AN ASSESSMENT OF THE PLANNING CYCLE IN ZAMBIA'S ROAD CONSTRUCTION PROJECTS

BY

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DECLARATION

I **Makalani Mkuni** do hereby declare that the work presented in this thesis is the result of my own research except to the extent acknowledged and that it has not been previously submitted in part or full for a qualification at any university.

11TH JANUARY, 2017

Signature Date

Professor Mundia Muya 11.01.2017

Supervisor's Name & Signature Date

CERTIFICATE OF APPROVAL

This dissertation of **Makalani Mkuni** is approved by the University of Zambia in partial fulfilment of the requirements for the award of the degree of Master of Engineering in Project Management.

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ABSTRACT

Despite so many studies about the construction industry in Zambia, very little is known about road construction project planning. A construction project is generally considered successful if it is planned, designed, constructed and handed over for use within the intended budget, time and meeting the desired set quality. However, road construction projects in Zambia have been known to overrun the design schedule and incur costs higher than planned and budgeted. The main aim of this research was to propose a planning cycle that will improve the management of road infrastructure projects in Zambia as a means of minimising road construction and maintenance costs. This was achieved through a total assessment of the current practices in the planning of public road infrastructure development projects and identification of key bottlenecks. This study was limited to public road construction projects within Zambia. The research was conducted using the cross – sectional study design and the study population of interviewees and questionnaire respondents comprised professionals involved in public road construction project planning at national and district levels. A triangulated methodological approach of using structured interviews, a questionnaire survey and three case studies was adopted preceded by a detailed literature review. Results revealed some constraints in the manner road projects were planned. Amongst the problems identified were non-adherence to strategic plans, political interference, poor project prioritisation, uncoordinated contract procurement, procuring contracts before confirmation of funds availability, government bureaucracy, inconsideration of vendor past performance during tendering and inappropriate project designs. After case studies a model was proposed which would be used in enhancing public road project planning in Zambia. It was established that the lapses in the project planning processes had negatively impacted on project delivery through cost overruns, delays and quality shortfalls. The researcher recommended the adoption of the developed model for use by implementing institutions as other researchers consider developing it further in order to address some of its limitations. The findings from this study, the proposed model, conclusions and recommendations are expected to enhance road project planning in Zambia and further still improve project delivery.

Keywords: *project planning, public road projects, contract, model*

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LIST OF ACRONYMS AND ABBREVIATIONS

ADB	African Development Bank
AG	Auditor General
AWP	Annual Work Plan
BoQ	Bill of Quantities
CEO	Chief Executive Officer
CPD	Continuous Professional Development
CSO	Central Statistics Office
EIZ	Engineering Institution of Zambia
EU	European Union
EUR	Euro
FHWA	Federal Highway Administration
FIDIC	International Federation of Consulting Engineers
GRZ	Government of the Republic of Zambia
IPC	Interim Payment Certificate
MLGH	Ministry of Local Government and Housing
MTEF	Medium Term Expenditure Framework
NCC	National Council for Construction
NRFA	National Road Fund Agency
RDA	Road Development Agency
ROADSIP	Road Sector Investment Programme
RRU	Rural Roads Unit
SADC	Southern African Development Community
UNZA	University of Zambia
URL	Uniform Resource Locator
USA	United States of America
ZMK	Zambian Kwacha (Old currency)
ZMW	Zambian Kwacha (Rebased)
ZNS	Zambia National Service
ZPPA	Zambia Public Procurement Authority

CHAPTER ONE: INTRODUCTION

1.1. Background

According to the Central Statics Office (2014), the construction sector has exhibited steady growth since independence of Zambia. In 2014 the sector recorded an 8.5% growth rate translating into 1% percentage point contribution towards real GDP growth. The transport, storage and communications sector accounted for 1.2 % percentage points in terms of contribution to real GDP growth in 2014. The road construction, rehabilitation and maintenance projects where cited among the factors that increased traffic volumes in the country and thereby positively contributing to the economic growth (BOZ, 2015). Transportation and Communications play a very significant role in growing and developing the economy of Zambia. The sector promotes agriculture, trade, commerce, mining, tourism and delivery of basic social services. In 2002, transportation costs accounted for over 60% of the cost of production of goods and commodities in Zambia which contributed to the high cost of living and increased poverty levels amongst the citizens. Therefore maintaining a safe and reliable road transport system works the effort to down turn the situation by reducing transportation costs and consequently the prices for essential goods and services (WTO, 2002).

In line with this, the Government of the Republic of Zambia is undertaking various road construction, maintenance and rehabilitation projects. The projects are managed by the Road Development Agency (RDA) as the main mandated body and delegated roads authorities comprising of Ministry of Local Government and Housing (MLGH), Rural Roads Unit (RRU) and Zambia Wildlife Authority (ZAWA).

The most common problem today for Africa's Infrastructure development decision makers is that of making 'yes or no' choices with incomplete and/or inadequate information. This is as a result of poor initial research and feasibility studies into potential construction projects and highlights the need to involve the right people in infrastructure development – from both the public and private sectors (KPMG, 2014).

Various stakeholders have complained about the delivery of road infrastructure projects in Zambia. At most instances politicians have made pronouncements to suggest that contractors are to be blame for shoddy works or poor project implementation (Miti, 2014).

The RDA (2015) reported that road construction projects had suffered cost and schedule overrun due to inadequate project preparation at planning stage. The report revealed that for the period 2011 to 2015 the road sector had incurred overrun costs in excess of K 1.9 billion representing 9% of the total projects value administered in this period. It was identified that road sector implemented works based on government directives with pressure thereby resulting into tendering and procuring works without proper planning, scope definition, cost estimates and designs. Most of the projects were initiated expeditiously outside the road sector work plan (Kalaluka, 2015).

A week later after the release of this report, the President of the Republic of Zambia announced suspension of procurement of roads and other infrastructure development projects. This was in an effort to enable the government clear the outstanding debt on the running projects as well as to minimise further stress on the national treasury which was already experiencing difficulties in meeting its obligations towards vendors (Cabinet, 2015).

During the midyear of 2015 RDA had cited uncoordinated plans for delays in the implementation of the Link Zambia 8000 programme. The programme was initiated in 2012 with the view of implementing it over a period of five to eight years with the construction of 8,000 km of new roads. The Agency reported that at the time the project was behind schedule by close to three years in progress of works but and due to uncoordinated planning the programme was visioned to reach 10, 000 km at its completion (Mbulo, 2015).

The auditor general's report on the RDA for the period extending from the year 2006 to the year 2009 revealed a number of weaknesses relating to the implementation of road infrastructure development projects. The following are some of the findings highlighted by the report which directly relate to project planning and control.

1.1.1. Over commitment of funds

It was observed that the Agency committed the Government to expedition in excess of what parliament had allocated for its expenditure in 2008. According to the report RDA had committed to contract totalling to ZMW 1.643 billion against the budgeted and approved ZMW 685 million for that year. This implies that RDA could have either entered into contracts totalling to that amount or reached that amount by way of change orders and penalties. This can be directly related to planning problems either at start when allocating resources which could have been underestimated or later on from the implementer's side not adhering to the plan and budget (AG, 2009).

1.1.2. Unauthorised budget variations

The Auditor General's report also revealed that RDA had issued variation orders amounting to ZMW 53 million in value without relevant approvals. Variation orders are an instruction issued on behalf of the client by the implementing agency to the contractor giving them authority to make changes to the scope of works being conducted other than specified in that particular contract it can either be addition to or subtraction from the initially agreed scope of works. To avoid abuse of this facility, implementation agencies are normally required to seek relevant approvals prior to making such contract changes. Normally in road works change orders are almost unavoidable, however it is important to note that such changes should be reasonable, justifiable and within acceptable limits. In Zambia's construction industry, the practice has been to consider contract variations within the tolerances of -25% and +25% of contract value as acceptable. This means that anything outside and especially in above this envelope is questionable and can considered as an overrun. With good planning, most avoidable changes in the implementation of the contract can be identified at an early stage and counter measures proposed so as to enhance the success probabilities of this project. Therefore having contract variations amounting to such huge sums of money could be a possible indication to poor project planning processes (Ibid).

1.1.3. Inadequate budget provision

The auditors reported that the RDA was owing vendors ZMW 207 million in 2008 which was carried forward to 2009, however the budget provision for 2009 was only ZMW 113 million. This meant that under whatsoever circumstances the agency had to experience some budget overruns as that amount could not carter for both the outstanding balances as well as the new works. This is also an indicator to the potential deficiencies in the planning systems though it seems much to be beyond the control of the RDA (Ibid).

1.1.4. Non – availability of designs

The Auditor General revealed that sixteen contracts at the time of audit had gone to tender, award and execution of works without designs. It has to be noted that apart from defining and stating the scope of works to be conducted designs form a basis upon which cost estimates for the works are made. Design is part of the planning process and stipulates the expected product after project implementation. Therefore executing works without designs is another indication of possible weaknesses in the planning processes of the particular project (Ibid).

Indeed the above listed are not expected to have occurred in cases where the project planning had been systematically done and adhered to. Past studies on project planning have revealed an influence of national culture in the way professionals in particular regions value and perform project planning and control as well as the overall project management. Generally all culture considers project planning and control as critical contributors to the success of any project. There is a significant relationship between project success factors and the importance professionals give to the project planning and control procedures. This implies that any failed project if analysed critically is going to exhibit some element of defective planning signs. It is therefore important for all organisations to invest in fostering a culture that values project planning and control, in order to increase project success, particularly in countries where the national cultures value these attitudes and practices poorly. Therefore this study is conducted in an effort to assess the current practices in planning of road projects in Zambia and their impacts on project implementation and seek opportunities for improved and effective road project planning (Rodrigues, 2014).

1.2. Justification

Road infrastructure development projects often account for the huge chunk of Zambia's annual national budget. In 2015, out of the total national budget of ZMW 46.7 billion which is 25% of the Gross Domestic Product (GDP), ZMW 5.6 billion was set aside for road infrastructure development and maintenance (KPMG, 2015). Meaning performance expectations of the general public by this sector were quite high.

Despite the huge investments by the government into this sector, the performance of the road sector in terms of meeting the general public expectations has not been impressive. This is seen through the continuous abandonment of works by the appointed contractors, slow progression rate for some running projects, cost escalations or budget overruns, avoidable works contract variations and in some cases quality shortfalls (Kaliba, 2010).

The above listed problems can be directly related to overall infrastructure development project planning. Effective project planning aims at the following; minimising uncertainty, ensuring effective operations, providing a detailed understanding of project objectives and providing reference for supervision, monitoring as well as control of project works implementation. It is for this reason that a research to assess the planning cycle of road construction projects in Zambia was proposed. Even though research has been conducted in other parts of the world on construction projects planning, very little has been done to identify the effects of project planning on road construction projects in Zambia. In fact no research has been done to the knowledge of the researcher on the road construction project planning in Zambia. Therefore this study provides an opportunity of addition to the project management body of knowledge on road project planning in Zambia.

It is anticipated that this research unveils weaknesses in the current systems which can be strengthened in order to enhance road construction projects implementation in Zambia, identifies bottlenecks as well as proposes fit for purpose measures where necessary.

1.3. Aim

The main aim of this research was to propose a planning cycle that would improve the management of road infrastructure projects in Zambia as a means of minimising road construction and maintenance costs.

1.4. Objectives

In order to achieve the main aim, the specific objectives of the study were to;

i. identify the levels of incorporation as well as institutional perception of project planning in Zambia's road construction industry;
ii. establish any relationships among project planning, implementation and expected road infrastructure benefits;
iii. identify any potential bottlenecks in the project planning processes; and
iv. develop a tool that will help enhance road project planning.

1.5. Problem Statement

A construction project is generally considered successful if it is planned, designed, constructed and handed over for use within the intended budget, time and meeting the desired set quality. The Zambian government has invested a lot of money in the development of road infrastructure in order to support better delivery of economic and social services. In 2015 alone, over ten percent of the national budget was allocated to this sector (KPMG, 2015).

Despite huge investments in this sector, projects have been known to delay, overrun budgets and fall short of the desired quality. Some selected reports by the media presented complaints from various stakeholders about the delivery of road infrastructure development projects in Zambia. The Vice Republican President was quoted in the 11th September 2015 issue of the Zambia Daily Mail complaining about the poor quality of some selected new roads under construction. The US$ 5.5 billion government initiative to construct 8,000 km dubbed Link Zambia 8000 which commenced in 2012 is not exempted from these setbacks. Most contracts under this programme had either stalled or been abandoned completely, some of the contract performance details are presented in Table 1.1. And other programmes

like the Pave Zambia 2000 aimed at improving township roads have failed to take off despite the government having spent heavily on procurement of plant distributed countrywide and materials.

A study into the causal factors for road construction overruns and quality shortfalls by Kaliba (2010) unveiled project planning as part of the leading factors. In a separate study on factors that affect costs of roads projects in Zambia, Mwiya (2015) identified 25 factors and project planning was ranked fourth on the list. The Road Development Agency in 2015 also cited uncoordinated plans as the major contributing factor cost and schedule overrun under the link zambia 8000 programme. Various sectors and parties have mentioned poor planning as the major contributory factor to the challenges in the public road development sector without substantive research findings to back the claims.

Table 1.1: Performance of selected projects

S/N	Project	Start Date	Original End Date	Revised End Date	Original Sum ZMW Million	Revised Sum ZMW Million	Comments
1	Mumbwa Weighbridge	Sep 2012	Apr 2013	Jan 2014	15.28		Abandoned
2	Ndola – Kitwe	Nov 2013	May 2015	Aug 2015	290.29	311.21	Not completed
3	Kabwe – Kapiri	Apr 2013	Apr 2014	Sep 2014	144.08	254.50	Not completed
4	Kawambwa – Mushota	Apr 2013	Apr 2015		258.77	396.34	Stalled
5	Bottom Road L1	Aug 2011	Aug 2013	Feb 2015	197.74	253.54	Completed
6	Nacala Corridor L1	Sep 2013	Sep 2015	May 2016	37.15 **EUR**	55.65 **EUR**	Not completed
7	Kabwe Urban Roads	Oct 2012	Dec 2013	Dec 2015	165.83	277.11	Stalled
8	Muyombe – Chama	Jan 2013	Jan 2015	Jan 2016	371.48	492.05	Not completed
9	Itezhi-tezhi Road	Mar 2014	Mar 2016		285.87		Stalled

Source: RDA Progress Reports

Despite the above spotted problems and concerns from the public and key stakeholders, nothing much has been done in terms of providing solutions and remedies. The implementing institutions do not seem to have invested in any means of investigating the solutions to the identified problems.

To the best knowledge of this researcher, there is no research that has been conducted to review and asses the road project planning procedures in Zambia. It is pertinent to note that the planning stage in the project management process is quite critical as it determines the outcome. It is for this reason that this research is proposed to assess the road project planning practices in Zambia in an effort to address the above identified problems. This research seeks to propose a planning model that would reduce project schedule overruns, budget overruns and quality shortfalls and enhance performance.

1.6. Significance

The results and recommendations from this research are expected to help the Zambian Government in putting in place measures that would improve roads and highways project planning. It is anticipated that the research will bring out measures that will enhance road project implementation.

1.7. Research question

To what extent does the planning cycle affect the road project implementation, desired output quality and realisation of intended benefits in Zambia?

1.8. Specific questions

a. What is the general perception of road construction project planning in Zambia?
b. What are the current practices in terms of road project planning in Zambia?
c. How do the current planning procedures affect the implementation of road construction projects?
d. What can be done to improve the project planning practices and positively impact project success?

1.9. Scope

This research was limited to public roads and bridges construction, rehabilitation and maintenance projects being executed in Zambia. The research focussed on project planning from the implementing agencies' point of view walking through all the phases from initiation to close out. The study mainly concentrated on the four knowledge areas of

project management thus; scope management, time management, cost management and quality management. However, in terms of project management process groups, all of them were considered thus; initiating, planning, executing, monitoring & controlling and closing. It being a research in partial fulfilment of an academic qualification, it will not look at all the projects but a considerable sample upon which reasonable conclusions can be deduced.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

The previous Chapter introduced the study by presenting the background, justification, aim and objectives of the proposed study. The section also outlined the following; non – availability of designs, unauthorised budget variations, inadequate budget provision, and over commitment of funds as highlighted in the Auditor General's report on the implementation of public road development projects.

This chapter reviews the available literature on road project planning from various parts of the world.

2.2. Definition of project planning

To be able to understand and fully assess how the planning cycle affects road construction projects, we need to define planning and planning cycle independently. According to Mintzberg (1981) planning is defined as the process of deciding what to do, when to do and how to do prior to the actual doing. Project planning can be seen as a continuous process that involves the project team and stakeholders. This plan becomes the reference for work during project implementation and therefore collaborative planning increases chances of project acceptability and success.

Project planning can be categorised into the following three planning horizons;

2.2.1. Master planning

This is a long-term perspective of what the project is all about which clearly describes the goal to all members as well as the way to attaining it.

2.2.2. Look ahead planning

This is the medium term perspective of the project which elaborates what has to be done after completing the next step.

2.2.3. Action planning

This is the short term perspective of the project and describes detailedly what has to be done in the immediate future thus either the next days, next weeks or even months.

In simpler terms, it is a detailed and systematic description, map or diagram of one's intention to do something (Laufer et. al. 1993).

The above definitions entail that project planning encompasses all aspects of conceptualising, defining the scope, estimating required resources, determining means of securing resource sourcing, identifying means of monitoring resource application and implementation of activities as well as evaluating outcomes resulting from the undertaking. In general, project planning is the task of balancing costs and benefits in order to arrive at the project intended goal (Kerzner, 2009).

2.3. A planning cycle

A planning cycle is a systematic combination and sequencing of various aspects of planning into one synthetic unit with the purpose of achieving certain set goals. This is formulated by answering questions such as; where are we, why are we here, where could we be, how could we get there and are we getting there? Planning cycle draws the relationship between people, processes and the product. For most effective project successes, planning should never be thought of as a straight through process but rather a cycle (Leach, 2006).

The above definitions mean that a planning cycle ensures the continuous processes of planning, monitoring changes and re-planning until the completion of the project. A planning cycle will ensure that the plan is well focussed, practical, cost-effective and measurable. The planning cycle comprises of nine main identifiable components as presented in the figure below:

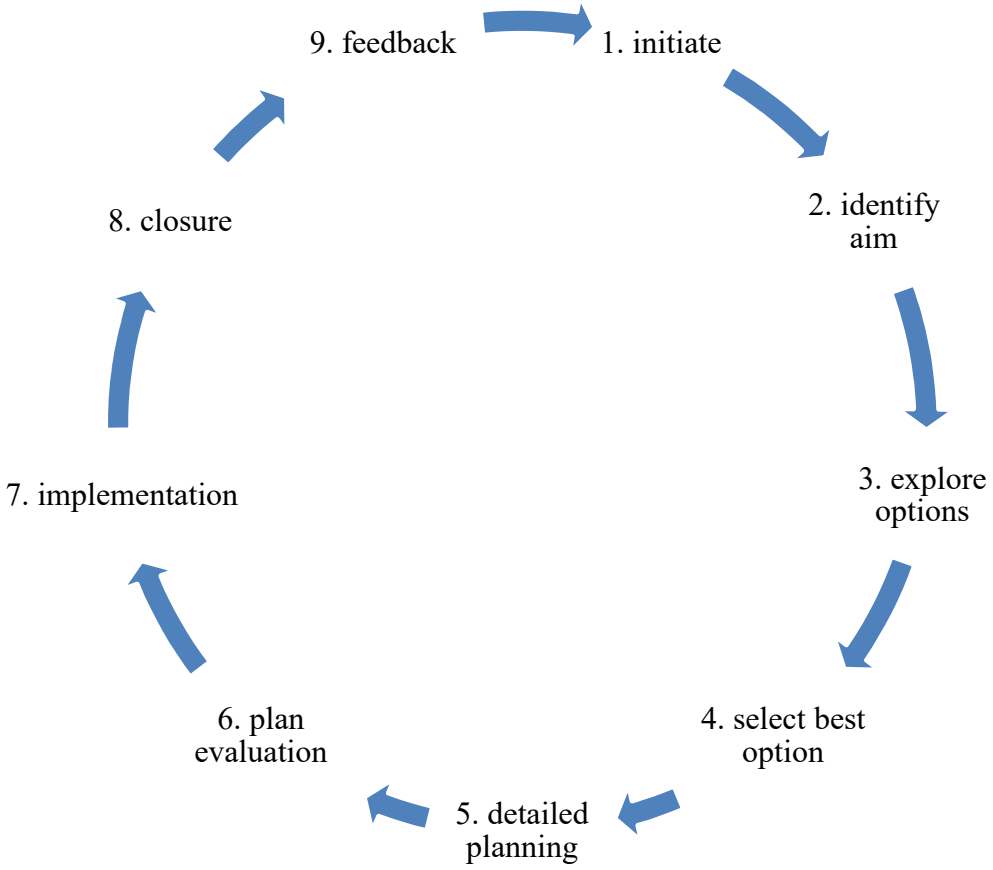


Figure 2.1: Planning cycle (Leach, 2006)

2.4. Types of plans

Classification of project plans is based on the purpose of use for each particular generated plan. However, there are certain general categories that cut across all project implementation sectors. Broadly, project plans are categorised into the following four types of strategic plans, tactical/intermediate plans, operational plans and contingence plans.

2.4.1. Strategic plans

These are plans that are formulated by considering the organisation's purpose and mission. These are generated by top management such as Presidents, CEOs and Directors by forecasting where the organisation is to be in the next three, five or ten years to come. Therefore these are long-term organisational plans that aim at presenting at directing the team in attaining certain particular set objectives (Marquis, 2006).

2.4.2. Tactical/Intermediate

These are medium term and specific plans translated from the strategic plans. They are usually done at departmental, unit or sectional level either annually or semi-annually as a way of achieving strategic objectives (Hartzell, 2013).

2.4.3. Operational plans

These are short term day to day plans to support operations of an activity. These are done at departmental level either weekly or daily so as to speed up the implementation process of a project. These plans mainly focus on the specific procedures and processes that occur within the lower levels of a project implementation structure (Hartzell, 2013).

2.4.4. