds lead to time overrun and adequate funding guarantees reasonable cash flow.

The study also noted that the following factors have little or no effect on the amount of cash capital in construction; performance guarantee, deduction of retention money and payment of insurances. Cash flow is crucial in sustaining smooth running of operations and that no business can operate effectively with no sufficient amount of cash capital. A similar but separate survey in Ghana seems to uphold this view, where financial hardships were ranked among the top three most likely impacts of late payments to contracting firms (Ansah, 2011). While in Malaysia it was similarly reported that financial hardships attributable to late payments was top among the three gravest effects of late and non-payments (Danuri, et al., 2006)

The findings are in line with the research by Akintude, 2003) who observed that lack of adequate working capital results in poor project performance in terms of meeting completion dates, work quality and cost effectiveness which has often led to bankruptcy and in extreme cases, project abandonment.

5.3.2 Skilled manpower and Contractor Performance

The study noted that skilled manpower in the road construction sector is inadequate. The availability of skilled & semi- skilled labour helps to expedite the achievement of project goals and hence performance of contractors. Skilled labour provides quality performance of construction projects and saves wastefulness of resources during construction of roads. Lack of semi & skilled labour delays or stalls road construction projects altogether. The findings are in congruence with the research by Hanim

(2010) who found that the shortage of skilled manpower causes delays in road construction projects.

The research also noted that the following challenges have a significant influence on skilled manpower in road construction projects: Shortage of manpower, lack of financial resources and high labour turnover, low level of education, lack of appreciation to the role of manpower development, lack of training programme and high cost of manpower development. Further the study noted that skilled manpower is important, makes a firm competitive, and improves contractor performance. The findings concur with the research by Trendle (2008) that indicated skilled employees perform quality work and can increase the number of clients quickly in an organization.

5.3.3 Organization Structure and Contractor performance

The research revealed that there existed strong relationship between organization structure and contractor performance. Tasks allocation should be carried out efficiently in order to improve contractor productivity hence performance. Coordination among departmental heads in a construction firm improves firm productivity. The findings are in line with the research by Armstrong and Stephens (2008) who indicated that organization structures must provide the framework in which organization processes have the best chance of achieving maximum performance in the interest of firm's objective hence performance of construction industry. This is also supported by a study done by Maduenyi (2015) on impact of organization structure on contractor performance.

Further the study recognized that fast and effective communication transfer among managers and participants speed up road construction process. Defined work plans assist organization processes in achieving maximum performance in the interest of firm's objective hence performance of construction industry. It also established that individual members and teams should be involved in decision making and that poor performance has been attributed to lack of proper coordination among stakeholders in road construction contracts. The findings agree with the research by Stephens (2008) that a strong organizational structure offers a comprehensive management training plan that is easier to create and execute to help maintain a strong managerial core.

5.3.4 Client Support and Contractor Performance

The study also revealed that construction projects were majorly financed by both donors and the Gabonese government; most of the construction projects were poorly funded. Client support helped to ensure prompt payments and approvals which facilitate timely project completion. Insufficient client support causes project cost

overruns, disputes, arbitration costs, litigation and project abandonment. Irregular funds disbursements lead to project delays and/ or stalling.

The study noted that only 25 percent of the road projects were completed on time. This is in line with the master plan report (2012) who had observed that only 20.8 per cent of road projects in Gabon were implemented on time and budget, while 79.2 per cent exhibited some form of failure. The study further noted that stakeholder involvement assisted in smooth project implementation. Construction project costs were accurately and professionally prepared. The project budgets were prepared in respect of construction projects and that the level of adherence to project budgets during construction project implementation was up to average level.

Dissanayaka and Kumaran (1999) observed that the government (client) needs to allocate more budgets to the project to facilitate its completion since it cannot proceed without adequate financing, and the cost of providing adequate financing can be quite high. The findings also correlate with the research by Latham (1994) that clients have a substantial role to play in setting demanding standards and insisting upon improvements. The findings further concur with the research by Thomas and Ellis (2007) that contractor is contracted by a firm to execute a contract and complete the project within a specified timeline. On the other hand, the government needs to play its client support role adequately to ensure successful implementation of the projects.

