CONTRACT MANAGEMENT OF HIGH-VALUE ROAD WORKS IN ZAMBIA: A CASE OF ROAD DEVELOPMENT AGENCY

BY

CHISALA TERRY MUTALE

A Dissertation submitted to the University of Zambia in Partial Fulfilment of the Requirements for the Award of Master of Science in Operations, Projects and Supply Chain Management

THE UNIVERSITY OF ZAMBIA

LUSAKA

2021

DECLARATION

I, **Chisala Terry Mutale**, do hereby declare that this work is my original work achieved through reading and research. This work has never been submitted to the University of Zambia or any other universities. All sources of data used and literature on related works previously done by others, used in the production of this dissertation have been duly acknowledged. If any omission has been made, it is not by choice but by error.

Signed: _____ Date: _____

COPYRIGHT

APPROVAL

This dissertation by **Chisala Terry Mutale** was approved as a fulfilment of the requirements for the award of the degree of Master of Science in Operations, Projects and Supply Chain Management.

Examiner 1	Signature	Date
_____	_____	_____
Examiner 2	Signature	Date
_____	_____	_____
Examiner 3	Signature	Date
_____	_____	_____
Chairperson Board of Examiners	Signature	Date
_____	_____	_____
Supervisor	Signature	Date
_____	_____	_____

ABSTRACT

The Government of the Republic of Zambia spends millions of kwachas every year for the development of road infrastructure. This was evidenced in the 2020 Budget were over ZMW10.5 billion was allocated for various road projects. With such sums of funds spent on road infrastructure, it is fundamentally important that road works are procured and managed efficiently and effectively to obtain value for money. The Road Development Agency (RDA) being the largest beneficiary of funds allocated for road infrastructure, a research was conducted at RDA on the contract management of high-value road works in Zambia. The research was triggered by the findings of the Office of the Auditor General on the poor management of contracts for road works in Zambia. The aim of the research was to develop a framework that addresses shortfalls in contract management of high-value contracts for road works at RDA in Zambia. Concurrent mixed methods research was the key methodological choice adopted for the study with the incorporation of philosophies such as critical realism, interpretivism and pragmatism; and approaches to theory development such as deduction, induction and abduction. Data was collected through questionnaires and interviews which were analysed using descriptive statistics and thematic analysis. Out of twenty-four (24) respondents, twenty-three (23) participated in the research which translated into a response rate of 95.8%. The results of the research showed that the top twenty-five (25) factors of poor contract management of high-value contracts for road works at RDA included delays in processing payments, awarding contracts without mobilising adequate funds, implementing contracts with improperly prepared design documents/statements of work, etc. In addition, it was discovered that the management of construction contracts at RDA comprised four (4) key stages namely; planning & design, development & award, mobilisation and implementation. Finally, based on the research results a contract management framework was developed which addresses limitations in the contract management of high-value contracts for road works at RDA.

Key words: *Contract management, High-value contracts, Road works*

ACKNOWLEDGEMENT

I would like to thank Dr. Erastus Misheng'u Mwanaumo for the guidance provided during the entire research process and the University of Zambia, Graduate School of Business for the support rendered.

Additionally, I would like to recognise and thank management at Road Development Agency (RDA) for granting me authority to undertake this research at RDA and all RDA employees that participated in this research. Without the organisation's approval and the participation of its staff, this study would not have been possible.

DEDICATION

This dissertation is dedicated to my wife, Mrs Bertha M. Mutale, and my daughters, Ms. Bulayo Mutale and Ms. Chishomyo Mutale, for the emotional and moral support bestowed from the onset of my master's degree studies to the end.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES, MAPS AND ILLUSTRATIONS

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

CIPS	Chartered Institute of Procurement and Supply
CMP	Contract Management Plan
CPM	Critical Path Method
EVM	Earned Value Management
IFAD	International Fund for Agricultural Development
KPI	Key Performance Indicator
PERT	Program Evaluation and Review Technique
RDA	Road Development Agency
UN	The United Nations
WB	The World Bank
WBS	Work Breakdown Structure

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND TO THE STUDY

The importance of good contract management in the road construction sector cannot be over-emphasised. Countries around the world spend billions of dollars annually to develop road infrastructure. Executing such high-value projects unfortunately comes with diverse challenges and risks, which when not managed well lead projects to incurring cost overruns, poor quality and extended contract durations.

Globally, cost overruns and delays are typical by-products of poor contract management of construction works. In Europe, Zidane and Andersen (2018) observed that poor contract management was a result of poor planning and scheduling; slow/poor decision-making processes; internal administrative procedures and bureaucracy within project organisations; resource shortages (labour, equipment); poor communication and coordination between parties; slow quality inspection process of the completed work; design changes during construction/change orders; sponsor/client/client lack of commitment and/or clear demands (goals and objectives); and late/slow/incomplete/improper design.

In one of the studies conducted in Africa by Sambasivan et al. (2017) contract management challenges were in relation to client interference, slow decision making and unrealistic contract duration imposed, construction method, improper planning, mistakes during construction stage, inadequate contractor experience. In addition, availability of quality materials, on-time delivery were cited. Furthermore, change orders, mistakes and discrepancies in contract documents, contract relationship-related causes, major disputes and negotiation, inappropriate overall organizational structure linking to the project and lack of communication between the parties were causative factors.

Similarly, according to a study conducted by Muya et al. (2013) on the major causes of cost escalation, schedule overruns and quality shortfalls in Zambian construction

projects, it was discovered that insufficient initial analysis of costs and change orders were the most causative factors of cost escalation. In addition to that, financial difficulties on the contractors' side were the most contributory factors of schedule overruns.

It was due to the prevalence of the aforementioned issues that a research on the Contract Management of High-value Road Works in Zambia was initiated. The research focused on the largest implementer of road projects in Zambia, Road Development Agency (RDA), which manages works contracts with an annual value of over ZMW3.0 billion per annum (RDA, 2016). The research investigated how high-value road construction projects are managed and the study explored the factors of poor contract management of road works in Zambia through RDA's lens.

Zambia has a road network of approximately 67,671 km, 22% of which is paved. The design of the road system resembles a "hub and spoke" format with Lusaka as the hub. Virtually all trunk highways go through Lusaka (Schweikert, 2018). The core road network, which consists of trunk (T), main (M), district (D), urban (U), primary feeder (PF) and primary tourist (TR) roads, is defined as the bare minimum road network required to be maintained continuously and on a sustainable basis so as to unleash Zambia's potential to promote self-development as the only approach to poverty alleviation for economic growth (Sectoral Development Strategies, n.d.).

Zambia's 67,671 km of classified road network covers the country relatively well, geographically. The classified road network comprises 3,116 km of Trunk Roads, 3,701 km of Main Roads, 13,707 km of District Roads, 5,597 km of Urban Roads, 14,333 km of Primary Feeder Roads (PFRs), about 15,000 km of Secondary Feeder Roads (SFRs) and Tertiary Feeder Roads (TFRs), 6,607 km of Park Roads and 5,000 km of Community Roads. This translates to a road density of 9.1 km per 100 km^2, which, by regional standards, would be categorized as the minimal network for good connectivity. The average total road density in Sub-Saharan Africa is 14.9 km per 100 km^2, and among eastern and southern African countries, classified road density is 28.4 in Kenya, 10.6 in Tanzania and 10.0 in Zimbabwe (Runji, 2017).

Zambia has made major progress with its main trunk road network. Despite relatively low road densities, analysis suggests Zambia's primary and secondary networks provide basic regional and national connectivity, linking the provincial capitals to Lusaka, and Lusaka to the main international border crossings. More than 80 percent of Zambia's paved road networks are in good or fair condition, on par with its middle-income neighbours and well ahead of the typical performance of resource-rich countries in Africa (Foster & Dominguez, 2010).

1.1.1 Organisations Supporting Road Infrastructure in Zambia

There are several institutions that are involved in developing road infrastructure in Zambia. The key ones include the Ministry of Local Government, Ministry of Transport and Communication, Road Transport and Safety Agency, National Council for Construction and Road Development Agency (RDA).

The Road Development Agency, of the institutions highlighted, is Zambia's leading agency in the development of road infrastructure. The National Road Fund Agency (2017) reported that in the 2017 budget, the Government of the Republic of Zambia allocated ZMW8,644,500,000 for road infrastructure projects of which approximately 31% was expended by RDA.

1.1.2 Road Development Agency

The Road Development Agency (RDA), the outgrowth of the Roads Department, is a strategic institution in the country operating as a statutory body under the Ministry of Housing and Infrastructure Development (MHID). RDA was established as a result of the Public Roads Act No. 12 of 2002. The mandate of RDA as provided by the Act is to provide for the care, maintenance and construction of public roads in Zambia; to regulate maximum weights permissible for transmission on roads. The RDA is mandated to deliver an unparalleled public value proposition of managing the entire road network (Road Development Agency, 2019b).

In October 2012, the Government launched the Link Zambia 8000 Project which was divided into three (3) phases which would result in the construction of a total of 8,000 km of roads. The first phase of the project would cover 2,290 km at an estimated total cost of about US$1.5 billion; the second phase would cover 3,049km of the road network worth approximately US$2.2 billion and the third phase would involve upgrading of 2,862 km of the road network at a cost of about US$1.76billion (Road Development Agency, 2019b).

Further, in 2013, the Government through the Road Development Agency (RDA), launched the Pave Zambia 2000 Programme. In this programme, the Government was to rehabilitate and construct 2,000 km of urban roads using concrete paving bricks technology. It was anticipated that the cost of construction and maintenance would be lower than the conventional road construction methods of asphalt and surface dressing. The project was expected to take five (5) years at a cost ZMW1.5 billion.

The management and planning of maintenance and rehabilitation activities take a coordinated approach between the RDA and the other stakeholders in the road sector. The RDA holds joint consultation with all the relevant stakeholders in the sector. This includes the Ministry of Local Government (MLG), Ministry of Transport and Communications (MTC), the Road Transport and Safety Agency (RTSA), National Council for Construction (NCC), National Road Fund Agency (NRFA) and the Ministry of Finance (MoF) among others (Road Development Agency, 2019b).

1.1.3 Importance of Road Infrastructure

Road infrastructure is key to national development as it facilitates growth in productive sectors such as agriculture, mining, manufacturing and tourism. In order to spur socio-economic development in the various key sectors, the Government of the Republic of Zambia, through RDA, has been strategically investing in the construction, upgrading, rehabilitation and maintenance of roads.

The RDA is committed to this objective, which will help create decent jobs, develop skills and uplift living standards of rural communities through the provision of an efficient road network. This commitment was demonstrated in 2016 through the continued implementation of various road infrastructure programmes and projects such as Link Zambia 8000, L400, Pave Zambia 2000 and other major rehabilitation and maintenance projects (Road Development Agency, 2016).

1.2 STATEMENT OF THE PROBLEM

There is a challenge in the management of high-value contracts for road works at the Road Development Agency (RDA) in Zambia. Contracts are implemented without thoroughly prepared engineering designs, confirmation of availability of funds, etc. (Auditor General, 2017). This was evidenced in November 2018 were only ZMW1,230,721,923 was paid to various contractors and consultants out of certified interim payment certificates and fee notes valued at ZMW12,140,479,049 (Auditor General, 2018). Additionally, it was observed with the Ndola-Kitwe, Kitwe-Chingola, and Chingola-Solwezi road projects that the total value of the contracts increased from the original combined value of ZMW2,481,725,819 to ZMW3,165,970,476 (Auditor General, 2017a).

This situation has negatively affected the execution of works contracts and, ultimately, the development of road infrastructure in Zambia. The ramification arising from this problem is that poor contract management leads to loss of millions of funds allocated to road infrastructure which consequently affects national development influenced by good road infrastructure. Therefore, a study which developed a framework for contract management of high-value road works was undertaken.

1.3 AIM OF THE STUDY

The purpose of this research was to develop a framework that addresses shortfalls in contract management of high-value contracts for road works at Road Development Agency in Zambia.

1.4 THE OBJECTIVES OF THE RESEARCH

(i) To understand how contract management of high-value contracts for road works is executed by Road Development Agency (Interpretivism; descriptive and evaluative study).

(ii) To explore the factors that emanate from/lead to poor contract management of high-value contracts for road works which negatively affect the schedule, quality and cost at Road Development Agency (Critical realism; exploratory study).

(iii) To develop a framework that can be used to effectively manage high-value contracts for road works at Road Development Agency (Pragmatism; exploratory and evaluative study).

1.5 RESEARCH QUESTIONS

(i) How are high-value contracts for road works in Zambia managed by the Road Development Agency? (2012 – 2018)

(ii) What are the factors that emanate from/lead to poor contract management of high-value contracts for road works at Road Development Agency? (2012 – 2018)

(iii) What framework can be recommended to address shortfalls in contract management of high-value road works at Road Development Agency?

1.6 SIGNIFICANCE OF THE STUDY

In the 2019 Budget, the Government of the Republic of Zambia allocated approximately ZMW6.5 billion for road infrastructure through such projects as the Link Zambia 8,000 Project. This represented about 7.5% of the budget (National Assembly of Zambia, 2018). Additionally, in the 2020 Budget ZMW10,552,606,147 was allocated for road infrastructure which represented approximately 9.95% of the Budget (National Assembly of Zambia, 2019). As road infrastructure is a noteworthy component of the Budget, it is imperative that funds allocated for such activities are used prudently because misuse would lead to loss of millions of Kwachas.

According to research conducted by Cummins (2012) of the International Association for Contract & Commercial Management (IACCM), poor contract management costs organisations about 9% of the bottom line. Poor contract management may lead to delays, cost overruns and the scope of contract not being achieved.

The Road Development Agency manages works contracts with an annual value of over ZMW3.0 billion and expends over 35%, on average, of the yearly allocation from the National Budget for road infrastructure (RDA, 2016). According to 52 sampled projects, RDA lost ZMW141,590,074 in interest claims due to delayed payments. This was a case in point of loss of public funds due to poor contract management (Auditor General, 2017b). Therefore, it is of paramount importance that RDA implements a framework that addresses shortfalls in contract management of high-value road works.

1.7 SCOPE AND LOCATION OF RESEARCH

This research focused on contract management of high-value road works at the Road Development Agency in Zambia from 2012 to 2018, from a client's perspective (i.e. RDA), with the aim of developing framework that addresses shortfalls in contract management of high-value contracts. According to the Public Procurement Regulations (2011), high-value works contracts are those contracts with a value above ZMW50 million. Therefore, the research concentrated on contracts for road works with contract sums above ZMW50 million.

1.8 OVERVIEW OF METHODOLOGY

A brief overview of the methodology that was used in this research is as shown in the table below.

Table 1: Overview of Methodology

Research Objective 1	
Methodological Choice	Mono method qualitative

Techniques and Procedures	1. Sampling - Non-probability sampling techniques - Purposive sampling 2. Data collection - Semi-structured interviews 3. Data analysis - Thematic analysis
Research Objective 2	
Methodological Choice	Mono method quantitative
Techniques and Procedures	1. Sampling - Target population = sample size 2. Data collection - Structured questionnaires 3. Data analysis - Descriptive statistics using MS Excel
Research Objective 3	
Methodological Choice	Mixed methods - Concurrent mixed methods research
Techniques and Procedures	1. Sampling - Probability sampling techniques (Target population = sample size) - Non-probability sampling techniques (Purposive sampling) 2. Data collection - Structured questionnaires - Semi-structured interviews 3. Data analysis - Descriptive statistics - Thematic analysis

1.9 OPERATIONAL DEFINITIONS

Term	Definition
Risk Owner	An individual responsible for the management, monitoring and control of all aspects of risks assigned to them (Axelos, 2017).
Risk Actionee	An individual appointed to address a risk (Axelos, 2017).
Client	Employer (World Bank, 2018)
Statement of Work	Specifications, requirements, designs for the execution of works (World Bank, 2018).
Work Breakdown Structure	Breakdown of all activities for a particular task or process (World Bank, 2018).
High-value Road Works	Contracts with a value of more than ZMW50 million (Public Procurement Regulations, 2011).

1.10 ETHICAL CONSIDERATIONS

The following ethical issues were given due consideration and applied in this research:

(i) Informed consent

The respondents were given Participant Information Sheets which contained information about the research. The respondents were advised that it was not mandatory for them to take part in the research if they did not wish to do so and that choosing to participate could not affect their job or job-related evaluations in any way. Furthermore, the respondents were informed that they could stop participating in the research at any time they wished without their job being affected.

The participants were given an opportunity to ask questions about the research, and all the questions asked by the participants were answered

correctly and to the best of the researcher's ability. None of the respondents were coerced into giving consent, and the consent was given freely and voluntarily.

(ii) Respect for anonymity and confidentiality

The information obtained was used to understand factors that led to poor contract management of high-value contracts, how contracts for high-value road works were managed by RDA, and to recommend a framework that could be used to address shortfalls in contract management of high-value road works at RDA.

The information that was collected from this research project was kept private. Any information about the respondents was coded instead of using the participants' names. Only the researcher knew what the codes were, and that information was kept under lock and key. It was not shared with or given to any third party.

1.11 SUMMARY

This chapter looked at the background to the research, statement of the problem, aim of the study, the objectives of the research and research questions. Additionally, the significance of the study, scope and the location were the research took place from was discussed.

CHAPTER TWO

LITERATURE REVIEW

2.0 LITERATURE REVIEW

This chapter showcases the literature that was reviewed in relation to the objectives of the research, research questions and statement of the problem.

2.1 DEFINITIONS OF CONTRACT MANAGEMENT

Contract management is the process of systematically and efficiently managing contract development, implementation, and administration for maximizing financial and operational performance and managing inherent risk. Contract management encompasses the life cycle of a contract and involves many stakeholders including, but not limited to the contract manager, the client and the supplier (Government of Canada, 2015). This definition describes contract management as a process that incorporates pre-award and post-award activities. Pre-award activities if not planned and implemented well have a negative impact on post-award contract activities.

Additionally, the Chartered Institute of Procurement and Supply (CIPS) (2020) states that "Contract life cycle management is the process of systematically and efficiently managing contract creation, execution and analysis for maximising operational and financial performance and minimising risk". The World Bank (2018) focusing on the contract implementation stage defines contract management as a process of actively managing contract implementation to ensure the efficient and effective delivery of the contracted outputs and/or outcomes.

According to the International Association for Contract and Commercial Management (IACCM) contract management is (IACCM, 2020):

> A discipline that supports commercial management through the preparation, negotiation, implementation and oversight of legally enforceable performance commitments and risk positions, both outbound (to the market) and inbound

> (from the market). It converts commercial policies and practices and technical capabilities into specific terms and conditions that are offered to or required from its suppliers, customers or business partners, ensuring compliance or gaining approvals for non-compliance. Through active monitoring of performance needs and outcomes, contract management informs commercial management with regard to actual and required commitment capabilities, together with their financial and risk impact.

The IACCM ratifies the view that contract management should occur before execution or signature; during review, drafting and negotiation; after signature; throughout implementation and until close-out (IACCM, 2020). The IACCM definition emphasises the importance of managing risks to achieve optimal results as well as the need for contract managers to possess the required technical, operational and commercial skills and expertise to manage contracts. Additionally, successful contract management involves successfully managing the relationship between the contractor's organisation and the procuring entity as a whole.

