

**AN INVESTIGATION INTO THE EFFECTS OF PROCUREMENT
METHODS ON PROJECT DELIVERY IN THE ZAMBIAN ROAD SECTOR**

BY

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A Dissertation Submitted to the University of Zambia in Partial Fulfillment of the
Requirements for the Degree of Master of Engineering in Construction Management

**SCHOOL OF ENGINEERING
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

UNIVERSITY OF ZAMBIA

LUSAKA

JANUARY, 2019

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APPROVAL

This dissertation of **Sundie Silwimba** is approved by the University of Zambia in partial fulfilment of the requirements for the award of the degree of Master of Engineering in Construction Management.

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ABSTRACT

The European Union (EU) notes that the construction industry is overwhelmed with various procurement methods and as such, it is very difficult to check irregularities and checks for compliance. The construction industry further faces challenges in coming up with a suitable method of procuring and delivering projects. In the Zambian Road Sector (ZRS). There are various procurement methods being used but the common ones are traditional project delivery method and design and building methods. There is no consistency in the procurement method used to determine the successful or failure of project.

The aim of the research was to investigate the effects of procurement methods on project delivery in the ZRS. The methodology employed was a mixed design approach which was tailored on achieving the specific objectives: to review the prevailing procurement guidelines; examine the performance of past projects from 2011 to date; to determine the critical procurement factors; investigate the relationship between procurement factors successful project delivery; and establish the appropriate procurement method in the project delivery in the ZRS.

A mixed method Research design in which knowledge claims based on pragmatic grounds as consequence-oriented, problem-centered and pluralistic approaches was used. Primary data was obtained using structured questionnaires and interviews. The study used seventy (70) respondents who were of Civil Engineering background and experts in procurement and road construction project management in the ZRS. This was deduced from a population size of 195 technical staff employed in key implementing departments.

The findings revealed that fifty-seven (57) percent of the ZRS is governed by the Zambia Public Procurement Authority's Public Regulations and guidelines, Act of 2008. The other procurement guidelines which are also used in the ZRS are World Bank procurement guidelines for loans and borrowers and the European Union (EU) procurement guidelines. On the other hand, the results showed that critical procurement factors that affect project delivery were; release of project funds (87 percent), procurement guidelines (30 percent), project procurement management training (26 percent), working capital (23 percent) and presence of a monitoring and evaluation (M&E) unit (23 percent). In addition, the sector is also affected by the factor of frequent bribery and corruption which has been verified by Zambia Bribery Payers Index Survey Report of 2017, to be at 8.1 percent. It was found that there was no major relationship between the performance of past projects and the procurement methods used. To the contrary it was established that there was a strong relationship between the procurement factors and the project delivery methods used in the ZRS. It is therefore recommended that the Employer should ensure that project funds are released on time for road projects to be successfully implemented in the ZRS industry as well as embracing best global procurement methods, regulation guidelines and project delivery methods.

The research question have been successfully met. The study was vital in the sense that it highlighted on the needs for effective and efficient procurement processes that may lead to cheaper delivery of quality road infrastructure in the ZRS. This has a number of multiplier effects to the development of the economy, for example, the country may build many roads in a short timeframe.

Keywords: Procurement Methods, Project Delivery, Zambian Road Sector

ACKNOWLEDGEMENTS

First and foremost, I would like to give gratitude to my Supervisor Dr. Balimu Mwiya, who never grew weary in guiding and continuous reviewing my work, word by word and chapter by chapter, until the dissertation study attained academic and professional acceptability. In the same vein, I want to appreciate the professional and industrial in-depth contributions of Dr. Erastus M. Mwanauimo and Dr. Chabota Kaliba to the research study.

To my wife Gracious and our children Salifyanji, Chilanzi and Niza I salute you all and remain greatly indebted by your unwavering long-suffering and patience exhibited, all the way through the times I stayed away from you on my pursuit for this cause.

Finally, I would like to appreciate all my lecturers at the School of Engineering, Department of Post-graduate Studies of Civil and Environmental Engineering, who laboured to give us a strong foundation during our first year taught session. To you all, I say may the almighty God bless you eternally. Thank you.

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ABBREVIATIONS AND ACRONYMS

AASHTO:	American association of state highway and transportation officials
ABO:	Assistant building officer
AfDB:	African Development Bank
BLT:	Build-lease-transfer
BOO:	Build-own-operate
BOOT:	Build-own-operate-transfer
BRT:	Build-rent-transfer
CF:	Counterpart funding
CFI:	Contractor facilitated initiative
CM:	Construction manager
CMAR:	Construction management at-risk
COC:	Citizen owned company
CRN:	Core road network
CSO:	Central statistics office
DB:	Design-build
DB:	Direct bidding
DEBS:	District education board secretary
DHMTs:	District health management teams
DSBL:	Drug supply budget line
EIB:	European Investment Bank
EIZ:	Engineering institute of Zambia
EU:	European Union
FA:	Force account
FIDIC:	Federation Internationale Des Ingenieurs-Conseils
GRZ:	Government of the republic of Zambia
IOB:	International open bidding
LB:	Limited bidding
LS:	limited selection
LZ:	Link Zambia
MHID:	Ministry of housing and infrastructure development
MoH:	Ministry of health
MPC:	Ministry procurement committee
MPC:	Multiple-prime-contracting
MPI:	Main procurement indicators
NCC:	National council for construction
NOB:	National open bidding
OAG:	Office of the auditor general
OIN:	Open international selection

OS:	Open selection
PCP:	Project contract price
PD:	Project delivery
PEM:	Public expenditure management
PEs:	Procurement expenditures
PM:	Project Manager
PPOA:	Public procurement oversight authority
PPP:	Public-private partnership
PSU:	Procurement and supply unit
PT:	Procurement threshold
PTs:	Procurement thresholds
PZ:	Pave Zambia
RDA:	Road development agency
SATTC:	Sothorn Africa transport and communication commission
SB:	Simplified bidding
SIS:	School infrastructure section
SMEs:	Small, medium enterprises
SPV:	Special purpose vehicle
TPDM:	Traditional project delivery method
UK:	United Kingdom
USA:	United States of America
WB:	World Bank
ZPPA:	Zambia public procurement authority
ZRS:	Zambian road sector

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter gives an overview on the dissertation study by illustrating the effects of procurement methods on project delivery of projects in the Zambian Road Sector (ZRS). It further, defines the reasons for the study, objectives and methodology which was used in order to provide solutions to the challenges being faced in the aforementioned sector.

Government agencies, multilateral development banks and public private institutions have predetermined project delivery outcomes in respect of various procurement methods: This trend shows that a procurement method may have its own anticipated project outcome. Because stakeholders in organisations, by way of having preference procurement guidelines, suggest that a unique relationship do exist between a procurement method and successful project delivery or failure. This can be attested to the fact that organisations world over, have their own procurement guidelines tailored to achieve specific intended project objectives and goals (World Trade Organisations, 2015).

Most often, organisation justify their preferences to certain procurement methods by highlighting factors such as competition, collusion, corruption, transparency and value for money as some of the factors taken into account during their selection of a procurement method against other discarded methods (UN Procurement Practitioner's Handbook, 2012). This rationale has led to procurement methods like open bidding being widely used in most organisations against other procurement methods. The preference for open bidding is based on the notion that it encourages competition and thereby ensuring value for money.

The allocation of funds for infrastructure development by governments is usually a challenge, because this requires prudent project management skills, use of the right procurement methods and practical micro/ macro-economic principles. These fundamentals of management ought to be coherently applied by various technocrats to strike a balance amongst all prioritized infrastructure projects and social amenities that are needed by the people in order to spur eco-social development and ensure citizenry satisfaction worthy of the tax payer's money (Casey and Bamford, 2014).

To realize a coordinated national economic management of public funds on prioritized infrastructure development that are planned, Governments world over strive to obtain the utmost project deliverables out of the funds injected into various developmental projects/ programmes. Despite the efforts exhibited through the set managerial benchmarks and project proposals, there is need to measure project results and or outcome against the government procurement methods employed during procurement of various infrastructure development contracts in order to ascertain their cost effectiveness and efficiency (Yan, 2015).

Infrastructure development projects are envisaged out of systematic empirical tests, trials and proven theories by professional engineers, social scientists and financial managers to mention but a few (Green, 2015). As a result, the expectations from the public are always high and are anticipated

to yield definite results after completion of infrastructure projects. This is so especially when the accredited procurement criterion and all the theories are said to have been adhered to throughout the project delivery life cycle. However, preliminary results into the procurement management of infrastructure projects world over show varying unknown, and unwanted retrogressive outcomes of the project during and after practical completion (Agha, 2013).

Consequently, government agencies, multilateral development banks and Public-private institutions such as the World Bank (WB), the European Investment Bank (EIB), European Union (EU), Asian Development Bank (ADB) and the African Development Bank (AfDB), are usually cautious and particular during procurement of infrastructure project contracts (Wolf, 2016). It is always evident in such cases that they champion their investment agendas in developmental projects with a preferred procurement method and regulation guidelines to be applied. In most cases these guidelines are outlined to form part of the tender document for various contracts that are formulated for infrastructure development (World Bank, 2014). However, studies have also shown that some of the procurement methods that are re-known in the construction industry have in the recent past, received criticism to be major contributing factors for the poor project delivery (Mechegiaw, 2012). In the recent past it has been suggested that alternative solutions be pursued in order to better the procurement and project delivery of public works contracts (Akram and Zareba, 2012).

In that regard, construction companies assume varying capacities and influences as they grow in their operations. The status of strength attained by contractors when abused or employed in a retrogressive manner, may lead to collusion, corruption, selection of undeservedly contractors who are not equal to the task and confidence in the whole procurement process gets eroded. Thus, affecting the infrastructure project delivery and this scenario when left uncontrolled may also affect the quality of public works executed (Huang, 2011).

Governments' agencies, multilateral development banks and public private institutions have developed their own procurement guidelines for goods, works and services. The purpose for the procurement guidelines are to ensure quality output of construction project works. In addition, the procurement regulations, guide in devising the capabilities of the personnel to be involved in the procurement of the contracted part and the clientele, so that the agreements made using these guidelines reflect the overall brilliance in achieving the anticipated project objectives and goals (Japan, 1889).

In Zambia, procurement methods employed to award a contract opportunity to a contractor or consultant for the supply of goods, public works and services in the construction industries include but are not limited to: international open bidding (IOB), national open bidding (NOB), open selection (OS); limited bidding (LB); limited selection (LS); simplified bidding (SB); direct bidding (DB); force account (FA), public private partnership (PPP) and contractor facilitated initiative (CFI) model (Zambia Public Procurement Act, 2011).

With the foregoing, when government agencies, multilateral development banks and public private institutions are overwhelmed with a variety of choices to make in deciding which procurement methods to use, it becomes a challenge, to come up with a suiTable method. The challenge lies in

the fact that for example in the execution of engineering project works, planning for the unforeseen is usually a standard practice. Therefore, it is very difficult to ultimately foretell at project inception stage the probable risks of using one type of procurement method against the other (Chartered Institute of Building, 2010).

Further, in 2011, the government of the republic of Zambia (GRZ), through the road development agency (RDA) unveiled an ambitious road programme, in a bid to open up the country and spur socio-economic development. The notable road programmes introduced among others into the road sector annual work plan (RSAWP), were the Link Zambia (LZ) 8000 and Pave Zambia (PZ) 2000 road programmes (Road Development Agency, 2015).

The LZ 8000 programme involved the construction to bituminous standard of 8000 kilometer roads within the core road network (CRN) of Zambia in order to connect strategic provinces, districts and villages within the country. The target group in this programme are high-tech road contractors, consultants, skilled personnel with a few unskilled workers. While the PZ 2000 programme was aimed at constructing and paving 2000 kilometers of low volume roads using paving bricks, in urban areas throughout Zambia. The PZ programme being a labour based intensive programme has an emphasis on the utilization of local resources such as labor and materials. The project was intended to employ youths and reduce high unemployment levels in the country among the youths and also encourage small scale enterprises (SMEs) through procurement of concrete paving bricks from various suppliers for the programme (Road Development Agency, 2015).

1.1 Statement of the Problem

Warsame (2013) reported that despite the Zambian road sector (ZRS) being managed by qualified Engineers and contract managers there has been an outcry from the public, that most of the roads that have been constructed are of poor quality and review early signs of failure, with potholes, depressions, cracking, shoving and rutting among other defects appearing on the newly constructed carriageway, barely a year or two after practical completion of works. The happenings of poor road delivery have led to many questions being asked by the public that range from allegations of lack of closer supervision, lack of adherence to standard specifications, contractor consultant collusion and lack of proper procurement methods.

He added that most of the road projects being executed in the ZRS are being procured through design and build method of delivery. The client is not privy nor undertake to carry out a detailed design of what is expected, but rather engages a contractor and the consultant to perform construction and provision of consultancy services, respectively. As a buyer, the client can only buy the right works, product or services if they themselves understand the design and quality of what is needed. Failure to have the understanding of what is being procured is also the source of failure to manage the public expenditure management (PEM). The procurement method adopted also forms the basis for checking the challenges being faced in the ZRS in achieving the quality of the project delivery of road projects in Zambia (Warsame, 2013).

Puddephatt (2012) reported that transparency is an open way of undertaking the public procurement process for goods, works and services, by disclosing all the necessary information. This virtue in PEM is key in putting up a responsive bid. It also aids in eliminating illicit public activities like corruption, collusion and fraud.

According to Kaliba et al (2009) schedule delays and cost escalations were reviewed in the ZRS. This was allegedly due to lack of proper procurement plans, which was supposed to take care of any resulting contract modifications and scope changes as well as effecting efficient and effective timely payment of interim Payments to the contractors. In the ZRS industry, the procurement plan for road projects is not completely known from the inception of road programmes. Consequently, successful project delivery of road programmes can only be achieved once the ZRS re-aligns its structures and commercialize its operations. Kaliba reported that the untimely continuous outsourcing of design works to consultants is another contributing factor of project delays and cost escalations. Further, the report by Kaliba reviewed that designs are carried out during the execution of the works contracts and that in certain instances, works projects commence without detailed designs. Therefore, by the time designs are completed, the contractor would have already undertaken certain wrong alignment or procedures. Hence, scope changes to correct work done or carry out rework is additional cost to a project and lead to cost escalations and schedule delays.

According to Kingstone (2016) effective procurement ensures that a contract includes elemental design life of an engineering facility required to be built in conjunction with fitness for purpose. This entails that every element of the structure must last for a life time as per the design procured and be able to serve its intended purpose without exhibiting major defects. Therefore, technical fitness for purpose warranties should be an engineering standard for measurement of time in reference to the outsourced contractual civil works. He reported that good practice, in procurement includes factoring in high level skill to ensure that every elemental part to the structure of the constructed facility remains in service and fit for purpose after closure of procurement and consequent practical completion, till the end of its design life (Kingston, 2016). Unfortunately, he argued that this requirement is far too way beyond the current technological standing of Zambia and many developing countries. This is because, there lacks the capacity to test the adopted design standards that come on the market as improvement to the known southern Africa transport and communications commission (SATTC) and American association of state highway and transportation officials (AASHTO) Design standards. In most cases institutions just adopt and apply the design formulas as they were experimentally tested by the inventor from their indigenous countries, without improving or verifying their suitability to their climatic conditions. Scientific experiments are undertaken at varying climatic conditions and therefore when implemented under different climatic conditions the performance standard are expected to yield different results.

A glance at the performance of the programme from 2012 to 2016 indicated that out of the 27 projects totaling 4,168.39 Km under the LZ 8000 project that commenced, only 692.83Km was opened to traffic as at December 31, 2016.

To help investigate the inter-play between procurement of road projects and successful project delivery, eight (08) projects from the Link Zambia 8000 programme were sampled as shown in Table 1.1

Table 1.1 Samples of Link Zambia 8000 projects procured using different methods and their project outcomes (Annual Report, 2015)

No	Name of Project	Contract Length (Km)	Achieved Length (Km)	Project Start Date	Project Completion Date	Revised Project Completion Date	Project Contract Sum	Revised Project Contract Sum	Type of Procurement	Status
			Total Km done By December 2016							
1	Design and Construction of Mansa to Luwingu (M3) Road (175Km) in the Luapula and Northern Provinces and 30Km of Township Roads in Mansa and Luwingu.	205	181.00	22-Oct-13	21-Feb-18	-	Initial: \$206,962,966.38	\$310,795,882.71	Open bidding (Later converted to a Concession Loan Agreement Road Project)	A partial payment against counterpart funding for addendum No. 3 was done. However, full amount is required to activate the loan facility. On-going.
2	The Upgrading and Re-alignment of R231 from Great North Road at Matumbo to Luangwa Bridge (115Km) Road in Muchinga Province of Zambia – Lot 2	115.00	37.00	14-Dec-12	14-DEC-17	-	K399,215,646.07		Limited Bidding	Works have stalled due to Non-payment and the road Project is not in the 2017 RSAWP (Has been abandoned).
3	The Rehabilitation of the Kawambwa- Mushota-Luwingu Road and the Chisembe-Chibote-Chief Chama Road in Luapula Province	158.00	84.00	15-Apr-13	14-Apr-16	14-Apr-18	K385,583,452.25		Open National Bidding	Variation Order No. 6 to include construction of bridge across Luongo river on section 5 under review by RDA. On-going.
4	The Upgrading to Bituminous Standard of the Leopards Hill Road (D152) from the State Lodge Junction to Katoba Basic School (43.8Km) in Lusaka Province.	58.49	58.49	9-Oct-12	2-Apr-14	-	K609,697,552.90	-	Limited Bidding	Completed and fully-paid.
5	The Construction of a Dual Carriageway way Between Kitwe and Chingola–45.5Km on the Copper belt Province.	45.50	40.00	29-Mar-13	12-Jun16	22-June 17	K844,912,167.25	-	Open National Bidding	Contractor has Suspended Works due to delayed IPCs
6	The Upgrading to Bituminous Standard of 91 Km of D145 from Great East Road at Luangwa Bridge to Luangwa (Feira) in Lusaka Province – Lot 4	91.00	86.00	13-Feb-13	12-Aug-16		K314,958,133.74		Open National Bidding	Initial Project Scope of Civil Works have been completed. Variation Order for bridges has been approved, while the Township roads have been rejected and RDA has appealed against the decision by AG. Project is not provided for in the 2017 RSAWP but the Addendum for three bridges has been fully signed.

No	Name of Project	Contract Length (Km)	Achieved Length (Km)	Project Start Date	Project Completion Date	Revised Project Completion Date	Project Contract Sum	Revised Project Contract Sum	Type of Procurement	Status
			Total Km done By December 2016							
7	The Upgrading to Bituminous Standard of D153 from Great East Road at Moono Police Check Point via Palabana to D151 at Chilyabale Basic School (54 Km) Road in Lusaka Province of Zambia	54.00	5.30	11-Dec-13	7-Mar-17	7-Mar-18	K221,121397.40	-	Open National Bidding	Contractor has suspended Works due to delayed payments and has issued notice of termination.
8	The Upgrading of Chiegi to Kaputa 78.1 Road (U2) and Lunchinda 27.6 Km D77 with 10 Km Urban Roads in Kaputa District, Luapula Province of Zambia	115.70	0.00	15-Jul-14	31-Dec-16	30-Apr-18	K500,040,613.78	-	Open International Bidding	The contract has been abandoned due to lack of funds and capacity by the Contractor (to finance the works under CFI model.

Source (Road Development Agency, 2015)

1.2 Aim

To investigate the effects of procurement methods on project delivery in the Zambian road sector

1.3 Specific Objectives

- i. To review the prevailing procurement guidelines in the ZRS industry.
- ii. To examine the performance of past projects and the procurement methods used.
- iii. To determine the critical procurement factors that affect project delivery.
- iv. To investigate the relationship between procurement factors and successful project delivery in the ZRS industry
- v. To establish the appropriate procurement method in project delivery in the
- vi. ZRS industry.

1.4 Research Questions

- i. What procurement guidelines govern the ZRS industry?
- ii. How was the performance of past projects with respect to the procurement method used?
- iii. Which procurement factors have an impact on successful delivery of road projects?
- iv. To what extent do these factors affect project delivery?
- v. What is the relationship between procurement factors and successful project delivery in the ZRS industry?

1.5 Significance of the Research Study

The research would help the government and decision makers embrace efficient performance standard norms. Further, the study is vital in the sense that it highlights on the needs for effective and efficient procurement processes that may lead to cheaper delivery of quality road infrastructure in the ZRS. This has a number of multiplier effects to the development of the economy, for example, the country may build many roads in a short timeframe.

1.6 Scope

The study focused on the investigation of the effects of procurement methods on project delivery in the Zambian Road Sector. To achieve this, road programmes and projects undertaken were revisited and examined appropriately, with the aid of key experts who took part in the survey. The study was further narrowed to the performance of the unveiled GRZ road programmes from 2012 to 2016 in the ZRS industry, while drawing the global experiences and theories related to the study.

1.7 Organization of the study

The research study has been structured into five chapters, namely:

- i. Chapter one focused on the general introduction of the study;
- ii. The second chapter delved into the available literature review to the study;
- iii. The third chapter explained the methodology used for the research study;
- iv. Chapter four dealt with the analysis of the results of the study; and
- v. The last chapter five presented the conclusions and recommendations of the study.

From Table 1.1 above, it was noticed that the project deliverables/ outputs achieved varied from one project to the other. The sampled projects were also of varying procurement methods that were employed. However, there is no clear indication as to the consistency or inconsistency in the procurement methods used to the successful project delivery. On this account, it became imperative that an in-depth investigation be carried out through this dissertation study in order to establish the interplay that exist between the procurement method used and successful delivery of a project.

1.8 Summary

This chapter introduced the research study: research problem, research questions, aim of the study, significance of the study and the methodology that was employed. The next, chapter two delves into reviewing the available literature that have been published on the research topic.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The previous chapter introduced the research study and outlined the core framework of the research. Further, pertinent key issues that defined the extent of the study were briefly discussed and described, such as: the statement of the problem; research objectives; significance of the study; and methodology to achieve the research objectives.

This chapter reviewed the published literature and studies relevant to the dissertation. This information was relied upon as it was authentic and related to the dissertation study. Further, it highlighted on factors that underlined the relationship between procurement methods and project delivery in the construction industry and as well as other business sectors. Therefore, the literature reviewed, also provided the principles that formed the basis on which the methodology and consequent analysis of data collected was benchmarked.

2.2 Definition of Variables

2.2.1 Procurement

Procurement is defined as “a business management function that ensures identification, sourcing, access and management of the external resources that an organization need or may need to fulfill its strategic objectives” (Chartered Institute of Purchasing and Supply, available at www.cips.org);

“the acquisition by means of a public contract of works, supplies or services by one or more contracting authorities from economic operators chosen by those contracting authorities, whether or not the works, supplies or services are intended for a public purpose” (European Union, 2015);

“A major part of the PEM cycle by which the local administration buys works, goods, and services” (Abrahams, 2013); and or, for the purpose of this study procurement was defined as:

“A process which embodies value for money as its core principle while embracing many virtues such as transparency, competition, efficiency, accountability, fairness and economic realistic project schedules in the public PEM cycle”.

This process is employed during the acquisition of public services, works and goods such as road contract works, in this context of the road implementing agencies, intended for the rehabilitation, maintenance, upgrading and or construction of public roads in the ZRS industry.

The essential objective of procurement is to ensure that all the fundamental principles governing the PEM cycle are adhered to, with a successful delivery of needed facilities to the public in order to spur eco-socio infrastructure development (Zambia Public Procurement Act, 2011).

2.2.2 Plan Procurement

A Plan Procurement is a phase which seeks to answer questions as to: what exactly should be

procured? How should the procurement be done? In what quantity should we procure? What exactly should be procured and when should procurement be done? (Public works and Government services Canada, 2011). Further, Plan procurement may be defined as the progression Phase of describing the range of a project/ programme to be undertaken by governments, organisations or institutions in order to ascertain the ideal project needs to be met by procuring services from the Private Sector (Canada, 2011).

2.2.3 Procurement Methods

Procurement methods have remained the same over the years while organizations have strived to employ different project delivery system (Baccarini, 2008). Other alternative procurement methods may be used by government agencies, multilateral development banks and public private institutions in cases where the ICB or the NCB would not be the best economic and cost effective methods (World Bank, 2011).

In Kenya, the government of the Republic of Kenya through the Public Procurement Oversight Authority (PPOA) devised the procurement manual for works and came up with procurement methods, namely: open tendering; request for proposals for works and consultants; restricted tendering; direct procurement or single sourcing; low value procurements also known as request for quotations or minor works only; two staged tendering and specially permitted procurements (or Public-Private Partnership Contracts) (PPOA, 2009).