5.4 Implications of the study

The study established that the number of road construction projects that respondents firm have been involved were more than 10 projects. Most road construction projects were not completed within the initial contract period. Only about 25% were completed within the initial contract period. The study also noted that majority of the road projects were not completed on the initial contract cost. The research noted that the following factors affected timely completion of road construction projects; variation in scope and cost overruns, delayed payment and weather conditions, land acquisition issues and delayed approvals by client.

5.4.1 The Implications of the study for academics

The findings further concur with the research by Ejaz *et al.*, (2013) that the contractors, consultants, and owners should simplify factors that affect contractor performance positively and negatively. The challenges identified in this study work simultaneously to diminish the success of Gabonese road contractors in their performance of construction projects. It is noted that the government is the main client of road contractors, but there are frequent delays in payments which have a

very significant effect on the performance of road contractors who are largely dependent on government for the survival of their businesses. In many cases, it takes several months and sometimes more than a year for road contractors to receive the much needed payments for both ongoing and completed projects.

5.4.2 The Implications of the study for the construction industry

Payment delays are caused by inadequate funding which most of the respondents including client representatives indicated that there was insufficient budgeting right from commencement date of the projects. Considering the long history of delayed payments by the government most financial institutions and banks have developed cold feet in providing credit to road contractors. Access to credit for road contractors has been hampered further by the high cost of finance charged by the banks. Some of the contractors have been declared bankrupt due to factors related to delayed payments. Lack of finance directly impacts the ability of road contractors in Gabon to sustain adequate operational resources in terms of skilled manpower, materials and equipment, thereby eroding their performance on construction projects.

5.5 Conclusion of the study

The study established that working capital aids construction firms to work efficiently with no fiscal difficulty of making the payment of immediate liabilities, procuring of raw materials and payment of remuneration, wages and make payment without any delay. The findings are in line with the research by Akinsulire (2002) that sufficient working capital aids in sustaining solvency of the business by providing continuous flow of operations. This is also in agreement with Rahman (2013) who indicated that financial stability of contractors and adequate cash flow is critical in keeping construction progress as planned. Ameh observes that inadequate funds lead to time overrun and adequate funding guarantees reasonable cash flow. Therefore, the study concludes that availability of adequate working capital was very vital in enhancing performance of contractors in the road construction sector.

The study established that skilled manpower enables the construction company to achieve overall goals of the company as skilled employees delivered quality work. The findings are in support of the research by Trendle (2008) that skilled employees perform quality work and can increase the number of clients more quickly. Thus the study concludes that the availability of skilled manpower enhanced the performance of contractors in the road construction sector.

The study revealed that coordination among departmental heads in a construction firm improves firm productivity, fast and effective communication transfer among managers and participant's speeds up road construction process and performance. The findings are in line with the research by Armstrong and Stephens (2008) that a

strong organizational structure offers a comprehensive management plan that is easier to create and execute to help maintain a strong managerial core.

The study therefore concludes that strong organizational structure enhance the performance of contractors in the road construction sector. The research findings noted that one role of client support is to ensure involvement of stakeholders and/or project beneficiaries throughout the project cycle, as it was considered paramount in achieving project success.

The study further revealed that client support services helped to curb irregular funds disbursements and thereby reduce on project delays and/ or stalling of road construction projects. The study also confirmed that prompt payments and approvals is considered very crucial in facilitating timely project completion and that insufficient support causes project costs overrun, disputes, arbitration costs, litigation and project abandonment.

The study therefore concludes that availability of client support enhanced the performance of contractors in the road construction sector.

5.6 Recommendations

The study recommends that:

1. Road construction firms need to have a reliable capital base and should only be awarded contracts based on their financial capabilities and technical resources at their disposal. However, contractors could improve their cash flow by forming public private partnerships with financiers who may be willing to finance big construction projects. On one hand, construction companies could establish a bank for the construction industry that could provide them with access to credit at reasonable interest rates to improve their operating cash flow. On the other hand, the government should ensure consistent disbursement of funds. Clients should not award road construction contracts to contractors without having a solid financial plan to ensure adequate budgets to complete the projects. This will help to alleviate operational delays which lead to slow project implementation process and overrun in cost and period for construction. To overcome the issue of delayed payment the government should come up with a policy that sets timelines for payment due to the contractors and suppliers of goods and services. This policy should also prescribe penalties for delayed payments and should apply on goods and services supplied to both the government and the private sector owners of projects. Furthermore, the contractors or service provider should be entitled to claim interest on overdue accounts.

2. There is need to encourage growth of manpower skills through training and skill up-grading within construction firms as skilled manpower was found to be an asset, which pays over the long term. There is also need to develop a mechanism that will aim at alleviating high cost associated with training of engineers and technicians in Gabon. This should be done in view of the current shortages of skilled man power. There is need for more middle level colleges while ensuring that the existing technical colleges are retained and not converted to universities as has been the case.

3. Construction firms need to have a flexible dynamic organizational structure. This is the basis of the revelation that existence of strong organizational structure forms the core from which the successful implementation of road construction projects can be grounded. Every contractor should have a clear strategic plan and appropriate, flexible organizational structure which is compatible with the needs of the organization. Recruitment should be based on qualification and experience; also there should be clear specific process of upgrade and bonuses based on progress reports. Most of the construction firms are owned by family and run as one-man shows. Adoption of Total Quality Management (TQM) practices is recommended in order to ensure that the firms offer quality standards that are commensurate with the size and budget of road project they undertake.

4. One of the most important client support role is to ensure that contractors for road projects are given possession of land that is without any encumbrances to ensure an early project commencement. This calls for the client to acquire land and compensate and involve the project affected persons (PAP) well in advance of commencement of the project. Clear policies on stake-holder/client involvement must be put in place. This is based on revelation that stakeholder/client involvement enhanced the implementation of road construction projects. There is need for equal effort and involvement of the government, contractor and the project beneficiaries, to enhance ownership and successful implementation of road construction projects. From the recommendations obtained from the study, clients need to improve on the speed of approval of interim payments, variations to the contract, evaluation of claims by the contractors and also prompt resolution of disputes in the contract, if contractor performance is to be enhanced. In order to alleviate problems associated with delayed payments, there should be effective funding of project by the client to avoid unnecessary time overruns which eventually lead to cost overruns and delayed completion of road construction projects which have a bearing on poor performance of road contractors.

5.7 Study Limitations

This research is limited in assessing the performance of road contractors in delivering road projects supervised by the National Agency of Public Works on time. The research sought to investigate the extent to which 4 delay factors are influencing the performance of road contractors in Gabon.

5.8 Suggestions for Further Research

The new areas of study recommend the following for further research;

A similar study should be carried out in other sectors of the construction industry for example building construction, water and sanitation including energy infrastructure projects.

A similar study could be conducted for contractors involved in projects non-supervised by the ANGT.

A research on influence of political factors on performance of contractors would be vital as this issue was mentioned by respondents to be influencing their profit margins and hence their performance.

5.9 Chapter Summary

This chapter presents the discussion of key data findings, conclusions drawn from the findings highlighted and recommendations made thereto. The conclusions and recommendations drawn focused on the objective of the study. The researcher had intended to determine the influence of finances, skilled manpower, organization structure and client support on the performance of road contractors.

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APPENDIX A: QUESTIONNAIRE COVER LETTER

University of the Witwatersrand, Johannesburg -PO Box 20, Wits 2050, South Africa • Tel: +27 (0)11 717 7652/77669
· Fax: +27 (0)11 717 9729 Email:CEM@wits.ac.za

06 April 2017

To whom it may concern

This letter serves as a confirmation that (Mr Jean-Claude Onana Student Number 1542242) is conducting a research project as a requirement for the completion of the degree of Master of Science Building in Project Management in the School of Construction Economic and Management.

The research is on the factors influencing the performance of contractors in delivering roads projects on time in Gabon. This study, which has been approved by the University of the Witwatersrand, focuses on the roads projects supervised by the National Agency of Public Works.

Attached is the questionnaire asking questions on the factors influencing the performance of contractors It is expected that the results from the study will contribute towards improving the performance of roads contractors.

The research will be conducted within the conventional ethical standard requirements for the research as specified by the Human Research Ethics Committee (Non-Medical) of the University of the Witwatersrand.

Participation is voluntary and willing participants can withdraw at any time. The responses will be kept strictly confidential .No names are required on the questionnaire.

Thank you in advance for your cooperation.

Kind Regards

Jean-Claude Onana

APPENDIX B: RESEARCH QUESTIONNAIRE

RESEARCH QUESTIONNAIRE

SECTION A: PARTICIPANT'S GENERAL INFORMATION

Gender: Male () Female ()

Age: 21-30 () 31-40 () 41-50 () 51-60 () 61-70 () Over 70 yrs.

Type of Occupation: _____

Level of Education:

No Formal Training () High School Graduate () Secondary () Diploma ()

Degree () Masters () Others ()

SECTION B: FINANCES FACTORS AND THE CONTRACTOR PERFORMANCE

1. Clearly state your opinion with regard to the implementation of roads projects by the National Agency of Public Works: Do you think projects finances factors affect the performance of roads contractors Yes () No () Not Sure ()

2. Using a scale of 1 to 5, rate the extent to which the following projects finances factors have influenced the performance of roads contractors

1= Very Little Extent (VLE)

2= Little Extent (LE)

3= Fair Extent (FE)

4= Great Extent (GE)

5= Very Great Extent (VGE)

Factors	1	2	3	4	5
Access to Credits					
Cash Flow Management					
Types of Project Finances					

SECTION C: SKILLED MANPOWER AND THE CONTRACTOR PERFORMANCE

1. Clearly state your opinion with regard to the implementation of roads projects by the National Agency of Public Works. Do you think that lack of skilled manpower has affected the contractor performance? Yes () No () Not Sure ()

2. Using a scale of 1 to 5, rate the extent to which the following manpower factors have influenced the contractors' performance:

1= Very Little Extent

2= Little Extent

3= Fair Extent,

4= Great Extent

5= Very Great Extent

Factors	1	2	3	4	5
Availability of skilled & semi- skilled labour helps to expedite the achievement of project goals hence performance of contractors.					
Skilled Manpower training programme					
The Competence of the Management Team					

SECTION D: ORGANIZATION STRUCTURE AND THE CONTRACTOR PERFORMANCE

1. Clearly state your opinion with regard to the implementation of roads projects by the National Agency of Public Works .Do you think that the organizational structure has affected the rate at which projects supervised by ANGT are completed? Yes () No () Not Sure ()

2. Using a scale of 1to 5, rate the extent to which the following organizational factors affected the contractors' performance

1= Very Little Extent

2= Little Extent

3= Fair Extent

4= Great Extent

5= Very Great Extent

Factors	1	2	3	4	5
The organization culture					
Effective Coordination within the firm					
The types of Organization Structure					

SECTION E: CLIENT SUPPORT AND THE CONTRACTOR PERFORMANCE

1. Clearly state your opinion with regard to the implementation of roads projects by the National Agency of Public Works. Do you think that the client support factors have affected the contractors' performance?

Yes () No () Not Sure ()

2. Using a scale of 1 to 5, rate the extent to which the following client support factors affect the performance of roads contractors in Gabon

1= Very Little Extent

2= Little Extent

3= Fair Extent

4= Great Extent

5= Very Great Extent

Factors	1	2	3	4	5
Client Processing of Invoices					
Client Decision Making					
Stake Holder Involvement					

APPENDIX C: ETHIC CLEARANCE CERTIFICATE
School of Construction Economics & Management

University of the Witwatersrand, Johannesburg -PO Box 20, Wits 2050, South Africa • Tel: +27 (0)11 717 7652/77669
• Fax: +27 (0)11 717 9729 Email:CEM@wits.ac.za

SCHOOL OF CONSTRUCTION ECONOMICS AND MANAGEMENT RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE

PROTOCOL NUMBER CEM/16/08/OJC/MSC

PROJECT TITLE

Factors Affecting the Performance of Contractors on Road Projects Supervised by the National Agency of Public Works in Gabon.

INVESTIGATOR

Onana Jean-Claude 1542242

SCHOOL/DEPARTMENT

SCHOOL OF CONSTRUCTION ECONOMICS AND MANAGEMENT

DATE CONSIDERED

1/8/2016

DECISION OF THE COMMITTEE

Approved conditionally with respect to the declaration and forwarded minor corrections

EXPIRY DATE

8th August 2017

DATE 09 August 2016

CHAIRPERSON

Dr. Kola Ijasan

cc: Supervisor: Dr. O. Babatunde

DECLARATION OF INVESTIGATOR (S)

To be completed in duplicate and **ONE COPY** returned to the Secretary Mrs. M. Sithole at the CEM reception desk.

I fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature

Date

22 / 08 / 2016