In the United Kingdom, a high-level corporate consultancy known as Developing People Serving the Supply Chain (DPSS Consultants, n.d.) has proposed what is described as "the more modern, enlightened and progressive definition of contract management". According to DPSS:

> Contract management is a process by which a contractor is motivated, enabled and empowered to achieve extra value added, over and above that which has been specified originally and assessable against criteria in the original contract. This extra added value can include process innovation, cost reduction and service improvement. The emphasis in this definition is on the contractor as an asset rather than a liability. Another key issue is that the process should be to the benefit of both parties.

The definition proposed by DPSS Consultants emphasises the need to foster a positive relationship with a contractor that will lead to a win-win outcome for both the procuring entity and the contractor (DPSS Consultants, n.d.). The strategy for achieving such an outcome includes motivating the contractor so that the procuring

entity may at the very least obtain the value that is contractually provided for, and possibly extra value beyond what is contractually stipulated.

2.2 POOR CONTRACT MANAGEMENT OF CONSTRUCTION WORKS

Based on the definitions of contract management above, poor contract management entails not systematically and efficiently managing contract creation, execution to maximise financial performance and minimise risk. This culminates in contract implementation not being actively managed to ensure the efficient and effective delivery of the contracted outputs and/or outcomes. Furthermore, poor contract management makes the contractor(s) demotivated, not enabled and empowered to achieve extra added value, over and above that which has been specified originally and assessable against criteria in the original contract. The following sections show literature reviewed from a global perspective using the funnel approach (i.e. that is narrowing literature from the global perspective to the local perspective in order to address the specific objectives of the research). The different continents were selected based on studies done in those continents that relate to contract management of road works and other related infrastructure.

2.2.1 Factors that emanate from/lead to Poor Contract Management of Construction Works in Europe

The construction industry is one of the major industries which contributes significantly to the economic growth of any country (Wong and Vimonsatit, 2012). Schedule and cost overruns are among the significant problems of the construction industry. There are many factors contributing to cost overruns and delays in construction contracts. Cost overruns and delays occur in most construction projects, and their magnitude varies from project to project depending on the scope and complexity (Wong and Vimonsatit, 2012).

Globally, cost overruns and delays are typical by-products of poor contract management of construction works. In general, the efficient management of construction works can be measured alongside different aspects related to both the

output of the work (e.g., the quality of the work, its capability of satisfying the objectives and the needs for which it has been carried out, etc.) and the process of the execution of the contract, which is key to the realisation of the output (Guccio et al., 2012).

Cost overruns are the additional costs incurred by contracting authorities above those agreed on in the contract. Guccio et al. (2012) enumerated a number of factors that have been considered as drivers of cost overruns, in the literature. First, it has been observed that when complex works are procured, there is an unavoidable degree of uncertainty related to events that may occur during the execution of the contract, which may cause a difference between what is planned and what is actually realized or needs to be realized. Cost overruns, therefore, can be considered a consequence of poor contract management for example, in the planning stage where poor initial design requires substantial changes in the execution stage. However, in certain instances cost overruns are justified as a result of unforeseen circumstances.

Delays refer to completing the contracted works beyond the schedule stipulated in the contract. The presence of delays may imply cost overruns, when the delay is representative of problems connected with the realisation of the original project, and additional works are required. However, there can be delays without cost overruns. Moreover, delays are representative of other costs that are not included in cost overruns for the contracting authorities.

Zidane and Andersen (2018) stated that the factors that emanate from/lead to poor contract management in the Norwegian construction industry are: poor planning and scheduling; slow/poor decision-making process; internal administrative procedures and bureaucracy within project organisations; resource shortages (labour, equipment); poor communication and coordination between parties; slow quality inspection process of the completed work; design changes during construction/change orders; sponsor/client/client lack of commitment and/or clear demands (goals and objectives); late/slow/incomplete/improper design; office issues; and users' issues.

Additionally, it was concluded that the top 10 universal poor contract management factors that impact on schedule are: design changes during construction/change orders; delays in payment of contractor(s); poor planning and scheduling; poor site management and supervision; incomplete or improper design; inadequate contractor experience/building methods and approaches; contractor's financial difficulties; sponsor/client/client's financial difficulties; resource shortages (labour, equipment); and poor labour productivity and shortage of skills (Zidane & Andersen, 2018).

2.2.2 Factors that emanate from/lead to Poor Contract Management of Construction Works in Asia

One of the significant challenges in the construction industry is delays. Delays occur in most construction projects and differ from project to project in terms of complexity and magnitude. Therefore, it is imperative to identify the causes of poor contract management in order to mitigate delays in construction projects.

In Saudi Arabia, a study conducted by Assaf et al. (1995) reviewed that the most important poor contract management factors impacting on the project schedule in construction projects, according contractors, were preparation and approval of drawings. From the perspective of architects and engineers, cash flow problems during construction, management of relationships with stakeholders and slow decision-making processes on the part of the client. Finally, the clients pointed out faulty designs, inadequate and incompetent staff as contributory factors to poor contract management.

Ogunlana and Promkuntong (1996) in their comparison of causes of poor contract management in the construction industry in Bangkok, Thailand summarised the causes in three ways, namely problems/shortages in the supply of resources, client/consultant-related problems and problems as a result of the contractors' incompetence/inadequacy. Similarly, in Lebanon's construction industry, it was discovered that clients were particularly concerned with financial issues; contractors perceived contractual relationships as being vital; and consultants considered project

management issues to be the most crucial to managing contracts effectively (Mezher & Tawil, 1998).

Al-Momani (2000) investigated the causes of poor contract management on 130 public projects in Jordan and concluded that the main factors of poor contract management in the construction of public projects are attributed to designers, user changes, weather, site conditions, late deliveries and economic conditions. In Malaysia, Ahmed et al. (2003) and Alaghbari et al. (2007) identified factors that emanate from/lead to poor contract management from two perspectives such as internal factors (i.e. clients, contractors and consultant's responsibility) and external factors.

First, client-related factors included lack of work knowledge, inefficient decision making, lack of coordination with contractors, contract modifications (replacement and addition of new work to the project and change in specifications, and financial problems (delayed payments, financial difficulties and economic problems). Second, consultant-related factors included absence of consultant's staff on site, lack of experience on the part of the consultant, inexperienced consultant's staff, slowness in giving instructions and incomplete documents. Third, contractor-related factors were delay in delivery of materials to site, shortage of materials on site, defective work, inexperienced labour, shortage and low productivity of labour and unavailability of equipment on site. Lastly, external factors related to lack of materials and equipment/tools on the market, poor weather and site conditions, poor economic conditions, changes in laws and regulations, transportation delays and external work due to public agencies.

Alaghbari et al. (2007) also pointed out that the top ten factors that emanate from/lead to poor contract management in Malaysia, thereby affecting the contract schedule were client's financial difficulties and economic problems, contractor's financial problems, supervision too late and slowness in making decisions by the consultant, consultant's slowness in giving instructions, lack of materials on the market (external), poor site management (contractor), construction mistakes and defective work (contractor),

delay in delivery of materials to site (contractor), slowness in making decisions (client), lack of consultant's experience and incomplete documents (consultant).

2.2.3 Factors that emanate from/lead to Poor Contract Management of Construction Works in Middle East

Keeping construction projects within estimated costs, quality and schedules requires sound strategies, good practices, and careful judgment. However, to the dislike of clients, contractors and consultants many projects experience extensive delays and thereby exceed initial time and cost estimates (Enshassi et al., 2009).

Poor contract management has contributed to the high cost of construction in many countries for many years (Enshassi et al., 2009). Schedule overrun is the delay beyond planned completion dates traceable to the contractors (Kaming et al., 1997) whereas Cost overrun is the excess of actual cost over budget. Cost overrun is also sometimes referred to as "cost escalation", "cost increase", or "budget overrun" (Enshassi et al., 2009).

Koushki et al. (2005) studied the factors of poor contract management in the construction of private residential projects in Kuwait and discovered that the amount of time-delays and cost-increases were greater when the total cost of a residential project was higher. A major factor contributing to the time-delay and cost-increase was the inadequacy of money and time allocated to the design phase. On one hand, the three main causes of poor contract management affecting time were the number of change orders, financial constraints and clients' lack of experience in construction. On the other hand, the three main causes of poor contract management affecting cost were contractor-related and material-related problems and, again, clients' financial constraints.

Lo et al. (2006) in Hong Kong found that respondents thought that construction delays caused by unforeseen ground conditions, poor site management and supervision by consultants, environmental restrictions, exceptionally low bids, and client variations

were highly significant and ranked them in the top ten. Four cost-related poor contract management factors that cause cost overruns identified from the existing research findings of Kaming et al. (1997) were design changes, inadequate planning, unpredictable weather conditions, and fluctuations in the cost of building materials.

Frimpong et al. (2003) studied 26 cost-related poor contract management factors the in construction of ground water projects in Ghana. According to the contractors and consultants, monthly payments difficulties was the most important cost overrun factor, while clients ranked poor contractor management as the most important factor. Despite some difference in viewpoints among the three groups surveyed, there is a high degree of agreement among them with respect to their ranking of the factors. The overall ranking results indicate that the three groups felt that the major factors that can cause excessive project cost overruns in developing countries are poor contractor management, monthly payment difficulties, material procurement, poor technical performances, and escalation of material prices.

In the Gaza Strip, Enshassi et al. (2009) grouped factors that emanate from/lead to poor contract management of construction projects into 12 categories:

(i) Project-related: Discrepancies between contract documents, Inflexibility of donor in giving appropriate periods for project implementation, Donor own policy in implementation methods and characteristics of the project, etc.

(ii) Contractors' responsibilities: Inappropriate type of contract used (traditional, design and-build, etc.), Poor communications and misunderstanding, Low harmony between technician team of contractor and consultant, Equipment allocation problems, Lack of protection of complete work, often changing sub-contractor company, etc.

(iii) Consultants' responsibilities: Low quality of materials, Delay of materials approval by consultant, waiting time for approval of tests and Poor inspection, Slowness in giving instructions, Centralization of decision-making process from consultant party, etc.

(iv) Clients' responsibilities: Contract modifications (replacement and addition of - new work to the project and change in specifications), Unrealistic contract

durations imposed by the client, Lack of unified system for contracts, general conditions, and specifications of projects, etc.

(v) Professional management: Poor judgment in estimating time and resources, Poor provision of information to project participants, Inadequate construction planning, Inadequate managerial skills for all parties, lack of follow up for the project schedule and absence of continuous tracking, etc.

(vi) Design and documentation: Incomplete drawings, Poor documentation and no detailed written procedures, Lack of designer's experience, unclear specifications, Delays in design work/lack of design information, slow drawing revision and distribution, etc.

(vii) Materials: Lack of materials in markets, Shortage of construction materials at site, Delay of material delivery to site, No adherence with materials standards, Poor material handling on site, Inappropriate/misuse material, etc.

(viii) Execution: Inappropriate construction methods, Poor equipment choice/ineffective equipment, highly bureaucratic organization, etc.

(ix) Labour and equipment: Shortage of equipment at site, Shortage of site workers, skilled labour shortage, Equipment availability and failure, inaccurate prediction of equipment production rate, unskilled operators, etc.

(x) Contractual relationship: Inappropriate overall organizational structure linking all parties to the project, Major disputes and negotiations, inappropriate type of contract used (traditional, design and-build, etc.).

(xi) Government relations: Building regulations, Bureaucracy in government agencies, Slow permits by government agencies.

(xii) External factors: Strikes, external or internal military action and border closures, Poor economic conditions (currency, inflation rate, etc.), Poor site conditions (location, ground, etc.), Changes in laws and regulations, etc.

A successful construction project is said to be one that has accomplished its technical performance, maintained its schedule and remained within budgetary provision (Frimpong et al., 2003). However, most construction projects experience delays which are usually accompanied by cost overruns. These have a debilitating effect in terms of adversarial relationships, mistrust, litigation, arbitration, cash flow problems and a general feeling of trepidation towards other stakeholders (Ahmed et al., 2003).

Al-Najjar (2008) concluded that the most significant factors that lead to poor contract management causing time overrun in building construction projects in Gaza Strip as perceived by contractors were: strikes, Israeli attacks and border closures, lack of materials in markets, shortage of construction materials at site, delay of material delivery to site, insufficient cash during construction, poor site management, poor economic conditions (currency, inflation rate, etc.), shortage of equipment at site, equipment and tool shortage on site, and client delay in freeing the contractor financial payments.

Odeh and Battaineh (2002) found that contractors and consultants agreed that client interference, inadequate contractor experience, financing and payments, labour productivity, slow decision making, improper planning, and subcontractors are among the top ten most important factors that emanate from/lead to poor contract management in Jordan.

Al-Momani (2000) investigated causes of poor contract management leading to delay in 130 public building projects constructed in Jordan during the period of 1990-1997. He presented regression models of the relationship between actual and planned project duration for different types of building facilities. He concluded that the main causes of poor contract management were related to designer, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity.

In the same vein, in Saudi Arabia Assaf and Al-Hejji (2006) discussed poor contract management factors in large construction projects and identified seventy-three factors that affect the project schedule. They concluded that the most common factor of poor contract management that affects the schedule identified by contractors, consultants and clients was ‘‘change orders’’.

In Kuwait, a study was conducted on factors that cause of time and cost overruns in construction projects (Koushki et al., 2005). A person-interview survey of 450

randomly selected private residential project clients and developers had been done. They concluded that the main causes of delay-related poor contract management factors were change orders, clients' financial constraints, and clients' lack of experience. They provided the following recommendations on how to minimize time delays; clients should ensure availability of adequate funds, allocation of sufficient time and money at the design phase, selection of competent consultants and reliable contractors to execute the works.

The result of an investigation into the main factors which cause construction delay in Iran revealed that most of construction projects in Iran were subject to poor contract management (Asnaashari et al., 2009). Financial constraints, shortage of resources, high inflation rate, delay in payments, and disputes in the supply chain were top causes of poor contract management in the Iranian construction industry.

Faridi and El-Sayegh (2006) studied the poor contract management factors in construction projects in United Arab Emirates (UAE) and concluded that 50% of construction projects encounter delays and are not completed on time. The highest-ranking factors of poor contract management causing construction delays are approval of drawings, inadequate early planning and slowness of the clients' decision-making processes.

Furthermore, a survey was conducted poor contract management factors affecting time overruns in the construction industry in Lebanon from the viewpoint of clients, contractors and architectural/engineering firms. It was found that clients had more concerns with regard to financial issues; contractors regarded contractual relationships as the most important, while consultants considered project management issues to be the most contributory factors to poor contract management (Mezher & Tawil, 1998).

2.2.4 Factors that emanate from/lead to Poor Contract Management of Construction Works in Africa

In Tanzania, a study conducted by Sambasivan et al. (2017) showed that factors that lead to poor contract management can be categorised as follows:

a) Client-related factors: Finance and payment of completed works, client interference, slow decision making and unrealistic contract duration imposed.
b) Contractor-related factors: Sub-contractors, site management, construction method, improper planning, mistakes during construction stage, inadequate contractor experience.
c) Consultant-related factors: Contractor management, preparation and approval of drawings, quality assurance, waiting for approval of tests and inspection.
d) Material-related factors: Availability of material, availability of quality materials, shortage in material, on-time delivery.
e) Labour- and equipment-related factors: Low labour productivity, lack of appropriate skills, equipment availability, inadequate equipment.
f) Contract-related factors: Change orders, mistakes and discrepancies in contract document, contract relationship-related causes, major disputes and negotiation, inappropriate overall organizational structure linking to the project, lack of communication between the parties.
g) External-related factors: Weather condition, regulatory changes, problem with neighbours, unforeseen site conditions.

Similarly, according to a study conducted by Muya et al. (2013) on the major causes of poor contract management leading to cost escalation, schedule overruns and quality shortfalls in the context of the Zambian construction industry, insufficient initial analysis of costs and change orders are the most causative factors of cost escalation and financial difficulties on the contractors' side are the most contributory factors of schedule overruns.

In Ghana, a study on the causes of government construction projects failure revealed a number of management and administrative issues that cause Ghanaian government construction projects to fail. The factors included poor planning, lack of monitoring,

project team formation, wrong project scope, commitment to project (by management), refusal of consultants to certify work for next phase of project, project management technique/framework/models, procurement processes, communication, management practices, poor supervision, bureaucracy, corruption and delays in payments (Damoah & Kumi, 2018).

One of the results of poor contract management is cost overrun. Cost overrun of construction projects has been a key concern for all stakeholders of projects for many decades now. Many studies have been done in the past and continue to be done currently to understand the underlying causes of construction project cost overruns (Asiedu & Adaku, 2020). A lot of factors have been considered to cause construction projects cost overruns.

In Ghana, Asiedu and Adaku (2020) summarised the factors of poor contract management that impact on cost as follows:

a) Poor contract planning and supervision: This factor points to the technical incompetence of the project team with regard to clear understanding of the scope of works, project schedule management, realistic cost forecasting and estimation and baseline planning for effective controlling and monitoring over the project execution period. An appropriate reporting and feedback process is essential in ensuring effective project monitoring and controlling.
b) Change orders: Changes in the design protocols and processes can engender bespoke problems. A change order is an "indication that something on a construction project has not gone as planned" and may result in either additional cost or time or both. Change orders issued to correct or modify the original design or scope of work during construction are inevitable for most projects.
c) Weak institutional and economic environment of projects: The weak institutional environment of projects represents the inadequate institutional capacity, particularly human resource, as well as the inefficiencies embedded in the processes of delivering public sector construction projects. The human capacity required to deliver successful public sector construction projects is not only deficient among contractors and consultants but also client representatives such as

procurement officers within the various public procurement entities. The success of a project depends, to some extent, on the technical competence of the project team.

d) Lack of effective coordination among the contracting parties: Communication gaps over the design phase between consultants and the client can deny the consultants vital information, which can lead to the underestimation of cost, and excessive change orders during the execution phase. The need for a comprehensive design brief, client's proposed cash flow outlook, client's financial contingency plans, specifications, contract type, the urgency of the project and expected completion date, among others, need to be thoroughly discussed and all ambiguities clarified before kick-starting construction projects.

2.3 POOR CONTRACT MANAGEMENT OF CONSTRUCTION WORKS AT ROAD DEVELOPMENT AGENCY

The Road Development Agency manages works contracts with an annual value of over ZMW3.0 billion and expends over 35%, on average, of the yearly allocation from the National Budget for road infrastructure (Road Development Agency, 2016). According to the audit of road and related infrastructure under the Road Development Agency (RDA) for the period October 2012 to December 2015 conducted by the Office of the Auditor General, the following were some of the challenges observed related to the poor management of high-value road works:

(1) Failure to Pay Contractors on Time

There were delays in settling of interim payment certificates which resulted in incurring interest and standing time charges. In some cases, commencement orders were issued prior to the settlement of advance payments. Once a contractor's claim for payment was certified by the supervising consultant, RDA was obliged to settle the claim within twenty-eight (28) to fifty-six (56) days failure to which the contractor was entitled to charge interest on the outstanding claim. An amount of ZMW3,572,567,083 relating to a sample of fifty-two (52) projects had been certified out of which ZMW2,262,026,893 had been paid leaving a balance of ZMW1,777,790,549 outstanding for periods ranging from 28 to more than 400 days resulting in contractors and consultants charging

interest amounting to ZMW141,590,074 as of December 2016 (Office of the Auditor General, 2017b).

(2) Late Engagement of Supervising Consultants

There were delays in the engagement of supervising consultants for periods ranging from one (1) to twelve (12) months. Thus, projects were implemented without adequate supervision. During the period under review, thirty-two (32) contractors with a contract sum of ZMW11,675,882,234 were engaged and commenced work prior to the engagement of supervising consultants. In some cases, supervising consultants were engaged as late as twenty-two (22) months after the commencement of works. In this respect, contractors executed works without supervision (Office of the Auditor General, 2017b).

(3) Lack of Detailed Engineering Drawings

Most projects commenced without detailed road engineering designs resulting in understatement of bills of quantities which consequently led to increases in contract sum once the drawings were in place. This further led to delayed completion of projects. Standard Engineering practice requires that detailed engineering road designs which include pavement and geometric designs, environmental management, drawings and estimated construction costs are put in place before tendering and construction. The purpose of designs is to comprehensively identify the scope and cost of the project and eliminate inappropriateness, inefficiency, error, omission, fault or other defects during implementation and in use. The designs are also a major input in the tendering process (Office of the Auditor General, 2017b).

In order for the contractors to be able to execute works correctly, RDA was required to provide them with detailed engineering road designs. However, contrary to this requirement, twenty-nine (29) projects with initial contract sums of ZMW8,011,422,391 were procured and commenced without detailed designs. The absence of detailed road engineering designs led to preparation of inaccurate BOQs which in turn led to variations in the contracts, re-scoping of works and extension of time thereby delaying the completion of projects (Office of the Auditor General, 2017b).

(4) Change of Key Personnel without RDA Approval

It was observed that contractors changed key personnel without approval from RDA. Although the contracts provided for the contractors not to change key personnel without approval from RDA, it was observed that on nine (9) projects, contractors changed key personnel without approval from RDA. There were no punitive measures provided in the contracts for the breach of this requirement (Office of the Auditor General, 2017b).

(5) Single Sourcing (Direct Bidding)

Although, RDA obtained authority to single source from ZPPA, most projects in question did not meet the criteria for single sourcing. The RDA Modalities and Guidelines on 20 percent Subcontracting states "It is Government Policy that a minimum of 20 percent of the works on all road contracts awarded by the Agency would be executed by Zambian-owned companies in line with the shareholding structure specified in the Citizens Economic Empowerment Act No. 9 of 2006 whose overall goal is to contribute to sustainable economic development, by building capacity in Zambian-owned companies." The 20 percent subcontracting policy is only applicable to all road contracts exceeding K30 million." There was no evidence that the selection and recommendation for award of tenders to subcontractors on all the contracts followed a competitive and transparent process (Office of the Auditor General, 2017b).

(6) Over-Procurement of Projects

It was observed that RDA procured works at the unconstrained budget as opposed to the approved budget by Parliament. A comparison of the approved annual budget and the unconstrained budget for the period under review revealed that although the Agency received actual funds equivalent to 92 percent of the annual work plan budget, the budget was significantly small compared to the unconstrained budget. For example, in 2015, the unconstrained budget was ZMW10,956,976,000 while the approved budget was ZMW6,624,938,774. The actual funding was K6,318,438,922 which was 95 percent of the approved budget, but only 58 percent of the unconstrained budget. It was however observed that roads were procured at unconstrained levels thereby resulting in

cash flow problems which in turn resulted in interest and standing time claims (Office of the Auditor General, 2017b).

(7) Variations

There were variations on various contracts ranging from 50 percent to 400 percent which were considered excessive. Guidance from the Attorney General provided that as per best practice all variations shall not exceed 25 percent of the contractual price. However, there were excessive variations on certain contracts ranging from 50 percent to 400 percent (Office of the Auditor General, 2017b).

(8) Poor Workmanship – non-adherence to Project Specifications

It was observed that specifications were not adhered to resulting in poor quality works. Samples of base course thickness did not meet the minimum specifications on selected roads. There were crumbled cores which were as a result of inadequate cement, poor selection of materials and inadequate compaction. The surfacing on some sections of the roads were found to be peeling off. Drainage on selected roads in Lusaka were characterized by incomplete and abandoned works. Some road signs did not meet the required specification of retro-reflectivity. Surface irregularities were also observed on most roads with seals. However, despite the contractors not meeting specifications, all payments were made as per specifications in the contract resulting in overpayments, wasteful expenditure and lack of value for money. For example, a road base specified at 150 mm and contractor constructs at 100 mm but claims and is paid for 150 mm (Office of the Auditor General, 2017b).

(9) Delayed Commencement of Works

Contrary to the contracts which required that contractors commence works within fourteen (14) days after signing the contracts, there were twelve (12) projects which did not commence for periods ranging from one (1) month to twelve (12) months (Office of the Auditor General, 2017b).

2.4 HOW CONTRACT MANAGEMENT OF HIGH-VALUE CONSTRUCTION WORKS IS EXECUTED

Contract management is most effective if upstream or pre-award activities are properly carried out (CIPS, 2020). Similarly, the World Bank Group states that effective contract management enables organisations to maximize value for money (VfM) in delivering development outcomes. The focus of contract management is on the activities that are undertaken during the contract execution/implementation phase, following the award of contract (downstream activities). However, the success of contract management is strongly influenced by upstream activities (Figure 1) such as those undertaken during the procurement planning, choice of contract, and contractor selection phase (The World Bank, 2018).

The primary objectives of contract management are to ensure that the contract is delivered on time, at the right place and in the right quantity, completed to the required specifications, standards and/or quality, and completed within the agreed price. The foundations for effective and successful post-award contract management rely upon careful, comprehensive and thorough implementation of the upstream or pre-award activities (CIPS, 2020). During the pre-award stages, the emphasis should be focused on why the contract is being established and on whether the supplier will be able to deliver in service and technical terms. The organisation's high-level requirements should be carefully researched so that there is clarity of purpose from the outset. This will help to ensure clarity in all aspects of the procurement process (CIPS, 2020).

2.4.1 Good Procurement Planning

Planning is a critical part of the procurement process to enable objectives and priorities to be set, workloads to be estimated and resources allocated. It enables the procuring entity to plan, organize, forecast and schedule its procurement activities and to identify potential areas for aggregation of needs (IFAD, 2010).

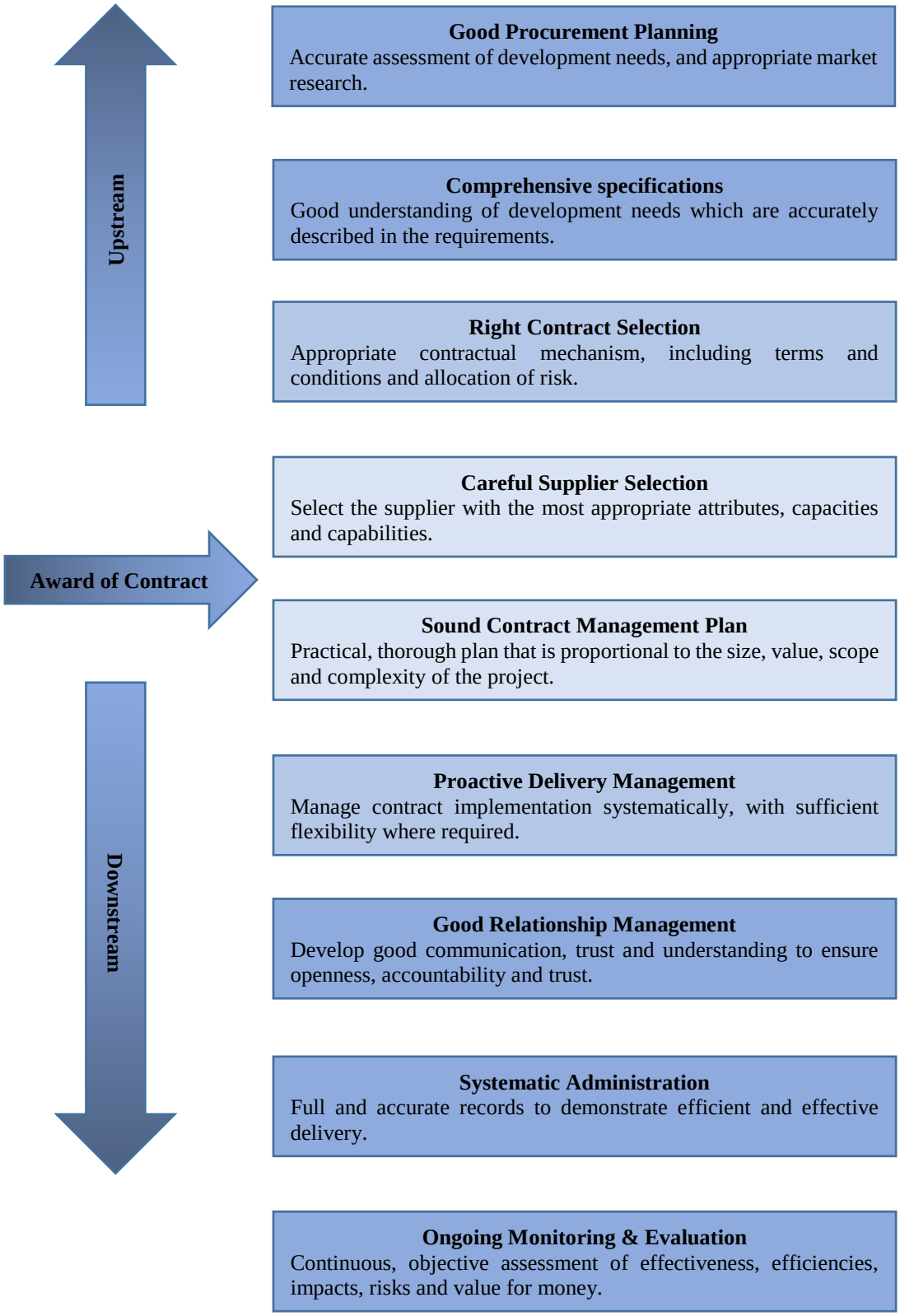

Figure 1: Phases of Contract Management (Source: World Bank, 2018)

Procurement planning for an individual procurement activity includes establishing the timelines required to perform each step of the procurement process per the identified solicitation method, contract type, and method of solicitation (UN, 2010). Advantages of procurement planning include:

(i) Improved sourcing, ensuring appropriately qualified vendors and an adequate number of vendors, leading to increased competition, and, potentially stronger offers at lower prices;
(ii) Less waste of resources on last-minute actions;
(iii) Early identification and management of risks;
(iv) Reduction of delays and lead times due to the ability to perform tasks proactively;
(v) Better planning and monitoring of procurement activities;
(vi) Identification of time periods when a high percentage of procurement actions are required (which can be useful in planning and distributing the workload);
(vii) Early consideration of logistics aspects and factors for the procurement of goods and equipment.

2.4.2 Comprehensive Specifications

Requirements definition is a systematic approach to define the procurement requirements included in the requisition and/or shopping cart, which should be in the form of a Statement of Work (statement of requirements for works), with technical specifications outlining the needs of the Organization (UN, 2010).

The statement of requirements for works should be prepared by an engineer with appropriate technical qualifications and experience. Where the procurer does not have access to this skill, external technical advice should be sought. The preparation of the statement of requirements should start with a general, summary description of the requirement (e.g. construction of classrooms or repair of airport road) taken from the procurement plan. This will normally be developed into a more detailed design brief for the engineer (IFAD, 2010). When preparing statements of requirements for works:

(i) take the basic description of the works from the procurement plan;
(ii) appoint a technical specialist;

(iii) prepare the drawings and specifications for the works;

(iv) decide on whether the most suitable contract (Lump-sum, ad/re-measurement, Cost-plus, Target cost, Supply and erect/install contracts, design and build, Turnkey contracts, PPP contracts, Framework contracts, etc.);

(v) prepare a bill of quantities or activity schedule as required;

(vi) prepare the required completion schedule;

(vii) prepare an overall scope of works, which will form the first part of the statement of requirements;

(viii) consider the supervision requirements, working relationships and other administrative arrangements;

(ix) think about the inspection and testing requirements

2.4.3 Careful Contractor Selection

According to Ogunsemi and Aje (2006) contractor selection is a critical aspect in the management of every construction project. Many mistakes and potential claims can be avoided if in-depth thought and planning is driven into the pre-tender stage of a project.

In selecting a contractor, various selection criteria such as experience, performance in past projects, financial strength, etc., should be considered simultaneously. It is important to use additional decision criteria other than the lowest tender. Awarding a construction contract to the lowest bidder, without considering other factors, can result in problems such as cost over-runs, delays and poor performance (Mahdi et al., 2002). Contractor qualification factors may include:

(i) Experience – This represents the number of years working on similar projects and in construction, total work volume on similar projects and in construction and working in similar weather conditions in similar projects.

(ii) Past performance – This criterion assesses how the contractor has met the defined objectives in previous projects and in similar projects, in terms of cost, quality of work, schedule, safety, etc.

(iii) Financial stability of the contractor - A bidder's financial longevity and his/her capacity to meet financial obligations, both short-term and long-term, as well as the financial reporting practices represented by contractor's credit level or payment record to his/her creditors, such as suppliers and subcontractors, quality of financial statements, adequacy of banking arrangements, liquidity ratio, operations ratio, and leverage ratio (Mahdi et al., 2002).

2.4.4 Sound Contract Management Plan

Planning how, when, where and by whom a contract will be implemented, monitored, managed and administered is an important step to ensure that what is procured will be delivered. A Contract Management Plan (CMP) provides a structured and systematic approach. The CMP should be fit-for-purpose. This means that the level of detail and length of the document should be proportionate to the scope, value, risk, complexity and duration of the contract (WB, 2018). Typically, a CMP will cover some, if not all of the following:

(1) Contract management roles and responsibilities (ensure that each party has established the necessary authorizations and delegations for its personnel at the beginning of the contract as this is an important prerequisite to ensuring that all contracting decisions are valid and enforceable);
(2) List of key contacts (e.g. the names and contact details of the key contacts for the Borrower and the contractor);
(3) Contract management system;
(4) Governance structure;
(5) Contract documents (including key contractual terms and conditions);
(6) Key milestones (including the critical path);
(7) Key Performance Indicators (KPIs) and a description of the standards or measurement process, if relevant;
(8) Key contract deliverables (identified and properly described, and updated to account for change orders during the execution of the contract);
(9) Reporting requirements (types of reports, times, contents etc.) and lines of reporting;
(10) Payment procedures consistent with contractual provisions;

(11) Record keeping requirements and procedures;
(12) Audit or independent assurance requirements;
(13) Change management or contract variation procedures;
(14) Issues management and escalation;
(15) Key contractual remedies;
(16) Risk management plan (see risk register below);
(17) Stakeholder engagement plan;
(18) Communication plan;
(19) Insurance coverage, if required;
(20) Guarantees and/or securities, if applicable;
(21) Price adjustment formula and circumstances, if applicable;
(22) Interface management (between contractors), if applicable;
(23) Contract closure procedures.

2.4.5 Components of Proactive Delivery Management

A complete description of all situations and issues that may affect the proper implementation of a contract is virtually impossible to do given the hundreds of different circumstances in which these contracts are being implemented (WB, 2011). The following summarizes the main stages and events in the contract management cycle where the Employer should be present and steer the process towards successful implementation:

(1) Internal arrangements:

The organisation must first of all ensure that the proper internal arrangements are made internally (WB, 2011). This mainly refers to people and processes:

- It is vital that the employer internally identifies and clearly assigns responsibilities for the contract management. These tasks should be assigned in the light of the skills and experience required to perform such functions (Nashikkar, 2013). For example, Liu and Wang (2010) stated the need for good quality professional staff to compile bid and tender documents. Odeh and Battainehm (2002) have also recommended well-trained personnel and transparent bid award

procedures as important factors to minimise delays in construction management;

- Establishing internal procedures (hierarchy, communication, level of authority, flow of documents, verification and acceptance procedures, payment procedures, internal audit etc.);

- Evaluation of main risks associated with the implementation of the contract and identification of the main remedies or mitigation measures, as well as the parties responsible with their enforcement;

- Coordination arrangements with third parties (other agencies, contractors, end users, beneficiaries etc.). Often the implementation of large civil works contracts requires close cooperation and coordination with many other parties with responsibilities or interests in the project. The proper agreements and arrangements should be put in place at the very outset of the project: which agency would be involved in which stage of the works (e.g. state inspection in construction, environmental agency, labor inspection, end users of the works etc.); who are the contact persons on both sides; which are the reporting or notification obligations; are there any fees to be paid and by whom (Contractor, Employer) etc.

(2) Kick-off meeting(s)

A kick-off meeting with the contractor is absolutely necessary at the start of the project. The contract manager should also be present, since it would take over much of organisation's contract supervision responsibilities (WB, 2011). It is also recommended to hold separate meetings with all other stakeholders – the parties responsible with the design and engineering; local authorities; state agencies (civil works inspection, environmental, labor etc.); end users and beneficiaries etc. The kick-off meeting between the organisation and contractor should normally take place as soon as the Letter of Acceptance is issued and should also include a site visit, if practicable (WB, 2011).

(3) Access to and possession of Site

As soon as practicable and usually after signing of the Contract Agreement; and submission by the contractor of the performance security and advance payment guarantee, the contract manager/contract management team and the contractor shall have another formal meeting (on Site) by which the contract manager/contract management team gives the contractor access to and possession of the Site. Depending on the status of the Site, the protocol for the hand-over of the Site should be signed by the relevant parties as well (WB, 2011).

(4) Verification of securities/bonds/guarantees

Practice has shown that many organisations are mere depositories of securities submitted by the contractor and no actual verification is done. There have been sufficient incidents involving forged or unenforceable securities (due to unacceptable conditions or improper wording) where the organisation did not properly protect their own interests (WB, 2011). (Some of these incidents occurred when bonds issued by insurance companies, rather than securities issued by banks, were involved. Agreeing that bonds are acceptable instruments should happen if the organisation has the capacity to actually verify the issuers of the respective bonds.) (WB, 2011).

(5) Verification of insurance policies

The importance of insurance policies is very often overlooked by organisations because they seem like just another item to tick off a checklist. However, insurance policies become important only when an incident happens and this is why organisations should pay extra attention to them. Like in the case of securities, insurance policies need to be checked because they are even more prone to deviations and conditions that can render them useless (WB, 2011).

(6) Advance payment / Contractor's mobilization

It goes without saying that no payment should be made to the contractor until valid and duly verified performance security and advance payment guarantee have been submitted. Then the contract manager should issue the appropriate

Interim Payment Certificate certifying that all conditions for the advance payment have been met (WB, 2011).

The organisation should supervise contractor's mobilization on site and use of the advance payment, because usually this is a fairly good indication on contractor's later performance. Any delays or deviations in site mobilization should be promptly notified to and remedied by the contractor (WB, 2011).

(7) Use of adequate project management tools for time and cost control

Day-to-day supervision and follow-up on the progress of works are essential attributes of the contract manager, who should employ appropriate project management tools to ensure that critical issues such as time (actual progress of works against planned) and money (how much has been paid vs. how much has been done) (WB, 2011).

Many contracts are managed poorly because of contract managers/management teams not being conversant with project management tools such as work breakdown structure, critical path method, earned value management, etc. Organisation's technical staff should equally be conversant with these tools (WB, 2011).

(8) Site visits by the Contract Manager

One of the key responsibilities of the contract manager/contract management team throughout the implementation of the contract is to maintain a close control on what actually happens on site. This cannot effectively be done without inspecting the Site as often as necessary. Organisation's technical experts should be actively involved in the site visits that would facilitate better understanding of the progress of works (WB, 2011).

(9) Variations

Changes in quantities of works occur in virtually any civil works contracts for a variety of reasons (quantities could not be accurately measured at the time of design, modifications of the conditions on site etc.) (WB, 2011).

The contract manager is again the most important player in this equation because it's the contract manager's duty to make sure that the variations requested by the contractor are (i) necessary; and (ii) make technical and economic sense. Depending on the limits of contract manager's authority established in the Particular Conditions, the organisation should approve the variations that exceed the respective threshold (WB, 2011).

(10) Payment

Payment of the Interim Payment Certificates issued by the contract manager based on contractor's monthly statements is one of organisation's key responsibilities and also the moment with the maximum involvement of its technical, contract management and financial staff (WB, 2011).

Good contract management practice demands timely identification and management of issues. Examples of causes of poor practice, and their consequences are illustrated in Table below (WB, 2018):

Table 2: Poor Contract Management Practices and their Consequences

Cause	Consequence
Failure to plan - The organisation and contractor fail to adequately plan for the transition to contract implementation.	• A chaotic start where adequate arrangements are not in place to support implementation.
Poor specifications - The organisation's requirements are poorly specified and the contractor's assumptions are not checked.	• The contractor does not understand the nature and quality of the Goods, Works or Non-consulting Services required. • The contractor's delivery is inconsistent with the organisation's requirements, and the intended benefits, outputs or outcomes aren't realized. • Difficult to manage the contract

Cause	Consequence
Inappropriate choice of contract - The contract terms and conditions are inappropriate for the type of procurement.	• The terms and conditions fail to provide a suitable contractual framework, allocation of risk, or appropriate remedies to best resolve issues that arise. • The respective obligations and responsibilities of the organisation, contract manager if any, and contractor may be inadequate.
Inadequate resourcing and poor decision making - Inexperienced contract management team (unfamiliar with the technical specifications, terms of reference and/or conditions of contract, as well as with standard contract monitoring methods, systems and/or tools). The delegations and responsibilities for making decisions are not clear.	• Understandings between the organisation and/or contract manager and the contractor differ on how to best deliver, implement and monitor the contract. • Progress is slow – even stalled. • Contract management is poor, issues are not resolved and can build up until they become bottlenecks, and the contractor is not held to account. • Misunderstandings and disagreements arise. Too many issues are escalated inappropriately. • The relationship deteriorates and becomes unworkable. • The contractor fails to deliver and the organisation fails to notice. • Decisions are not made at the right time, if at all. Staff who have no authority make decisions. Decision-making is inconsistent. • Where the organisation /contract manager fail to adequately perform their part of

Cause	Consequence
	contract management, the contractor may take control, resulting in unbalanced decisions that are not always in the organisation's interests.
Lack of readiness for implementation - Lengthy approval process of contracts, Outstanding land acquisition issues, Delays in making advance payments.	• Delays in contract effectiveness and contractor mobilization.
Poor contract supervision and monitoring - The contract's context, complexities and dependencies are not well understood, the organisation/contract manager fails to monitor and measure the contractor's delivery and performance, The organisation/contract manager fails to monitor and manage related risks (e.g. operational, financial, commercial, political, environmental, social), Failure to enforce the contractual requirements and contractual remedies.	• The organisation cannot assess whether it is getting full delivery and value for money, including quality results, which it requires and expects. • Failure to achieve contractor performance in accordance with the contract.

2.4.6 Good Relationship Management

Successful relationship management influences the overall success of the contract. It is vital to establish and sustain a constructive relationship, and regular communication in relation to on-going service delivery. A structured approach to managing relationships should be adopted, comprising informal day-to-day discussions and interactions, and formal meetings at pre-determined intervals with nominated personnel from both the employer and the contractor (Majid, 2006; Tookey et al., 2001). Nguyen et al. (2004) and Majid (2006) recommended clear communication, regular progress meetings and frequent coordination between parties to minimise delays in construction management. Relationships should be managed in a professional manner and be based on cooperation and mutual understanding taking into account the need for probity and ethical behaviour (Coleman et al., 2020).

2.4.7 Systematic Administration

This involves maintaining full and accurate records to demonstrate efficient and effective delivery. All contract management records maintained should contain the following documents (Public Procurement Regulations, 2011):

(i) The signed contract document, including any signed contract amendments;
(ii) Any variations issued under the contract;
(iii) All post contract documentation relating to the fulfilment of contract obligations, in particular copies of bank guarantees or advance payment guarantees;
(iv) Minutes of any meetings relating to contracts management, including contract progress or review meetings;
(v) All documentation evidencing deliveries of goods or completion certificates in relation to contracts for works or services;
(vi) Copies of all invoices for goods, works and services, including work papers verifying the accuracy of payments claimed and details of the actual payment authorised by a Contracts Manager;
(vii) Copies of cumulative payment worksheets evidencing management of all payments made;

(viii) Copies of any claims made by a contract manager on behalf of the procuring entity in respect of any warranty, non-warranty, short supply, damage and other claims, upon the supplier or upon the procuring entity;

(ix) All correspondence between the procuring entity and supplier; and

(x) All submissions to, and all decisions of, the approvals authority relating to contracts management, including the authorisation of any contract amendment.

2.4.8 Managing Contractor Performance (Monitoring and Evaluation)

Performance management must be undertaken throughout the life of the contract. It involves: monitoring (collecting data and maintaining records), assessment (determining if performance meets need) and action (understanding effective performance and correcting under performance). An experienced team of experts in a relevant field handles the supervision of the projects. The monitoring requirements and methods depend on the nature of the contract and the project to be executed (Liu and Wang, 2010; Tookey et al., 2001).

There are some standard practices that are followed. Examples include monitoring the contractor performance against the specific targets, inspection of completed work or random sample checks, the contractor providing information about his/her own performance and recording complaints received from clients (Nashikkar, 2013; Liu and Wang, 2010). Coleman et al. (2020) found poor supervision, poor project management and poor site management as factors that were overlooked but delayed project execution in Ghana.

2.5 SUMMARY

This chapter looked at the factors of poor contract management in Europe, Asia, Middle East and Africa. The literature reviewed on such factors formed a basis for questions used in the questionnaires and interviews conducted. Literature relating to poor contract management of road works at RDA was also reviewed.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 RESEARCH METHODOLOGY

This Chapter discusses the methodology that was employed in this research. It outlines the general plan on how the research questions were addressed in terms of the research philosophies, approach to theory development, methodological choices, research strategies, time horizons and techniques and procedures for sampling, data collection and analysis.

3.1 RESEARCH DESIGN

Table 3: Research Design

Research Objective/Question 1	
How are high-value contracts for road works in Zambia managed by the Road Development Agency? (Descriptive and Evaluative; Qualitative research design)	
Research Philosophy	Interpretivism
Approach to Theory Development	Induction
Methodological Choice	Mono method qualitative
Research Strategy	Case study
Time Horizon	Cross-sectional
Techniques and Procedures	1. Population - All employees of RDA 2. Target population - RDA employees involved in contract management 3. Sampling

	- Non-probability sampling techniques - Purposive sampling 4. Data collection - Semi-structured interviews 5. Data analysis - Thematic analysis
Research Objective/Question 2	
What are the factors that emanate from/lead to poor contract management of high-value contracts for road works at Road Development Agency? (Exploratory; Quantitative research design)	
Research Philosophy	Critical realism
Approach to Theory Development	Deduction
Methodological Choice	Mono method quantitative
Research Strategy	Survey
Time Horizon	Cross-sectional
Techniques and Procedures	1. Population - All employees of RDA 2. Target population - RDA employees involved in contract management 3. Sampling - Target population = sample size 4. Data collection - Structured questionnaires 5. Data analysis - Descriptive statistics using MS Excel
Research Objective/Question 3	

What framework can be recommended to address shortfalls in contract management of high-value road works at Road Development Agency? (Exploratory and Evaluative; Mixed methods research design)	
Research Philosophy	Pragmatism
Approach to Theory Development	Abduction
Methodological Choice	Mixed methods - Concurrent mixed methods research
Research Strategy	1. Survey 2. Case study
Time Horizon	Cross-sectional
Techniques and Procedures	1. Population - All employees of RDA 2. Target population - RDA employees involved in contract management 3. Sampling - Probability sampling techniques (Target population = sample size) - Non-probability sampling techniques (Purposive sampling) 4. Data collection - Structured questionnaires - Semi-structured interviews 5. Data analysis - Descriptive statistics - Thematic analysis

3.1.1 Research Philosophy

Research philosophy refers to a system of beliefs and assumptions about the development of knowledge (Saunders, Lewis & Thornhill, 2016). The following

research philosophies were used in the development of knowledge to address the research objectives:

(1) Critical Realism – Research Objective 2 was guided by the critical realism philosophy. Critical realism focuses on explaining what we see and experience, in terms of the underlying structures of reality that shape the observable events (Saunders, Lewis & Thornhill, 2016). It could only be understood how poor contract management arises at RDA after understanding the factors that caused it. The Researcher focused on quantitatively exploring the factors that emanate from/lead to poor contract management of high-value contracts for road works at Road Development Agency.

(2) Interpretivism – Research Objective 1 was guided by the interpretivism philosophy. Interpretivism emphasises that humans are different from physical phenomena because they create meanings (Saunders, Lewis & Thornhill, 2016). The objective of using interpretivist research to address Research Question 1 was to create new, deeper understandings and interpretations of how high-value contracts for road works in Zambia were managed by RDA.

(3) Pragmatism – Research Objective 3 was addressed from a pragmatic point of view. Pragmatism proclaims that theories are only relevant where they support action (Kelemen & Rumens, 2008). Pragmatism strives to reconcile both objectivism and subjectivism, facts and values, accurate and rigorous knowledge and different contextualised experiences (Saunders, Lewis & Thornhill, 2016). The Researcher adapted and considered theories, concepts, ideas and research findings in terms of the practical consequences in the context of contract management. The aim was to develop and recommend a framework to addresses shortfalls in the contract management of high-value road works at RDA.

3.1.2 Approach to Theory Development

Three approaches were used to develop theory in this research:

(1) Deduction – Deductive reasoning occurs when the conclusion is derived logically from a set of premises, the conclusion being true when all the premises are true. Research Objective 2 involved reviewing the premises from literature about the factors of poor contract management and designing a research strategy to test the theory about the factors of poor contract management in the context of RDA.

(2) Induction – Induction starts with data collection followed by data analysis in order to develop a theory (Saunders, Lewis & Thornhill, 2016). The Researcher collected data for Research Objective 1 and analysed it qualitatively in order to develop theory about how high-value contracts for road works in Zambia were managed by RDA.

(3) Abduction – Abduction involves collecting data to identify themes and explain patterns, to generate a new or modify an existing theory (Saunders, Lewis & Thornhill, 2016). For Research Objective 3, data was collected to identify shortfalls in the contract management of high-value road works at RDA in order to modify the existing framework for contract management.

3.1.3 Methodological Choice

(1) Mono method quantitative – As Research Objective 2 followed a quantitative research design, a mono method quantitative technique was employed. A mono method quantitative study is where a quantitative research design uses a single data collection technique such as a questionnaire (Saunders, Lewis & Thornhill, 2016).

(2) Mono method qualitative - As Research Objective 1 was based on a qualitative research design, a mono method qualitative technique was employed. A mono method qualitative study is where a qualitative research design uses a single data collection technique such as semi-structured interviews (Saunders, Lewis & Thornhill, 2016).

(3) Concurrent mixed methods research – Mixed methods research is the branch of multiple methods research that combines the use of quantitative and qualitative data collection techniques and analytical procedures (Saunders, Lewis & Thornhill, 2016). A concurrent triangulation design was adopted to answer Research Objective 3 where qualitative and quantitative data was collected in the same phase of the research in order to compare how these data supported each other in developing a framework that addresses shortfalls in contract management at RDA (Creswell, 2003).

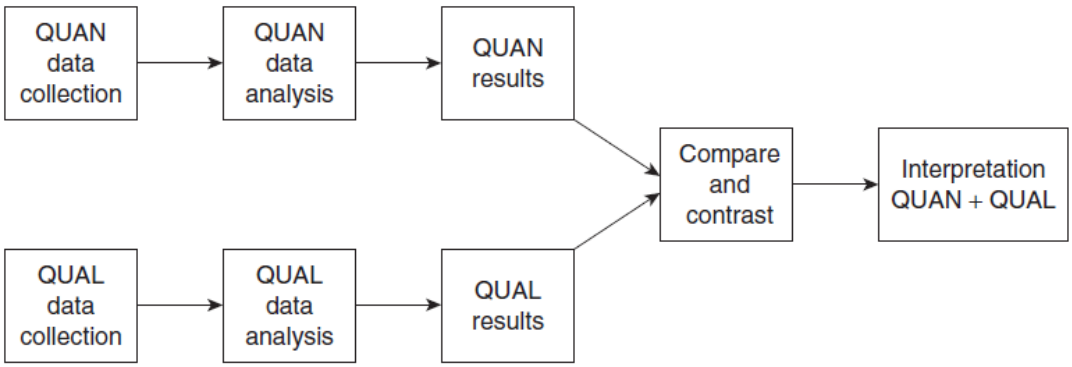

Figure 2: Concurrent Mixed Methods (Source: Creswell, 2003)

3.1.4 Research Strategy

(1) Survey – The research strategy for Research Objectives 2 and 3 was a survey strategy. The survey strategy is usually associated with a deductive research approach and most often used to answer "what" questions (Saunders, Lewis & Thornhill, 2016). This strategy allowed quantitative data about the factors of poor contract management at RDA to be collected and quantitatively analysed using descriptive statistics. The survey strategy facilitated more control over the research process and the generation of findings that were statistically representative of the whole population.

(2) Case study – A case study is an in-depth inquiry into a topic or phenomenon within its real-life setting (Yin, 2014). The 'case' in case study research may refer to a person (e.g. a manager), a group (e.g. a work team), an organisation (e.g. a business), an association (e.g. a joint venture), a change process (e.g. restructuring a company), an event (e.g. an annual general meeting) as well as many other types of case subject (Saunders, Lewis & Thornhill, 2016).

Research Objectives 1 and 3 followed a case study strategy. This enabled the creation of insights from in-depth research into the study of how high-value contracts for road works in Zambia were managed in the context of RDA leading to rich, empirical descriptions and development of a framework for resolving shortfalls in contract management.

3.1.5 Time Horizon

This research was based on a cross-sectional study. Cross-sectional studies are studies that involve the study of a particular phenomenon/phenomena at a particular time. The researcher studied the contract management of high-value road works at RDA from 2012 to 2018 as literature showed that this was the section when poor contract management of road works was prevalent.

3.2 STUDY AREA/SITE

This study was conducted at the premises of the Road Development Agency, Head Office situated at the corner of Government and Fairley Roads, Lusaka, Zambia.

3.3 STUDY POPULATION

The population for the study comprised 433 RDA employees and the target population for each of the research questions comprised RDA employees involved in contract management, which was 24 employees.

3.4 STUDY SAMPLE

The minimum sample for Research Objective 2 and the quantitative part of Research Objective 3 was estimated based on the table below by Saunders, Lewis and Thornhill (2016) for sample sizes for different target population sizes at a 99 per cent confidence level.

Table 4: Sample Size Based on Population Size

	Margin of error			
Target population	5%	3%	2%	1%
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	343	384
500	217	340	414	475
750	254	440	571	696
1 000	278	516	706	906
2 000	322	696	1091	1655
5 000	357	879	1622	3288
10 000	370	964	1936	4899
100 000	383	1056	2345	8762
1 000 000	384	1066	2395	9513
10 000 000	384	1067	2400	9595

Therefore, given a target population of twenty-four (24) participants and the need for a 99% confidence interval (i.e. 1% margin of error), the researcher resolved to collect data from the entire target population. Saunders, Lewis and Thornhill (2016) state that where data can be collected from the entire target population, there is no need to sample. The target population was developed based on the information obtained from the Human Resources and Administration Department of RDA on employees that were directly involved in the management of roads works.

The minimum sample for Research Objective 1 and the qualitative part of Research Objective 3 was estimated based on the table below by Saunders, Lewis and Thornhill (2016) for minimum non-probability sample sizes.

Table 5: Sample Size for Interviews

Nature of study	Minimum sample size
Semi-structured/In-depth interviews	5–25
Ethnographic	35–36
Grounded Theory	20–35
Considering a homogeneous population	4–12
Considering a heterogeneous population	12–30

The researcher used a sample size of five (5) as semi-structured interviews were conducted to collect data for Research Objective 1. This was in accordance with guidance by Saunders, Lewis and Thornhill (2016) in relation to conducting interviews as shown in the table above.

3.5 SAMPLING TECHNIQUES

3.5.1 Research Objectives/Questions 2 and 3

The sampling technique that was used for Research Objective 2 and part of Research Objective 3 was the entire target population as data could be collected from the whole target population (Saunders, Lewis & Thornhill, 2016).

The target population was the sample size for Research Objective 2 and 3 because:

(1) The sampling frame for this research did not contain periodic patterns,
(2) The majority of the population for this study was geographically concentrated,
(3) The research required face-to-face contact,
(4) There was need to represent the population as data could be collected from the entire target population.

3.5.2 Research Objectives/Questions 1 and 3

Purposive sampling was used to come up with a sample for Research Objective 1 and Research Objective 3. Purposive sampling is a sampling technique where the researcher uses judgement to choose cases that will best enable the provision of answers to the research question and objectives (Saunders, Lewis & Thornhill, 2016). Research Objective 1 and part of Research Objective 3 followed a qualitative research

design were statistical inferences were not made from the sample, access was not envisaged to be difficult and there was clear focus for selecting the sample, hence the need to use purposive sampling.

3.6 DATA COLLECTION INSTRUMENTS

3.6.1 Questionnaires

The primary data for Research Objective 2 and 3 was collected using structured questionnaires. Self-administered questionnaires were used which were delivered to each respondent and collected later. This ensured that the respondents sampled to participate in the research were the ones that actually completed the questionnaires.

3.6.2 Interviews

The primary data for Research Objective 1 and 3 was collected through semi-structured interviews. The researcher had a list of themes and questions to be covered and the order of questions could vary depending on the flow of the conversation. Additional questions were required to explore the research questions and objectives and the data were recorded by audio-recording the conversation and/or note taking.

As this form of interviewing was non-standardised and one to one, the data collected facilitated qualitative analysis in an attempt to answer the research objectives. Additionally, this type of interview enabled the researcher to explore and explain how high-value contracts for road works in Zambia were being managed by the Road Development Agency.

3.7 DATA COLLECTION PROCEDURE

3.7.1 Questionnaires

The steps that were involved in collecting data using structured questionnaires were as follows:

(1) Ensured that questionnaires and letters were printed.

(2) Contacted recipients by telephone or email and advised them to expect a questionnaire.
(3) At the meeting or meetings, handed out the questionnaire with a covering letter to each respondent.
(4) Introduced the questionnaire, stressed its anonymous or confidential nature and that participation was voluntary.
(5) Collected questionnaires from respondents that had completed them and followed up on respondents that had not yet completed.

3.7.2 Interviews

The steps that were involved in collecting data using semi-structured interviews were as follows:

(1) Gathering sufficient knowledge about the research topic and the organisational/situational context in which the interview was to take place.
(2) Developing interview themes and supplying information to the interviewee before the interview.
(3) Selecting the appropriate location for the interview.
(4) Dressed appropriately to avoid affecting the perception of the interviewee.
(5) Made the interviewee at ease and comfortable enough to respond in-depth to the questions.
(6) Phrased questions clearly and in a comprehensible manner in order to increase the reliability of the information obtained.
(7) Used open, probing, specific and closed questions appropriately.

3.8 DATA ANALYSIS INSTRUMENTS AND PROCEDURE

3.8.1 Quantitative Data

3.8.1.1 Microsoft Excel

The quantitative data collected from Research Objectives 2 and 3 was analysed using Microsoft Excel. Microsoft Excel is an application with a set of features that enables one to extract actionable insights from data. Microsoft Excel was adopted due to the following useful features which were crucial for this research:

(1) Analysis and construction of visualisations and reports through a point-and-click interface,
(2) Lessened data preparation time by identifying invalid values, viewing patterns of missing data, and summarizing variable distributions, and
(3) Facilitated the analysis of large data sets and preparation of data.

3.8.1.2 Procedure

Quantitative data was analysed using the following procedure:

(1) Prepared the data for analysis.
(2) Cleaned, transformed, and loaded data in Microsoft Excel.
(3) Performed analytics using Microsoft Excel.

3.8.2 Qualitative Data

3.8.2.1 Thematic Analysis

The qualitative data collected from Research Objectives 1 and 3 was analysed by Thematic Analysis. Thematic Analysis offered a systematic yet flexible and accessible approach to analyse qualitative data (Braun & Clarke, 2006). It was systematic as it provided an orderly and logical way to analyse qualitative data. Thematic analysis, as a flexible and useful research tool, provided a rich and detailed, yet complex, account of the data.

3.8.2.2 Procedure

Qualitative data was analysed using the following procedure (Braun & Clarke, 2006):

(1) Familiarising with data: Transcribing data, reading and rereading the data, noting down initial ideas.
(2) Generating initial codes: Coding interesting features of the data systematically across the entire data set, collating data relevant to each code.
(3) Searching for themes: Collating codes into potential themes, gathering all data relevant to each potential theme.

(4) Reviewing themes: Checking if the themes worked in relation to the coded extracts and the entire data set, generating a thematic map.

(5) Defining and naming themes: Ongoing analysis for refining the specifics of each theme and the overall story that the analysis tells, generating clear definitions and names for each theme.

(6) Producing the report: The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a report of the analysis.

3.9 SUMMARY

This chapter looked at the research philosophies, approaches to theory development, methodological choices, research strategies and time horizons adopted for addressing the objectives of the research. The study area, population, sampling techniques, data collection and analysis instruments and procedures were also discussed.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.0 DATA ANALYSIS, FINDINGS AND DISCUSSIONS

This chapter of the research presents the how the data collected was analysed and reports the findings of the research.

4.1 RESEARCH OBJECTIVE NO. 1 - HOW ARE HIGH-VALUE CONTRACTS FOR ROAD WORKS IN ZAMBIA MANAGED BY THE ROAD DEVELOPMENT AGENCY?

The data collected for this objective was analysed using Thematic Analysis which comprises the following steps:

(i) Familiarisation
(ii) Coding
(iii) Generating themes
(iv) Findings

4.1.1 Familiarisation and Coding

Interview data was reviewed in order to get a thorough overview. Thereafter, codes were prepared from the interview extracts shown in the table below.

Table 6: Familiarisation and Coding – Objective 1

Interview Extracts	Codes
My experience in contract management on the planning and design side has a lot to do with compliance with design standards and codes. There is little interaction with the designers who are engineers/consultants that design the works on our behalf.	

Interview Extracts	Codes
The designs are reviewed and approved for tendering at later stage. When it comes to implementation, we check what happening on the ground/on site against what is on paper. The implementation aspect involves a lot of real time management. So, the contracts are managed in terms of compliance to standards. We also have the aspect of cost control because there are times when other aspects affect the project that is ongoing. You find fluctuations in prices, changes in currency conversions and so on.	Ongoing monitoring and evaluation Specifications/standards Three-dimensional approach Managing contract risks
The way we manage contracts, basically we follow the provisions that are in the contract. For instance, if it is design, we have specific deliverables that are in the contract. So, from the time of signing the contract you have, say, the kick-off meeting maybe after 4 weeks, inception reports, then after 2 months preliminary design report, thereafter the draft design report and then the final design report. There are also environmental impact statements or assessments. Those are the deliverables that are usually in our contracts.	Three-dimensional approach Contract terms and conditions Contract management plan

Interview Extracts	Codes
The managing part is to check that the consultant is delivering according to the terms of reference. Whichever officer is running those projects has to check against what is provided in the terms of reference.	Comprehensive specifications
In terms of the planning, what informs these projects is the demand from the stakeholders. In an idea case it is supposed to be following the highway management system (HMS) plus the needs. That is what informs the study, you do the feasibility study and then the detailed design. In that design you indicated how feasible that project is. Once the designs are completed the documentation is given to the people in construction department to implement. Some contracts have got design and supervision, whereas others it is just feasibility study and detailed design.	Contract manager Acquisition/procurement planning Pre-qualification, qualification & tendering procedures
Those with a supervision component help with the procurement of the works contractor. The consultant would assist with the preparation of bidding documents for tendering. Thereafter, a contractor is engaged who is supervised by the consultant.	Pre-qualification, qualification & tendering procedures
Most of the contracts we handle in construction range from K50 million to K1 billion. The	Contract type/selection

Interview Extracts	Codes
management depends on the amount and the NCC grade the contractor is in.	Contract strategy
From the RDA point of view, we have the Project Manager who is a Director. It may be Director Construction, Director Maintenance, etc. The Project Manager through the Director & CEO appoints a Project Manager's representative. The Project Manager's representative is usually a consultancy firm. So, the contractor is supervised by the consultancy firm.	Assembling the project team Selection of consultant/tendering Implementation/delivery
The project implementation unit (PIU) from the RDA perspective comprises the Director, Senior Manager, Project Engineer who may be supported by an Engineer, the consultant and contractor. The consultant also has their own structure on site e.g. resident engineer, materials engineer, etc. This is the basic structure of management of a project. Furthermore, if it is a donor-funded project the PIU may also have a dispute board, technical auditors, etc. and the Project Manager may not be an RDA director.	Internal arrangements/contract start-up Implementation/quality management Dispute management
In terms of contract management, RDA delegates the management of contracts to the consultant. All communication is done through the consultant. However, the organisation is	Proactive delivery management

Interview Extracts	Codes
actively involved in the management of the works despite being the Employer.	

4.1.2 Generating Themes

Table 7: Theme Generation

Codes	Themes
• Ongoing monitoring and evaluation • Three-dimensional approach • Managing contract risks • Implementation/delivery • Implementation/quality management • Dispute management • Proactive delivery management	Contract implementation
• Comprehensive specifications • Specifications/standards • Acquisition/procurement planning	Planning & Design
• Contract type/selection • Contract strategy • Contract terms and conditions • Pre-qualification, qualification & tendering procedures • Selection of consultant/tendering	Contract development and award
• Contract management plan • Assembling the project team • Internal arrangements/contract start-up	Mobilisation

4.1.3 Findings

The Figure 2 summarises how high-value contracts for road works in Zambia are managed by RDA.

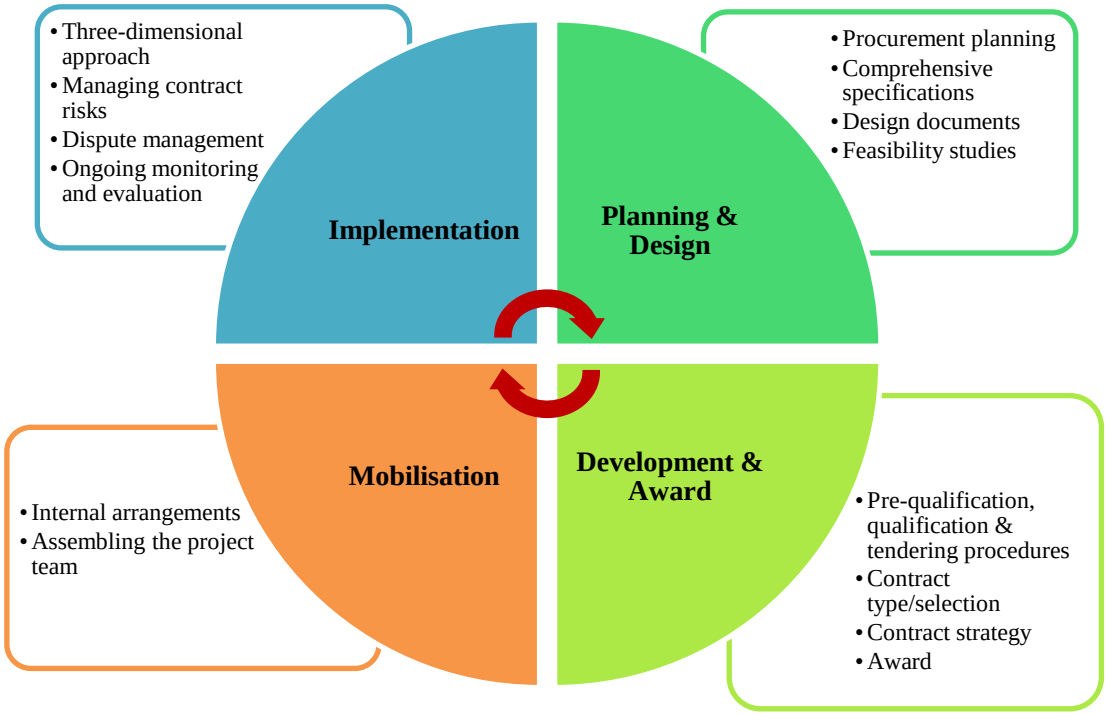

Figure 3: RDA Contract Management Cycle

4.2 RESEARCH OBJECTIVE NO. 2 - FACTORS OF POOR CONTRACT MANAGEMENT AT RDA

A total of 136 road projects from 2012 to 2018 were considered for the research. The questionnaires distributed to respondents covered three (3) categories of factors of poor contract management of high-value contracts for road works at Road Development Agency. The categories are enumerated in the Table 5:

Table 8: Categories of Poor Contract Management Factors

S/N	Client-related Factors	Contractor-related Factors	Consultant-related Factors
1.	Poor procurement and contract management planning	Poor site management and supervision by the contractor	Inexperienced personnel (managerial and supervisory personnel)
2.	Improper evaluation of bids	Conflicts of subcontractors' schedules in execution of the project	Lack of quality assurance/control
3.	Awarding contracts to incompetent contractors	Rework due to defective work during construction	Delay in undertaking quality inspections, testing and approving works
4.	Slow decision-making process	Poor communication and coordination by the contractor with other parties	Lack of communication and cooperation by consultants
5.	Lack of coordination with contractors	Ineffective project planning, scheduling and execution	Design documents with errors, incomplete and not thoroughly detailed
6.	Poor communication and coordination between parties	Improper or ineffective construction methods implemented by the contractor	Lack of timely and effective reporting
7.	Delay in processing payment	Delay in subcontractors completing their works	Delay in approving sample materials

S/N	Client-related Factors	Contractor-related Factors	Consultant-related Factors
8.	Awarding contracts prior to confirmation of availability of funds	Inexperienced technical personnel	Inadequate review for drawings and contract documents
9.	Delay in facilitating the mobilisation of the contractor	Delay in site mobilisation	
10.	Delay in engaging contractor after planning and designing	Increase in the cost of materials, equipment and labour	
11.	Design documents with errors, incomplete and not thoroughly detailed	Failure and unavailability of equipment, poor quality of materials	
12.	Insufficient data collection prior to planning and design	Poor site and weather conditions	
13.	Erroneous estimation of time and resources	Inadequate cash/finance during construction	
14.	Lack of cost planning/monitoring during pre- and post-contract stages	Shortage of labour, materials and equipment	
15.	Inappropriate choice of contract	Failure to thoroughly comprehend design documents	

S/N	Client-related Factors	Contractor-related Factors	Consultant-related Factors
16.	Management of relationships with stakeholders	Frequent personnel changes	
17.	Design changes during construction/ variation orders		
18.	Inexperienced contract management team		
19.	Poor contract supervision and monitoring		
20.	Contractual claims e.g. EOT with cost, interest on delayed payments		

Out of the sample of 24 respondents to whom questionnaires were issued, 23 respondents participated in the research and submitted the questionnaire online. This translated into a response rate of 95.83% as calculated below.

$$Total\ response\ rate = \frac{Total\ number\ of\ responses}{Total\ number\ in\ sample - Ineligible}\ x\ 100$$

$$Total\ response\ rate = \frac{23}{24 - 0}\ x\ 100$$

$$\underline{Total\ response\ rate = 95.83\%}$$

Research of this nature uses the relative importance index (RII) to analyse data collected through questionnaires. The table below shows similar research which was conducted were quantitative data was analysed using the relative importance index (RII).

Table 9: Data Analysis of Contract Management-related Research

Source	Analysis Method	Country of Study
Alwi and Hampton (2003)	Importance index	Indonesia
Assaf and Al-Hejji (2006)	Importance index	Saudi Arabia
Danso and Antwi (2012)	Relative importance index (RII)	Ghana
Faridi and El-Sayegh (2006)	Relative importance index (RII)	Dubai (UAE)
Fatoye (2012)	Relative importance index (RII)	Nigeria
Fugar and Agyakwah-Baah (2010)	Relative importance index (RII)	Ghana
Le-Hoai *et al* (2008)	Importance index	Vietnam
Marzouk and El-Rasas (2012)	Importance index	Egypt
Sullivan and Harris (1985)	Frequency of occurrence	United Kingdom
Wong and Vimonsatit (2012)	Relative importance index (RII)	Australia

The RII was computed for each category of factors using the formula below:

$$RII = \frac{\sum W}{A\ x\ N}\ x\ 100$$

Where:

W = The weight given by the responded to each factor (i.e. 1 – 7).

A = The highest weight i.e. 7.

N = Total number of responses.

The factors with missing data/responses were excluded from the analysis using the complete case analysis approach. Complete case analysis is a method for dealing with missing questionnaire data were only subjects with fully observed data are considered for analysis.

The RII for client-related factors, contractor-related factors and consultant-related factors were computed and ranked as shown in the following tables.

Table 10: RII for Client-related Factors

Weights	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**Total**	**RII**	**Rank**
Client-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**			
	Frequency									
Delay in processing payment	9	5	5	0	2	2	0	23	79.50	1
Awarding contracts prior to confirmation of availability of funds	10	6	2	1	0	3	1	23	78.88	2
Design documents with errors, incomplete and not thoroughly detailed	7	8	4	0	2	1	1	23	78.26	3
Insufficient data collection prior to planning and design	7	4	8	2	0	1	1	23	77.02	4

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Client-related Factors	Strongly Agree	Agree	Slightly Agree	Not Sure	Slightly Disagree	Disagree	Strongly Disagree			
	Frequency									
Design changes during construction/ variation orders	5	11	2	0	2	3	0	23	76.40	5
Poor contract supervision and monitoring	3	11	6	0	1	1	1	23	76.40	5
Poor procurement and contract management planning	4	8	6	1	4	0	0	23	75.78	7
Delay in engaging contractor after planning and designing	6	8	4	1	2	0	2	23	75.78	7
Lack of cost planning/monitoring during pre- and post-contract stages	6	7	4	2	2	1	1	23	75.16	9
Contractual claims e.g. EOT with cost, interest on delayed payments	5	9	3	1	3	2	0	23	75.16	9
Erroneous estimation of time and resources	5	9	4	0	0	4	1	23	73.29	11
Awarding contracts to incompetent contractors	1	10	8	0	2	2	0	23	72.67	12
Inexperienced contract management team	3	9	6	0	0	4	1	23	70.81	13
Lack of coordination with contractors	2	7	8	2	1	2	1	23	69.57	14

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Client-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**			
	Frequency									
Poor communication and coordination between parties	3	4	9	3	3	0	1	23	69.57	14
Management of relationships with stakeholders	5	5	3	4	2	3	1	23	67.70	16
Improper evaluation of bids	2	5	6	1	2	7	0	23	60.87	17
Inappropriate choice of contract	3	2	8	4	0	2	4	23	60.25	18

Table 11: RII for Contractor-related Factors

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Contractor-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**			
	Frequency									
Inadequate cash/finance during construction	10	9	0	2	0	1	1	23	83.85	1
Ineffective project planning, scheduling and execution	6	7	6	3	1	0	0	23	80.12	2
Poor site management and supervision by the contractor	0	14	4	4	1	0	0	23	76.40	3

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Contractor-related Factors	Strongly Agree	Agree	Slightly Agree	Not Sure	Slightly Disagree	Disagree	Strongly Disagree			
	Frequency									
Inexperienced technical personnel	5	6	7	2	2	1	0	23	75.78	4
Rework due to defective work during construction	2	10	6	3	0	2	0	23	74.53	5
Poor communication and coordination by the contractor with other parties	3	5	9	5	1	0	0	23	73.91	6
Failure and unavailability of equipment, poor quality of materials	1	10	6	4	0	2	0	23	72.67	7
Improper or ineffective construction methods implemented by the contractor	0	11	5	5	1	1	0	23	72.05	8
Delay in subcontractors completing their works	0	10	6	5	1	0	1	23	70.81	9
Frequent personnel changes	1	8	7	4	2	0	1	23	70.19	10
Delay in site mobilisation	2	6	7	3	2	3	0	23	67.70	11
Failure to thoroughly comprehend design documents	4	4	5	5	1	3	1	23	66.46	12
Shortage of labour, materials and equipment	2	5	6	4	0	5	1	23	62.73	13

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Contractor-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**			
	Frequency									
Poor site and weather conditions	0	4	7	3	4	4	1	23	57.14	14

Table 12: RII for Consultant-related Factors

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Consultant-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**			
	Frequency									
Lack of quality assurance/control	4	11	3	2	1	2	0	23	77.02	1
Delay in undertaking quality inspections, testing and approving works	4	8	5	2	2	2	0	23	73.91	2
Design documents with errors, incomplete and not thoroughly detailed	2	6	10	2	2	1	0	23	72.05	3
Inadequate review for drawings and contract documents	2	6	10	2	2	1	0	23	72.05	3
Lack of timely and effective reporting	1	10	5	1	4	2	0	23	69.57	5

Weights	7	6	5	4	3	2	1	Total	RII	Rank
Consultant-related Factors	Strongly Agree	Agree	Slightly Agree	Not Sure	Slightly Disagree	Disagree	Strongly Disagree			
	Frequency									
Inexperienced personnel (managerial and supervisory personnel)	2	6	8	3	1	3	0	23	68.94	6
Lack of communication and cooperation by consultants	2	6	7	3	4	1	0	23	68.94	6
Delay in approving sample materials	1	5	5	5	5	2	0	23	62.7	8

In light of the analysis above, the following are the top twenty-five (25) factors across the three categories that were a result of and/or led to poor contract management of high-value contracts for road works at RDA:

(1) Delays in processing payment
(2) Awarding contracts prior to confirmation of availability of funds
(3) Design documents with errors, incomplete and not thoroughly detailed
(4) Insufficient data collection prior to planning and design
(5) Design changes during construction/ variation orders
(6) Poor contract supervision and monitoring
(7) Poor procurement and contract management planning
(8) Delay in engaging contractor after planning and designing
(9) Lack of cost planning/monitoring during pre- and post-contract stages
(10) Contractual claims e.g. EOT with cost, interest on delayed payments
(11) Inadequate cash/finance during construction
(12) Ineffective project planning, scheduling and execution
(13) Poor site management and supervision by the contractor

(14) Inexperienced technical personnel
(15) Rework due to defective work during construction
(16) Poor communication and coordination by the contractor with other parties
(17) Failure and unavailability of equipment, poor quality of materials
(18) Improper or ineffective construction methods implemented by the contractor
(19) Delay in subcontractors completing their works
(20) Frequent personnel changes
(21) Lack of quality assurance/control
(22) Delay in undertaking quality inspections, testing and approving works
(23) Design documents with errors, incomplete and not thoroughly detailed
(24) Inadequate review for drawings and contract documents
(25) Lack of timely and effective reporting

4.3 RESEARCH OBJECTIVE NO. 3 - WHAT FRAMEWORK CAN BE RECOMMENDED TO ADDRESS SHORTFALLS IN CONTRACT MANAGEMENT OF HIGH-VALUE ROAD WORKS AT ROAD DEVELOPMENT AGENCY?

In order to address this objective, questionnaires were administered and interviews conducted with respondents on the shortfalls/gaps in the contract management of high-value road works at Road Development Agency.

4.3.1 Qualitative Data Analysis for Research Objective/Question 3

The data collected from interviews was analysed using Thematic Analysis using the following steps:

(i) Familiarisation
(ii) Coding
(iii) Generating themes
(iv) Findings

4.3.2 Familiarisation and Coding

Interview data was reviewed in order to get a thorough overview. Thereafter, codes were prepared from the interview extracts shown in the table below.

Table 13: Familiarisation and Coding – Objective 3

Interview Extracts	Codes
Well in terms of shortfalls and gaps in the contract management of high-value road works at RDA, we have always endeavoured as an Agency to ensure that all these stages in contract management are adhered to accordingly. The significant shortfalls at RDA are related to payments. Payments have been erratic given the current national financial situation. Works have been slowed down due to non-payment and certain services have been discontinued due to lack of funding.	Lack of funding Delayed payments
The main gap that comes to my mind is the issue of funding because when there is no cash flow on the project it affects contract management. The lack of resources also delays the implementation of contracts. You find that a consultant engaged to supervise road works for 6 months ends up having their contract extended in order to allow the organisation to mobilise funds to pay the consultant for the completion of their deliverables. Therefore, the longer the project takes the costly it becomes. In most cases, the	Negative cash flow Extended durations

Interview Extracts	Codes
consultancy services are extended without cost but for construction works extensions are usually with cost because they charge you for standing time i.e. for equipment, labour, etc.	Cost overruns
Additionally, quality is also affected. Imagine the contractor has done works up to the base and they have submitted an invoice to be paid. Then you take 2 years to pay, and that base was already compacted and when you leave it traffic and rains damage the works affecting the quality. When the contractor gets paid the works would have to be redone which increases the cost of the works. The construction schedule is derailed as funds are made available outside the contractual payment period. At the time the funds are made available, the stakeholders may want to see progress despite the late payment. As a result of not following payment schedules, the implementation schedule is affected, and contractors are compelled to execute certain works in the rain season which may affect quality.	Poor quality of works Rework Schedule overruns Interest claims Stakeholder management

Interview Extracts	Codes
	Quality impairment
Even if contractors have financial resources, we have reached a stage where most contractors who may not have been paid for months/years, will not risk deploying their own resources as they wait for payment from RDA because the payment duration is uncertain. However, the contractor may deploy their financial resources when they are assured that they would receive payment on time. Sometimes the organisation commences construction works prior to confirmation of availability of funds when it comes to emergency works. The emergency works and request for funds for those works are initiated simultaneously. Therefore, the contractors are engaged on the understanding that payment would be made as soon funds are received. Usually when the annual work plan is being implemented, the understanding is that funds are available but what happens is when you start implementing there are delays in funding. Whether or not the funds are actually available at the time of execution is beyond us (RDA).	Poor risk management Poor contract selection Poor financial management Poor risk management Delayed funding

Interview Extracts	Codes
Some of the challenges in contract management at RDA relate to competence of the consultant. While we may review these people but at the end of the day competence, capability is something that needs to be enhanced. Because there are some consultants where RDA literally takes over. They are there but we seem to be doing the work.	Competence of personnel Performance management
This happens due to various reasons, for instance, at the time of evaluating the personnel provided are different from those provided at contract execution. This may be because of RDA taking long to conclude the tendering processes as a result the evaluated personnel are no longer available.	Prolonged solicitation
Furthermore, there are issues of cash flow. At the moment cash flow is one of the biggest shortfalls in contract management. If your cash flow is poor, these issues I am talking about of competence start coming in because the contractor can say I can get you superior personnel if you have enough financial resources. So, the issue of cash flow has very serious multiplier effects on many fronts in relation to contract management.	Cash flow management

Interview Extracts	Codes
Then the other issue on RDA side is that we embark on numerous projects at the same time. Each project has a consultant, but you find that we get overwhelmed because of backstopping many of them. These are some of the challenges from the RDA perspective.	contract overload
Some international contractors experience challenges at implementation because of not being conversant with the local governance procedures for projects and types of contracts we use. We have also observed that some local contractors lack technical and management competencies.	Contractor selection

4.3.3 Generating Themes

Table 14: Theme Generation – Objective 3

Codes	Themes
• Lack of funding • Delayed payments • Negative cash flow • Poor financial management • Delayed funding • Cash flow management	Financial management
• Poor quality of works • Quality impairment • Rework	Quality assurance

Codes	Themes
• Cost overruns • Interest claims • Contract overload	Cost overruns
• Stakeholder management	Stakeholder management
• Schedule overruns • Extended durations	Schedule overrun
• Poor risk management • Poor contract selection	Risk management
• Performance management • Competence of personnel	Monitoring, evaluation and control

4.4 DISCUSSIONS

The analysis of qualitative data showed that there were 8 themes related to limitations/shortfalls in contract management of high-value road works at RDA:

4.4.1 Financial Management

The research reviewed that RDA experiences inadequate funding for most of their road works which affects the timely processing of interim payment certificates (IPCs) for contractors. According to the 2018 Road Sector Annual Work Plan (RSAWP), funds from external sources amounted to ZMW3.3 billion out of the budgeted ZMW5.2 billion (RDA Annual Report, 2018). External funding was in the form of loans and grants to the Zambian Government for various road infrastructure from Multi-lateral Development Banks (MDBs) such as the World Bank, European Investment Bank (EIB), Exim Bank of China, African Development Bank and various Cooperating Partners such as the European Union and the Japanese International Cooperation Agency (JICA) among many others.

Moreover, it was noted that over-procurement shrinks the limited financial resources available for implementing construction contracts. In 2015, RDA's unconstrained budget was ZMW10,956,976,000 while the approved budget was ZMW6,624,938,774. The actual funding was ZMW6,318,438,922 which was 95% of the approved budget, but only 58% of the unconstrained budget. It was however observed that roads were procured at unconstrained levels thereby resulting in cash flow problems which in turn resulted in interest and standing time claims. The study done by Assaf et al. (1995) in Asia confirmed that cash flow problems to contribute to poor contract management of construction works.

4.4.2 Quality assurance

According to the research, unavailability of detailed engineering designs emerged as a contributing factor to poor quality of road works. Engineering designs enable contractors to execute works in accordance with the client's requirements. Twenty-nine (29) with a cumulative value of over ZMW8 billion were procured and commenced without detailed statements of work (SOW). The literature reviewed about contract management in Europe indicated that poorly prepared design documents affected the quality of construction works to a large extent (Zidane & Andersen, 2018).

Additionally, stoppage of construction works due to lack of funding or delayed payments resulted in a situation where the works get impaired due weather conditions such as rains.

Furthermore, changes of key personnel during the implementation of contracts increases the risk of the contractor engaging underqualified personnel. Although the contracts provided for the contractors not to change key personnel without approval from RDA, it was observed that on nine (9) projects, contractors changed key personnel without approval from RDA (Office of the Auditor General, 2017b).

4.4.3 Cost Overruns

The type of contracts deployed by RDA provides for contractors to claim interest in the event of delayed payment. Due to delayed payment, most construction projects incur cost overruns (i.e. over-expenditure). A review of literature showed that an amount of ZMW3,572,567,083 relating to a sample of fifty-two (52) projects had been certified out of which ZMW2,262,026,893 had been paid leaving a balance of ZMW1,777,790,549 outstanding for periods ranging from 28 to more than 400 days resulting in contractors and consultants charging interest amounting to ZMW141,590,074 as of December 2016 (Office of the Auditor General, 2017b).

Likewise, scope changes resulting from poor engineering designs increased the implementation cost of high-value road works through contract variations. It was observed that variations on certain contracts ranged from 50% to 400% (Office of the Auditor General, 2017b).

4.4.4 Schedule Overrun

Schedule overrun occurs when the actual duration of a contract exceeds the planned contract duration. From the interviews, respondents mentioned that sometimes contracts are extended in order to facilitate payment. Furthermore, it was observed that variations to the scope of work require execution of additional works which in turn lengthens the contract duration.

4.4.5 Stakeholder Management

A stakeholder is any individual, group or organisation that can affect, be affected by or perceive itself to be affected by an initiative i.e. activity or risk (Axelos, 2017). It was noted that financial stakeholders were not proactively management and engaged for funds for road works. This resulted in a situation RDA experience funding gaps in the midst of contract implementation.

4.4.6 Risk Management

Respondents alluded to the fact that due to poor risk management processes in the initial stages of contract management, inappropriate types of contracts where being implemented for road works.

4.4.7 Monitoring, Evaluation and Control

The research findings showed that lack of regular monitoring and control led to a situation where incompetent personnel where being engaged by contractors and consultants to manage road works.

4.4.8 Quantitative Data Analysis for Research Objective/Question 3

Quantitative data related to contract management deficiencies at RDA was collected through questionnaires from the target population. A total of 23 respondents participated and the frequencies for each deficiency in contract management are as shown below:

Table 15: Contract Management Deficiencies at RDA

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
Payment:	Late payments of Interim Payment Certificates	19	23
Contract Management Tools:	Lack of use of contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique	17	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
	(PERT), Critical Path Method (CPM), Gantt Chart, Earned Value Management (EVM), etc. for time and cost control		
Internal Arrangements:	No evaluation of main risks associated with the implementation of the contract and identification of the main remedies or mitigation measures	14	23
Site visits:	Inadequate site visits undertaken by the contract manager	14	23
Claims/Disputes:	Failure to settle claims and resolve disputes amicably	14	23
Non-performing Contractors:	Failure to apply penalties for non-performing contractors	14	23
Termination of Contract:	Terminating contracts without a contingency plan	14	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
Internal Arrangements:	No coordination arrangements with third parties (other agencies, contractors, end users, beneficiaries etc.)	13	23
Non-performing Contractors:	Approving/accepting non-compliant goods, defective work, or sub-standard materials	12	23
Contract Close-out:	No contract close-out meetings conducted, no follow up on close-out action points together with user departments and relevant stakeholders	12	23
Contract Close-out:	No preparation of contract close-out report and no lessons learnt are recorded	12	23
Kick-off Meeting(s):	No meetings with all other stakeholders – the parties responsible with the design and engineering, local	10	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
	authorities, state agencies (civil works inspection, environmental, labour etc.), end users and beneficiaries, etc.		
Site Access/Possession:	Late access to and possession of site	10	23
Internal Arrangements:	Lack of identification and clear assignment of responsibilities for contract management	9	23
Contract Close-out:	Unable to confirm that all contractor invoices are fully paid and that the main contractor has settled all subcontractors' payment. No request for letter of no obligation from the subcontractors	8	23
Contract Close-out:	Lack of verification with the appropriate Offices (e.g. Finance, Legal, Procurement, etc.) that there are no	8	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
	issues, claims or litigation actions in process or pending under the contract		
Internal Arrangements:	Failure to establish internal procedures (hierarchy, communication, level of authority, flow of documents, verification and acceptance procedures)	7	23
Contract Close-out:	Failure to ensure that the contractor has completed the required deliveries and that they have been inspected and accepted	7	23
Contract Close-out:	No request to contractor for a letter of no obligations under the contract and sending a similar confirmation to the contractor	7	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
Advance Payment:	Advance payment being made before receipt of/verification of the advance payment guarantee	6	23
Termination of Contract:	Terminating contracts contrary to the provisions of the contract	6	23
Securities/Bonds/Guarantees:	Lack of verification of securities, bonds, guarantees	5	23
Insurance Policies:	Lack of verification of insurance policies	5	23
Defects Liability Period:	Validity period of Performance Security/Retention Money Bank Guarantee and insurance policies (where applicable) not sufficient to cover the Defects Liability Period	5	23

Factor	Shortfall/Gap	Total Responses	Total Number of Respondents
Contract Close-out:	Failure to ensure that contractor's facilities are demobilized or properly written off or disposed of	5	23
Non-performing Contractors:	Non-rejection of non-performing staff	4	23
Contract Close-out:	Failure to undertake reconciliation of all financial records, invoices and payments made under the contract	4	23
Kick-off Meeting(s):	No kick-off meeting held with the contractor awarded the contract	3	23
Payment:	Absence of a well-established mechanism for the verification and approval of payment documents	2	23

The research results showed that more than 50% of respondents identified 11 critical shortfalls/gaps in the contract management of high-value road works at RDA.

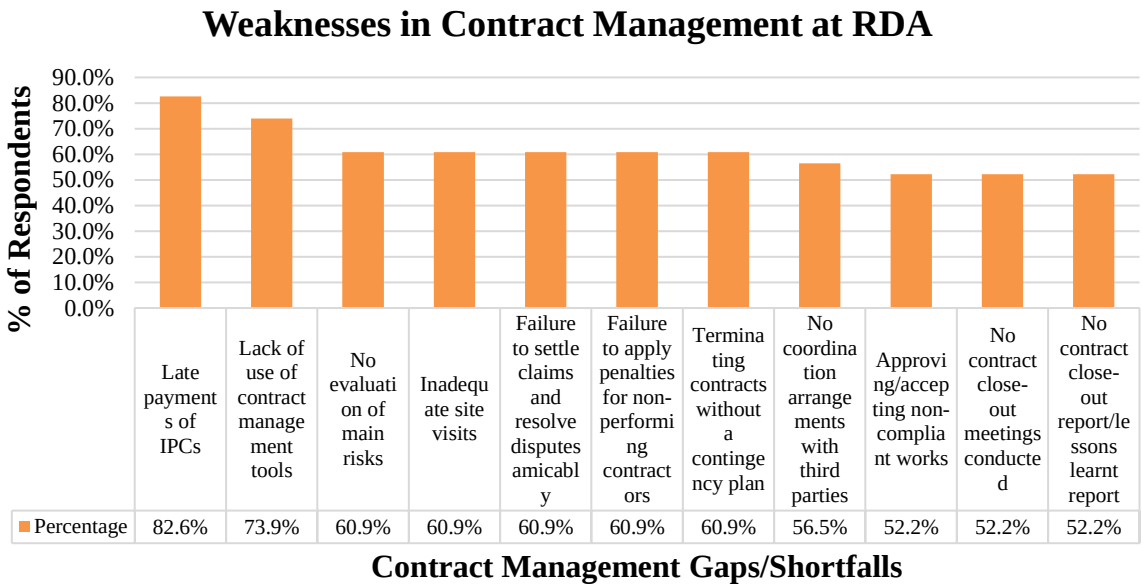

Figure 4: RDA Contract Management Weaknesses

4.5 DISCUSSIONS

4.5.1 Late Payments

Once a contractor's claim for payment is certified by the supervising consultant, RDA is obliged to settle the claim within twenty-eight (28) to fifty-six (56) days failure to which the contractor is entitled to charge interest on the outstanding claim. However, from the sampled projects 82.61% of the respondents stated that contractors experience late payments of Interim Payment Certificates (IPCs).

4.5.2 Failure to use Contract Management Tools

According to the data collected, 73.91% of the respondents indicated that lack of use of contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), Gantt Chart, Earned Value Management (EVM), etc. for time and cost control is a deficiency in the management of road contracts at RDA. A good number of contracts are mismanaged because the contract management team are unfamiliar with basic contract management tools and techniques that would enable to monitor the implementation road works.

4.5.3 Poor Risk Management

The results of the research show that 60.87% of respondents pointed to lack of evaluation of main risks associated with the implementation of contracts and identification of the main remedies/mitigation measures as one of the shortfalls in construction contract management. It was established that contract managers do not regularly review risk registers during contract implementation to ensure that the risks are being managed proactively by risk owners and risk actionees, and to identify emerging risks.

4.5.4 Inadequate Monitoring and Evaluation

The research reviewed that 60.87% of participants stated that inadequate site visits are undertaken by contract managers. Without sufficient monitoring of works on site, it is almost impossible to determine if the contractor mobilised equipment and materials, the works comply with the quality requirements and to ascertain the progress against what was planned.

Moreover, regular monitoring and evaluation assists contract managers to ascertain if personnel deployed by the contractor are sufficient to have the works completed on schedule, and whether environmental, health and safety issues are being addressed appropriately.

4.5.5 Dispute Management

60.87% of the research participants mentioned that failure to settle claims and resolve disputes amicably impacts effective management of high-value contracts at RDA. Contractual disputes could be time-consuming, expensive and difficult. They can damage contractual relationships, cause delays and negatively impact contract execution. They could also substantially increase the contract price.

It is therefore in the interest of RDA and contracting parties to work towards averting disputes in the first place. This can be achieved, among other things, through

developing good communications and working relationship management with the contractors.

4.5.6 Poor Contractor Performance Management

According to 60.87% and 52.17% of respondents, Failure to apply penalties for non-performing contractors and approving/accepting non-compliant/defective works, or sub-standard materials respectively contributes to poor contractor performance management.

4.5.7 Stakeholder Management

A stakeholder is any individual, group or organisation that can affect, be affected by or perceive itself to be affected by an initiative i.e. activity or risk (Axelos, 2017). 56.52% of participants in the research stated that there were no coordination arrangements with third parties (other agencies, contractors, end users, beneficiaries etc.). Despite the implementation of high value works contracts requiring close cooperation with diverse parties, it was observed that there were no proper agreements and arrangements put in place from the onset of projects, such as which agency would be involved in which stage of the works, etc.

4.5.8 Contract Close-out

Contract close-out is a process that occurs upon the physical completion or termination of a contract. Its purpose is to ensure that the contractor as well as the client/employer has complied with all the contractual requirements and that both parties have fulfilled their obligations. In the contract management of road works at RDA, 52.17% of research participants mentioned that there are no contract close-out meetings conducted, no follow up on close-out action points together with user departments and relevant stakeholders. Furthermore, contract management teams do not prepare contract close-out reports and lessons learnt for adoption in future road projects.

4.6 RECOMMENDED FRAMEWORK FOR CONTRACT MANAGEMENT

The results from research objectives/questions 1 to 3 were compared, contrasted and interpreted as a whole in order to develop the framework below which is being recommended to RDA for contract management of high-value road works in Zambia.

Figure 5: Recommended Contract Management Framework

Among subcomponents of Contract Initiation, Development & Award, and Implementation stages, the framework incorporates Contract Start-up and Contract Close-out as fully-fledged stages for effectively managing high-value contracts for road works at RDA. It was vital to develop the results-based framework as it addresses the limitations experienced by RDA in managing works contracts.

4.7 SUMMARY

This chapter looked at the analysis of data and findings using descriptive statistics to address research objective/question 1. The top twenty-five (25) factors of poor contract management were also identified and discussed. Thematic analysis was used to analyse the data collected for research objective/question 2. Lastly, concurrent mixed methods approach was adopted to address research objective/question 3.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 CONCLUSION AND RECOMMENDATIONS

This section of the dissertation contains conclusions and recommendations to the research conducted on the contract management of high-value road works in Zambia – a Case of Road Development Agency.

5.1 CONCLUSION

Contract management is one of the pillars for value creation in organisations. Effective and efficient management of RDA high-value road works contracts can contribute up to 9% in savings thereby increasing free cash flow for RDA to invest in other road projects and operations of the organisation.

It was discovered that contract management of road works at RDA primarily comprises four (4) stages, namely: planning and design, development and award, mobilisation and lastly implementation. The planning and design stage comprised such activities as feasibility studies and preparation of design documents. The development and award stage involved pre-qualification, tendering procedures, contract selection and award. The mobilisation stage comprised assembling the project team and finally implementation consisted of the actual execution of the road works.

The research reviewed that RDA experiences inadequate funding for most of their road works which affects the timely processing of interim payment certificates (IPCs) for contractors. Furthermore, unavailability of detailed engineering designs emerged as a contributing factor to poor quality of road works.

According to the research, lack of use of contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), Gantt Chart, Earned Value Management (EVM), etc. for

time and cost control was a deficiency in the management of road contracts at RDA. Additionally, lack of proactive management of main risks associated with the implementation of contracts was found to be lacking in downstream contract management activities.

Due to inadequate site visits are undertaken by contract managers, it was challenging for the organisation to determine contractors mobilised equipment and materials as per contractual requirements in order to execute road works effectively. In the absence of regular monitoring and evaluation contract managers were not able to determine with certainty if personnel deployed by the contractor are sufficient to have the works completed on schedule, and whether environmental, health and safety issues are being addressed appropriately.

Based on the findings of the research, a framework was developed that looks into addressing contract management limitations at RDA. After the implementation of the proposed contract management framework, it is expected that financial challenges related to executing construction projects will diminish, there will be minimal contract variations and road works will be executed within budget and on schedule. Contract managers/management teams will be equipped with tools and techniques for effective project management.

The contract close-out phase of the framework shall facilitate the creation of a pool of practical experiences which can applied to future road construction projects for successful implementation.

Furthermore, it is anticipated that contractors will have confidence in partnering with RDA in developing road infrastructure as the former shall incur fewer financial losses due to prolonged payment periods. Stakeholders would be engaged and managed proactively which shall increase the probability of projects being completed successfully with minimal bottlenecks.

5.2 RECOMMENDATIONS

In light of the research conducted and the proposed framework for managing high-value road works in Zambia – a case of Road Development Agency, the following recommendations were developed:

5.2.1 Financial Management

In the context of this research, financial management refers to resource mobilisation, payments and cost overruns. It is recommended that RDA implements the following measures:

(i) Ensure availability of funds at contract initiation and prior to contract signing. The cost of implementing a contract from initiation to close-out should be determined and adequate financial resources mobilised. No upstream contract management activities should precede confirmation of availability of funds. Engaging and managing stakeholders that sponsor road works as recommended below would be of paramount importance on this issue.

(ii) No major projects should be initiated outside the annual work plan for a given financial year. This would reduce and/or eliminate over-procurement which constrains limited financial resources. Emergencies should be considered on a case-by-case basis in light of available funding.

(iii) After the implementation of the foregoing measures, the organisation would be able to meet financial obligations to contractors when they fall due. This would build confidence in the supply market and enable the organisation procure road works at a competitive cost as contractors may cease factoring in delayed payments in their bid prices. Consequently, the organisation may consider eliminating the provision in works contracts for contractors to claim interest on delayed payments.

(iv) RDA should ensure that thorough geotechnical and feasibility studies are undertaken efficiently for the preparation of engineering designs for road

works. This would significantly reduce variations due to scope changes at contract implementation which cause cost overruns.

(v) RDA should consider implementing target cost contracts and public-private-partnerships (PPP) contracts for strategic works (high cost impact/high supply risk). Target cost contracts enable savings and cost overruns to be shared among the parties and PPP contracts enables the organisation to engage contractors/investors that deploy their financial resources.

5.2.2 Quality Assurance

(i) Detailed SOWs and engineering designs reduce the likelihood of contractors executing works that do meet the requirements of the organisation.

(ii) Contactor personnel should be vetted to ensure that they possess the requisite expertise and qualifications.

(iii) Redesign the quality assurance tests or inspections to ensure that quality issues are found and dealt with.

5.2.3 Schedule and Scope Management

Schedule management comprises the administration of processes required to manage the timely completion and execution of contracts. In managing the schedule of contracts, RDA should:

(i) Establish policies, procedures, and documentation for planning, developing, managing, executing, and controlling the contract schedule.
(ii) For every contract, identify and document the specific actions to be performed to produce the contract deliverables.
(iii) Identify and document relationships among the contract activities.
(iv) Estimate the number of work periods needed to complete individual activities with the estimated resources.

(v) Analyse activity sequences, durations, resource requirements, and schedule constraints to create a model for contract execution and monitoring and controlling.

(vi) monitor the status of the contract to update the contract schedule and manage changes to the schedule baseline.

Scope management comprises the processes required to ensure that the contract includes all the work required, and only the work required, to complete the contract successfully. RDA should incorporate the following processes in order to manage the scope of contracts for high-value road works:

(i) Creating a scope management plan that documents how the contract scope will be defined, validated, and controlled.

(ii) Determining, documenting, and managing stakeholder needs and requirements to meet project objectives.

(iii) Developing detailed statement of work and engineering designs for road works.

(iv) Creating work breakdown structures by subdividing contract deliverables and project work into smaller, more manageable components.

(v) Formalising the acceptance of completed contract deliverables.

(vi) Monitoring the scope of the contract and managing changes to the initial scope of the contract.

5.2.4 Stakeholder Management

The recommended framework for contract management of road works shows that stakeholder management should be carried during the both upstream and downstream stages of contract management. The four-step process below should be considered:

(i) Identify the stakeholders

Identifying stakeholders comprises brainstorming potential stakeholders with the project team, consulting peers and funders who are envisioned to be stakeholders. The role that each stakeholder plays should be summarised

according to who is responsible, accountable, should be consulted and informed (RACI).

(ii) Understand and prioritise the stakeholders

This is pertinent as not every stakeholder is of equal importance to the goal of the project and thus, they need to be engaged with at different frequencies and with different levels of information. A stakeholder matrix such as the one shown below should be utilised for this step.

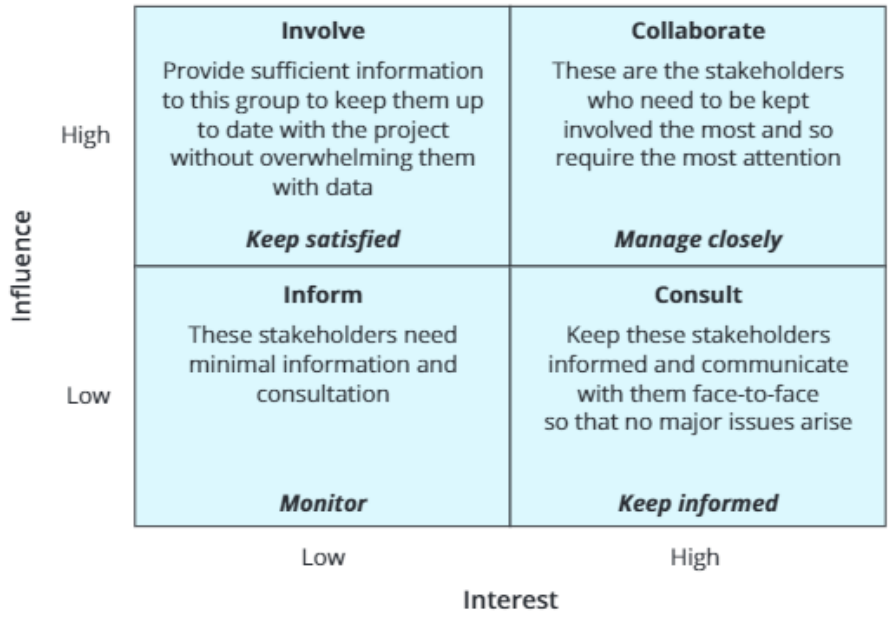

Figure 6: Stakeholder Matrix (Source: CIPS, 2020)

(iii) Prepare a stakeholder engagement plan

The next step is to prepare a communication plan that covers each of the four categories of stakeholders.

Table 16: Stakeholder Engagement Plan

Inform	Consult	Involve	Collaborate
Email	Questionnaire	Workshop	Steering group meetings

Newsletters	Focus groups	Face-to-face meetings	Face-to-face meetings
Once a quarter	At the start of the contract followed by monthly	Weekly to monthly	Monthly

(iv) Implement the plan

Last the stakeholder plan should be implemented with regular reviews and making changes were necessary. While executing the plan, it is imperative to:

- Make sure that the purpose, scope, risks and approach are clear to everyone and there is no confusion.
- Be aware of stakeholder behaviour and what might be causing a particular reaction.
- Plan the stakeholder engagement in advance and talk to colleagues about possible reactions to the engagement.
- Use foresight to identify potential problems with communication and engagement and forge a way around them.
- Treat stakeholders as potential sources of risk and opportunity for the contract and take action accordingly.

5.2.5 Risk Management

Risk management is the systematic application of principles, approaches, and processes to the tasks of identifying and assessing risks, planning and implementing risk responses and communicating risk management activities with stakeholders (Axelos, 2017). RDA may consider adopting the following 5-step risk management process throughout the stages of the proposed contract management framework, from contract initiation to contract close-out:

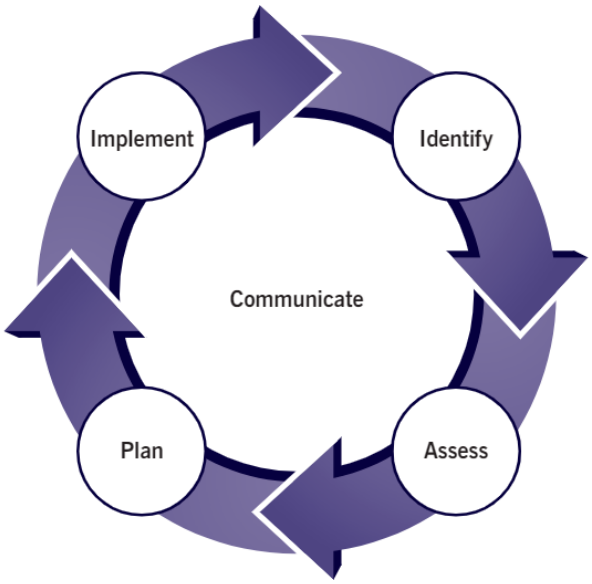

Figure 7: Risk Management Process (Source: Axelos, 2017)

(i) **Identify** – risks may be identified through techniques such as review lessons, risks checklists, risk prompt lists, brainstorming and risk breakdown structures.

(ii) **Assess** – risks may be assessed and estimated using techniques such as probability impact grid, expected value, probability trees and pareto analysis. Additionally, risks may be evaluated using risk models (i.e. Monte Carlo simulation) and expected monetary value.

(iii) **Plan** – this step involves identifying and evaluating the appropriate risk response to remove or reduce threats and maximise opportunities.

(iv) **Implement** – this step ensures that the risk owner and risk actionee are identified and agreed for each risk for management, monitoring, control and mitigation.

(v) **Communication** – this step, undertaken continually, ensures that information related to threats and opportunities faced by the contract are communicated internally and externally to stakeholders.

5.2.6 Monitoring and Contractor Performance Management

(i) RDA should be training staff, involved in managing contracts, in using contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), Gantt Chart, Earned Value Management (EVM), etc. for time and cost control.

(ii) Conducting regular monitoring and evaluation on site to determine if the contractor(s) mobilised equipment and materials, the works comply with the quality requirements and to ascertain the progress against what was planned, if personnel deployed by the contractor are sufficient to have the works completed on schedule, and whether environmental, health and safety issues are being addressed appropriately.

(iii) Contract managers may consider be applying contractual remedies below to manage non-performing contractors:

- Deny approval or acceptance of defective works, or sub-standard materials
- Withholding payment
- Rejection of non-performing staff
- Penalties for failure to meet functional guarantees
- Use of liquidated damages
- Actions against the Performance Security
- Termination of Contract.

5.2.7 Dispute Resolution

Dispute resolution is any process which can bring about the conclusion of a dispute. Techniques range from the most informal discussions, through to formal negotiations, mediation and arbitration. Arbitration and litigation should be considered as resolution methods of the last resort.

(i) Contract management planning should include agreement on the procedure to follow to resolve disagreement between parties regarding responsibilities and interpretation of the contract.

(ii) RDA should always endeavour to avoid arbitration as it consumes time and can be costly for parties involved. Every attempt should be made to find an efficient and cost-effective resolution including through amicable settlement.

(iii) To minimize contractual disputes and complication, RDA and all contracting parties need to effectively carry out their duties in accordance with the contract.

(iv) Many contractual disagreements stem from ambiguities in the language of contracts. Some basic rules for resolving ambiguous contract language include:

- Respect established order of precedence of documents
- Interpret the contract as a whole and, wherever possible, consistently
- Apply dictionary definitions to everyday words and a law dictionary for legal terms
- Apply standard trade or technical definitions to technical words, unless the context or usage indicates a different meaning
- When conflict occurs between two sections of the contract and no directions to the contrary exist, assume that: Handwritten text takes precedence over typed text, typed text takes precedence over pre-printed text on a standard form, and specific clauses take precedence over general clauses.

(v) Keys to effective dispute resolution that may be considered include:

- Recognise that contract documents are not perfect
- Keep larger objectives in mind
- Focus on the facts
- Depersonalize the issues
- Be willing to make reasonable compromises

5.2.8 Contract Close-out

Contract close-out is a process that occurs upon the physical completion or termination of a contract. Its purpose is to ensure that the contractor as well as the client/employer has complied with all the contractual requirements and that both parties have fulfilled

their obligations. It is recommended that RDA incorporates the following steps in the close-out processes of all works contracts:

- Ensure that the Contractor has completed the required deliveries of supplies and they have been inspected and accepted by the organisation.
- Contractor's facilities are demobilized or properly written off or disposed of.
- Provide a statement of completion of all obligations by the contractor for deliveries or services under the contract to the contract manager.
- Conducts close-out meetings, follow up on close-out actions points together with technical departments and relevant stakeholders.
- Confirm that the all contractor invoices are fully paid by RDA and further that the main contractor has settled all subcontractors' payment. Request for letter of no obligation from the subcontractors.
- Verify with the appropriate Offices (e.g. Finance, Legal, etc.) that there are no issues, claims or litigation actions in process or pending under the contract.
- Confirm that employees of the contractor are paid and properly demobilized.
- Undertake reconciliation of all financial records, invoices and payments made under the contract.
- Request Contractor to send a letter of no obligations under the contract to RDA and send a similar confirmation to the contractor.
- Prepare close-out report and ensure Lessons Learnt are recorded, close-out report is approved, signed, original submitted to relevant departments.

5.3 SUMMARY

This chapter looked at the step by step breakdown of the recommendations to RDA on how to address shortfalls/limitations in the contract management of high-value road works. The recommendations are all based on the results of the research and the proposed contract management framework developed in chapter 4.

REFERENCES

Ahmed, S.M., Azhar, S., Kappagantula, P. and Gollapudi, D., 2003. "Delays in construction: a brief study of the Florida construction industry", *Proceeding of the 39th Annual ASC Conference,* Oemson University, Clemson, SC, pp. 257-266.

Alaghbari, W., Kadir, M. R. A., Salim, A. and Ernawati, 2007. "The significant factors causing delay of building construction projects in Malaysia", *Engineering, Construction and Architectural Management,* 14(2), pp. 193-202.

Al-Momani, A., 2000. "Construction delay: A quantitative analysis", *International Journal of Project Management*, 18(1), 51-59.

Al-Najjar, J., 2008. *Factors influencing time and cost overruns on construction projects in the Gaza Strip*. Master's Thesis. Islamic University.

Asiedu, R. O. and Adaku, E., 2020. "Cost overruns of public sector construction projects: A developing country perspective", *International Journal of Managing Projects in Business*, 13(1), 66-84.

Asnaashari, E., Farahani, S., Hoseini, A. and Knight, A., 2009. *5th International Conference on Construction in the 21st Century: Causes of delay in Iranian construction projects*. Istanbul, Turkey, 20-22 May 2009.

Assaf, S. and Al-Hejji, S., 2006. "Factors affecting time overrun in large construction projects", *International Journal of Project Management*, 24(4), 349-357.

AXELOS Limited, 2017. *Managing Successful Projects with PRINCE2®*. United Kingdom: The Stationery Office.

Braun, V. and Clarke, V., 2006. “Using thematic analysis in psychology”, *Qualitative Research in Psychology*, 3(2), pp. 77-101.

Carmichael, G. D., 2000. *Contracts and International Project Management*. Rotterdam, Netherlands: A. A. Balkema Publishers.

Chartered Institute of Procurement and Supply, 2020. *Contract Management Guide*. [pdf] Chartered Institute of Procurement and Supply. Available at: <https://www.cips.org/en/knowledge/procurement-topics-and-skills/developing-and-managing-contracts/contract-management/contract-management-guide/> [Accessed 26 February 2020].

Coleman, E., Nooni, I. K., Fianko, S. K., Dadzie, L., Owusu-Agyemang, J., Ansa-Asare, E. O. and Neequaye, E. N., 2020. “Assessing contract management as a strategic tool for achieving quality of work in Ghanaian construction industry: A case study of FPMU and MMDAs”, *Journal of Financial Management of Property and Construction*, 25(1), pp. 41-60.

Creswell, J. W. (2003). *Research design: qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, California: Sage Publications. Harvard (18th ed.).

Damoah, I. S. and Kumi, D. K., 2018. “Causes of government construction projects failure in an emerging economy: Evidence from Ghana”, *International Journal of Managing Projects in Business*, 11(3), pp. 558-582.

Developing People Serving the Supply Chain, n.d. *Contract & Commercial Management Training.* [pdf] Developing People Serving the Supply Chain. Available at: <https://www.dpss.co.uk/contract-management-training-courses-endorsed-by-iaccm/> [Accessed 26 February 2020].

Engineering and Consulting Firms Association, n.d. *Sectoral Development Strategies*. [pdf] Japan: Engineering and Consulting Firms Association. Available at: <http://www.ecfa.or.jp/japanese/act-pf_jka/H17/renkei/zambia/Zambia-Chapter%204-A.pdf> [Accessed 17 November 2019].

Enshassi, A., Al-Najjar, J. and Kumaraswamy, M., 2009. "Delays and cost overruns in the construction projects in the Gaza Strip", *Journal of Financial Management of Property and Construction,* 14(2), pp. 126-151.

Faridi, A. and El-Sayegh, S., 2006. "Significant factors causing delay in the UAE construction industry", *Journal of Construction Management and Economics*, 24(11), 1167-76.

Foster, V. and Dominguez, C., 2010. *Zambia's Infrastructure: A Continental Perspective*. [pdf] The World Bank. Available at: <http://siteresources.worldbank.org/INTAFRICA/Resources/Zambia-Country_Report_03.2011.pdf> [Accessed 6 December 2019].

Frimpong, Y., Oluwoye, J. and Crawford, L., 2003. "Causes of delay and cost overruns in construction of groundwater projects in a developing countries: Ghana as a case study", *International journal of Project Management,* 21(5), pp. 321-6.

Government of Canada, 2015. *Overview of Contract Management*. [pdf] Government of Canada. Available at: <https://buyandsell.gc.ca/policy-and-guidelines/supply-manual/section/8/1> [Accessed 26 February 2020].

Guccio, C., Pignataro, G. and Rizzo, I., 2012. "Measuring the Efficient Management of Public Works Contracts: A Non-parametric Approach", *Journal of Public Procurement*, 12(4), pp. 528-546.

International Association for Contract & Commercial Management, 2012. *Poor Contract Management Costs Companies 9% - Bottom Line*. [online] Available at: <https://www.iaccm.com/resources/?id=6845&cb=1569306558> [Accessed 29 December 2019].

International Association for Contract and Commercial Management, 2020. *What is Contract Management?* [online] Available at: <https://www.iaccm.com/about/contract-management/> [Accessed 26 February 2020].

International Fund for Agricultural Development, 2010. *IFAD Procurement Handbook*. [pdf] International Fund for Agricultural Development. Available at: <https://www.ifad.org/documents/38711624/39421018/proc_handbook_e.pdf/2febc53a-4244-4447-a788-d06a632fd3b5> [Accessed 26 February 2020].

International Organization for Standardization, 2018. *Risk Management Guidelines: ISO 31000*. [pdf] International Organization for Standardization. Available at: <https://www.iso.org/obp/ui/#iso:std:iso:31000:ed-2:v1:en> [Accessed 26 February 2020].

Kaming, P., Olomolaiye, P., Holt, G. and Harris, F. C., 1997. "Factors influencing construction time and cost overruns on high-rise projects in Indonesia", *Journal of Construction Management and Economics,* 15(1), pp. 83-94.

Kelemen, M. and Rumens, N., 2008. *An Introduction to Critical Management Research.* London: Sage.

Koushki, P. A., Al-Rashid, K. and Kartam, N., 2005. “Delays and cost increases in the construction of private residential projects in Kuwait”, *Journal of Construction Management and Economics,* 23(3), pp. 285-294.

Liu, S. S. and Wang, C. J., 2010. “Profit optimization for multi-project scheduling problems considering cash flow”, *Journal of Construction Engineering and Management,* 136(12), pp. 1268-1278.

Lo, T., Fung, I. and Tung, K., 2006. “Construction delay in Hong Kong civil engineering projects”, *Journal of Construction Engineering and Management,* 132(6), pp. 636-49.

Lysons, K., and Farrington, B., 2016. *Procurement and Supply Chain Management*. Edinburgh Gate, Harlow CM20 2JE, United Kingdom: Pearson Education Limited

Mahdi, I., Riley, M., Fereig, S. and Alex, A., 2002. “A multi-criteria approach to contractor selection”, *Engineering, Construction and Architectural Management*, 9(1), 29-37.

Majid, I. A., 2006. *Causes and Effects of Delays in Aceh Construction Industry*. Master’s Thesis. Universiti Teknologi.

Mezher, T. C. and Tawil, W., 1998. “Causes of delay in the construction industry in Lebanon”, *Engineering, Construction and Architecture Management,* 5(3), 252-260.

Mishra, G. (2014). *Public Private Partnership (PPP) Construction Projects – Types and Benefits.* [online] Available at: <https://theconstructor.org/construction/public-private-partnership-ppp-construction-projects-types-benefits/1319/> [Accessed 26 February 2020].

Muya, M., Kaliba, C., Sichombo, B. and Shakantu, W., 2013. "Cost Escalation, Schedule Overruns and Quality Shortfalls on Construction Projects: The Case of Zambia", *International Journal of Construction Management*, [e-journal] 13(1), 53-68. http://dx.doi.org/10.1080/15623599.2013.10773205.

Nashikkar, J. T., 2013. "Contract Management". [pdf] Available at: <www.indiaurbanportal.in/pdf!Lesson3-Nashikkar.pdf> [Accessed 7 November 2019].

National Assembly of Zambia, 2018. *2019 National Budget Speech*. [pdf] National Assembly of Zambia. Available at: <http://www.parliament.gov.zm/node/7693> [Accessed 14 November 2019].

National Assembly of Zambia, 2019. *2020 National Budget Speech*. [pdf] National Assembly of Zambia. Available at: <http://www.parliament.gov.zm/node/8121> [Accessed 14 November 2019].

National Road Fund Agency, 2017. *National Road Fund Agency Annual Report*. [pdf] National Road Fund Agency. Available at: <http://nrfa.org.zm/wp-content/uploads/2019/01/Annual-Report-2017.pdf> [Accessed 21 October 2019].

Nguyen, L. D., Ogunlana, S. O. and Lan, D. T., 2004. "A study on project success factors on large construction projects in Vietnam", *Engineering Construction and Architectural Management*, 11(6), pp. 404-413.

Odeh, A. M. and Battainehm, H. T., 2002. "Causes of construction delay: Traditional contracts", *International Journal of Project Management*, 20(1), pp. 67-73.

Office of the Auditor General, 2017a. *Report of the Auditor General on the Accounts of Parastatal Bodies and other Statutory Institutions for the Financial Year Ended 31st December 2017*. [pdf] Office of the Auditor General. Available at: <https://www.ago.gov.zm/?page_id=5200> [Accessed 11 September 2019].

Office of the Auditor General, 2017b. *Report of the Auditor General on the Road Projects under the Road Development Agency for the Period January 2012 to December 2015*. [pdf] Office of the Auditor General. Available at: <https://www.ago.gov.zm/?wpfb_dl=61> [Accessed 11 September 2019].

Ogunlana, S. O. and Promkuntong, K., 1996. "Construction delays in a fast-growing economy:

Comparing Thailand with other economies", *International Journal of Project Management,* 14(1), pp. 37-45.

Ogunsemi, R. D. and Aje, O. I., 2006. "A model for contractors' selection in Nigeria", *Journal of Financial Management of Property and Construction*, 11(1), 33-44.

Project Management Institute, 2017. *A Guide to the Project Management Body of Knowledge*. Newtown Square, Pennsylvania, USA: Project Management Institute, Inc.

Public Procurement Regulations 2011. 2011. SI 2011/65. Lusaka: Zambia Public Procurement Authority.

Research", *Academy of Management Review*, 35(2), pp. 315-33.

Road Development Agency, 2016. *Road Development Agency Annual Report*. [pdf] Road Development Agency. Available at: <http://www.rda.org.zm/index.php/media-

centre/reports/annual-reports/download/7-annual-reports/91-rda-annual-report-2016> [Accessed 26 September 2019].

Road Development Agency, 2018. *Road Development Agency Annual Report*. [pdf] Road Development Agency. Available at: <http://www.rda.org.zm/index.php/media-centre/reports/annual-reports/ > [Accessed 26 February 2021].

Road Development Agency, 2019a. *About RDA*. [online] Road Development Agency. Available at: <http://www.rda.org.zm/> [Accessed 26 September 2019].

Road Development Agency, 2019b. *2019 – 2021 Strategic Plan*. [pdf] Road Development Agency. Available at: <http://www.rda.org.zm/index.php/media-centre/downloads/download/12-publications/99-2019-2021-strategic-plan> [Accessed 26 September 2019].

Runji, J., 2017. *Appraisal Project Information Document-Integrated Safeguards Data Sheet - Zambia: Improved Rural Connectivity Project-SUF - P159330 (English)*. [pdf] World Bank Group. Available at: <http://documents.worldbank.org/curated/en/855541491590243313/Appraisal-Project-Information-Document-Integrated-Safeguards-Data-Sheet-Zambia-Improved-Rural-Connectivity-Project-SUF-P159330> [Accessed 16 January 2020].

Sambasivan, M., Deepak, T., Salim, A., and Ponniah, V., 2017. "Analysis of delays in Tanzanian construction industry", *Engineering, Construction and Architectural Management*, 24(2), 308-325.

Saunders, M., Lewis, P. and Thornhill, A., 2016. *Research Methods for Business Students*. 7th ed. England: Pearson Education Limited.

Schweikert, A., 2018. *Zambia Road Network. Logistics Capacity Assessment*. [online] Available at: <https://dlca.logcluster.org/display/public/DLCA/2.3+Zambia+Road+Network> [Accessed 23 January 2020].

Service Works Global, 2020. *Types of PPP Contracts*. [online] Available at: <https://www.swg.com/can/insight/ppp-resources/types-of-ppp-contracts/> [Accessed 1 September 2019].

The United Nations, 2010. *UN Procurement Practitioner's Handbook (PPH)*. [pdf] The United Nations. Available at: <https://www.ungm.org/Shared/KnowledgeCenter/Pages/PPH2> [Accessed 1 September 2019].

The World Bank, 2011. *Manual for Contract Management Procedures in World Bank-Financed Projects in Europe and Central Asia Region*. NW Washington, DC, USA: The World Bank.

The World Bank, 2018. *Procurement Guidance: Contract Management Practice*. [pdf] The World Bank. Available at: <http://pubdocs.worldbank.org/en/277011537214902995/CONTRACT-MANAGEMENT-GUIDANCE-September-19-2018-Final.pdf> [Accessed 1 September 2019].

The World Bank, 2020. W*hat are Public Private Partnerships?* [online] Available at: <https://ppp.worldbank.org/public-private-partnership/overview/what-are-public-private-partnerships> [Accessed 23 September 2019].

Tookey, J. E., Hand Castle, C., Murray, M. and Langford, D., 2001. “Construction procurement routes: Redefining the contours of construction procurement”, *Engineering Construction and*

U.S. Department of Transportation, 2020. *Alternative Project Delivery*. [online] Available at: <https://www.fhwa.dot.gov/ipd/alternative_project_delivery/defined/new_build_facilities/dbom.aspx> [Accessed 14 October 2019].

Whitticks, E., 2005. *Construction Contracts: How to Manage Contracts and Control Disputes in a Volatile Industry*. Houston, TX, USA: Gulf Publishing Company.

Wong, K. and Vimonsatit, V., 2012. “A study of the factors affecting construction time in Western Australia”, *Scientific Research and Essays*, 7(40), pp. 3390-3398.

Yin, R. K., 2014. *Case Study Research: Design and Method*. 5th ed. London: Sage.

Zidane, Y. J. and Andersen, B., 2018. “The top 10 universal delay factors in construction projects”, *International Journal of Managing Projects in Business*, 11(3), pp. 650-672.

APPENDICES

APPENDIX A: QUESTIONNAIRE

Contract life cycle management is the process of systematically and efficiently managing contract creation, execution and analysis for maximising operational and financial performance and minimising risk (CIPS, 2020).

A. Which of the following factors are as a result of and/or lead to poor contract management of high-value contracts for road works at Road Development Agency?
(Please tick √ strongly agree, agree, slightly agree, not sure, slightly disagree, disagree or strongly disagree against each factor)

Client-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**
	7	**6**	**5**	**4**	**3**	**2**	**1**
1. Poor procurement and contract management planning							
2. Improper evaluation of bids							
3. Awarding contracts to incompetent contractors							
4. Slow decision-making process							
5. Lack of coordination with contractors							
6. Poor communication and coordination between parties							
7. Delay in processing payment							
8. Awarding contracts prior to confirmation of availability of funds							
9. Delay in facilitating the mobilisation of the contractor							

10. Delay in engaging contractor after planning and designing							
11. Design documents with errors, incomplete and not thoroughly detailed							
12. Insufficient data collection prior to planning and design							
13. Erroneous estimation of time and resources							
14. Lack of cost planning/monitoring during pre- and post-contract stages							
15. Inappropriate choice of contract							
16. Management of relationships with stakeholders							
17. Design changes during construction/ variation orders							
18. Inexperienced contract management team							
19. Poor contract supervision and monitoring							
20. Contractual claims e.g. EOT with cost, interest on delayed payments							

Contractor-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**
	7	**6**	**5**	**4**	**3**	**2**	**1**
1. Poor site management and supervision by the contractor							
2. Conflicts of subcontractors'							

schedules in execution of the project							
3. Rework due to defective work during construction							
4. Poor communication and coordination by the contractor with other parties							
5. Ineffective project planning, scheduling and execution							
6. Improper or ineffective construction methods implemented by the contractor							
7. Delay in subcontractors completing their works							
8. Inexperienced technical personnel							
9. Delay in site mobilisation							
10. Increase in the cost of materials, equipment and labour							
11. Failure and unavailability of equipment, poor quality of materials							

12. Poor site and weather conditions							
13. Inadequate cash/finance during construction							
14. Shortage of labour, materials and equipment							
15. Failure to thoroughly comprehend design documents							
16. Frequent personnel changes							

Consultant-related Factors	**Strongly Agree**	**Agree**	**Slightly Agree**	**Not Sure**	**Slightly Disagree**	**Disagree**	**Strongly Disagree**
	7	**6**	**5**	**4**	**3**	**2**	**1**
1. Inexperienced personnel (managerial and supervisory personnel)							
2. Lack of quality assurance/control							
3. Delay in undertaking quality inspections, testing and approving works							
4. Lack of communication and cooperation by consultants							

5. Design documents with errors, incomplete and not thoroughly detailed							
6. Lack of timely and effective reporting							
7. Delay in approving sample materials							
8. Inadequate review for drawings and contract documents							

B. What are the shortfalls/gaps in the contract management of high-value road works at Road Development Agency? (Tick all that apply)

Internal Arrangements:

☐ Lack of identification and clear assignment of responsibilities for contract management

☐ Failure to establish internal procedures (hierarchy, communication, level of authority, flow of documents, verification and acceptance procedures)

☐ No evaluation of main risks associated with the implementation of the contract and identification of the main remedies or mitigation measures

☐ No coordination arrangements with third parties (other agencies, contractors, end users, beneficiaries etc.)

☐ Kick-off Meeting(s)

☐ No kick-off meeting with the contractor

No meetings with all other stakeholders – the parties responsible with the design and engineering, local authorities, state agencies

Payment

☐ Late payments of Interim Payment Certificates

☐ Absence of a well-established mechanism for the verification and approval of payment documents

Non-performing Contractors:

☐ Approving/accepting non-compliant goods, defective work, or sub-standard materials

☐ Non-rejection of non-performing staff

☐ Failure to apply penalties for non-performing contractors

Defects Liability Period

☐ Validity period of Performance Security/Retention Money Bank Guarantee and insurance policies (where applicable) not sufficient to cover the Defects Liability Period

(civil works inspection, environmental, labour etc.), end users and beneficiaries, etc.

☐ Site Access/Possession

Late access to and possession of site

☐ Securities/Bonds/Guarantees

Lack of verification of securities, bonds, guarantees

☐ Insurance Policies

Lack of verification of insurance policies

☐ Insurance Policies

Lack of verification of insurance policies

☐ Advance Payment

Advance payment being made before receipt of/verification of the advance payment guarantee

☐ Contract Management Tools

Lack of use of contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), Gantt Chart, Earned Value Management (EVM), etc. for time and cost control

☐ Contract Management Tools

Lack of use of contract management tools such as Work Breakdown Structure (WBS), Program Evaluation and Review Technique (PERT), Critical Path Method (CPM), Gantt

☐ Termination of Contract

Terminating contracts without a contingency plan

☐ Terminating contracts contrary to the provisions of the contract

☐ Contract Close-out

Failure to ensure that the contractor has completed the required deliveries and that they have been inspected and accepted

☐ Failure to ensure that contractor's facilities are demobilized or properly written off or disposed of

☐ No contract close-out meetings conducted, no follow up on close-out action points together with user departments and relevant stakeholders

☐ Unable to confirm that all contractor invoices are fully paid and that the main contractor has settled all sub-contractors' payment. No request for letter of no obligation from the subcontractors

☐ Lack of verification with the appropriate Offices (e.g. Finance, Legal, Procurement, etc.) that there are no issues, claims or litigation actions in process or pending under the contract

Chart, Earned Value Management (EVM), etc. for time and cost control

Site visits

☐ Inadequate site visits undertaken by the contract manager

☐ Failure to undertake reconciliation of all financial records, invoices and payments made under the contract

Claims/Disputes

☐ Failure to settle claims and resolve disputes amicably

☐ No request to contractor for a letter of no obligations under the contract and sending a similar confirmation to the contractor

☐ No preparation of contract close-out report and no lessons learnt are recorded

Thank you for taking the time to complete this questionnaire. If you have any queries please do not hesitate to contact Mr Chisala Mutale by telephoning +260977794998 or emailing ct.mutale@gmail.com.

APPENDIX B - INTERVIEW GUIDE

Contract life cycle management is the process of systematically and efficiently managing contract creation, execution and analysis for maximising operational and financial performance and minimising risk (CIPS, 2020).

A. How are high-value contracts for road works in Zambia managed by the Road Development Agency?

Themes to be covered in the interview:

1) Procurement planning
2) Design and specifications
3) Contract and contractor selection
4) Contract management plan
5) Contract execution and delivery

B. What are the shortfalls/gaps in the contract management of high-value road works at Road Development Agency?

Themes to be covered in the interview:

1. Internal Arrangements
2. Kick-off Meeting(s)
3. Site Access/Possession
4. Kick-off Meeting(s)
5. Securities/Bonds/Guarantees
6. Site Access/Possession
7. Insurance Policies
8. Advance Payment
9. Securities/Bonds/Guarantees
10. Contract Management Tools
11. Site visits
12. Insurance Policies
13. Claims/Disputes
14. Payment
15. Non-performing Contractors
16. Defects Liability Period
17. Termination of Contract
18. Contract Close-out
19.