However, this research focused on the ZPPA's public procurement Act of 2011, which provides a wide range of procurement methods that are available for use by all procuring entities in Zambia. Against this background, the road sector in Zambia have the privilege to access from a pool of various procurement methods as outlined below (Zambia Public Procurement Act, 2011):

a) Open bidding

Open bidding refers to a type of procurement method in which a procuring entity publicly invites eligible bidders to tender or offer to execute an advertised work or service through a purchasing of a solicitation document or following an outlined instruction to bidders as may be outlined in the advert. Open bidding is also a benchmark for effective and efficient public procurement in that it promotes fairness, transparency, value for money and helps to reduce collusion, fraud and corruption. In addition, this method of procurement may be used to obtain eligible service providers and civil works contractors in the road sectors (World Bank, 2014).

According to ZPPA Act of 2011 the public procurement regulations, 2011, open bidding may be national open bidding (ONB) or international open bidding (IOB) and requires that all procuring entities use this method of procurement for goods, works and non-consulting services. Further, the condition precedent in Zambia is that award of a contract opportunity is biased to determination of the bid with the lowest evaluated price (Zambia Public Procurement Act, 2011).

b) Open Selection and Limited Selection

The ZPPA Act of 2011 defines the objective of open selection as that of encouraging the participation of the Private Sector and enabling the clients to obtain the best possible shortlisted contractors, worthy value for money. Sporrang, J (2011) proposed that this type of procurement is

meant for consulting services and it is usually designed as an open tender in order to encourage competition. In addition, he went on to suggest that open selection can either be open international selection (OIN) or national open selection (NOS). Despite being open to the public, open selection may prescribe specific qualification criteria to guide in the eligibility of the targeted road service providers required to participate in the bidding process. The criterion applied in the ZRS may range from affiliation to the national council for construction in respect to grade, status of a company such as citizen owned company (COC) to the domicile status of the bidding firm (National Council for Construction, 2003). In case of consultants, the ZRS industry have an accredited body known as the Association of Consulting Engineers of Zambia (ACEZ), where all practicing consultant are affiliated.

c) Limited bidding and direct bidding

Limited bidding (LB) is a type of procurement which in reality is international competitive bidding except the design under this one is that eligible contractors are invited in person through writing instead of advertising in the media. On the other hand, though there is a limit in terms of number to be shortlisted it is anticipated to be broader enough to assure competitive prices (Ireland, 2012). In addition. Direct bidding (DB) is another type of procurement in which a procuring entity engages a bidder directly without subjecting him/her to any form of competition. This may happen only in emergence cases otherwise this kind of procurement may lead to corruption in the selection of contractor or consultants (World Bank, 2011).

Other Instances in which these kind of procurements may arise could be due to lack of many service providers in such works which are being sought to be done. Besides these, it can also be used when the proposed contract amount is not lucrative to attract foreign based contractors or suppliers (African Development Bank, 2015).

The African Development Bank noted that, a threshold for procurement is not in any way a fundamental principle that should govern a choice of a procurement method because project costs are determined by contracting authorities. Therefore, contracting authorities may adjust project cost in order to avoid competition and give themselves an advantage to benefit from a project by ensuring that it falls below a less competitive threshold. Because project costs with lesser thresholds does not attract competition from non-regional contractors and on the other hand having a higher project cost such as the one falling under the threshold for international competitive bidding (ICB) reduced into a threshold for simplified bidding only increases the time taken during procurement process and eventual successful project delivery African Development Agency, 2014).

e) Procurement of infrastructure for Private Financing and Award of Concessions

This refers to comparable contracting, service concessions that the government may enter into with private investor to develop, operate and manage a public facility such as a road over a period of time for a return on their investment. Zambia is currently considering a number of road projects on the core road network to be carried by Public-private partnership (PPP) or contractor facilitated (CFI) model (RSAWP, 2017).

Procurement of infrastructure project entered into by governments use concession agreements which comes in various forms, not limited to the following: build-lease— transfer (BLT); build-rent-transfer (BRT); build-own-operate (BOO); and build-own- operate-transfer (BOOT). These types of procurement methods are not good for developing nations like Zambia because infrastructure development is undertaken based on borrowings and the repayment period is usually very long, like it was in the case of the Suez canal which had a concession period of 99 (ninety-nine) years. This length period of time is too long for the concessionaire and the financier of a special purpose vehicle (SPV) to continue enjoying the benefits out of a constructed facility at the expense of the public of an origin country (Bunni, 2005).

Furthermore, designing, structuring and financing private and public projects poses great risks during both the pre and post construction phases. Some of the notable risks of these procurement methods which can subsequently haunt the origin country after assuming overall responsibility to care and maintain the constructed infrastructure are: increased interest rate risks which emanate from fluctuations in interest rates and depreciation of currencies against the major global currencies, especially volatile currencies are those amongst developing countries compounded by the risk of exchange rates (Gatti, 2008).

f) Community participation in procurement

This is a situation where the success of a project is anchored on the utilization of the local resources that may range from, human resource, materials and technical know-how. In addition, achievement of certain social problems like poverty may be reduced by implementation of labor intensive programmes like the Labor-based road projects. This kind of projects enable the participating locals to earn salaries and be able to better their livelihood at household levels (Puddephatt, 2012).

This type of procurement is not good because it take place outside the confines of the fundamental principles of procurement as defined in this study, such as competition, transparency and fairness. A person in authority may prefer to implement a labor intensive project in his home town or place of origin based on ethnicity grounds, while disadvantaging other communities, this is so, because community participation doesn't have well defined criteria to follow but simply depends on special discretion of those in authority. That is, basically obtaining community labor, either on a voluntary or paid basis similar to a private contractor may be engaged to carry out specified works by contracting authorities (UNCDF, 2013).

2.2.4 Procurement Threshold

Procurement threshold (PT) refers to the stipulated value limits in any respective procurement guidelines for government organisations, beyond which a trigger to shift from one type of procurement method is necessitated. For example, if an allocation for a contract is falling within the confines of a national competitive bidding (NCB) method and a donor brings in their counterpart funding and exceeds the value limit for NCB then automatically a shift is triggered by the consequent exceeding of the value limit for international competitive bidding (ICB) (Group, 2014).

However, procuring entities or contracting authorities retain the discretion to manipulate and work

around the set procurement thresholds, by keeping the project below the higher and stricter procurement threshold thereby accruing incentives for themselves. More so, it is very difficult to know if the size of the project has been reduced because contracting authorities have the right to also apportion work packages in various lots in order to justify the reduction in project sizes. As a result, despite having the procurement threshold the eventual choice of procurement may not be the best for the job if the contracting authority had tempered to the actual project size. Consequently, the presence of thresholds in public procurement guidelines for the selection of a procurement method can safely be said to be an ineffective way of selecting a procurement method, unless a better framework underlying their application is established (Konkurrensverket, 2015).

One key fundamental principles of procurement is economic realistic project schedules. With this principle in mind it was noticed in Table 2.1 that the presented difference in threshold for procurement between ONB and OIB of over K500 million and over K50 Billion are not realistic as they are too wide apart. This entails that a project can only qualify to attract the participation of international contractors and the use of OIB if it exceeds the project cost of K50 Billion.

Table 2.1: Thresholds for Procurement Methods for Works and Consulting Services

S/N	Procurement Method	Type of Procurement	
		Works	Consulting Services
1	Open National Bidding	Over K500,000.00	Not Applicable
2	Open International Bidding	Over 50 Million	Not Applicable
3	Limited Bidding	In appropriate circumstance	Not Applicable
4	Open National Selection	Not Applicable	Over K300,000.00
5	Open International Selection	Not Applicable	Over 500,000.00
6	Limited Selection	Not Applicable	In appropriate circumstances
7	Simplified Bidding	Up to K500,000.00	Up to K300,000.00
8	Direct Bidding	Up to K10,000.00 of in appropriate circumstances	Up to K10,000.00 or in appropriate circumstances

Source: (Zambia Public Procurement Act, 2011)

To the contrary, the essence of floating bids on the international frontier should not only be for commercial purposes but should also be due to the complexity of the works to be carried out, so that high-technological know-how can be acquired. This implies that a contract opportunity may be over K500 million and far less than 50 Billion yet too complex to be handled by local contractors. Therefore, specialized foreign contractors can be the only answer to such needs. And in such cases if a local contractor is awarded a complex contract which is beyond his or her capacity then it leads to inefficiencies and schedule delays. In addition. The trend leads to acquisition of expatriates, who better understands the works to come in and help but at additional expenses to a local contractor.

2.2.5 Counterpart Funding

Counterpart funding (CF) is the pledged contribution of funds towards a developmental project or programme alongside the local government set budget for the same works to be executed. Over the years in Ghana like Zambia CF has been of great help to the efficiency and effectiveness of public procurement delivery. However, to the contrary, delays in the disbursement of CF has led to a lot of projects remaining uncompleted in many developing nations (Samwel, 2014).

It is quiet common amongst development countries that usually their annual work plans include CF

that donors pledge towards funding of infrastructure development programmes. Therefore, the procurement thresholds (PTs) presented in Table 2.1 above, does not give the details pertaining to the breakdown of such funding for projects. It is therefore misleading from the onset when verifying project delivery of a project using the PTs. This is because in most cases the pledged CF is delayed and at times not honored by cooperating partners, leading to delays and subsequent project failure.

2.3 Basic Factors affecting Procurement of Projects

Attention was given to review the noTable factors that have reportedly impacted on project procurement, as the study sought to identify the major factors that could be “major drivers” of the inter-play between project procurement and successful project delivery in the ZRS. Therefore Figure 2.1 highlights the primary factors that have been identified in the recent past to impacting negatively on the procurement of various projects.

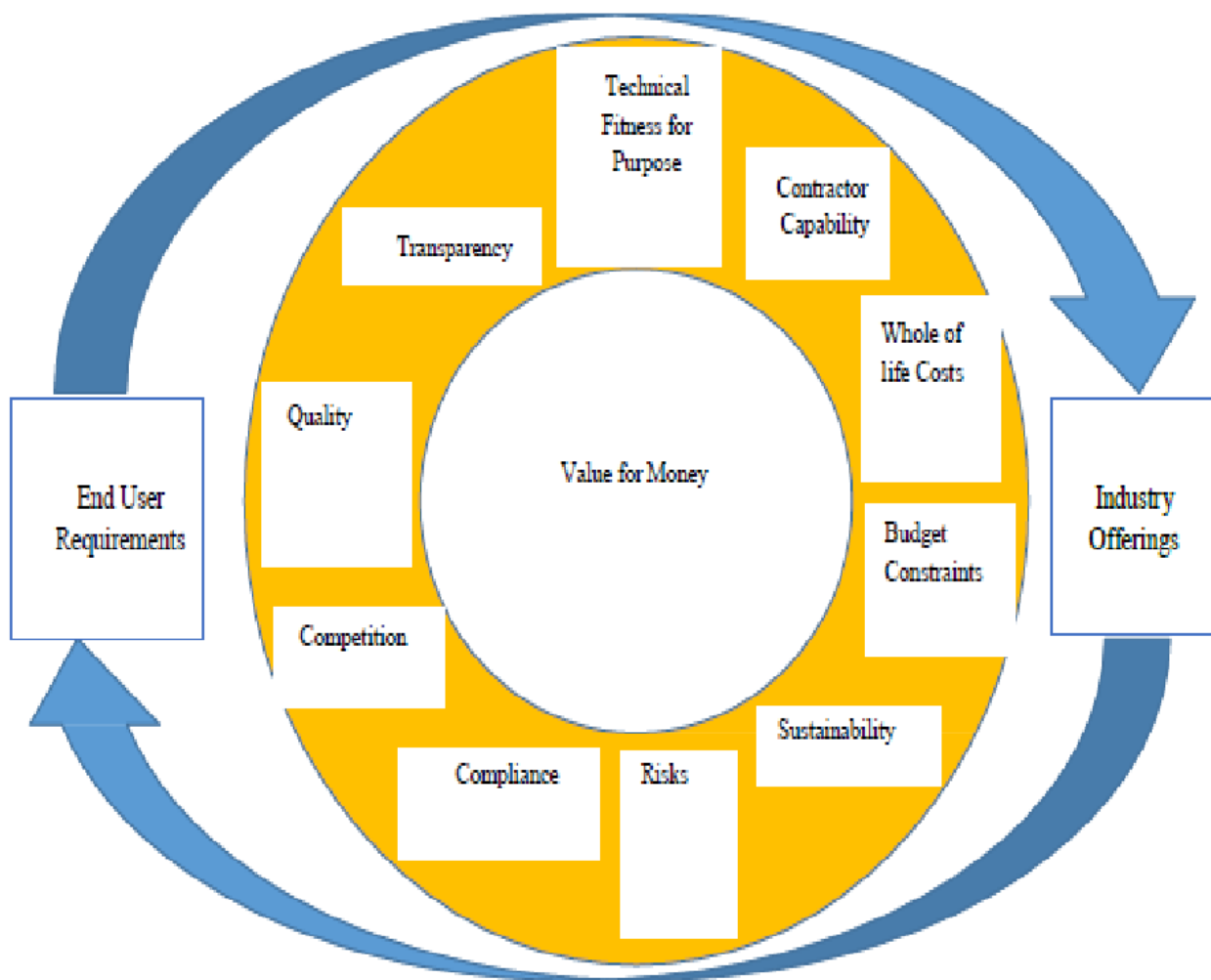


Figure 2.1: Elemental moral and technical factors needed to achieve value for money. Source: (Deloitte, 2015)

2.3.1 Value for Money

Value for money is a great factor placed at the core of any public procurement of goods, works and/ or services that every procuring entity endeavors to achieve, as depicted in Figure 2.1 below. This is because public procurement is funded by ordinary citizens of nations and therefore it is expected, of them to see a return through eco- social service delivery worthy their tax contribution. (Delotte, 2015).

Unlike what has been obtaining in the ZRS and the construction industry in most developing countries where value for money hardly misconstrued to mean the acquisition of a service or product at the lowest price. This perception is rather being shortsighted of other important aspect that make up “value” to the public and for the purpose of this study, “Value” was defined on a rather broader perspective to mean not only the acquisition of a service or product at the lowest price but also to include quality, length of service of the obtained product, service contribution to the national economy and spurring of employment opportunities to the public. There is overwhelming outcry for recording negative outcomes such as project cost overruns, delayed schedule and shoddy works, from nations where value was misconstrued to mean only obtaining services or products at the lowest price (Khan, 2015). In order to achieve value for money a number of moral and technical virtues are needed to be well in equilibrium against which it would not be possible. Deloitte Access Australia, 2015 has therefore identified a number of elemental moral and technical virtues as shown in Figure 2.1.

a) Technical Fitness for Purpose

Effective procurement ensures that a contract includes elemental design life of an engineering facility required to be built in conjunction with fitness for purpose. This entails that every element of the structure must last for a life time as per the design procured and be able to serve its intended purpose without exhibiting major defects. Therefore, Technical fitness for purpose warranties should be an engineering standard for measurement of time in reference to the outsourced contractual civil works. And good practice, in procurement includes factoring in high level skill to ensure that every elemental part to the structural of the constructed facility remains in service and fit for purpose after closure of procurement and consequent practical completion; till the end of its design life (Kingston, 2016).

b) Contractor Capability

Contractor capabilities in Zambia is assessed by the National Council for Construction who are mandated by an Act of Parliament of 2003 to register Contractors in various grades according to their capacities. The highest grade is grade one (1) with the least being grade six (6). Contractor capacity assessment takes into account the human resources, plant and equipment as well as financial capacity of a firm (National Council for Construction, 2016)

c) Whole of life costs

Clients in the construction industry face challenges in coming up with a suitable method of procuring and delivering a project need, especially in cases where various options exist which fulfil the same performance requirements, but differ in terms of their inputs for initial costs and operating costs. The best solution could be comparing such projects on the basis of how much net savings is realized after implementation by taking into account the requisites of acquiring, owning and salvage value of the project. The project that yields maximum net saving is said to have a better “Whole of life costs” and should be considered for use (Wang, 2014).

d) Budget Constraints

Budget Constraints or sealings determine the extent of project scope and project cost to be undertaken annually as may be unveiled through the National Budget of a country. The sealings outline the funds allocated towards maintenance, rehabilitation, reconstruction and construction of road, however, due to the limitation that come with them only a sizeable number of roads receive attention annually. Therefore, budget sealings result in a backlog of deferred maintenance of roads that consequently erodes the initial huge investment made on the core road Network (Heggie, 2010).

e) Sustainability

A sustainable road procurement requirement is one that embraces aspects of detailed transportation design, planning, construction and operation and maintenance activities from its inception. Implying that if any of these attributes is lacking then a proposed procurement will be considered unsustainable. Therefore, based on these aspects of sustainability, specific rating systems may be developed by Road Agencies to check for procurement sustainability of road projects (Hirsch, 2015).

f) Risks

A matrix of risk distribution for road infrastructure projects is cardinal as it provides relevant knowledge to both the client and the concessionaire. However, project risks vary from one project to the other and the approach to risk identification is purely based on practical experience. Risks when identified within and around the project environment form the basis of addressing risks especially in the concession agreement under Public-private partnership (PPP) infrastructure projects (Phillips, 2008).

g) Compliance

Since the construction industry is overwhelmed with various procurement methods which involve a host of respective procurement rules and regulations for each method, it may prove very difficult to examine the irregularities in the procurement processes and check for compliance. As a result Supreme Audit Institutions (SAIs) have developed checklists for checking compliance in the public

procurement processes. Therefore, with the use of such a checklist in the construction industry, road authorities can endeavor to check and examine any irregularities such as fraud, corruption, lack of fitness for purpose, and lack of efficiency (European Union, 2004).

h) Competition

The construction industry is a market like any other market involving buying and selling, in which participants strive to get a contract opportunity. Consequently government organisations, multilateral banks and public and private institutions have identified competition as the key factor in realizing value for the money during the PEM process. It is anticipated the broader the completion the more likely it is for a procuring entity to acquire goods, works and services at the best and lowest evaluated price. Competition also promotes the image of procuring authorities as it approves confidence and transparency of the public procurement process.

i) Quality

Quality in this study was defined as the degree of strength of road materials as demonstrated by laboratory and field test values obtained be-fitting the design specifications (Thagesen, 2004).

j) Transparency

Transparency is an open way of undertaking the public procurement process for goods, works and services, by disclosing all the necessary information that may be helpful in putting up a responsive bid. It also involves public discouragement of activities like corruption, collusion and fraud. On the other hand, the lack of transparency in public procurement hinders project efficiency in spending public funds and competitive bidding (Puddephatt, 2012).

2.4 Major Factors affecting procurement of projects

Some of the major factor affecting procurement projects are defined as follows:

1) Contract Price

Federation international des Ingenieurs-Conseils (FIDIC) conditions of contract for engineering procurement contracts (EPC) Turnkey projects define contract price as “the agreed amount stated in the contract agreement for the design, execution and completion of the works and remedying of any defects, and includes adjustments (if any in accordance with contract)” (John B Bowcook, 1999) . In public procurement, a price should be competitive enough to attain value for money and obtained in a transparent manner through a well-defined selection criteria that accords the public equitable access to participate and follow the public expenditure management (PEM) process.

2) Project Design

Design-Build (DB) is defined as “All work to be performed by the contractor under the contract to design, build, test and obtain the commissioning certificate issued in accordance with sub-clause 9.12 (completion of design-build) (Jaeger, 2008).

This study defined project design as “the Employer’s envisaged, interpreted and mapped out work on paper, requiring construction, to be approved, tested, with all its constituent materials and obtain commissioning certificate at practical completion of the project works”.

3) Project Delivery

Project delivery (PD) is the procedure by which the project will be designed and executed. Therefore, the procuring authorities responsible for the execution of the project should make timely decisions concerning the procedure to be used. Over the years, the following are the most accredited methods of project delivery systems (CMAA, 2012):

a) Traditional Project Delivery

The traditional project delivery method (TPDM) in the road sector refers to the commonly practiced general conditions, particular conditions and individual’s standard specifications as may be designed by the employer. The other key players in the traditional delivery method are the contractor and the engineer. An outline of the road map from inception to closure of the traditional delivery method comprises the following aspects: Issue of the solicitation documents; Submission of the solicitation documents; Issue of the letter of acceptance; commencement date; completion date and duration of contract; Issue of taking over certificate; Defect liability period; Issue of the performance certificate; and return of the performance security (FIDIC, available at www.fidic.org).

Davis et al, (2008) extensively wrote on TPDM but particularly on procurement strategies, its advantages and disadvantages. He went on to state that TPDM is also referred to as a delivery system. Further, he explained that this type of system assigns specific responsibilities to people and organisations. NoTable, among the players involved in this delivery system are, the Employer, the Engineer and the Consultant. (Baccarini, 2008)

According to David (2008) the TPDM approach defers from Design and Build delivery system, in that the later, allows the Employer to accept design work to be generated separately from construction by the consultant. The responsibility of the Contractor is only to execute the works based on the provided designs by the Consultant. This system is venerable to project delays and re-works in cases where the project designs are delayed to be handed over to the Contractor (Atout, 2016). Finally, he outlined that TPDM may be applied either as: lump sum contract in which a contractor undertakes an assignment for a fixed contract price; Measurement which entails pay items in a contract are paid to a contractor by measuring the actual volume of works done; and Cost reimbursable contract in which a charged fee may be directly related to the prime cost; tendered fee by the contractor; and fee may vary in proportion to the difference between the estimated cost and the actual prime cost (Mearig, 2017).

David (2008) analysed various procurement strategies based on a number of project delivery methods, without identifying any procurement factor which could lead to project failure or success. In addition, he reported that the main *advantages* of using a traditional approach to procurement are: accountability due to a competitive selection; competitive equity as all tendering contractors

bid on the same basis; design lead and the client is able to have a direct influence which can facilitate a high level of functionality and improve the quality in the overall design; price certainty at the award of the contract; variations (changes) to the contract are relatively easy to arrange and manage; and a tried and test method of procurement which the market is very familiar with. To the contrary he also failed to establish the preferred procurement method or even critical factors which may affect the outcome of a procurement process such as political influence, corruption, bribery or release of project funds. Finally, David (2008) research was undertaken in a different environment different from the Zambian conditions, procurement guidelines and law of the land (UN-HABITAT Pakistan, 2011).

b) Construction Management at-Risk

Construction management at-risk (CMAR) is a project delivery method in which the project deliverables are tied to both the project duration period and the project contract price (PCP) as consented to by the Construction manager (CM). This entails that the contract is basically between the client and the CM, who bears all the associated project risks for the final project cost and time in which to deliver the project works to the client. Unlike in a traditional project delivery method (TPDM), CMAR functions in a unique fashion as shown in Figure 2.2 (Public works and Government services Canada, 2011). In this system, the client enters into separate contracts with the contractor, the design consultant and the CM at-risk. The role of the CM in this method is to manage all the pre-construction services on behalf of the client plus: assessment of the project feasibility; ensuring that the design consultant provides cost effective designs equal or below the clients' budget sealings; and above all to deliver constructible and realistic schedules which are attainable (Chan, 2011). This approach of delivery shows high level of professionalism and project focused timelines tailored on achieving project deliverables as opposed to the TPDM being practiced in Zambia. Therefore, this type of international procurement and project delivery best practices is what this study recommends to be incorporated into the Zambia Public Procurement Authority guidelines in order to expedite on project delivery of road projects (Thai, 2009).

With, "Extension of time" becoming a common feature on most of the projects in the construction industry in the recent past, CMAR stand out to provide viable solutions to this deficiency in project delivery by timely examining and taking cautious responsibilities of reviewing the feasibility, helping the client to establish that the designs are within the client's budget and above all ensuring that the project schedule is realistic and achievable (Holland, 2016).

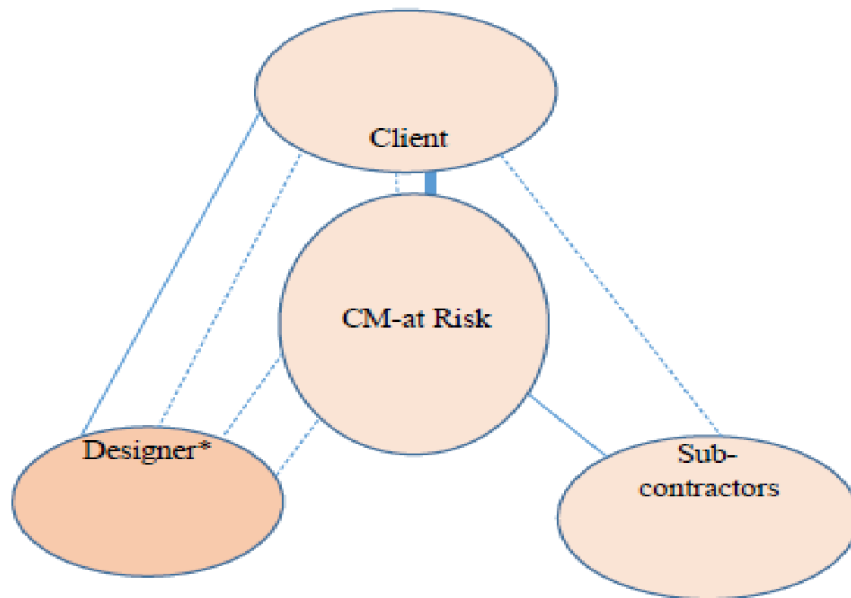


Figure 2.2: Typical CMAR structure

Source: (Shane, 2012)

c) Multiple Prime Contracting

Multi-prime contracting (MPC) project began in the late 1960s and 1970s in the public sector as an alternative to the traditional general contracting design/bid/build type of project delivery method. This is a project delivery method that is a variation of design- bid-build in which the client or the owner superintends over distinct contracts with contractors of various areas of specializations such as Transportation/ Highways, General construction, earthwork, structural works etc. In this type of delivery, the client or its CM, oversees the whole project schedule and budget. Among many other solutions, the project delivery method sought to mitigate against projects' cost overruns, delayed projects and increased number of claims (Yugar-Arias, 2014).

d) Design and Build

Design and build (D&B) may be defined as “a sole-sourced contract for design and construction services”. In a design and build type of project delivery system everyone involved in the project team endeavors to think and work together in one accord for a collective purpose (America, 2014).

Marwa (2004) conducted a research on comparing procurement methods for design- build projects. According to him, the design-build delivery method is increasingly used due to the numerous advantages it can offer to a project. An important issue associated with design-build delivery method is the procurement method used to select the design- build team. He reported that it was a critical decision that involves several key project team members and requires the owner to carefully select the design-build team expected to successfully deliver the project. His research quantitatively studied the correlation between the design-build procurement method and the performance of the design-build project with regard to cost, time and quality. The procurement methods studied were: sole source, qualifications-based, fixed budget/best design, best value, and low bid selection. He defined the procurement methods as follows:

i) *Sole Source Selection*

This type of procurement method involves the direct selection of the design-build team without

proposals. The lack of price competitiveness factor discourages public owners from selecting design-build teams using this procurement method (Molenaar and Gransberg 2001). However, the sole source selection potentially allows a shorter procurement time and thus, may be used during emergency conditions to ensure a faster project delivery.

ii) *Qualifications-Based Selection*

Using this method, the owner selects the most qualified design-build team through an RFQ and often negotiates only with that entity to a “fair and reasonable” price (Beard et al. 2001). Selection of the team is primarily based on qualitative criteria such as past performance, design-builder reputation, technical competence and financial stability. The later non-cost criteria represent 50percent or more of the evaluation process. In this arrangement, owners may choose to award the project to a design-build team with whom they have established long-term relationships, with minimal scope design completed at the procurement time. A negotiation process usually associated with this procurement method increases the probability for the design-build team of meeting the owner’s quality expectations.

iii) **Best Value Selection**

In a best value approach, the design-build team respond to the owner by submitting proposals that are primarily evaluated based on the technical aspects together with the associated cost of the project (Beard et al., 2001). Negotiations may take place after the proposal submittal phase. The owner selects the proposal that offers the best value. A weighting criteria evaluation method is usually used to identify the right design- build team and the weights assigned to each of the factors are specific of the owner’s organization, in addition to the type and size of the project. He reported that the best value selection is advantageous because it also allows owners to prequalify the design-build teams based on technical criteria before the final selection phase, which is based on the price competitiveness.

iv) **Fixed Budget/Best Design Selection**

The owner specifies the project budget during the RFP process (Beard et al., 2001). The design-build teams compete by placing as much scope as they can in their submitted proposals. Using this approach, the design-build teams are selected based on qualitative and technical aspects, taking into consideration that the project cost is fixed for all competing teams. This procurement method is considered to be competitive regarding scope and quality rather than project cost. It allows the owner to have the optimum for the specified budget value.

v) **Low-Bid Selection**

The owner primarily selects the design-build team based on the project value and related cost items. Cost criteria represent more than 90percent of the design-build team procurement selection process (Beard et al., 2001). This selection method is characterized by a high level of design completion at time of procurement to facilitate the competitive selection process (Molenaar and Gransberg, 2001). However, innovation normally associated with the design-build delivery method may be reduced.

Further, Marwa (2004) performed various statistical tests to analyze the data. The cost growth

metric relationship with the procurement methods was statistically verified, showing projects procured using low bid selection incurred a higher cost growth than projects procured using other methods. Several other trends illustrating the effect of adopting each procurement method on project performance were identified. Design-build projects procured using the sole source selection method seemed to result in the highest project intensity. Also, the lowest schedule growth appeared to be associated with the best value procurement method.

Based on the patterns and relationships identified, a better understanding of the procurement process and how it may affect the project performance is achieved. The impact of project-specific factors, such as the level of project complexity and the level of design completed at the time of the procurement, on the design-build project performance were examined. Guidelines are defined to assist owners in selecting the design-build team procurement method that responds to their project goals. Guided by these recommendations, owners can improve their selection decision process for design-build projects.

The conclusions of the study illustrate the extent that implementation of the appropriate procurement method is related to successful project performance. Cost, time and quality served as the basis for comparison between the five main procurement methods studied.

He reported that this was an issue of extreme importance to the construction industry because a qualified design-build team can significantly impact the delivery of a project on time, within budget and meeting the owner's expectations. Also, the selection of the procurement method is closely related to the selection of the project delivery method and the contract type. A procurement method that is not selected in accordance with the entire project process can result in numerous problems during and subsequent to construction. Consequently, in order for the construction industry to benefit from the advantages of the design-build delivery systems, it is necessary to ensure that the appropriate procurement method is used to select the right design-build team.

Marwa reported that numerous research studies have confirmed that cost, time, quality are the three main criteria used to measure successful project delivery. The different models and criteria of evaluation systems identified the need to shift from the lowest cost criterion to a more comprehensive and systematic approach for contractor selection. According to Marwa (2004), for design-build projects in particular, an empirical study was conducted to identify the different project success factors. Time and cost metrics were used to evaluate and measure project performance (Chan et al.

2001). the results of the study concluded that teamwork and efficient coordination between different project players were the most important among the six main factors identified. In addition, the contractors' competencies was also identified as a critical success factor that should be considered by owners when procuring a team for a design-

build project. The contractors' competencies include technical and financial capabilities; effective implementation of project planning; design and construction within a design-build environment; and past experience. As noted, it is essential that the contractor engaged in a design-build project possesses the appropriate knowledge and ability to manage the project, as it highly impacts on the project performance.

Design-build projects that performed successfully, together with recently introduced changes in procurement regulations encouraged numerous public owners to select the design-build project

delivery method. According to Molenaar and Songer (1998) as in Marwa (2004) 122 case studies of public design-build projects were analyzed to help public owners make informed decisions when selecting the design-build delivery system. In this study, several project characteristics were used to identify the correlations necessary for the model development. Project-specific attributes; owner's agency experience and staffing; design-build market; and owner/design-build team relationship were identified as the most important characteristics public owners should consider to fully benefit from the design-build delivery method (Marwa, 2004).

The research by Marwa (2004) was important to this research study as it has highlighted the benefits of design-build delivery method. This research highlighted on all the procurement methods used in Zambia and project delivery because there are several procurement methods being used and the successful project delivery of the procurement methods is not known in Zambia. Further, the research by Marwa was conducted in 2004 and its findings may not be valid to today's situation due to time lapse.

e) Integrated Project Delivery

Integrated project management delivery method is a phenomenon of controlling, planning and motivating procedures and resources to obtain the required project goals. This is a project delivery method in which talents and insights of all the project team members are cooperatively harnessed together by integrating them alongside with the core work type and system of approach to be employed. It is anticipated that doing so will reduce waste and maximize on efficiency throughout all the stages of design, fabrication and execution of project requisites (Council, 2007).

f) Public-Private Partnership (PPP)

Van (2002) examined the advantages and disadvantages of Public Private Partnership (PPP) as a method of procurement. In his finding, he reported that PPP arrangement display three essential characteristics which are: a significant level of responsibility and risk that is transferred from the Public to the Private sector; contractual arrangements are but around performance based outcomes, rather than work specification, and a long term contractual arrangements. He further added that the financing of Public Infrastructure development off the book of government which might include tapping into new sources of project revenue to secure project financing and the imposition of real tolls or other fees to finance the project. According to Van (2014) the advantages of PPP procurement methods are:

- 1) Value for money: He referred to value for money as a means of delivering a project with the same quality as under conventional procurement for less money, or delivering a project with a superior quality for the same amount of money. He cited three primary values for money drivers which are:
 - (i) Risk transfer: Risk will be transferred to the part which is best able to manage this risk and at the least cost. Risk transfer according to him would ensure that the parties involved will use conservative assumptions in developing their expectations of benefits and costs.
 - (ii) Output based specification; specifying the project results as outputs allows innovations to take place. He reported that in the conventional procurement method, an output specification is used, therefore describing the assets used to provide a service. He indicated that many

clients (Public sector) find it difficult to articulate precisely which outputs they want.

- (iii) Long-term nature of contracts (including whole life costing). He reported that service providers take more time to recover the cost of investment, enabling the supplier to reduce annual charges. It also gives the supplier greater depth of experience in running the business which could be a source of efficiency. It makes it easier to transfer technology risk to the supplier by enabling the supplier to make better judgment about when renewal of assets and capital expenditure is incurred. In his report, to be cost effective, performance measures and payment systems must be included in the contract measurement and the often advantages of Public Private Partnership cited in the report are performance measurements and incentives, use of private sector management skills, competition, cost efficiencies, time for delivery savings, reduction on the public treasury, improved response to market forces, broad support and improved cost calculations.

Further, he argued that Public Private Partnership has disadvantages of poor value for money in form of higher transaction cost, high capital costs, insecurity, culture gap, inefficiency, short term rigidities and hold up problems.

The report by Van (2002) is important to this research as it has indicated the advantages and disadvantages of using Public Private Partnership as a procurement method, but the research was conducted in Europe and its applicability to Zambia is not known. Further the report was conducted in (2002) making it difficult to apply the findings in today's situations. The objectives and the methodology used in Van H. report are different from this research as he used a desk research thereby not contributing any new knowledge to the study.

g) Design and manage (DM)

A DM strategy is similar to MC. Under a DM contract, the contractor is paid a fee and assumes responsibility, not only for works contractors, but also for the design team. The common variations of DM are (Turner, 1990):

- Contractor – a project design and management organisation designs and manages the work, generally for a fee and delivers the project by employing works contractors as its subcontractors to design/or construct.
- Consultant – a project designer/manager is the client's agent, who designs and manages the work, obtains subcontract tenders from works contractors, and then, enter into a direct contract with the client.

The main advantages of using a management approach to procurement are: the client deals with only one firm, which enables improved coordination and collaboration between designers and constructors; potential for time savings for the overall project as design and construction activities are overlapped; under a DM form, the contractor assumes risk and responsibility for the integration of the design with construction; works packages can be let competitively at prices that are current; improved constructability through constructor input into the design; roles, risks and responsibilities for all parties are clear; and flexibility for changes in design.

The main disadvantages of using a management approach to procurement are: price certainty is not achieved until the final works package has been let; informed and proactive client is required;

poor price certainty; close time and information control required; client must provide a good quality brief to the design team as the design will not be complete until resources have been committed to the project (CM and MC); and client loses direct control of design quality which is influenced by the constructors (DM).

The report by Davis et-al (2008) is very important to this research as it has highlighted the types of PM as well as its advantages and disadvantages. This research and that of David (2008) is different because the objectives are different. Further, David et-al (2008) conducted desk research, thus, he used secondary data and extensively relied on the findings of other researchers. This research will use both primary and secondary data, thereby adding to the body of knowledge relating to the effects of procurement methods on project delivery in the ZRS industry.

2.5. Procurement of works contracts in Malaysia

2.5.1 Effects of Procurement systems towards performance of refurbishment works

Azlan –Sha et-al (2004) conducted a study on the effects of procurement systems towards the performance of refurbishment works in Malaysia.

In his findings, he concluded that there was no wide gap between the traditional and DB procurement systems because the designers come from different organizations. He reported that there was high involvement by the contractor for DB procurement method during pre-construction stage. However, there was no significant correlation detected by different types of procurement towards project performance.

The research by Azlan-Ash et al., (2004) indicated the effects of procurement systems towards the performance of refurbishment works in Malaysia by specifically looking at the traditional and the DC method. This research compared all the procurement methods used in Zambia and came up with the most successful project delivery methods which is IOB and NOB. Further, the research by Azlan Ash-et-al was conducted in Malaysia which has a different environment from that of Zambia. Therefore, what worked in Malaysia may not work in Zambia due to different political, economic and social environment.

2.6 Procurement of donor funded projects in Kenya

2.6.1 The factor affecting the timelines of completion of donor funded projects in Kenya

According to Samuel (2014) the factors affecting the timelines of completion of donor funded projects in Kenya were: well-trained project managers which was a key factor linked to project success because as a team builder, he/she can create an effective team. According to his findings, 70.97percent of the respondents mentioned that project management training would positively influence project timelines and delivery, with only 19.35percent indicating that project management (PM) training would not influence project timelines and delivery.

Further, Samuel (2014) found out that there was a relationship between promptness in the release of funds by donors and the implementation of activities. He reported that working capital is crucial for a firm as it affects performance. He reported that the financial position of a firm can influence the way projects are implemented. Further, he indicated that untimely release of funds, inadequate and unpredictable transfer of funds influence timelines of completion of projects to a great extent.

Samuel (2014) furthermore found that having a monitoring and evaluation unit at an institution would help improve on project timeliness and delivery. He reported that his findings were in agreement with Goluvrea (2004) who established that monitoring of projects provides timely feedback of the comprehensive control information at each stage in the implementation process.

The report of Samuel (2014) was important to this research as it highlighted the influence of promptness in the release of funds, influence of education level, training of project staff and influence of regularity of monitoring projects in order to ensure that projects are delivered on time. Despite the importance of the highlighted findings by Samuel (2004) to this research, his research was conducted in Kenya which has a different social and economic environment from Zambia. Moreover, his research was conducted thirteen (13) years ago and therefore this research stands out to benefit from the latest technological discoveries over the last thirteen (13) years as well as improved global procurement and project delivery best practices.

Further, the research of Samuel (2014) focused on the factors affecting the timeliness of completion of donor funded projects while the focus of this research is to investigate the relationship between the procurement methods used and project delivery on the ZRS. Though the methodology is similar, Samuel's respondents were from the agriculture sector while this research drew its respondents from the road sector in Zambia.

2.7 Procurement practices influencing service delivery in Kenya

According to Maurice (2004) in his research "Procurement Practices Influencing Service Delivery in Kenyan electric power revealed that: Procurement rule and regulation lack flexibility and it is hampering the procurements operations as revealed by 77.5 percent; Procurement planning does not take long term cost of ownership into consideration as also revealed by 39.4percent; the findings also revealed 59.1percent agreed that there is no Sustainable procurement practice by the company even though it has Green policy in places but, the implementation is hampered by organizational culture as well as budgetary constraint.

The focus of Maurice's research was on electric Power and service delivery in Kenya, while this research focused on the Zambia Road Sector. In addition, his study was narrowed to procurement rules and regulations only and neglected other important factors which may also affect project delivery, such as release of project funds, presence of a monitoring and evaluation unit (M&E) in a firm, contract price and availability of project designs among others. In acknowledging these gaps, this study went further by highlighting the importance of these factors and showed how they fared in the Zambia Road Sector, during the period investigated.

2.8 Effects of procurement planning on institutional performance in Mombasa

2.8.1 Cost estimation, needs assessment and quality specification variables

Onyango (2012) conducted a study on the effects of procurement planning on institutional performance in Mombasa Law Court using proper cost estimation, effective needs assessment and quality specifications variables. According to his findings, needs assessment was ranked first with frequency 35 and the highest percentage of 58 percent, procurement cost estimation was ranked second with a frequency of 15 and a percentage of 25 percent and quality specification was ranked third with a frequency of 10 and percentage of 17 percent. The results revealed that among the

effects of procurement planning, needs assessment was the major factor affecting procurement planning and important level of decision for procurement department of any institution.

Onyango (2012) concluded that there was a significant relation between procurement planning and performance. Staff competence which was shown in the professionalism aspect, while coming up with the cost estimate and quality specifications in the procurement plan was also a factor.

In addition, factors affecting procurement planning were identified as need assessment, cost estimation and quality specifications. Other factors identified included financial capacity of an institution, professionalism and management style, availability of procurement officers, market price and quality of the items to be procured. He urged that lack of proper procurement planning through identification of user needs in an organization creates an avenue of unethical practices in the procurement department such as corruption, improper use of resources and excess budget votes. He emphasized the need for staff training and competency in all departments in order to ensure effective and efficient procurement process.

Though the study of Onyango is similar to this research, the focus of Onyango's study was on effects of procurement planning on institutional performance in the Mombasa Law Court using the variable of cost estimates, needs assessment and quality specification. Moreover, the premise of his research was limited to construction of buildings and not Highways/ Roads. In that regard, it should be noted that buildings are less complex in nature as compared to Road construction and the parameters applied during planning and project delivery are totally different. Therefore, the gap noticed gave impetus to carry out an investigation in respect Road Construction. This dissertation's concentration was on the ZRS and used the variable of prevailing procurement procedures, the performance of past projects, procurement factors and PM in the ZRS. In as much as the research methodology is similar, the research by Onyango was conducted in Mombasa which may have different political, social and economic environment to that of Zambia.

2.9 Procurement of public works in South Africa

2.9.1 Procurement planning and service delivery in public enterprises in South Africa

Wogube (2011) in his research of Procurement Planning and Service Delivery in Public enterprise in South Africa found that there is a strong and positive relationship between procurement planning and service delivery. Further, the study undertook to examine the roles of different stakeholders in procurement planning and the following were found; defining procurement requirements, dividing requirements allocated to a single procurement process into separate lots, integration of the diverse decision and activities, ensuring availability of sufficient funds to run the plans and developing of proposals and evaluation of potential service providers.

The factors which were found to be affecting service delivery included the following: corruption, lack of finances, the challenge of getting the right service provider, limited skilled personnel and poor communication.

While the objective of Wogube's research was to find out the effect of procurement planning on service delivery. In as much as both research studies are in the Southern African region and the methodology is similar, the institutional framework and policies under which the public works and

delivery systems employed, are very different. Further, Wagube's research took a generalized approach to various public works while this study had limited its investigations to the Road Sector. Therefore, it became imperative to investigate the Zambia case irrespective of the South African findings.

2.10 Zambian procurement systems

According to central statistics office (CSO) procurement as on www.csprzambia.org, it is reported that the Zambian procurement system despite having a relatively modern legal and regulatory framework faces a number of challenges resulting from non- enforcement or weak enforcement of the provisions of the Act, including sanctions for breach, resistance to change, limited capacity and simply incompetence in some cases. The Act for example, requires procuring entities to publish annual procurement plans and contract awards but these requirements were not being adhered to by most, if not all procuring entities. The publications were meant to enhance transparency and accountability. Therefore the non-adherence to the provisions was not only a breach of the law but also inhibited transparency and accountability. The Auditor General has, year in year out, been reporting cases of procuring entities not complying with procurement procedures in the procurement of goods, works and services with no sign of this practice coming to an end.

The general challenges which were still being faced included, but were not limited to, the following;

- Non-preparation of annual procurement plans;
- Lack of capacity by the private sector to participate in public procurement;
- Suppliers who would like to participate in public procurement found the procurement procedures cumbersome;
- Poor Procurement practices; and
- Lack of enforcement of ZPPA procurement guidelines

Further, the Office of the Auditor General (OAG) exercised oversight over public procurement and had been doing a commendable job in exposing weaknesses, poor practices and corruption cases in the Public Procurement system which resulted in losses to Government and poor service delivery (Auditor General's Report, 2017).

According to their OAG's report, institutions had different challenges. Procurement in the ministry of health (MoH) for example, was the responsibility of the Procurement and Supplies Unit (PSU). The procurement of Pharmaceuticals and related supplies was one of the key roles of the PSU. The procedure for the procurement of drugs and medical equipment and supplies was that, the user department initiated the procurement through a purchase requisition which was submitted to the PSU. Thereafter, PSU confirmed the availability of funds and counter checked the requirements in terms of quantities and specifications. The PSU then determined the method of procurement and developed the appropriate solicitation document, invited offers and coordinated the evaluation of the offers received. The PSU then obtained the necessary approvals to proceed with the procurement. Once due approvals were obtained the PSU arranged for the signing of the contract. In most cases the goods when delivered were consigned to storage.

The report indicated that the process of procuring drugs and medical supplies always started at the

hospital or the District Health Management Team (DHMTs) levels. The requirement schedules were prepared for all hospitals and clinics by the DHMTs and sent to the Drug Supply Budget line (DSBL) unit which raised the purchase requisition. The procurement processes in the Zambian health sector had been a subject of great attention to a number of stakeholders. Several stakeholders had raised concerns on the lack of transparency, poor adherence to standards of good governance and risks of corruption in procurement (OECD-DAC, 2007). Furthermore, internal reviews of MoH PSU had identified many areas of risk for corruption and weaknesses in procurement (CYMA, 2011).

The major weakness in MoH procurement procedures and practices were:

- a) Insufficient or no follow-up on goods and services to ensure adherence to quality specification and timely delivery after contracts were signed. Assessment of the procurement processes revealed that many pharmaceutical consignments arrived without: the standard documentations; with expired or about-to-expire drugs; inappropriate quantities; and discrepancies between goods received and tender specifications.
- b) The oversight function was not institutionalized. In addition, suppliers and apparently many officers in the PSU were aware of this weakness. The oversight was supposed to be conducted by the Office of the Auditor General and ZPPA. However, the Auditor General often conducted the audit after 2 years or more. Even then, the Auditor General's reports of the past four years pointed out that procurement procedures were still being flouted in the Ministry. To the contrary, the ZPPA has never undertaken any procurement audit of the Ministry of Health.
- c) Political interference was also a major problem in procurement process (MoH, 2008).
- d) Lack of access to information at the PSU had been cited as a major cause of concern about the transparency of the procurement process and activities. The result of these weaknesses was that many stakeholders remained apprehensive about the procurement procedures and practices in the Ministry. In 1999, donors in the sector withheld their financial support on account of dissatisfaction with procurement practices (Rakner, Michelsen, walle, & Mulaisho, 1999). Further, in 2008/09 the global fund for HIV/AIDS, TB and Malaria (GFATM) withheld its certification of the PSU to procure drugs under the Programme and outsourced it instead. Similarly, in 2009 the donors again suspended aid due to embezzlement of resources by civil servants, a case that is equally related to procurement practices (Atchison, 2008).

Procurement in the Ministry of Education (MoE) was the responsibility of the PSU. The procurement procedure was similar to that on MoH already discussed, in that the user department also raised a purchase requisition. The purchase requisition was authorised by head of department and submitted to the PSU. The PSU verified the budget allocation, specifications, determined the procurement or selection method, and proceeded with inviting offers or proposals. Upon receipt of offers, the PSU coordinated the evaluation of the offers or proposals and obtained the necessary authorities to proceed with the procurement. Furthermore, PSU then arranged for the signing of the contract.

The weakness in MoE procurement procedures and practices were:

- i) The practice within the ministry required the School Infrastructure Section (SIS) to carry out

all activities for the construction of schools from detailed engineering design and preparation of tender documents, participation in the tendering and evaluation process to construction supervision. The decision by the ministry to use in house capacity to carry out all activities for civil works had proved to be a challenge given the wide geographical spread of the sites and the need for close supervision at all sites. This resulted in poor quality of works since there was inadequate supervision or checks on projects.

- ii) Although the ministry of education had adopted best procurement practices, the institutional arrangements led to delayed procurement processes. It was observed that procurement delays mainly occurred during: the approval of draft bidding documents by Zambia Public procurement authority (ZPPA), or the Ministry Procurement Committee (MPC); the approval of the recommendations for contract award by the MPC; the approval of draft contract by the MoE management and Ministry of Justice (MoJ) respectively. The review and approval of draft contracts by MoJ before the successful bidder was invited to contract negotiations or signing, sometime took as long as 90 days in the worst scenario. Another source of delay was the issuance of “No Objection” by donors, especially for World Bank (WN) funded projects.
- iii) At the district level, the Assistant Buildings Officer (ABO), the District Education Board Secretary (DEBS) and heads of schools were involved in procurement. At that level the procurement was delayed or hampered by lack of transport; inappropriate procurement structures; low qualifications among those involved in procurement processes; low staffing levels; lack of capacity to prepare tender documents and tender inquiries; poor capacity to evaluate bids; low thresholds; and delays in the granting of No Objections by donors in some cases.
- iv) Poor procurement record management at all the levels: Headquarters; Province; and District.

Therefore, studies undertaken in the Zambian construction sector (ZCS) according to the report by Colmak Associates, (2010) revealed a number of weaknesses in procurement procedures and practices. These weaknesses included:

- i) Procurement files are often incomplete and files went missing. This was attributed to poor record keeping. Without a proper filing system, supporting papers are inadequate for good contract management. Poor contract management had resulted in many avoidable losses to government.
- ii) Bidding Statistics- For the works contract sampled, there were no invitations for expression of interest undertaken. For consultancy work, most design and supervision assignments were done in-house except for road development agency (RDA) which outsourced consultancy work. The low availability of statistics on the number of bidders in most of the cases could be attributed to all sampled project expenditures (PEs) never disclosing pre-contract main performance indicators (MPI) such as the tender evaluation report which would invariably contain information on the number of companies bidding or which expressed interest.
- iii) Duration: From the entire sampled projects only one was delivered within the original contract period. All the other sampled projects experienced contract overruns, typified the experiences of most projects in Zambia. On average the sampled projects experienced contract schedule overruns of 137percent.
- iv) Procurement planning was inadequate and in certain instances was not in existence, a

component that was essential for an efficient and economic procurement system. The net result of these weaknesses in the procurement system was, lack of transparency and accountability, misapplication of funds, corruption, inefficiency and loss of confidence by the population in government programmes. For instance, according to the Auditor General's Report of 2008

Report, there were various overwhelming financial irregularities in the procurement of 100 hearses in the ministry of local government and housing (MLGH). Contrary to the Application of the Act of 2008, out of the total amount of **K50, 000.00** provided for recurrent grants to local authorities, the MLGH misapplied a total of **K 14, 920.00** on the procurement of one hundred (100) hearses from Beijing Automobile Works Company of China. The purchase of the hearses raised a lot of public outcry and government vehemently defended this decision. The malpractices had continued as shown in the latest Auditor General's (AG's) report of 2010. The AG's report for the year ended December 2010, contained 75 paragraphs on issues that could not be resolved. The major irregularities, were mostly due to failure to adhere to regulations. In addition, there were weaknesses in internal control systems: wastage in the use of resources; poor management of contracts; failure to follow tender procedures; delays in completion of projects; poor workmanship; and non-adherence to contract terms and conditions.

The report from CSO Procurement on www.csprzambia.org was of great importance to this research study because it clearly highlighted Public Procurement Systems (PPS) in Zambia. However, the report concentrated on the procurement of pharmaceuticals, building infrastructure under Ministry of Education as well as procurement of hearses under the Ministry of Local Government. Further, the report indicated that the procurement thresholds particularly in the MoH were low which showed that the goods and services delivered were not involving huge sums of money. Therefore, resource mobilisation was not a challenge especially that procurement, for example, of pharmaceuticals was ethical in nature and could not be delayed or deferred indefinitely like the case was for Road Infrastructure projects investigated (Torvund, 2013). Despite this report being important to this research, the methodology which was used is not known. Further, the report extensively highlighted the weaknesses in the Zambian Procurement Sector only and did not highlight on the available key personnel available in the sector. The aspect of available human resource available in any sector is a strength which was neglected. To the contrary, this research described the technical key experts who immensely helped to establish pertinent information on the relationship of procurement methods used and its effects on Project delivery in the Zambian road sector which was not the focus of the report just reviewed. Furthermore, the report reviewed was limited to Health and Education sectors in Zambia while this research study focused on the ZRS industry. However, in order to cut down on unnecessary repetitive and similar information, procurement procedures in the Zambian Education Sector was not considered to form part of this dissertation study.

And did not highlight on the available key personnel available in the sector.

A summary of literature reviewed is shown in Table 2.2.

CONTENT ANALYSIS

Table 2.2: Research Content Analysis

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
1	Julian Abrahams	2013	Procurement for local development, A guide to best practice in local government procurement in least developed countries	To help local government institutions to understand the underlying principles of the Public Procurement in the context of local government programmes based on international best practices and key lessons learnt from the United Nations Capital Development Funds local government programmes world wide	Explanatory	The book adequately provides guidelines and expiations for procurement procedures on how to conduct procurement in order to achieve best value for money
2	Chabota Kaliba	2009	Cost escalation and schedule delays in road construction	To identify the causes and effects of cost escalation and schedule delays in road construction projects	Detailed literature review, structured interviews and questionnaires survey	The results of the study confirmed the prevalence of cost escalation and schedule delays in the road construction projects in Zambia
3	Vasco Nhabinde and Constantino Pedro Marrengula	2012	Challenges and the way forward for the construction industry in Mozambique	To establish the problems which are being faced by the Mozambique Construction Industry and the adequacy of the existing policy and Regulatory framework	Explanatory/ Literature review	Reform the government procurement code and increase the resources available for technical and vocational training for mid-level skills in the construction industry

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
4	Rohaniyati Salleh	2009	Critical success factors of project management for Brunei construction projects: Improving project performance	To identify the delay factors that currently exist in the construction industry in Brunei Darussalam and critical success factors which are most influential in preventing critical delay factors	Descriptive/ Literature review	The study identified the most important causes of building construction delays as perceived by clients as slow decision making, inadequate planning, change orders, labour supply, sub- contractor performance
5	Samuel Kotefy	2014	Effects of local counterpart funding delay on procurement of donor funded projects	To identify the factors causing delays in local counterpart funding in donor funding project in Ghana, determine the effects of local counterpart funding delay on donor funded public projects procurement delivery and develop strategies to mitigate the effect of local counterpart funding delay on donor funded projects	Explanatory/ Literature review	Identified factors causing delay were procurement management, cost and time overrun, community participation capacity training and creating community fund

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
6	Tariq Hussain Khan and Abdul Qadir Khan	2015	Effects of lowest Bidding Bid Awarding System in Public Sector Construction Projects in Pakistan	To highlight the weaknesses, performance, opportunities and implications of the public owned construction projects that are awarded on the basis of lowest bidder bid system in Pakistan	Descriptive/ Literature review	Eight-three (83) percent of public works contracts awarded are awarded to responsible and responsive bidders with the least price offers in construction industry of Pakistan and collusion/ Bid shopping is a malpractice in almost all the construction industry of the world
7	Olufemi Adedamola Oyedele	2013	Construction projects financing for sustainable development of Nigeria	To document the reasons for the failure of Public-private partnership (PPP) method of construction financing in Nigeria and recommend a more suiTable system of construction project financing in Nigeria	Explanatory/ Literature review	There is no method of procurement that is not feasible but the situation, size, technicality and the people managing the procurement. Northern Ireland discarded PPP for a mundane public procurement method called Scottish Future Trust created in 2008. This agency is charged with the responsibility of improving the efficiency and effectiveness of infrastructure investment in Scotland.

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
8	Lea Kaspar and Andrew Puddephatt	2012	Benefits of transparency in public procurement for SMEs: General lessons for Egypt	To give an account of a well- defined regulations and procedures that are enforceable and open to public scrutiny: giving the public equiTable access to clear and standardized tender documents and guidelines with clear and public selection criteria.	Explanatory/ Literature review	In developing countries where corruption is still a pervasive issue, transparency initiatives are key to unlock many challenges facing SNEs in benefiting from the public procurement market.
9	Van H	2002	The advantages and disadvantages of PPP as a method of procurement	To find out the advantages and disadvantages of PPP as a method of procurement	Explanatory/ Descriptive	He found that PPP arrangement display three essential characteristics which are: a significant level of responsibility and risk that is transferred from the Public to the Private sector; contractual arrangements are but around performance based outcomes, rather than work specification, and a long term contractual arrangements

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
10	David (et- at)	2008	Procurement Strategies: Advantages	To present the characteristics of the most common procurement systems and methods	Explanatory/ Descriptive	He explained various procurement strategies, its advantages and disadvantages and found that there is no best procurement method, the procurement method depends on what the owner needs.
11	Azlan- Sha (el-at)	2004	The effects procurements systems towards refurbishment works in Malaysia	The main objectives of this Research was to present how procurement system could contribute to the uncertainty and show how they affect the overall performance of refurbishment projects.	Explanatory/ Descriptive	He concluded that there is no wide gap between the traditional and design and build procurement systems because the designers come from different organizations.
12	Samuel N.G	2014	Factors affecting the timeliness of completion of donor funded projects in Kenya	To investigate the factors affecting the timeliness of completion of donor funded projects in Kenya using the educational levels and training of project staff, promptness in release of funds by donors and regularity monitoring of projects were considered.	Explanatory/ Descriptive	He found that well-trained Project Managers was a key factor linked to project success

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
13	Onyengo C.J	2012	The effects of procurement planning on institutional performance	To find out the effects of procurement planning on institutional performance in Mombasa Law court using proper cost estimation, effective needs assessment and quality specifications	Explanatory/ Descriptive	He concluded needs assessment was ranked first with frequency 35 and the highest percentage of 58percent, procurement cost estimation was ranked second with a frequency of 15 and a percentage of 25percent and quality specification was ranked third with a frequency of 10 and percentage of 17percent.
14	Wagube S.G	2011	Procurement Planning and Service Delivery in Public enterprise in South Africa	The study aimed at establishing the impact of procurement planning on service delivery in Sironko Town Council.	Explanatory/ Descriptive	He concluded that there is a strong positive relationship between procurement planning and service delivery

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
15	Maurice J.D	2004	Procurement Practices Influencing Service Delivery in Kenya electric power	<ul style="list-style-type: none"> ▪ To establish the influence of procurement policy on service delivery. ▪ To evaluate how procurement planning influence service delivery. ▪ To evaluate sustainable procurement practice influence on service delivery. 	Explanatory/ Descriptive	He concluded that procurement rule and regulation lack flexibility and it is hampering the procurements operations as revealed by 77.5percent; Procurement planning does not take long term cost of ownership into consideration as also revealed by 39.4percent; the findings also revealed 59.1percent agreed that there is no Sustainable procurement practice by the company even though it has Green policy in places but, the implementation is hampered by organizational culture as well as budgetary constraint.

S/N	AUTHOR	YEAR	TITLE	OBJECTIVES	METHODOLOGY	CONCLUSION/ COMMENTS
16	Marwa	2004	Comparing procurement methods for design-build projects.	The primary goal of this research was to quantitatively study the correlation between the performance of a design-build project and the method used to procure the design- build team.	Explanatory/ Descriptive	He concluded that projects procured using low bid selection incurred a higher cost growth than projects procured using other methods.
17	CSO Procurement	-	Public Procurement System in Zambia: A case for procurement monitoring	Not clear	Explanatory/ Descriptive	Studies undertaken in the health, education and construction sectors revealed weaknesses in the legal and regulatory frameworks with regard to release of information and accessibility to such information. The studies also revealed the lack of capacity of CSO and citizens to actively and effectively participate in public Procurement. The studies further revealed poor procurement practices.

2.11 Summary

This chapter defined the variables used in this research and reviewed the existing literature which related to procurement methods used and project delivery systems. The literature reviewed indicated that most of the studies were conducted outside Zambia and none of the studies undertaken addressed procurement and project delivery in the Road Sector in Zambia. Moreover, all the studies were conducted a decade ago. Therefore, there was need to conduct a study in the ZRS industry so as to investigate the effects of procurement on project delivery,

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter presented literature reviewed. The literature reviewed, provided the link to this study and formed the benchmark on which this investigation thrived in order to offer viable solutions to the statement of the problem envisaged.

This chapter attempted to describe the road map employed to achieve the research objectives. The methodology comprised of key elements such as, the research paradigms, research design and the sample frame of the research among many other important features.

3.2 Methodology

The research dissertation used a mixed method design approach and was complimented by selected case studies of the selected projects: qualitative method and quantitative methods were both used. The initial stage of the research reviewed the existing literature on the investigation of effects of procurement methods on project delivery from journals, books, internet and other secondary sources. Based on the obtained findings from secondary data, a questionnaire was designed. Finally, the identified road projects were examined in order to investigate the cause and effects for their success and failure, respectively.

The questionnaire was designed with three sections; section one (1) addressed demographical aspect of respondents, section two (2) addressed the procurement methods used in the construction industry while section three (3) was a guided interview with structured questions. The key experts were drawn from institutions which are at the center of procurement, implementation and policy regulation in the ZRS. The targeted institutions that helped in the research were: The Road Development Agency (RDA), Ministry of Housing and Infrastructure Development (MHID), Ministry of Finance (MoF), National Road Fund Agency (NRFA), Zambia Public Procurement Authority (ZPPA), National Council for Construction (NCC), Association of Consulting Engineers of Zambia (ACEZ), Engineering Institute of Zambia (EIZ) Association of Building and Civil Engineering Contractors (ABCEC) and the National Association for Medium and Small Scale Contractors (NAMSC).

Having had the institutions to help with the investigation or research, the appropriate sampling method which was adopted was purposive sampling method. Therefore, procurement officers, contract managers, senior engineers, site engineers, contractors and consultants among many other professionals in the ZRS who have been involved in actual contract procurement and project delivery of road works were identified, administered with questionnaires and interviewed. The overall sample size of the respondents was seventy (70).

Data collection comprised both primary and secondary data. Further, the collected data was analysed using Microsoft Excel 2013.

3.3 Research Paradigms

Research paradigms may be defined as the mental models or frames such as belief systems which are used to organise people's reasoning and observations. Therefore, mental paradigms helps to shape a research study, through the use of recapitulative processes of observation, rationalisation, and validation (Kuyini, 2017). The observation phase involves studying natural, social phenomena, events, behaviour of people or systems which require solutions. The rationalisation phase involves making sense out of the observed phenomenon, events, behaviour of people or systems by logically connecting the various pieces of a complex situation (s) observed. While, the validation phase endeavours to test the theory used during the processes of data collection and analysis (Bhattacharjee, 2012).

Creswell (2003) presented the three main categories of research designs as elaborated below.

- (a) Quantitative Research - is the type of research design which focusses on finding out the cause and effects, thinking, and reduction of the findings to specific variables and hypothesis. Quantitative research also uses the techniques of carrying out measurements and testing of theories by employing strategies of inquiry such as experiments and surveys. Further, it is used to collect data on predetermined instruments that yield statistical data (Jack, 2014).
- (b) Qualitative Research – is an alternative to quantitative research design. It primarily uses the approach of making knowledge claims based on constructivist perspective such as; having multiple meanings of individual experiences, socially, historically that are constructed with a view of developing a theory or pattern. To some extent qualitative approach also uses strategies of inquiry such as narratives, phenomenologies, ethnographies and grounded theory studies or case studies. In this method, it was recommended to collect open-ended, emerging data with the primary intent of developing theories from the data (Lincoln, 2018).
- (c) Mixed Method Research design is one in which knowledge claims is based on pragmatic grounds such as consequence-oriented, problem-centered and pluralistic. It uses strategies of inquiry that involve collecting data either simultaneously, or sequentially in order to best understand the research problem. The data collected also involved gathering both text information through interviews as well as obtaining numeric information using instruments such as questionnaires' so that the final base data defined both qualitative and quantitative information (Cameron, 2015).

The research study was complimented by reviewing of past projects. Therefore, this process called for the analysis of a number of case studies that related to the research. A case study is basically defined as a research approach which is used to study personalities or particular happenings, in order to have an exemplary and comprehensive understanding of an idea that relate to a common cause under investigation (Jack, 2014). This design approach to investigative research studies, proved to be very effective because the cases which were investigated was easily verified by replicating outcomes across similar circumstances (Wioddowson, 2011)

The advantages and disadvantages of case study, qualitative and quantitative research is shown in Table 3.1.

Table 3.1: Advantages and Disadvantages of Research Design Methods

S/N	RESEARCH METHODS	ADVANTAGE	DISADVANTAGE
1	Quantitative Method	Able to: Measure; Examine, Make relationships; Make forecasts; Test hypothesis; Construct concepts and theories; Explores; Controls; Explains; and uses numbers to reduce most of its information	Since it uses numbers to record most of its information, a lot of information cannot be interpreted or reduced to numbers such as, people's judgments', feelings, emotions and comfort.
2	Qualitative Method	Enables: One to develop his or her own theory since theory building is dependent on an individual's data collected; and a lot of information is well interpreted and described such as people's judgement, feelings, emotions and comfort, through the use of interactive structured interview guide and questionnaires.	Defines concepts and research processes of investigation nature in a more tentative and explorative manner than quantitative research. There is uncertainty during the investigation phase.
3	Mixed Method	The final base data obtained during a survey defines both qualitative and quantitative information.	The final data defined is dependent on both Qualitative and quantitative methods. Therefore, it is neither independent of quantitative nor qualitative.
4	Case Study	When cast in a narrative format, descriptive case studies offers clear accessibility and interesting information to non-scientist/ technical audience.	Whether qualitative or quantitative, case studies typically relate to single projects or at best, small cluster of projects, such that their results cannot be generalised.

Source: (Welliman, 2011)

This research aimed at discovering the underlying effects and causes by using in-depth mixed method research design and case study approach. It involved sequential and concurrent collection of data using research instruments such as structured interview guide and questionnaire.

3.4 Research Design

Research design refers to the overall plan of the approach employed to a research topic. It is greatly influenced by a number of factors, namely: the type of topic chosen; the audience of the research; time frame of the research; supervisors of the researcher; and the available resources required to accomplish the study (Greener, 2008).

According to Kothari (2004), he explained that research methods can be grouped into three main categories:

- (i) Exploratory research method – is employed usually when conducting new areas of inquiry, where the objectives of the research are, to scope out the size or range of a respective phenomenon, problem, or behaviour of people or systems; to produce some initial ideas such as hunches about the phenomenon under investigation; or to test the viability of carrying out a more lengthy study concerning that phenomenon. An example of exploratory research are experimental and simulation research methods (Reiter, 2017);
- (ii) Descriptive research method – is a type of research directed at making diligent observations and meticulous documentation of a phenomenon requiring solutions. Such observations must be based on the scientific method that should be repeated and obtain exactly the same results. Therefore, descriptive research is more reliable than casual observation by untrained people. Other forms of descriptive research may include chronicling ethnographic reports that range from historical, cultural, ethnological, action, feminist in nature and aids the role of technologies such as twitter and instant messaging in the spread of democratic tenets in the world (Creswell, 2014); and
- (iii) Explanatory research methods – seeks explanations of the observed phenomenon, problem, or behaviour of people or systems. Most academic or doctoral research belongs to the explanatory and/ or descriptive research. They may also be needed during initial phase of academic research. Explanatory research may include evaluation, comparative, action and correlation research methods (Atchison P. C., 2008).

Creswell et al (2003) further highlighted the other purposes of mixed research design as: To obtain different but complementary data on the same topic; to bring together the different strengths and non-overlapping weakness of quantitative methods like huge sample size, trends and generalization with those of qualitative method such as small numbers and in-depth details.

3.5 Sampling Frame

A sampling frame may be defined as an agreed source of materials, persons or experts from which the sample is chosen for the purpose of carrying out a study. This definition also takes into account the aspect of purpose because an ideal sample should also provide the means for selecting particular members or elements of the population to be interviewed or be distributed with questionnaires (Turner, 2003).

Further to sampling frame models, purposive sampling provides a researcher with options of

strategies which he / she may choose to attain a suitable sampling frame. In that regard, this research employed snowballing technique to identify the suitable key technical experts, who took part in the survey (Atchison, 2008)

3.4.1 Sampling determination and population

Mwanaumo et al, (2013) argued that no matter how efficient, effective or accurate a model of determining a sample can be, it cannot be better than a sample frame where it is drawn. Barreiro and Albador (2001) defined population as the actual quantity of things such as people, cases, events, organisations, cases or the comprehensive collection of ideal items or things of particular interest to the study. In acknowledging this definition Salleh (2009) argued that a population should be the actual number of things, events, items or people while a sample is a convenient representation of the whole population.

3.4.2 Target Population

The targeted population for the research study comprised of key institutions that drives the Zambia Road Sector (ZRS) and included: the Road Development Agency (RDA) which undertakes the procurement, design, construction and maintenance of public roads infrastructure in Zambia; the National Road Fund Agency (NRFA) mandated with the sole responsibility of mobilisation of funds for the implementation of road safety and implementation of public road projects in Zambia; National Council for Construction (NCC) whose mandate is to register and monitor the performance of contractors; Engineering Institute of Zambia (EIZ) which regulates the conduct of practicing engineers; the Ministry of Housing and Infrastructure Development (MHID) mandate with the overall responsibility of providing policy directions to all the departmental and government agencies within the sector; and the Zambia Public Procurement Authority (ZPPA) which regulates all government procurements in Zambia and provides guidelines on procurement of goods, works and services in Zambia. Table 3.2 shows the total population of the ZRS.

Table 3.2: Targeted Population Size

S/N	Name of Organisation	Number of Staff Employed	Number of Technical Staff
1	RDA	486	101
2	ZPPA	54	2
3	NRFA	213	9
4	NCC	97	27
5	MHID	227	56
	Total Population Size	1067	195

Source: Primary data

Note: The above population data was obtained formally from respective institutions to be used for the study.

Wogube (2011) in his research study defined the population study without stating the status of those in the population: instead he named them as officials, committee members, service providers

and beneficiaries. Further, he did not show the selection criteria that was used in arriving at the sample size for the study. This research therefore, observed that such an anomaly may prove very difficult during the validation of results and in establishing the credibility of the study. Therefore, this research defined the targeted population in the ZRS as shown in Table 3.2 by showing the overall population targeted and the overall technical population of technical staff. The cardinal population for the study was that of the technical staff. Finally a criteria for selecting the sample size was devised (Kuyini, 2017).

3.4.3 Selection of respondents

(a) Questionnaire

The selection of respondents was arrived at with the aid of snowballing technique in which one person surveyed recommended another eligible candidate for the survey. Therefore, out of the one hundred and ninety-five (195) targeted population size of the key experts, with the knowledge of civil engineering background, seventy (70) were found to have had at least two years of experience in either procurement or management of road projects (Rahi, 2017).

(b) Interviews

Respondents who were eligible to be interviewed were also identified through snowballing technique having had satisfied the requirement of at least ten (10) years' of experience in the management of road projects in the ZRS industry. Therefore, out of the one hundred and ninety-five (195) population size, twenty-eight technical experts were found to be eligible to be interviewed.

3.4.4 Sampling Procedure

The following procedures was used to come up with the number or size of respondents:

a) Non-probability sampling

Non-probability sampling does not consider any room for estimating the probability that each item or persons in the population size has, of being included in the sample size. Instead, items for the sample are deliberately chosen: based on the surveyors' or enumerators' preferred sample. In that regard, items or population size remains supreme. Further, the determined sample size is arrived at purposively by using the surveyors' or enumerators' definite number of the sample size with an assumption that such a sample size out of a huge population will adequately be the representative or typical of the whole population (Kothari, 2004)

Kelley et al (2003) stated that there are three major techniques in non-probabilistic sampling.

- i. purposive sampling in which a specific population is identified and only its members are included in the survey (Biernacki, 2017);
- ii. Convenience sampling in which the sample is made up of the individuals who are the easiest to recruit (Abawi, 2013);
- iii. Snowballing where the sample is identified as the survey progresses, that is, as one individual is surveyed he or she is invited to recommend others to be surveyed (Biernacki, 2017).

The research procedure that was adopted for this study was snowballing. Having had identified the key institutions in the ZRS, it was simple to establish the starting point in the identification of

key people who later comprised the sample size for the study (Creswell, 2014).

b) Probability Sampling

Probability sampling is one in which every member of the entire population has a known, non-zero opportunity of participating in the survey. It implies that every item, person or things constituting a population is regarded as a useful barometer for judging a frame's quality. Failing to achieve this standard therefore, calls for the target population to be well defined so that users are clearly informed of which segment of the population are excluded from coverage (Headlam, 2015).

Due to limitation in time, this research adopted non-probability sampling because not everyone in the target population was relevant to contribute to the study. Therefore, using the devised selection criteria for the study, the identified key technical staff in the ZRS formed the sample size for the study.

3.5 Data Collection Methods

Kothari (2013) explains that the task of data collection commences after a research problem has been established, the research designed and methodology mapped out. Further, he added that two types of data exists, namely:

- (a) Primary data - is new data collected for the first time which is original in character (Johnston, 2014); and
- (b) Secondary data – is data that has been already collected by someone and have passed through the statistical process (Creswell, 2014).

3.5.1 Primary Data

Collection of primary data can be done using numerous methods such as:

- (a) Observation Method – is one which is a formulated research purpose and is systematically planned to record data subject to be checked and controlled on validity and reliability (Driscall, 2011);
- (b) Interview Method – This method involves presentations of oral-verbal stimuli and replied in terms of oral-verbal responses. It can be done either through personal face to face interviews and or through telephone interviews (Mohajan, 2017);
- (c) Through Questionnaires – Consist of a number of questions typed or printed in a well outlined manner on a form or set of papers. The questionnaire is then mailed through post/internet or handed personally to respondents by the researcher. It is recommended that the respondent answers the questionnaire on their own. However, in certain instances the facilitator of the survey may be there to clarify certain questions, especially when he/ she is distributing and collecting them personally (Abawi, 2013);
- (d) Through Schedules – This method is similar to questionnaire except that it is under this method the enumerators go to respondents with a proforma which has a set of questions and provision where write answers. Then as the respondents are answering the questions, the enumerator records the responses against the questions on the proforma. Other methods which may be used includes, but are not limited to (Abawi, 2013):

- i) Warranty cards – These are basically postal cards used by dealers of consumer durables to collect feedback regarding the utility performance of their product (Atchison, 2008);
- ii) Distributor Techniques or store audits – refer to retail stores audited conducted by distributors through salesmen and utilise such information to estimate their market size (Jack, 2014) (Johnston, 2014);
- iii) Structured depth interviews – interviews designed to discover underlying motives and desires in order to explore respondents needs, feelings, knowledge about the area of interest or feelings/ emotion (Johnston, 2014)s; and
- iv) Content Analysis – involves the analysis of documents such as books, journals, magazines as well as the contents of other verbal materials that may either be spoken or printed (Biernacki, 2017).

3.5.2 Secondary Data

Secondary data can be collected using the following methods:

- 1) Technical and business journals – professional and business publications that may relate to the topic of study
- 2) Books, magazines, newspapers, reports and internet publications.

Furthermore, it was observed that the above methods of secondary data collections have advantages and disadvantages. Therefore, Table 3.3 highlights both advantages and disadvantages of secondary data methods of collecting data.

Table 3.3: Advantages and Disadvantages of secondary data methods

S/N	Secondary data Method	Advantage	Disadvantage
1	Technical and Business Journals	They are relevant to a specific field of research study because articles are written by specialists in their fields	Cannot be applied to all research studies that are of a different discipline because they are oriented toward specific fields. Therefore, they are not scholarly in nature.
2	Books	Have specific objectives, aim and audience targeted in order to convey a message. They thoroughly provide a good treatment of a topic	A book may contain ancient technology which may not be applicable in present times. Therefore, may not be scholarly.
3	Magazines	Authored by corporate organisation and they are good for general information; and give a contemporary focus.	They may not be specific to a study topic and they are not scholarly in nature

4	Newspapers	Readily available and they are a good source for current events; primary sources	It's difficult to very certain source of information, and information may be biased. Therefore, it is not scholarly in nature
5	Reports	Easy to access and provide wide variety of topics ; very good source of statistics	They contain specific information
6	Internet Publications	Easy to access, quantity of information, scholarly information and information is updated frequently	Quality of information is uneven; authority of some information is unknown; may not be peer reviewed and access may not be restricted

Source: Secondary data

Primary data for this research was collected using self-administered questionnaires. The questionnaires were suitable because the respondents were educated and did not need an interpreter. It gave the respondents enough time to think over the questions before attempting to answer. It was also convenient for use in data analysis using Microsoft Excel 2013 software. In addition, face to face interviews were also used to gather information. The advantage of face to face is that respondents were privileged with the chance for the surveyor or enumerator to clarify on some issues that were unclear in the questionnaire. Finally, the research study also relied on secondary data such as books, journals, reports and internet report publications (Creswell, 2014).

3.6 Data Analysis

Marwa (2004) employed two primary data analysis techniques, namely:

- (i) Univariate Analysis – is the type of analysis which uses descriptive statistics to summarise data. This is achieved based on the phenomenon of measuring the central tendency such as the mean and medians. Kothari (2004) provides the formula for measuring central tendency: the mean as shown in equation 3.1.

Equation 3.1: Central Tendency

$$\text{Mean (or } \bar{X}) = \frac{\sum X_i}{n} = \frac{X_1 + X_2 + \dots + X_n}{n}$$

Where \bar{X} = the symbol herein used for mean

\sum = Symbol for summation

X = Value for the i th item X , $I = 1, 2 \dots n$

N = total number of items

However, in certain instances instead of calculating for the mean in the manner shown above, simple mean may be worked out as below:

Equation 3.3: Simple Mean

$$\bar{X}_w = \frac{\sum w_i X_i}{\sum w}$$

Where \bar{X} = Weighted item

W = weight of ith item X

X = Value of the ith item X

- (ii) **Multivariate Analysis** – is a type of data analysis which involves the development of a model that describes the relationship between each performance metric and the procurement methods.

This research study used Microsoft Excel 2013 software package to analyse the data. The primary data collected through questionnaire and interview surveys, were manually entered into the software package and graphical representations were obtained. The out-put information was then interpreted and concisely presented the results found by giving the positive and negative implications of the findings thereof, to enable the public to understand the research findings.

3.7 Ethical Aspect

Ethical aspect demanded that authority must be obtained from controlling officers to conduct the surveys in the targeted institutions. This was done by writing formal letters to prospective institutions where potential respondents were envisaged, and requested for their actual staff standing or number in order to ascertain the participants for the survey. Participants that agreed to take part in the survey were assured of the required ethical boundaries such as anonymity and confidentiality (Creswell, 2014).

3.8 Limitations of the Study

The results from the findings were not generalised to other sectors involved in the procurement of goods, works and services in Zambia. This meant that not everyone engaged in the procurement fraternity was eligible to take part in the survey. This is because expert sampling was used, that is non-probability sampling and targeted experts with civil engineering background, particularly in the Zambian Road Sector (ZRS) industry. Therefore, the study was limited to the ZRS only.

3.9 Summary

This chapter discussed the research design, sampling frame, population study, sample size, sampling procedure, how data was analyzed as well as the aspect of ethics.

Further, the study involved a field survey which was non- experimental in design. Quantitative method was used in order to collect statistical information about procurement methods that are used in the Zambia Road Sector (ZRS) industry and the effects on project delivery. Qualitative

method was also used in order to collect information which could not be obtained using quantitative method. Both primary and secondary data was used. Primary data was obtained using questionnaires and interviews while secondary data was obtained from the internet, journals and books.

The next chapter discusses the analysis of the results obtained and consequently reports on the findings of the research.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

The previous chapter discussed the methodology which was used to achieve the objectives and aim of the research study.

This chapter analyses the primary data which was collected based on the secondary data reviewed. The collected data was processed using Microsoft Excel 2013 software and obtained charts/ graphical representation of the results, from the investigations carried out.

Primary data was collected using questionnaires and interviews.

4.2 Questionnaire Survey

Snowballing procedure was employed to identify key respondents in the Zambian Road Sector (ZRS) industry. This involved physically identifying the sample size right from inception of the survey to the end, that is, as the first questionnaire was administered, the respondent recommend others to be surveyed.

The questionnaire was divided into two sections:

4.2.1 Respondents background

The professionals who took part in the questionnaire survey ranged from civil/ highway engineers, quantity surveyors, hydraulic/ hydrology engineers, procurement officers/ specialists and accountants. The overall population target was one hundred and ninety- five (195) of key professional experts from the ZRS who were identified. This was obtained formally after requesting for the staff standings/ number from institutions, particularly those with civil engineering background. Then respective institutions responded and highlighted the number of technical staff as well as the overall employee number within their respective institutions. Therefore, after carrying out snowballing technique, seventy (70) key experts were administered with questionnaires and they successfully responded to the survey.

4.2.2 Procurement and Project delivery

The questionnaire contained questions that pertained to procurement methods, procurement guidelines employed and performance of past projects in the ZRS industry. This provided valuable data to ascertain the procurement methods, procurement guidelines used as well as the appropriate procurement method which is ideal for Zambia. In addition, the respondents provided data which determined the procurement factors that affect successful projects delivery. They also established whether there was a relationship between procurement method used and successful project delivery.

4.2.3 Interviews

The key professional experts were selected through snowballing technique. Therefore, twenty-eight (28) respondents were identified besides the seventy who were administered with questionnaires. However, only twenty-three (23) out of twenty- eight (28) identified respondents were successfully

interviewed, representing 82 percent of those who were eligible to be surveyed.

4.2.4 Background of interviewees

The targeted key experts to be interviewed were drawn from three key management levels from amongst the targeted institutions in the ZRS industry: Junour management; Middle management; and Senior management level. The criteria that was required for the interviewee was to have at least ten (10) years' experience in the corporate management of construction projects in the ZRS industry, to be eligible for an interview.

4.2.5 Objective of the interview

The objective of the interview was to further, probe the identified key professionals with questions that could neither be quantitatively be expressed through words nor numbers using the questionnaire. Pertinent issues contained in the designed interview guide ranged from: procurement guidelines; performance of past projects; critical procurement factors; relationship between procurement methods and successful project delivery; and the ideal procurement methods for the ZRS industry. The impact of these factors were recorded from the experts by taking into account their expression in terms of feelings, emotions and their recommendations in order to improve the status quo.

Finally, the overall professional key experts who participated in the survey were of different age groups and experiences in their respective work life. This was advantageous to the study as the views obtained were balanced and ranged from partial understanding of the happenings in the industry to an in-depth understanding of the inter-play between the procurement methods and successful project delivery.

a) Age Group of Respondents

Mature age is defined as the stage at which one is fully developed physically; fully grown, having reached the most used abilities euphemistically to describe someone's middle age (<https://en.oxforddictionaries.com/definition/mature>). In that regard, the age groups of respondents was one of the vital features which were assessed in order to determine the credibility of those who participated in the survey. Using a rating scale that ranged from less than thirty (30) years to that of above fourty (40) years and between the two age limits was used.

As seen from Figure 4.1, seventy-six (76) percent of the respondents were thirty-five (35) years and above, while 24 percent of the respondents were below thirty (30) years of age. The average and active working age of any population is thirty-five (35) years and above. Therefore, the majority of average respondents met this assumption (Fotakis, 2003). Consequently, the results revealed that the majority of the respondents were of an accepTable expert level standing and were responsible, energetic and of a balanced mature age.

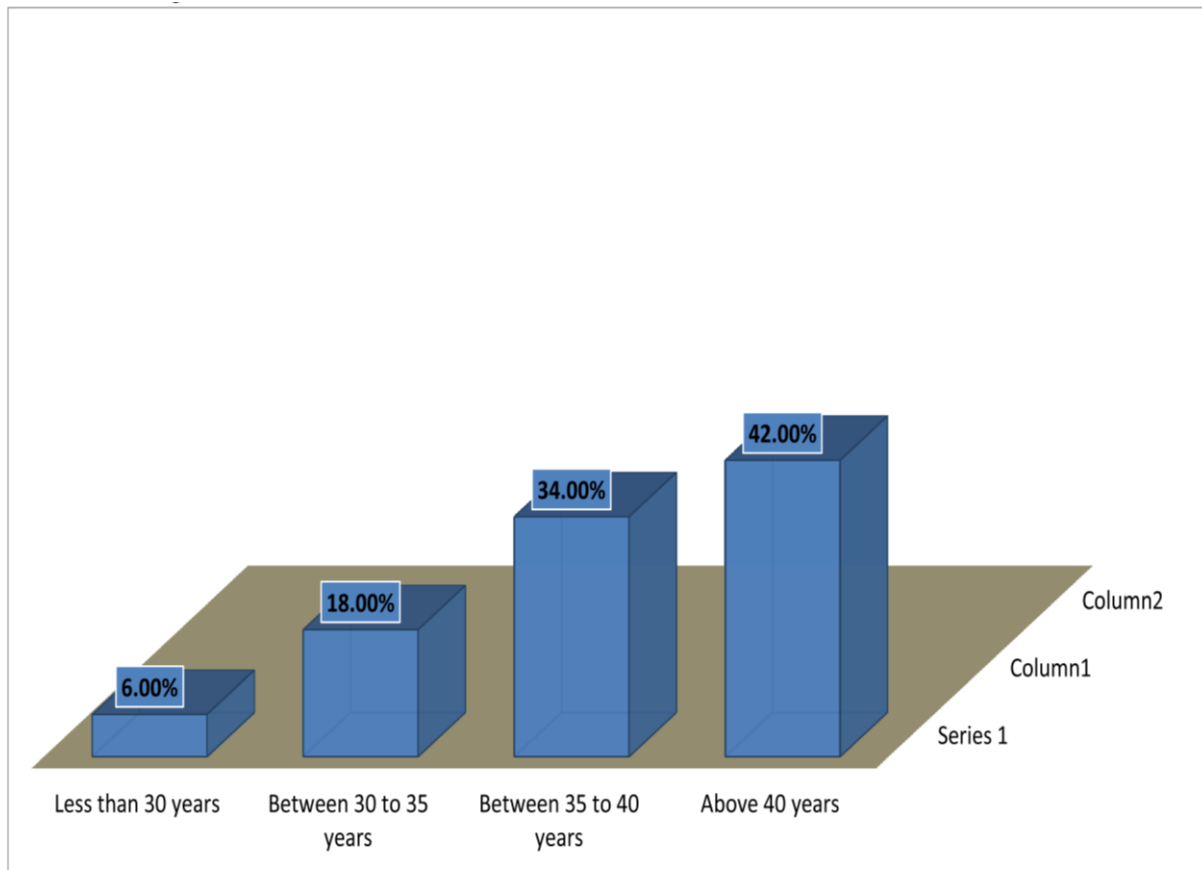


Figure: 4.1: Age of Respondents

b) Experience of Respondents

The age of respondents alone was not enough to validate the credibility of the research, and therefore it was recommended to take into account the number of years the respondents had worked in the ZRS, particularly in the area of procurement and construction project delivery of projects. Skirbekk (2003) reported that it takes at least ten (10) years for a professional to achieve expert competence. Using the set rating scale, it was established that the overall experience for key experts were a combination of less than five (5) years, average and highly experienced professionals in the field of study. Figure 4.2 illustrates the results for the experience of respondents in the ZRS. On one hand, the result obtained gave a good indication that the data collected was credible and sound, because the percentage representation was close to real life experiences: A few represented by fourteen (14) percent were the ones with expert competency (experience of more than ten years) which should not be in the majority; and the majority had varying expert competency. The result showed that the majority were being led or supervised by the few (senior management level) in management, which is normally the case in most organisations. While, the majority (from middle and junior management) was represented by a majority percentage.

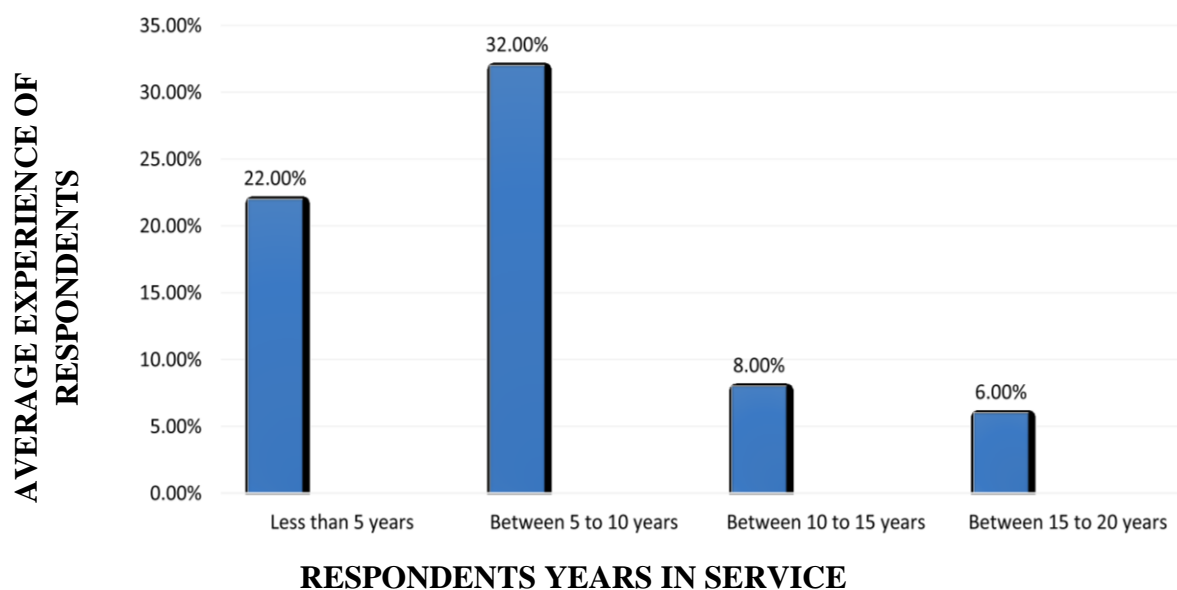


Figure 4.2: Experience of Respondents

However, going by the assumption that professional expert competency is attained with at least ten (10) years working experience, then it can be deduced that the ZRS is being managed by very few competent professional expert in the area of procurement and successful project delivery. This result also supports the past performance of road projects which is at 53 percent.

The trend in Table 4.2 is a very worrisome status of the personnel who have been entrusted to manage the ZRS industry: with thirty-two (32) percent of key experts having no experience in both procurement and successful project delivery of projects; and with respondents having meaningful experience of only 14 percent, representing competent professional expert experience of between ten (10) and twenty (20) years.

The above analysis of the respondents' experience shows that inexperienced key experts in procurement of road infrastructure and successful project delivery have been entrusted with the management of the ZRS industry. This could therefore be attributed to the average delivery of road projects, because works of such magnitude require to be managed by people of great practical experience and expert competency.

c) Outline of Interviewees

The study was limited to the ZRS because expert sampling was used which is a non- probabilistic sampling method. Therefore, the profile of interviewees was in accordance with the number of institutions that was identified as being key in the management of the overall procurement and project delivery of construction projects in the ZRS. Figure 4.3 shows the number of interviewees' who were targeted in each institution as well as the actual number of respondents who were interviewed.

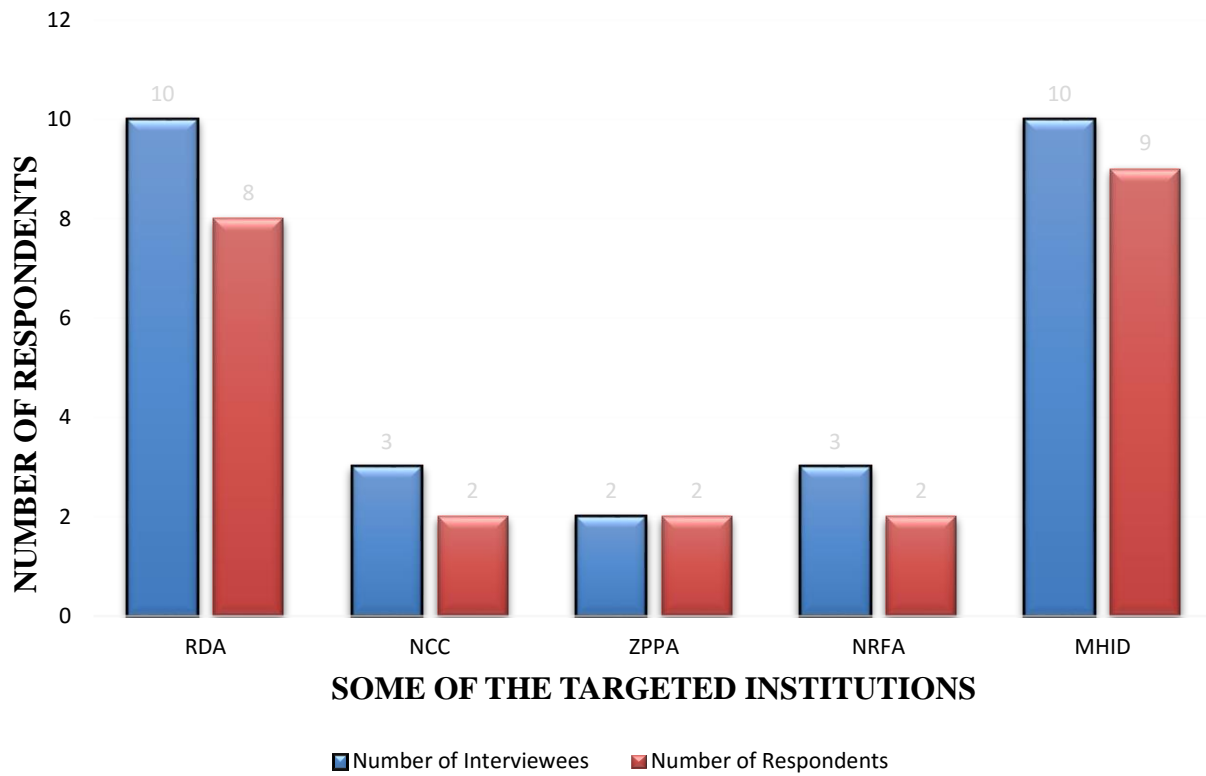


Figure 4.3: Profile of respondents

Further, Figure 4.4 also shows the response rate of respondents who were targeted to be interviewed and the actual number of interviewees represented at 82 percent. The result of the responses was excellent and represents good co-operation on the part of the identified respondents.

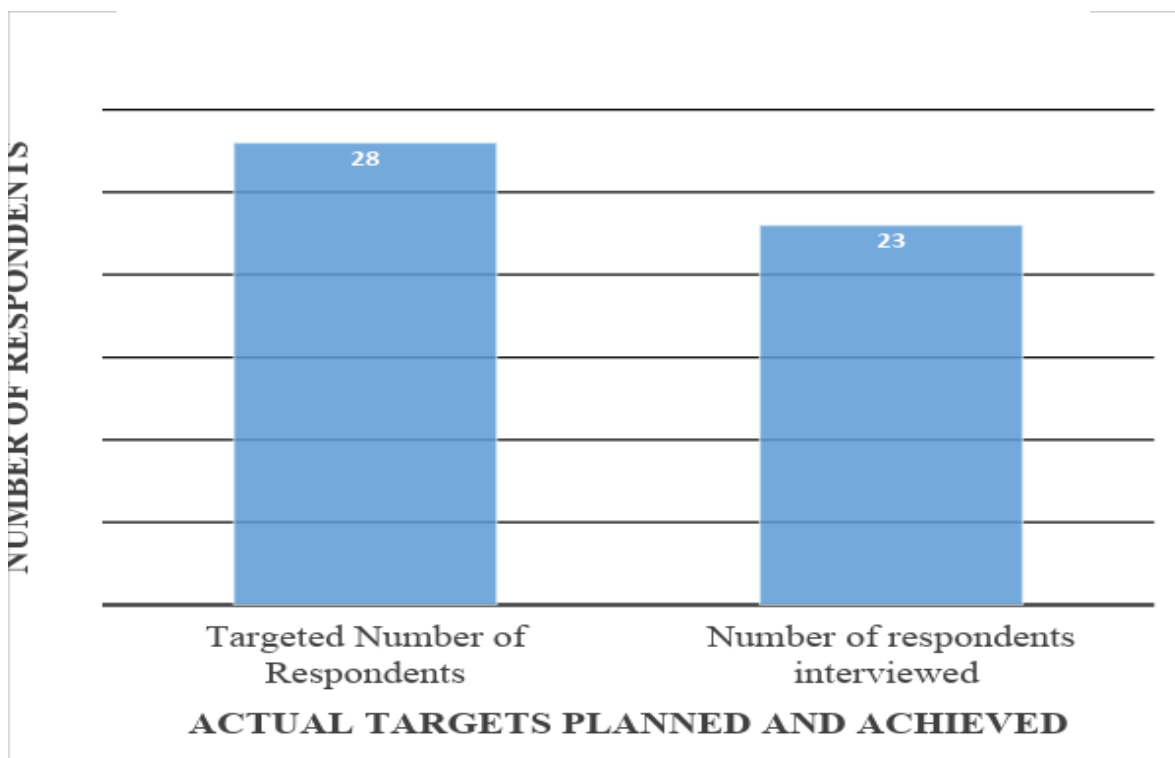


Figure 4.4: Interviewee respondents

d) Management levels of the Interviewees

The interview drew interviewees from three categories, namely: Senior Management; Middle Management and Junior Management. The findings revealed that the majority of the interviewees were from middle management, who are represented at 56 percent against all the interviewees who took part in the survey as shown in Figure 4.5.

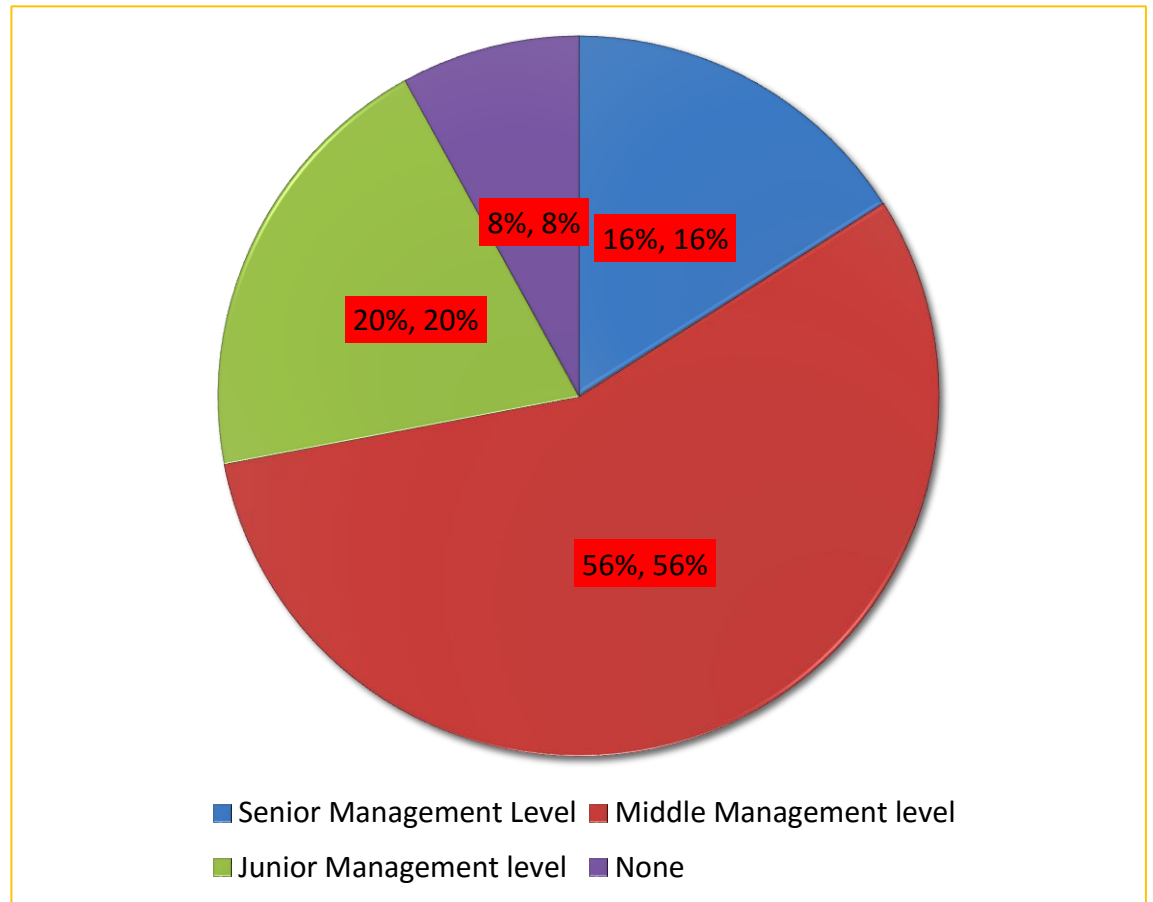


Figure 4.5: Management level of respondents/ interviewees

The outcome of the overall survey gave a good representation of a strong matrix organisation structure with project manager's role being on full time basis as well as that of administrative staff who comprised the majority (Project Management Institute, 2013).

The above analysis, depicts an anticipated real life scenario for any balanced organisation. The majority staff belonged to middle management coupled with junior management involvement, while the few who held authority belonged to senior management. Therefore, the turnout representation gave a sense of credibility as it demonstrated a participatory and proportionally representative, strong management matrix.

4.3 Viewpoints of respondents

The study provided a structured interview guide question that complimented well with the questionnaire findings with a more in-depth acquisition of information. The interview guide questions were tailored to achieving the outlined research objectives, aim and goals of the research

study.

Therefore, the identified key professional experts from institutions within the ZRS who had at least ten (10) years of experience were subjected to further probing questions. The purpose of the interview was to provide an interactive platform that yielded in-depth opinions that couldn't have been heard and acquired through the use of the questionnaire only.

The findings and results from the interviewees are herein outlined:

4.3.1 Prevailing procurement guidelines in the Zambian Road Sector Industry

The interviewees from the Zambian Road Sector (ZRS) said that “besides the Zambian Public Procurement Authority’s (ZPPA’s), Public Procurement Regulations and Act of 2008, procurement entities in the industry were also using other procurement guidelines, such as: the World Bank procurement guidelines; European Union (EU) procurement guidelines; African development bank (AfDB) procurement guidelines; and the Asian development bank (ADB) guidelines”. Further, the primary data processed revealed that the ZPPA public regulations were the mostly used procurement guidelines and was represented by 60 percent, as shown in Figure 4.6.

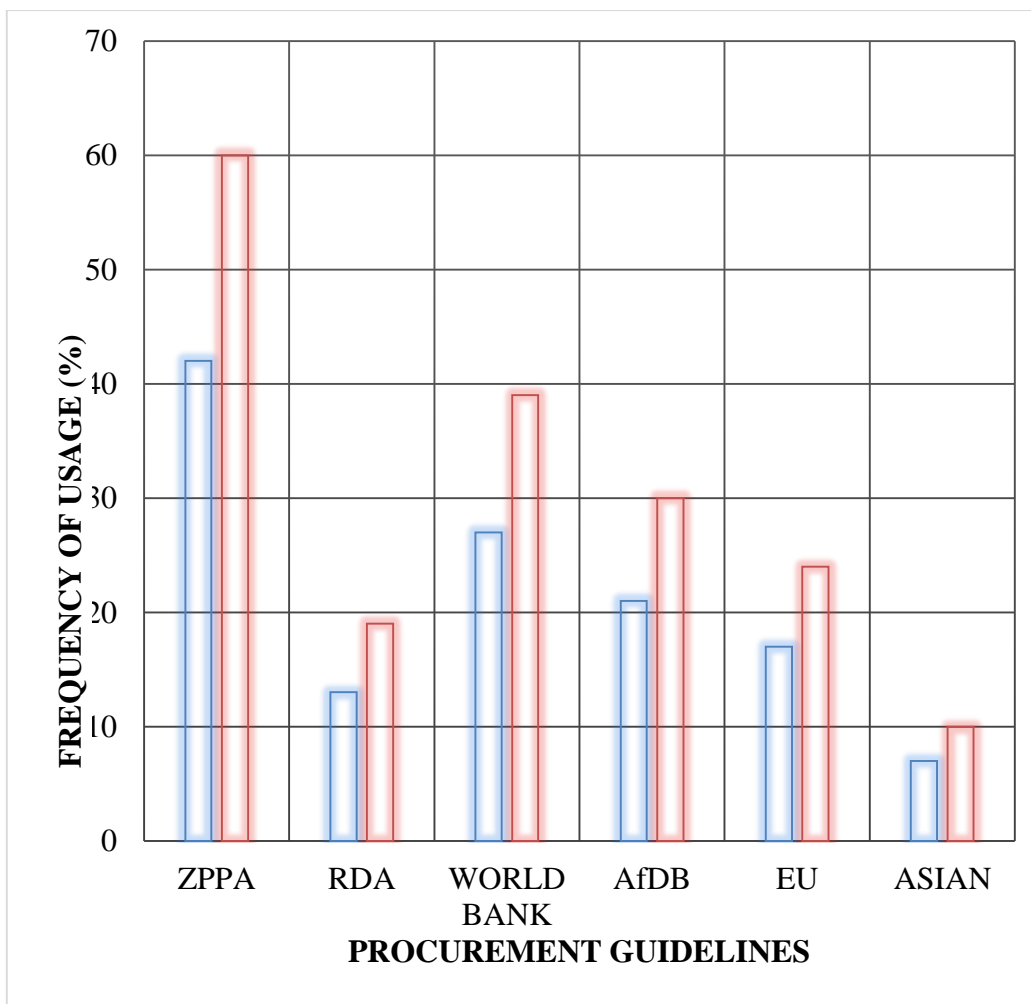


Figure 4.6: Frequency of using procurement methods

The findings on the impact of other procurement guidelines on the ZRS industry reflected the truth and was supported by their recent influence achieved by organisations such as the World Bank

(WB), African development bank (AfDB) and European Union (EU) in the financing of infrastructure road projects in Zambia. The results of the organisation's influence obtained were, 39 percent, 30 percent and 24 percent, respectively. The interviewee from the Road Development Agency (RDA) said, "The world bank, AfDB as well as the EU, were the main organisations who are behind most successful infrastructure road projects in Zambia. He further attributed their achievement to their steady counterpart funding towards various road projects".

On the adequacy of the ZPPA guidelines, the key expert from ZPPA said, "procurement entities in zambia use standard solicitation documents whose drafting basis was the Federation International Des Ingenieurs-Conseils (FIDIC) and the World Bank (WB) guidelines". But after further probing, the expert also revealed that "the ZPPA Act of 2008 and public procurement regulations were being reviewed". It is therefore interpreted that the reason behind the review of the ZPPA regulations and guidelines was an indication and an acknowledgement that, they are not adequate. Therefore, the Institution could have realized the inadequacies and felt the need to begin incorporating best practices. The need to improve procurement guidelines together with other institutional policies that pertain to the overall procurement process of contracts and successful project delivery is in line with the concerns raised by the expert from National Council for Construction (NCC) who said, "Local contractors do not have capacity due to high percent rate on credit. He explained that this status makes it very difficult for a local contractor to borrow from the banks in order to successfully carry out a contract opportunity and later on equip themselves with machinery and expertise thereof. As a result successful delivery of projects gets affected". Therefore, policy reforms in every institution that are directly or indirectly connected to the ZRS should considered in order to incorporate best practices.

4.3.2 Performance of past projects

The assessment of project works was limited to the projects that were unveiled after 2011, particularly those under the link Zambia 8000 project. During the interview of key experts, the identified desk engineers and project managers with at least ten (10) years' experience who were interviewed, gave their viewpoints, concerning the performance of road projects under their charge.

The interviewee from RDA said, "In most cases works contracts commenced before the finalisation of the designs and engagement of consultants to the projects. He further explained that this situation usually occurs due to stakeholder pressure, though mostly it is from politicians. He also stated that this situation always had retrogressive effects on successful project delivery because it is very difficult to monitor or supervise a project without designs".

In addition, the interviewee disclosed that noTable effects of works that commenced without designs and consultants on projects, experienced re-works and delays in completion of works. This was so because when the consultant finally got on site they found that contractors had wrongly executed certain works and therefore correction became ineviTable. Consequently, project cost overruns, delays and re-works had characterized the ZRS sector. On the other hand, experts from NCC revealed that during assessment of some of the past and on-going projects they had encountered poor quality of works being executed and pointed out that corruption could be the root cause of such substandard works noticed. They hinted that despite some of the project having had timely release of project funds, the quality of works left much to be desired. The interviewee also

reported that incompetency of consultants and contractors had also contributed to project failure in the ZRS.

The overall project performance of past road projects in the Zambian road sector stood at 53 percent as shown in Figure 4.7. When Subjected to the rating scale that was used to rate performance of past projects, the performance of past projects in Zambia was found to be “average” standard, and fell between 50 percent and 59 percent (See Appendix A).

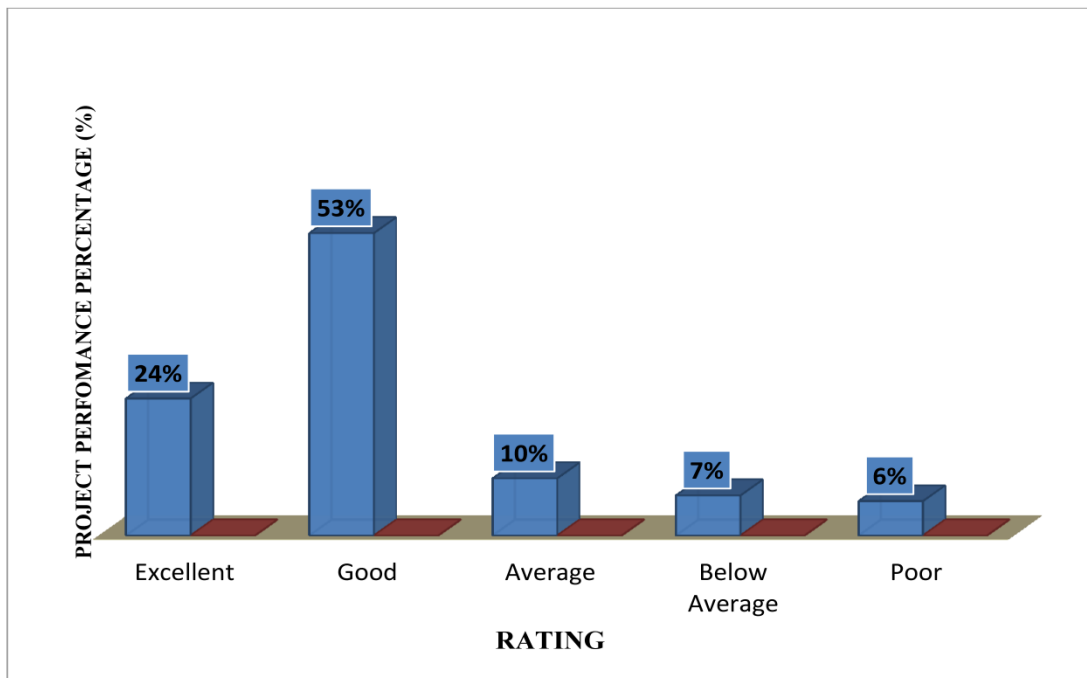


Figure 4.7: Performance of past projects (2011 to 2017)

4.3.3 Critical procurement factors

The interviewee from ZPPA argued that “it was the funding challenges that affected the procurement of construction projects and not the procurement methods used”. This argument was supported by the overall outcome of the investigation on the critical procurement factors as illustrated in Figure 4.8 that showed release of project funds to be the major procurement factor at 87 percent. Procurement requires that funds are secured before procurement process starts.

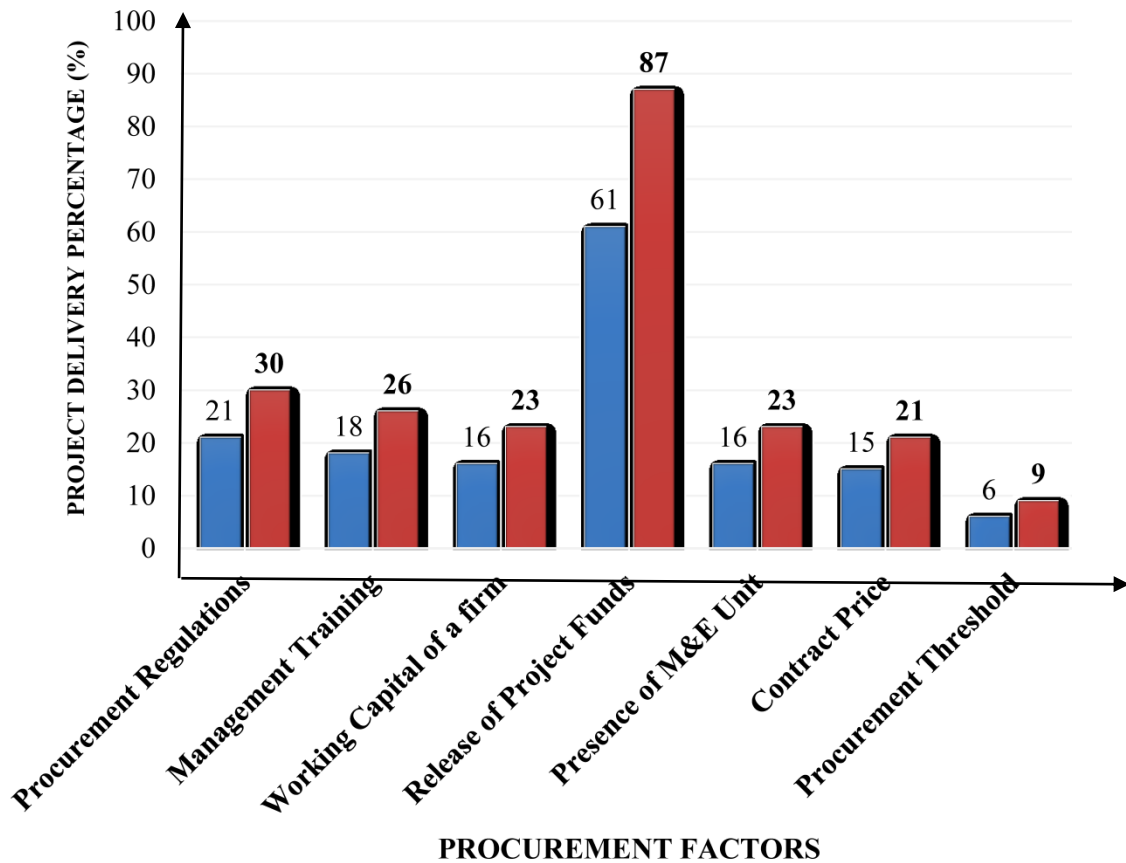


Figure 4.8: Critical procurement factors

The findings revealed were in line with the project status report obtained from the interviewee at RDA which showed that most of the unveiled and commenced projects under the Link Zambia 8000 have since stalled due to fiscal challenges. Further, it was revealed that recommendations have been made to adopt some of the stalled projects and convert them into contractor facilitated initiative (CFI) model. However, when probed further as to whether the awarded contractors had the capacity to mobilise funds and execute their contracts as CFIs, the interviewee from RDA said it has been a big challenge on the part of the contractors. Therefore, the project sites remained abandoned due to lack of funds. It was also disclosed that the contractual agreement of those contracts could not easily be changed from one type of contract to another without costs as there were legal implications which require to be addressed such as termination of the first signed contract.

As a mitigating measure to lack of project funds and subsequent failure to release of project funds to projects, the interviewee spelt out the following measures that was being implemented by the National Road Fund Agency (NRFA) in Zambia.

- a) Rolling out of road tolling countrywide and subsequent collection of toll fees for road maintenance activities.
- b) Promotion of contractor facilitated initiative model and Public-private partnerships (PPPs)

programmes in the management of road infrastructure projects

The revelations on the performance of past projects from the experts at NRFA said, “The performance of road projects in the past two (2) years had not been so good, however, improvements have been noted due to the introduction of some of the above mentioned measures”.

4.4 Procurement Methods

Both respondents who participated in the questionnaire and interview survey had the opportunity of rating the procurement methods which are prevalent in their institutions. The primary data obtained provided the basis for determining the frequencies of procurement methods as well as establishing the most preferred procurement method in the ZRS. Figure 4.9 shows various procurement methods used in the ZRS industry, with the frequently used method being open bidding represented at 57 percent. With the least used procurement methods being open selection and simplified bidding represented at 29 percent, respectively.

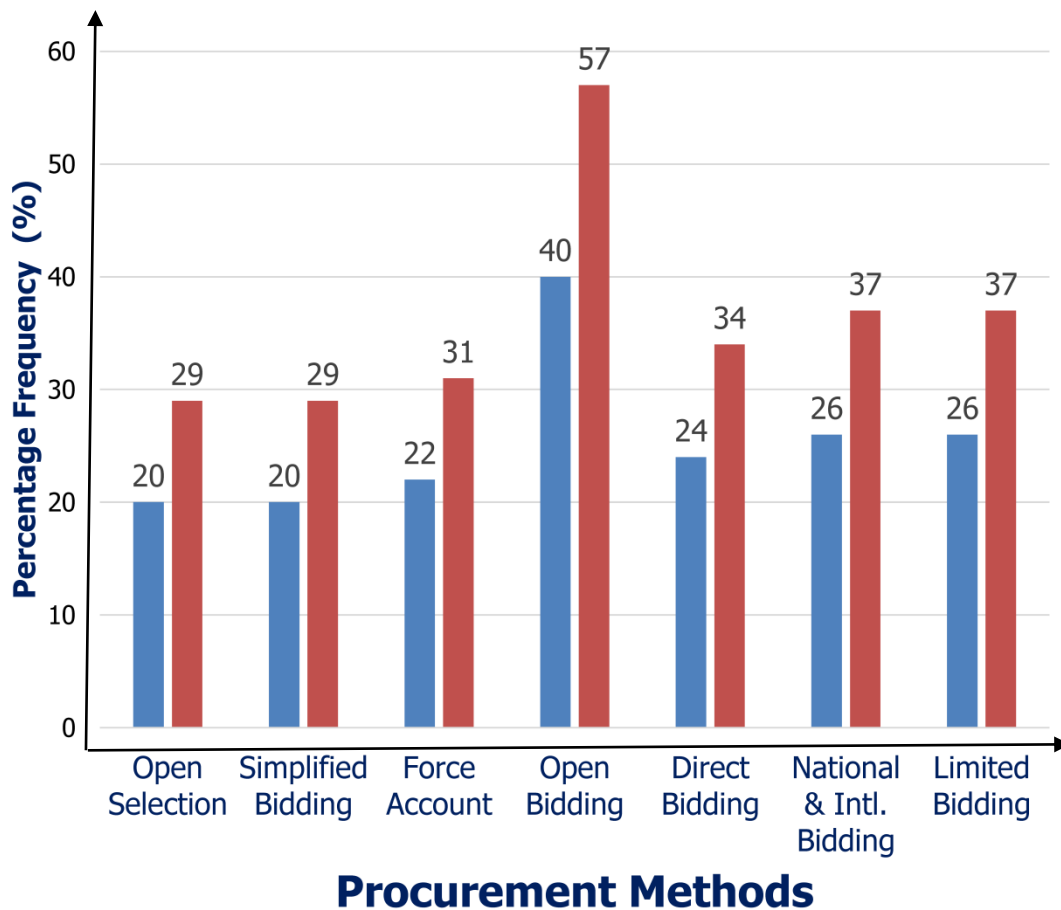


Figure 4.9: Frequency Usage of Procurement Methods

4.5.1 Findings/ Results of the sampled projects

The report is based on the outcome of four (04) projects, as the eight (08) sampled Link Zambia 8000 projects had similar challenges that affected their delivery.

a) Design and Construction of Mansa to Luwingu (M3) Road (175Km) in the Luapula and Northern Provinces and 30Km of Township Roads in Mansa and Luwingu.

Background

The project was awarded to Messrs China Henan International Cooperation Group company limited (CHICO) to carry out the Upgrading of 175Km of the M3 road from Mansa to Luwingu, to bituminous standard of 6.2 meters of a two way single carriageway with 1.5 metres shoulders; upgrading of townships roads with double seal surface dressing in Mansa and Luwingu; and 20 km of pothole patching and double seal surface dressing in Mansa Town

Table 4.1: Mansa to Luwingu (M3) Road

S/N	DESCRIPTION	DETAIL
1	Procurement Method Used	Procurement method that was used was open bidding. However, due to fiscal challenges, the contract type was re-negotiated and converted to a contractor facilitated initiative (CFI) model
2	Start date	October 22, 2013
3	Initial Contract completion date	January 31, 2017
4	Revised completion date	February 21, 2018
5	Contract Sum	\$310,795,882.71
6	Status	Completed

ai) Overall Project Performance status

The initial findings of the project in regard to the procurement method that was used to procure the contractor shows that commencement of works stalled until it was converted to a contractor facilitated initiative (CFI) model. The failure to commence the project, necessitated re-negotiations and subsequent change of the funding source, from the Government of the Republic of Zambia (GRZ) coffers to contractor facilitated initiative (CFI) model. This required the contractor to provide financing for the works. Consequently, the contractor obtained a loan from Export and import (Exim) bank of China for the financing of project works and execution of works commenced. The availability of funds and timely release of project funds has led to the execution of the project works to be on schedule. However, this does not mean the open bidding method that was initially used to procure the project was not effective as compared to contractor facilitated initiative. The difference here is that while the procurement of the contract using open bidding depended on government funding which was not available at the time of commencement, the later managed to secure a loan and therefore release of project funds to road project became on schedule

or timely.

The project manager also reviewed that the project incorporated thirty (30) road contractors under the twenty percent sub-contracting policy. However, some sub-contractors have stopped works without notice. The reasons for stopping works were not clear but the project manager attributed the reason to lack of capacity by the local sub-contractors. Further, it was reported that the main contractor CHICO had only sub contracted the works for clearing, and grubbing, accommodating traffic and maintaining diversions, removal of top soil. It was found that the works given to local contractors were too basic and involved no technological knowledge transfer which could help to build the local contractor's technical capacity. The project manager explained that this was partly based on the capacity of the local contractors as they had no relevant equipment to carry out sophisticated civil works. Therefore, it was in the best interest of the taxpayers that the contractor only sub-contracted works which could be handled by the local sub-contractors in order to achieve value for money. The opposite could have meant re-works and failure to execute the works.

The quality of works so far achieved was of high quality as the main contractor had high capacity and exhibited good planning for the works. All the procurement factors reviewed were well take care of under the project and they have contributed to the ongoing successful project delivery, with physical progress achieved at the end of August 2017 being at 95.22 percent. This meant that the contractor had only remained with 4.78 percent of physical works to be carried out in the remained seven months till the revised completion date scheduled for February 21, 2018.

Finally, the success of this project was not attributed to the procurement method that replaced the initial open bidding method. However, the project success was due to the fact that all the procurement factors that enables a successful project delivery were conducive and fulfilled such as timely release of project funds, working capital of the firm, good planning and presence of a monitoring and evaluation (M&E) Unit.

b) The Upgrading and Re-alignment of R231 from Great North Road at Matumbo to Luangwa Bridge (115Km) Road in Muchinga Province of Zambia – Lot 2

Background

The project was awarded to Messrs China Jiangxi Cooperation for International Economic and Technical Cooperation Zambia Limited. The project comprised the construction of a rural trunk road, the R231 from the T2 Junction at Matumbo to a point on the Luangwa River in Chama District. The length of the road is approximately 115Km and was designed to comprise of 6.5metre carriageway plus 1.5 meters shoulders on either side of the carriageway. The scope of works included; bush clearing, earthworks, construction of road formation, subgrade, and construction of road pavement layers with double seal surface dressing to the carriageway

Table 4.2: Matumbo to Luangwa Bridge (115Km) Road

S/N	DESCRIPTION	DETAIL
1	Procurement Method Used	Limited bidding
2	Start date	December 14, 2012
3	Initial Contract completion date	December 14, 2017
4	Revised completion date	February 21, 2018
5	Contract Sum	K399,215,646.07
6	Status	On-going/ Stalled

bi) Overall Project Performance status

The project is on-going though works have stalled due to non-payment of interim payment certificates (IPCs). Physical progress achieved stood at 37Km to date from the time the project commenced works in December, 2012. Further, the project hit another setback this year (2017) after it was left out of the 2017 Annual Road Sector Work Plan (RSAWP). Therefore, no works have been done on site by the contractor in the months from January 2016 to August, 2017. Further the contractor has lost approximately twenty-five (25) months with the overall percentage of time lapse standing at ninety-six (96) percent.

During interview, the project manager disclosed that despite the contractor stopping works, they were still fully mobilised on site. The implications of this are; the contractor continues to accumulate additional payments in terms of interest for their equipment on site and should the client terminate the contract, the contractor will still be paid.

The quality of works so far achieved was of high quality. The failure of this project can and was not attributed to the mode of procurement method that was used but instead, it was caused by non-payment of interim payment certificates. Release of project funds was again the reason for failure of the project. Thus, the relationship between procurement method and successful project delivery is on the premise of abrogating the inter-plays between procurement methods and successful project delivery: release of project funds; working capital of a firm; procurement regulations; procurement threshold; presence of a monitoring and evaluation unit; and contract price.

c) The Rehabilitation of the Kawambwa-Mushota-Luwingu Road and the Chisembe-Chibote-Chief Chama Road in Luapula Province**Background**

The project was awarded to Messrs Unik Engineering Construction Limited to carry out the rehabilitation and upgrading of various road sections of the 158.7Km: section I earmarked to receive a single seal using 6.7mm aggregate; sections II, III and IV to be surfaced in full to bituminous standard; and section V to have bituminous surfacing limited to the selected sections through villages. The balance of section V was to be constructed to engineering gravel standard.

Table 4.3: Kawambwa-Mushota-Luwingu Road

S/N	DESCRIPTION	DETAIL
1	Procurement Method Used	Open National Bidding (ONB)
2	Start date	May 15, 2013
3	Initial Contract completion date	April 14, 2017
4	Revised completion date	`
5	Initial Contract Sum	ZMW258,773,688.00
6	Revised Contract Sum	ZMW385,583,452.30
7	Status	On-going/ Stalled

Ci) Overall Project Performance status

The average overall project progress of works completed for the whole project to date was at eighty-one (81) percent. This project was behind schedule due to a number of challenges: non-payment of interim payment certificates (IPCs); and lack of capacity by local sub-contractors. The first challenge of non- payment has led to the contractor stopping works on site and most of the workers remain laid off.

The project engineer also cited variation orders to have impacted negatively on the project financial position because as things stood at the time of the survey, variation order No. 5 was being reviewed by RDA. This will likely increase the contract value once it is approved and will lead to project cost overruns. Further, it was established that variation order emanated from lack of project designs at project inception.

Finally, the highlighted challenges on this project have nothing to do with the procurement method that was used but the abrogated procurement factors or interplays; non-payments and capacity of the firm. The latest besides the ones discussed earlier was variation orders that caused the project cost to increase from **ZMW258, 773,688.00** to **ZMW385,583,452.30**. Now at a time when the client was struggling to pay IPCs that was the time the contract value was also being increased through variation orders. Therefore, works that could have been envisaged at project inception and could have been budgeted for under the initial contract sum, were now being introduced as new work pay items.

d) The Upgrading to Bituminous Standard of the Leopards Hill Road (D152) from the State Lodge Junction to Katoba Basic School (43.8Km) in Lusaka Province.**Background**

The project was awarded to Messrs China Geo Engineering Corporation. The project assumed Km 0+000 at state lodge Junction on Leopards Hill road. The end of the road is at Katoba Basic School. In addition to this the project was varied to accommodate six variations orders

Table 4.4: Leopards Hill Road

S/N	DESCRIPTION	DETAIL
1	Procurement Method Used	Limited bidding (LB).
2	Start date	September 19, 2013
3	Initial Contract completion date	March 14, 2014
4	Revised completion date	-
5	Initial Contract Sum	ZMW509,697,552.82
6	Contract Sum	ZMW509,697,552.82
7	Status	Completed

di) Overall Project Performance status

The project engineer who supervised the contractor reported that. “The contractor exhibited high level of planning skills as well as high-technological capacity in the execution of works and prudence in the management of project funds. He went on to explain that, besides the project scope of works, the project was varied six (6) times in order to include other roads”. However, the contractor maintained and managed to execute all the varied works within the contract duration period and original contract value. Further, the contract did not request for extension of time in view of the six (6) variation orders but had to even complete the projects works ahead of schedule.

The findings from this project revealed that just like in the other assessed projects above, a procurement method used does not affect successful project delivery in itself. But rather, inter-plays that exist between the procurement method used and the successful project delivery does affect the outcome of the project. It was further noticed that good practices were at play in this project, namely: good planning exhibited by the contractor; high capacity to execute works at high rate despite increased quantum of works necessitated by variations orders; and sound cash-flow or working capital of the firm was high as well as prudence in the management of time and project funds

In conclusion, it was found that the above assessed projects had similar outcomes concerning the relationship between procurement method used and successful project delivery. Therefore, it was found that what defines the relationship, between procurement methods used and successful project delivery is the presence of either positive or negative conditions which exists between procurement and project delivery.

4.6 Brief Discussion of the Results/ Findings**4.6.1 Release of Project Funds**

The critical procurement factor which contributed to poor or unsuccessful delivery of road projects in the ZRS was release of project funds. This factor stood at 87 percent of the rating by the seventy (70) key technical personnel who took part in the survey. This was also evident from the several reported works which had stalled to date or deferred maintenance, rehabilitation and construction

of works on various projects due to lack of funds from the Employer. This also had other retrogressive multiplier effects on the national treasury because the contractor's equipment on site and their presence on site despite not carrying out any works attracted interest payments. The key technical experts who were interviewed revealed that interest payments were becoming a huge drain on the national treasury. Therefore, the Employer needed to make a bold decision to terminate these stalled and deferred projects by settling/ negotiating for reasonable compensation fees as opposed to continuous payment of interest whilst no progress in terms of physical works was going on (Overy, 2012).

4.6.2 Review of the prevailing procurement guidelines in the Zambian Road

Sector

The review of procurement guidelines based on the Zambia Public Procurement Authority (ZPPA) guidelines as well as other international procurement guidelines was successfully done. The frequency usage of ZPPA procurement guidelines versus project delivery was at 60 percent and was the highest against the other procurement guidelines which was also used during the period. However, the frequency usage of the other procurement guidelines were all below average, with World Bank (WB) procurement guidelines at 40 percent and African Development Bank (AfDB) at 30 percent in terms of frequency usage, respectively.

Furthermore, the respondents rated the ZRS to have dominated by the use of the Zambian Public Procurement Authority (ZPPA) guidelines and regulations amongst most of the procuring entities under the sector. The survey, further revealed that open bidding was the most preferred procurement method and had a percentage rating of 57 percent from the respondents against other methods which are used. There was also a call from the respondents for the ZPPA to review their procurement guidelines by incorporating international procurement guidelines' best practices (Georgios Baltos, 2018).

Henceforth, the findings in respect of procurement guidelines varied from one project to the other. Mostly they depended on the source of funding. For example, the Public Procurement Regulations of 2011 – ZPPA, Part X and Sub section (3) states that “the total amount of an advance payment shall not exceed twenty-five percent of the total contract price”. However, the interviewee from the Road Development Agency (RDA) said that “RDA wrote to the Auditor General's (AG's) office and sought for the adjustment and limitation of Advance Payment (AP). After approval was granted the ZPPA provided envelope of zero (0) percent to twenty-five (25) percent advance provision was adjusted to: ten (10) percent for local contractors; and seven and half (7.5) percent for foreign contractors. While projects with external funding such as the World Bank (WB) have continued to pay advance payments even beyond the ZPPA allowable envelope, depending on the strength of the negotiating parties”. Therefore, contractors who participated in the Zambian Road Sector (ZRS) were limited to receiving ten (10) percent and seven and half (7.5) percent advance payment for local and foreign contractors, respectively.

Moreover, the scenario revealed above of deliberately limiting the amount of advance payment to contractors attest to the conclusive analysis that the most procurement factors which influenced project delivery in the Zambia Road Sector was release of project funds. Release of project funds was rated at eighty-seven (87) percent higher than other procurement factors which was revealed. Further, ZPPA procurement guidelines spelt out acceptable aspects on which advance payment should be paid on, namely: mobilization; start up; the purchase of materials; and any other related

costs to the goods, works, non-consulting or consulting services. It therefore, follows that when advance is limited like in the case of the ZRS then contractors are incapacitated in regard to successful mobilization, start up and purchase of materials which are required for successful commencement/ implementation of a project. Finally, the limitations regarding to advance payment also explains why commencement of road projects was reportedly very difficult on a number of projects in the ZRS industry.

Presently, the RDA law on limiting advance payment to ten (10) percent and seven and half (7.5) percent to local contractors and foreign contractors, works against best practices and therefore, hinders successful negotiations regarding the same, which is an international contract administration norm.

4.6.3 Examination of Performance of Past Projects

The eight (08) sampled projects were successfully examined. The assessed road projects within the ZRS revealed that the performance of projects was good at fifty-three (53) percent. In addition, the analysis showed that twenty-four (24) percent of the overall project's assessed, attained excellent rating and twenty-three (23) percent of the other projects assessed were rated as average, below average and poor respectively.

The findings on the performance of past projects revealed that a number of factors led to the imbalance amongst various road project outcomes recorded: projects that attained excellent rating also recorded excellent release of project funds, excellent planning/ scheduling of project activities, as well as having had very stable working capital of the firm and had good presence of monitoring and evaluation (M&E) units; and projects that attained average were mostly prioritised government funded projects with inescapable red tape coupled with general fiscal challenges that characterized the key institutions within the ZRS circles. Furthermore, over-procurement or unrealistic roll- out of road programmes/ projects was also noticed in the ZRS. As most of the awarded and commissioned road projects after the 2011 unveiled road programmes, such as the Link Zambia 8000 and Pave Zambia 2000 had no supporting budgets to sustain their execution and have only remained, phased perpetually as projects earmarked for implementation.

The performance of past projects in the ZRS was rated at 53 percent which according to the survey question (see Appendices A) gives average performance. This performance left much to be desired considering the colossal sums of funds that was being channeled to the sector for infrastructure development of roads. Therefore, it is prudent that all the illegal vices which the respondents brought out as contributing factors to the average performance of past projects were eradicated from the sector. The illegal factors which came up were bribery/ corruption and political influence. The aspect of bribery and corruption was also verified by an independent survey report conducted by Transparency International – Zambia in conjunction with the Anti-Corruption Commission - Zambia. Their findings were that bribery and corruption in the construction industry was at **8.1** percent (Zambia Bribery Payers Index Survey Report, 2017) . On the other hand political influence was reported by the respondents that, while it was difficult to give numeric Figures to describe the extent of the vice; Political influence was visibly observed when one looks at the Link Zambia 8000 Map (Figure 4.10). The Map showed the phased manner or order in which the roads were to be constructed throughout the country (Zambia). However, due to the reported political influence, it was noted that some of the roads which were phased to start under the last phase (Phase III) were the ones which commenced in Phase I.

The other factor which was reported was the late appointment of consultants on project and consequent commencement of projects without design drawings. This in most cases resulted in re-works, delays and cost-overruns (Sun, 2010). Further, the current 20 percent sub-contracting policy which mandated every high tech contract awarded to major contractors to sub-contract 20 percent of the total contract sum to Zambian local contractors was reportedly not serving its intended purpose. The policy was meant to build capacity of the local contractors through knowledge transfer. However, it was revealed that more was expected to be done beyond the 20 percent policy pronouncement. Because, most local contractors were not acquiring high-tech knowledge transfer through the 20 percent sub-contracting policy, since their capacity is too low and therefore, they are only sub-contracted to carry out very low level works such as bush clearing and grubbing.

4.6.4 Determine Critical Procurement Factors that affect Project Delivery

Based on the reviewed procurement factors by other published literature, this research also subjected responded to the same factors in order to establish the critical procurement factors that affected the Zambian Road Sector (ZRS) industry. The analysis of primary data revealed that the critical procurement factor was: release of project funds at eighty-seven (87) percent; procurement regulations was second at thirty (30) percent; while management training of key personnel in procurement and project management came out third with twenty-six (26) percent; working capital of a firm and presence of monitoring and evaluation (M&E) unit were at par with twenty- three (23) percent each; contract price as a selection criteria had twenty-one (21) percent; and lastly procurement threshold recorded insignificant influence of only nine (9) percent.

4.6.5 The appropriate procurement method in the ZRS industry.

The findings concerning the appropriate procurement method ideal for the Zambian Road Sector (ZRS) industry, revealed is open bidding method. The conclusion was based on practical utility of the method amongst procuring entities, as was revealed during questionnaire and interview survey. However, the success of project delivery was dependent on the fulfilment of procurement factors and other contract conditions such as upholding clauses such as the payment terms. Best practice recommends that payments of advance payment and interim payment certificates (IPC's) be made within the stipulated timeframe according to the prevailing contract and procurement guidelines.

The interviewee explained that open bidding was favoured amongst procuring entities in the ZRS as it had public approval based on its high competitiveness, transparency as opposed to single sourcing that was also being practiced in the road sector. In addition, it was reported that "politicians on several occasions influence the procurement of certain contracts by soliciting procuring entities to urgently procure works, goods, or services, thereby forcing them to use limited bidding or single sourcing", on the pretext of emergency need for remedial works in the communities.

The other factors highlighted were lack of competent personnel in procurement and project delivery as well as corruption. The analysis revealed that only fourteen (14) percent of the ZRS industry' personnel surveyed were competent in procurement and project delivery related aspect of contract administration and management. This revelation was worrisome and could be attributed to the unsuccessful procurement and project delivery of most road projects that was recorded. Further, the aspect of corruption is another vice that was revealed by the interviewees, to have had an effect on the poor quality of road infrastructure delivered to the public.

4.6.6 Relationship between procurement factors and successful project delivery

The investigation conducted on the Zambian Road Sector (ZRS) revealed that there was a relationship between procurement methods used and successful project delivery. However, this relationship is indirect and not direct. It was envisaged mainly to be established by the abrogation of procedures as well as failure to fulfil contractual obligations/ conditions of contracts that goes with respective road infrastructure contracts. NoTable abrogated procurement guideline that consequently affected the project delivery was the “payment term clause”, particularly concerning payment of advance payment which the Road Development Agency (RDA) had limited to ten (10) percent and seven and half (7.5) percent to local contractors and foreign contractors, respectively. Further, abrogation of the payment terms were in form of delayed interim payment certificates (IPC’s).

The adjustment and limitation in payment of advance payment in the ZRS had not only limited the release of project funds but also disadvantage the rate at which contractors mobilised and bought materials on site. The consequences that came with this adjustment contributed to the overall project delays and subsequent project failures as some of the local contractors were reported to have had no capacity in terms of both equipment and financial capacity. Therefore, minimizing advance payment only makes it hard for the local contractors to appropriately put in place the key equipment’s and materials required during the “start-up” of a project.

4.6.7 Expert Competency

The survey conducted revealed that only 8 percent of the employees engaged under the ZRS had the required expertise in procurement and project delivery. This revelation was worrying and could be the source of project failure. In addition, it is also on record that the number one contributing factor to project failure is poor project management. This is so because of late project managers are promoted to their positions on the premise of technical ability despite lacking important practical industrial management skills (Barry Jon Bauer, 2014).

4.7 Summary

This chapter analysed the primary data collected and obtained the results. The results and findings were also measured against the factors of literature that was reviewed, such as the prescribed standard norms of assessing competency for experts. The sampled projects were also analysed in terms of their progress report status, as was described by their project managers, who were surveyed through the use of questionnaires and interviews. The indicative tests in order to obtain the desired findings were based on factors of literature that was reviewed such as, release of project funds, presence of monitoring and evaluation (M&E) unit and working capital of a firm. Therefore, the overall outcome of the study provided the basis to make a conclusive and informed judgement on how to finalise this topic of study.

The next chapter attempts to wrap up the research study with the conclusion, limitation of the study and consequent recommendations that may be a solution to the identified statement of the problem in the Zambian Road Sector (ZRS).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The previous chapter reviewed the research findings and analysed the results obtained. It comparatively looked at the reviewed literature and then interpreted the results generated using Microsoft Excel 2013 software.

This chapter endeavours to give a concise conclusion of the research study, citing the limitations as well as offering probable recommendations in order to add to a pool of the available knowledge related to the study, on how to better the procurement and project delivery of construction projects.

5.2 Conclusion

The different types of procurement methods employed in construction of road projects has a vital role in the successful selection of a contractor to be awarded a contract opportunity and subsequent completion of the project. However, the findings of this research study concerning, the relationship between procurement method and success project delivery indicated that: A procurement method cannot be singled out to be the reason for project success or failure alone. Because every procurement method have their own procedures to be followed and once they are followed the project delivery takes place with their due conditions and expected outcomes to be met; and the conditions to be met during project delivery are the implementation of procurement factors which have been extensively analysed to establish their impact on project delivery.

In light of the above, and after past projects between the years 2011 and 2017 were thoroughly examined, it was established that the major factors that contributed to the effects of procurement methods and project delivery, in the Zambian Road Sector (ZRS), were:

- i. Release of project funds was the highest rated procurement factor by the respondents at 87 percent;
- ii. Political Interference;
- iii. Procurement guidelines versus performance guidelines, with the highest rated frequency in terms of usage by the respondents, being the Zambia Public Procurement Authority (ZPPA) guidelines at 60 percent. The comparative performance based on previous investigated past projects between 2011 and 2017 was 53 percent only which was translated to be good;
- iv. Untimely release of project design/ drawings; and
- v. Corruption and bribery
- vi. In view of the highlighted factors, it was further noted that the outlined factors also had consequent multiplier effects on project delivery, such as:
- vii. Poor quality of road works;
- viii. Re-works/ unnecessary variation orders;
- ix. Project re-scheduling and cost overruns; and
- x. Delayed execution of scheduled works and suspension/ failure of road projects

Finally, the prevailing procurement guidelines were successfully interrogated, with flaws thereof established and opening bidding procurement method recommended as the most appropriate

procurement method for the *Zambian Road Sector*.

5.3 Recommendations

Having had the limitations and conclusion of the study, a definite platform had been established on which general recommendations and specific recommendations concerning the research study, were to be laid. Therefore, recommendations have been made against the revealed flaws in the relationship between procurement methods and successful project delivery in the *Zambian Road Sector (ZRS)* industry.

5.3.1 General Recommendation

There is a saying that “When you put water in the fridge, there is no need to pray for the water to freeze and subsequently to form ice”. This saying means that, scientific knowledge suggests that once conditions for any scientific procedure are satisfied, the desired results are expected to be seen or achieved. This explanation suits well with the general recommendation for this study:

For the procurement methods to work or thrive in line with what is termed “Best Practices”, procedures that are laid down for respective procurement methods, conditions of contracts should be adhered to and supported by all parties. Similarly, the personnel and all the stakeholders should be ethical and competent in their involvement during the procurement and project delivery of road construction projects. This also means that competency levels on the part of both clientele: Road Agency implementing Personnel; Contractors; and Consultants, should be of acceptable standards. Finally, no contract should be signed without a budget line/ readily available project funds in the Road Sector Annual Work Plan (RSAWP), project designs and available key Plant and equipment. Steady cash flow should be certain by way of having commercially viable investments in order to broaden the revenue base within the Road Sector, for road infrastructure projects and programmes.

5.3.2 Specific Recommendations

1. It is recommended that the *Zambian Employer* in the Road Sector should consider the factor of “release of project funds”, to the contractor and consultant on time. Further, to ensure effective and efficient payments for the works, the Employer should encourage the acquisition of all the required funds for project execution before procurement of works contract commence;
2. Implementing Agencies such as RDA and MLG should uphold timely release of project designs/ drawings to the contractor/ or Consultant prior to commencement of works contracts. In that regard, the Employer should not allow any works contract to proceed with execution of works without project designs or the presence of the appointed consultant;
3. The Road Sector Annual Work Plan (RSAWP) drawn by implementing Road Sector Agencies (RDA, MLG & MHID) should be framed based on definite available funds. As opposed to the current scenario where, the Road Sector Strategic Work Plans (RSSWP) were framed on account of pledged Donor funding as well as revenue that the Agency have no direct control over, such as Road User charges mobilised through Control Ninety-nine (99) vote;
4. Further, it was recommended that the Government of the Republic of Zambia (GRZ) should streamline the collection of Road User Charges/ Revenue. This could be done by having decentralised collection points of Revenue so that Agencies like the National Road Fund Agency (NRFA) could be allowed to fully collect all Road User charges/ Revenue and operate

according to its mandate: to mobilise road fund for the maintenance, rehabilitation and construction of public roads in Zambia. Such a move can certainly remove the red tape revealed in the disbursement of project road funds from the Ministry of Finance (MoF) to NRFA;

5. Furthermore, it was recommended that government through the Attorney General and ZPPA advocate against decisions on all limitation of advance payment which are in conflict with the ZPPA provisions in order to improve the capacity of contractors. This may be done by putting punitive measures in place to would be ailing officers who may engage in flouting procurement guidelines;
6. The other recommendations are that the National Council for Construction (NCC) and Zambia Public Procurement Authority (ZPPA) regulations and guidelines should be reviewed to incorporate best practices. It is also recommended that stakeholders such as contractors should be allowed to be part of the review exercise so that their concerns are incorporated as well. Consequently, adjustments of guidelines such as advance payment should not be altered only in the interest of individual procuring entities. Rather, such adjustments to be made should be subjected to all the stakeholders before amendments could be effected;
7. Government and procurement entities should enforce a policy which should prevent personnel without formal procurement training from handling assignments related to contract administration/ planning. In addition, personnel working in institutions engaged in contract administration should have a deliberate policy of training their staff in procurement and contract administration courses;
8. Moreover, it was recommended that GRZ should consider empowering Small Scale Contractors with equipment and financial capacities so that once they are sub- contracted under the 20% Sub-contracting Policy, they may be able to carry out high-tech works and acquire the needed knowledge, as opposed to the low works which their capacity had allowed them to handle; and
9. Finally, GRZ and or the Employer should devise deliberate policies which allows for procuring entities to timely review their procurement guidelines in accordance with international best practices as well as de-linking political patronage from implementing Agencies such as RDA and NRFA. Once implementing Agencies attains true autonomy then procurement methods will gain public confidence and will help in the successful project delivery (Hill, 2017).

REFERENCES:

- (2004). In First (Ed.), *Checklist for use in financial and Compliance audit of public procurement* (pp. 1-58). Geneva: The contract committee of the supreme audit institute of the european union.
- Abrahams, J. (2013). *Procurement for local development, A guide to best practice in local government procurement in least developed countries*. Geneva: UNCDF.
- Abrams, J. (2013). *Procurement for Local Development, A Guide to Best Practice in Local governance procurement in least developed Countries* (1 ed.). Washington DC: UNCDF.
- ADB. (2015). *Procurement Guidelines*. Retrieved March Friday 31, 2017
- AfDB. (2014, April). *Procurement Policy Document Establishing of Monetary thresholds for Modes of Procurement of goods and works*. Retrieved April Sunday 16, 2017, from Available at www.afdb.org
- Agency, N. R. (2015). *Annual Report*. Lusaka: National Road Fund Agency. Agency, N. R. (2015). *Annual Report*. Lusaka: National Road Fund Agency.
- Agency, N. R., & Agency, N. R. (2015). *Annual Report*. Lusaka: National Road Fund Agency.
- Agha, E. (2013). *Factors Affecting the Selection of Procurement methods in the Construction Projects in Gaza Strip* (First ed.). Gaza Strip: The Islamic University of Gaza.
- Akram and Zareba. (2012). *Strengthening of European Union Funds Absorption Capacity for infrastructure Construction Project Manula "Procurement Strategy in Construction"*. Warsaw, Ankara, Mondavio.
- al, O. e. (2013). *A study on performance of contractors selected using the lowest bid evaluation method as a major criteria for government projects in Ghana*. Kumasi: Kwame Krumah University.
- America, D.-B. I. (2014). *Design and Build Institute America*. Retrieved April Friday 7, 2017, from www.dbia.org
- (2015). *Annual Report* . Lusaka: National Road Fund Agency.
- Authority, Z. P. (2008). www.google.com. Retrieved February 15, 2016
- Available at: www.cles.org.uk. (1986, March 17). Retrieved August 15, 2017, from Available at:<http://www.cles.org.uk>
- Axel-Volkmar Jaeger, C. W. (2008). *FIDIC Conditions of contract for design, build and operate projects: general conditions, particular conditions and sample forms*. Geneva.
- Baccarini, D. a. (2008). *Report Building Procurement Methods*. CRC Construction Innovation.
- Bandyopadhyay, S. a. (2007). *Capacity issues, constraints and recommendations*.
- bGreener, S. (2008). *Business Research Methods*. Ventus Publishing Aps.
- Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices* (Second Edition ed.). South Florida: Creative Commons Attribution.
- Bunni, N. G. (2005). *The Fidic Forms of Contract* (Third Edition ed.). Malden: Blackwell Publishing Limited.
- C.R.Kothari. (2004). *Research Methodology Methods and Techniques (Second Revised*

Edition) (Second Revised ed.). New Delhi: New Age International (P) Limited.

Canada, G. o. (2011). *Real Property Branch Procurement Management Manual*. Public Works and Services Department.

Casey and Bamford. (2014). *Building and Construction Procurement Guide Principles and Options* (First Edition ed.). Sydney NSW 2000 Australia: Austroads Limited.

Chan, P. T. (2011, 11 10). Available at <https://www.irbnet.de/daten/iconda/CIB12585.pdf>. Retrieved April Wednesday 5, 2017, from Available at <https://www.irbnet.de/daten/iconda/CIB12585.pdf>

Chartered Institute of Building. (2010). *Procurement in the Construction Industry* (First ed.). Berkshire, United Kingdom: CIOB.

CIPS. (available at www.cips.org/Documents/definitions_of_procurement_and_scm.pdf). available at www.cips.org/Documents/definitions_of_procurement_and_scm.pdf. Retrieved March Tuesday, 28, 2017, from available at www.cips.org/Documents/definitions_of_procurement_and_scm.pdf

CMAA. (2012). *An Owners Guide to Project Delivery Methods*. Washington DC: The Construction Management Association of America.

Committee on Estimates. (2014). *Report on the Committee on estimates for the fourth session of the Eleventh National Assembly*. Lusaka: National Assembly.

Council, A. C. (2007). *A working definition version 1, integrated Project delivery*. California: AIA California Council.

Council, P. E. (2009). *Standard Procedure for Evaluation of bids for procurement of works*. Islamabad: Parkistan Engineering Council.

Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (Second Edition ed.). London: Sage Publication Limited.

Delotte. (2015). *Economic benefits of better procurement practices*. Sydney: Deloitte Access. Department, P. (2015). *Technical Evaluation Report*. Lusaka: Road Development Agency.

Estache, A. (2008, August). *Benefits from competition for infrastructure procurements and financial needs reassessed*.

Estimates, C. o. (2014). *Report on the Committee on estimates for the Fourth Session of the Eleventh National Assembly on wednesday, 24th September, 2014*. Lusaka: National Assembly.

EU. (2004). Audit Checklist. In *Checklist for use in Financial and compliance audit of public procurement* (pp. 1-58). Geneva: The Contract of Committee of the Supreme Audit Institute of the European Union.

EU. (2004). www.eca.europa.eu/sites/cc/Lists/CCDocuments/9532056/9532056_EN.PDF.

Retrieved June 15, 2017, from

http://www.eca.europa.eu/sites/cc/Lists/CCDocuments/9532056/9532056_EN.PDF

EU. (2015). *Public Contracts Regulations*. Geneva: EU. EU. (2015). *Public Contracts Regulations*. EU.

FIDIC. (1999, October 5). Available at www.fidic.org. Retrieved April 22, 2017, from Available at www.fidic.org

FIDIC. (2011). <https://www.google.com.eg>. Retrieved April Monday 3, 2017, from <http://fidic.org/book/fidic->

procurement-guide-1st-2011

FIDICa. (2010). *Conditions of Contract for Construction*. Geneva.

Fotakis, C. (2003). *The Economic and Social Aspects of Migrations*. Brussels: DG Employment and Social Affairs: European Commission.

Gatti, S. (2008). *Project Finance in Theory and Practice Designing, Structuring and Financing Private Public Projects* (First ed.). California: Elsevier Inc.

Government of Tasmania. (2014). *Guidelines on Tender Evaluation using Weighted Criteria for Building Services* (Version 3 ed.). Hobart Tasmania: Department of Treasury and Finance.

Government of the Republic of Zambia. (2002). *The Public Roads Act of 2002*. Lusaka: Government of the Republic of Zambia.

Government of the Republic of Zambia. (2014). *Estimate on Government Expenditure*. Lusaka: Government Printers.

Government of the Republic of Zambia. (2003). *Act No. 13 of 2003*. Lusaka: Government Printers.

Green, B. (2015). *Understanding the value of Professionals and Professional bodies*. London: The Chartered Institute of Building.

Green, B. (2015). *Understanding the value of Professionals and Professional bodies*. London: The Chartered Institute of Building.

Group, A. D. (2014). *Procurement Policy Document, Establishment of Monetary Thresholds for Modes of procurement of goods and works* (First ed.). Tunis: Procurement and Fiduciary Services Department.

GRZ. (2015). *Committee on Government Assurance*. Lusaka: GRZ.

GRZa. (2015, October 9). *2016 National Budget*. Retrieved December 20, 2016

HDR, C. a. (2010). *History and Application of Least Cost Planning for Transportation from the Mid - 1990s*. Oregon.

Headlam, M. a. (2015). *Research Methods Handbook: Introductory guide to research methods for social research*. London: cles.

Heggie, I. (2010). *World Bank*. Retrieved March Friday 31, 2017, from www.worldbank.org

Hirsch, M. a. (2015). *Improving Environmental Sustainability in Road Projects*. Washington

DC: International Bank for Reconstruction and Development, World Bank. Holland, J. K. (2016).

Construction Management at risk. Zurich: Construction Risk, LLC.

Huang, X. (2011). An Analysis of the selection of Project Contractor in the Construction Management Process. *International Journal of Business Management*, Vol. 6(No. 3), 184.

Japan, G. o. (1889). *Public Accounting Act and Act on Promoting Quality Assurance in Public Works* (First ed.). Tokyo: Procurement System for Public Works in Japan.

- John B Bowcook, M. M.-H.-V. (1999). *FIDIC Conditions of contract for EPC/ Turnkey projects*. Geneva.
- Kaliba, C. (2009). Cost escalation and schedule delays in road construction projects in Zambia. *International Journal of Project Management*, 27(First), 522-531.
- KFW. (2016). *Guidelines for Procurement of goods and associated services in financial cooperation with partner countries* (First ed.). Frankfurt: KFW.
- Khan, T. H. (2015). Available at https://globaljournals.org/GJMBR_Volume15/3-Effects-of-Lowest-Bidding.pdf. Retrieved April 17, 2017, from Available at https://globaljournals.org/GJMBR_Volume15/3-Effects-of-Lowest-Bidding.pdf
- Kingston, S. a. (2016). *Design life warranties and fitness for purpose in construction contracts: The position of Australia and England*. Sydney: K&L GATES.
- Konkurrensverket, B. a. (2015). *Public Procurement Thresholds and Data in Sweden* (First ed.). Sweden Competition Authority.
- Kothari. (2004). *Research Methodology Methods and Techniques* (Second ed.). New Delhi: New Age International (P) Limited.
- Kothari. (2004). *Research Methodology Methods and Techniques (Second Revised Edition)* (Second Revised ed.). New Delhi: New Age International (P) Limited.
- LLC. (2014). *National Funding of Road Infrastructure*. Retrieved April 17, 2017, from Available at online <https://www.loc.gov/law/help/infrastructure-funding/infrastructure-funding.pdf>
- M. o. (2012). *Best Value Procurement Manual*. Minnesota: Minnesota Department of Transportation.
- Marrengula, V. N. (2012). *The Challenges and the way forward for the construction industry in Mozambique*. Maputo: International Growth Centre Mozambique.
- Mbabazize, N. F. (2016). Institutional factors influencing timely completion of road projects in Rwanda: Case of Government externally financed projects. *European Journal of Business and Social Sciences*, 5(01), 146 - 159.
- Mechegiaw. (2012). *Performance Study of Lowest Bidder Bid Awarding System in Public Construction Projects*. Adis Ababa: Addis-Ababa University. Mechegiaw, L. (2012, March). www.google.com. Retrieved February 15, 2016
- Minnesota Department of Transportation Office of Construction and Innovative Contracting. (2012). *Best Value Procurement Manual*. Minnesota: Minnesota Department of Transportation Office of Construction and Innovative Contracting.
- MnDoT Office of Construction and Innovative Contracting. (2012). *Best-Value Procurement Manual*. Minnesota: MnDoT Office of Construction and Innovative Contracting.
- Mukokona, T. M. (2016). Available at www.ippa.org/IPPC4/.../10LegalIssuepercent20inPublicProcurement/Paper10-3.pdf. Retrieved April Teuesday, 2017, from Available at www.ippa.org/IPPC4/.../10LegalIssuepercent20inPublicProcurement/Paper10-3.pdf

- NADB. (2003, January 5). *North American Development Bank*. Retrieved April Monday 3, 2017, from Available at www.nadb.org/pdfs/procurementdocs/Bid_Eval_Procedures.pdf
- National Council for Construction. (2016). *Infrastructure Development Symposium*. Lusaka: National Council for Construction.
- National Council for Construction. (2016). *NCC Registration Form*. Lusaka: National Council for Construction.
- National Road Fund Agency. (2015). *Annual Report*. Lusaka: National Road Fund Agency. National Road Fund Agency. (2015). *Annual Report*. Lusaka: National Road Fund Agency.
- NCC. (2003). Available at www.ncc.org.zm. Retrieved March Thursday 30, 2017, from Available at www.ncc.org.zm
- OECD. (2011). *Competition and Procurement, Key Findings*. Organisation for Economic Co-operation and Development.
- Opong, B. (. (2013). www.google.com. Retrieved February 15, 2016
- Opongetal. (2013). *A study on performance of contractors selected using the lowest bid evaluation method as a major criteria for government projects in Ghana*. Kumasi.
- OYEDELE, O. A. (2013). *Construction Project Financing for Sustainable Development of Nigerian Cities*. Abuja.
- Phillips, R. (2008). *PPP Infrastructure Research Centre for Contract, Laws and Regulations*. Washington DC: World Bank.
- Planning and Design Department. (2013). *RDA Policy and Procedures Manual*. Lusaka: Road Development Agency.
- PMI. (2013). *A guide to the project management body of knowledge* (Fifth Edition ed.). Atlanta: Project Management Institute. Inc.
- PMI. (2013). *A Guide To The Project Management Body of Knowledge* (Fifth ed.). Pennsylvania: Project Management Institute. Inc.
- PPOA. (2009). *Procurement Manual for works*. Nairobi: Government of the Republic of Kenya.
- Procurement Committee . (2015). *Technical Evaluation Report for the Tender for the upgrading of 47Km of the Mansa to Matanda (D102) Road in Luapula Province*. Lusaka: Road Development Agency.
- Procurement Department . (2015). *Technical Evaluation Report*. Lusaka: Road Development Agency.
- Procurement, R. D. (2015). *Tender for Construction/Upgrading/ Rehabilitation and Paving of selected Township roads in Zambia*. Lusaka: Tender for Construction/Upgrading/ Rehabilitation and Paving of selected Township roads in Zambia.
- Project Management Institute. (2013). *A guide to the Project Management Body of Knowledge (PM BOK Guide)* (Fifth ed.). Newtown Square, Pennsylvania: Project Management Institute, Inc.
- Puddephatt, K. a. (2012). *Benefits of transparency in Public Procurement for SMEs*. Cairo: Global Partners

Association.

RDA. (2015). *Road Sector Annual Work Plan*. Lusaka: Road Development Agency.

RDA Procurement Department. (2014). *Evaluation Guidelines*. Lusaka: Road Development Agency.

RDA Procurement Department. (2016). *Procedures Manual for Procurement Department*. Lusaka: Road Development Agency.

RDAPC. (2013). *Evaluation Guide (Goods and Works)*. Lusaka: Road Development Agency. Regulations, T. P. (2013, December 20). *Tanzanian Public Procurement Regulations*. Retrieved February 15, 2016

Road Development Agency. (2014). *Strategic Plan 2012 to 2016*. Lusaka: Road Development Agency.

Road Development Agencyb. (2015). *Report on the operations of the Road Development Agency*. Lusaka: Road Development Agency.

Road Development Agencyc. (2015). *Road Sector Annual Work Plan*. Lusaka: Road Development Agency.

RSAWP. (2017). *Road Sector Annual Work Plan*. Lusaka: Road Development Agency. Salleh, R. (2009). *Critical success factors of project management for brunei construction project: improving project performance*. Bandar Seri Begawan: Queensland University of technology.

Samwel, K. (2014). *Effects of local counterpart funding delay on procurement of donor funded projects*. Kumasi.

Semar, I. H. (2003). Available at www.tnrd.gov.in/buildings_design/Roads_Bridges.pdf. Retrieved April Friday, 2017, from Available at www.tnrd.gov.in/buildings_design/Roads_Bridges.pdf

Shane, J. S. (2012). *Construction Manager/ General Contractor Issue Identification*. Minnesota: Department of Civil, Construction, and Environmental Engineering Construction Management and Technology, Iowa State University.

Skitmore, Z. H. (1997). Criteria for Contractor Selection. *Construction Management and Economics*, 15 (1)(1), 19-38.

Tasmania, G. o. (2014, May 1). www.google.com. Retrieved February 15, 2016

The Government of the Republic of Zambia. (2003). *Government of Zambia Act No. 13 Of 2003*. Lusaka: Government of the Republic of Zambia.

The Public Roads Act No. 12 of 2002 (First ed.). (2002). Lusaka: Government of the Republic of Zambia.

Turner, A. G. (2003). *Designing of Household Sample Surveys*. Available at: https://unstats.un.org/unsd/demographic/meetings/egm/Sampling_1203/docs/no_3.pdf: United Nations Secretariat, Statistic Division.

UK. (2013-14). *Annual Report and Accounts*. Surrey: Williams Lea Group.

- UNCDF. (2013). *Procurement for Local Development, A guide to best practice in local government procurement in least developed countries* (First ed.). Geneva: Advanced Printing Services.
- URT. (2013). *The Public Procurement Regulations, 2013*. Dar es Salaam: Government Printer.
- Wang, R. a. (2014). Sustainable Construction through life cycle costings. *Journal of Building Performance*, 5 (1), 84-91.
- Warsame, A. (2013). Framework for quality Improvement of Infrastructure Projects. *Civil Engineering and Architecture*, 7(12), 1529-1539.
- WB. (2011). *Guidelines Procurement of Goods Works and Non-Consulting Services, Under IBRD Loans and IDA Credits & Grants by World Bank Borrowers*. World Bank.
- WB/IBRD. (2011). www.worldbank.org/intergrity. Retrieved March Friday 31, 2017, from <http://www.worldbank.org/intergrity>
- WBa. (2014). *Guidelines Procurement of Goods, Works and Non - Consulting Services under IBRD Loans and IDA Credits & Grants By World Bank Borrowers*. World Bank.
- Welliman, N. (2011). *Research Methods: The Basics* (First Edition ed.). New York: Routledge.
- Wide, C. A. (2012). *An Owners Guide to Project Delivery Methods* (First ed.). Washington DC: The Construction Management Association of America.
- Wolf, E. G. (2016). *Revision of Green Public Procurement Criteria for Road Design, Construction and Maintenance: Procurement Practice Guidance Document*. Seville, Spain: European Commission.
- World Bank Borrowers. (2012). *Procurement of Goods, Works and Non-Consulting Services under* . The International Bank for Reconstruction and Development/ World Bank.
- Yan, M.-R. (2015). Project-Based Market Competition and Public Implications for sustainable development in Building and Construction Sectors. *Open Acces Sustainability*(ISSN 2071-1050).
- Yugar-Arias, M. a. (2014). *Guidebook for Selecting Alternative Contracting Methods for Roadway Projects: Project Delivery Methods, Procurement Procedures, and Payment Provisions* (First ed.). Boulder, Colorado: University of Colorado.
- Zambia Public Procurement Act. (2011). *Zambia Public Procurement Act of 2008, Regulation of 2011* (First ed.). Lusaka: Government Printers.
- Zambia, G. o. (2011). *Statutory Instrument No. 63 of 2011, The Public Procurement Act of 2008*. Lusaka: Government Printer.
- Zambia, N. A. (2014). *Estimates on Government Expenditures*. Lusaka: Government Printers.
- ZPPA. (2011). *The Public Procurement Regulations* (1 ed.). Lusaka: ZPPA.

APPENDICES 1

THE UNIVERSITY OF ZAMBIA SCHOOL OF ENGINEERING DEPARTMENT OF CIVIL AND ENVIRONMENT ENGINEERING

RESEARCH TOPIC:

AN INVESTIGATION OF THE EFFECTS OF PROCUREMENT METHODS ON PROJECT DELIVERY IN THE ZAMBIAN ROAD SECTOR

The details presented in this structured questionnaire are meant to acquire data to be utilised ultimately for academic research work.

Kindly respond to the questions by either ticking or elaborating in your own words where applicable.

APPENDICES 2

INTRODUCTION

I am a student from the University of Zambia and pursuing a Master of Engineering in Construction Management (MEng - CM) programme. As part of the University's partial fulfilment for the award of MEng-CM programme, a student is required to carry out a Research Study on a particular topic related to the programme. In response to this requirement I have identified a topic entitled "An investigation of the effects of procurement methods on project delivery in the Zambian Road Sector".

In light of the above, I have designed this questionnaire to enable me collect data from the targeted respondents. The data being collected is key to the research study and respondents are therefore assured of confidentiality as they share their experiences and knowledge. Further, we request that you answer the questionnaire in the most truthful manner possible.

Thanking you sincerely for your co-corporation and invaluable time dedicated to answering this questionnaire.

Sincerely,

Sundie Silwimba

Student – Comp No: 2015130819

Cell No: +260 971 168 940/964 512 070

SECTION A – Demographical/ Biographical of Respondents

1. Are you a Government Department/Agency/Construction Company/Construction Regulation Body, Consultant or Others (Specify)? *(Indicate by ticking or elaborate where necessary)*

- A. Government Roads Department:
- B. Road Development Agency
- C. Contractor
- D. Consulting Organisation
- E. National Road Fund Agency
- F. National Council for Construction
- G. Zambia Public Procurement Authority

2. What is your gender?

- A. Male
- B. Female

3. How old are you?

- A. Less than 30
- B. Between 30 to 35
- C. Between 35 to 40
- D. Above 40

4. What is your professional background?

- A. Civil Engineering
- B. Geo-technique Surveying
- C. Quantity Surveying
- D. Road Project Procurement
- E. Contract Management
- F. Others (Specify).....

5. What is your highest academic qualification?

- Doctorate Degree Master's
- Degree Bachelor's Degree
- Diploma Certificate
- O level/ Grade Twelve

6. Do you have experience in the procurement of road construction projects?

Yes

No

7. If your answer in question six (6) above was “Yes), how many years?

a) Less than 5 years

b) Between 5 and 10 years

c) Between 10 and 15 years

d) Between 15 and 20 years

e) Above 20 years

8. Do you have any formal training in Procurement/ Chartered Institute of Purchasing and Supply (CIPS) program or course?

Yes

No

9. What management level do you belong to in your organisation?

a) Senior Management

b) Middle Management

c) Junior Management

d) Others (Specify):

10. Do you have a Procurement Plan in your organisation?

Yes

No

SECTION B - Procurement Methods (Please select by ticking your answers below)

1. Which procurement methods is used in your organisation for the procurement of construction projects?

a) Open bidding

b) National and International Bidding

c) Open Selection

d) Limited Bidding

e) Simplified Bidding

f) Direct Bidding

g) Force Account

h) Public-private participation (PPPs)

NB: You can select more than two methods

2. What procurement guidelines govern the construction industry in Zambia?

- a) Zambia Public Procurement Authority Guidelines
- b) RDA Procurement Guidelines for Works and Goods
- c) World Bank Guidelines for Loans and Borrowers
- d) African Development Bank Procurement Guidelines
- e) European Union Procurement Guidelines
- f) Asian Development Bank Procurement Guidelines
- g) All of the above
- h) I don't Know
- i) Others specify.....

..... NB: You can select more than two options

3. How was the performance of past projects with respect to the procurement methods used:

No.	Rate	Scale
a	Excellent	Above 85percent
b	Very Good	Between 70percent - 84percent
c	Good	Between 60percent - 69percent
d	Average	Between 50percent - 59percent
e	Below Average	Between 40percent - 49percent
f	Poor	Below 40percent

(Option) Please you may give reasons to clarify your selection below

.....
.....

4. Which procurement factors have an impact on successful delivery of construction of road/ general construction projects?

- a) Project/Procurement Management Training
- b) Release of project funds

- c) Working capital of a firm
- d) Presence of a Monitoring and Evaluation (M&E) Unit in an organisation
- e) Procurement Thresholds
- f) Contract Price as a selection criteria
- g) Procurement Regulations

5. What project delivery methods is used in your organisation?

- a) Traditional Method (By lump Sum)
- b) Traditional Method (By Measurement)
- c) Construction Management At-Risk d) Force Account
- e) PPPs

NB: You can choose more than two options

6. Is there a relationship between procurement method used and project delivery in the construction industry?

- a) Yes
- b) No
- c) Not sure

(Option) Please you may give reasons to clarify your selection below

.....

.....

.....

.....

.....

7. Do you think the procurement guidelines are adequate for the procurement of road/general construction projects?

- a) Yes
- b) No
- c) Not sure

(Option) Please you may give reasons to clarify your selection below

.....

.....

.....

.....

.....

8. Do consultants adequately monitor the road projects/ general construction works in Zambia?

- a) Yes
- b) No
- c) Not sure

(Option) Please you may give reasons to clarify your selection below

.....
.....

SECTION C – Structured Interview Guide (This section is to be used to interview technical experts from RDA, MHID, NRFA, NCC, EIZ and ZPPA)

S/N	Institution/ Organisation	Title of Technical Expert (s)	Interview Questions	Expert Responses
1	Road Development Agency (RDA)		<ol style="list-style-type: none"> 1. Which procurement methods are commonly used for the procurement of road projects? 2. Do you have a policy to train employees in procurement? 3. What is the maximum time-frame for the procurement of road projects? 4. Do you have situations where works contracts commence before finalization of the designs for the project 5. From your experience, is there a relationship between procurement method and project delivery? 6. Do you think Public Private Partnership (PPPs) can be a viable alternative to the traditional project delivery system in the Zambian Road Sector? 7. What are the factors which lead to delay in completion of road projects? 	
2	Ministry of Housing and Infrastructure Development (MHID)		<ol style="list-style-type: none"> 1. What policy measures has been put in place to expedite timely delivery of road projects in Zambia? 2. How do you rate the procurement process in the Zambian Road Sector? 3. Which procurement methods are you using in the implementation of road projects? 4. What are some of the factors causing delay of road projects in the Road Sector? 5. PPP model of procurement is being implemented in the Road Sector in Zambia. Do you think this is a viable alternative to the traditional project delivery method? 6. Are you receiving training in procurement or is it important in order to improve project delivery and timely procurement of projects? 	
3	National Road Fund Agency (NRFA)		<ol style="list-style-type: none"> 1. What is the mandate of your Agency in the Road Sector? 2. Which measures are you putting in place to broaden the revenue base for the mobilization of road fund? 3. How do you rate the current disbursement of funds to the road implementing Agencies? 4. What are the financial challenges causing delay in the procurement and project delivery of road projects in the road sector? 5. What should be done in order to improve the disbursement of road funds to the road implementing agencies and government departments? 	

S/N	Institution/ Organisation	Title of Technical Expert (s)	Interview Questions	Expert Responses
4	National Council for Construction (NCC)		<ol style="list-style-type: none"> 1. What is the mandate of your institution? 2. What is your assessment of the contractor's capacity in the Road Construction Industry? 3. Do you think the procurement methods being used to select road contractors have an effect on project delivery? 4. If your answer in question three (3) is yes, what has been your observations and findings? <p>What are some of the measures that you have put in place to ensure that credible contractor are registered under your institution?</p>	
5	Zambia Public Procurement Authority (ZPPA)		<ol style="list-style-type: none"> 1. What is the mandate of your institution? 2. Do you think the delayed project delivery has got something to do with the procurement methods being provided by your institutions to procuring entities in the road sector? 3. Is your institution undertaking any policy reforms in the provision of regulatory procurement guidelines? 4. If your answer is yes, what has necessitated the reforms and what exactly are you introducing to better the procurement regulations and guidelines? 5. Are the procurement thresholds serving the effective purpose of guiding procurement entities to select the ideal procurement method to obtain works, services and goods? 6. Do you carry out training programmes for procuring entities and does your institution assess individual procuring entities in order to check the adequacy or capacity of their staff? 	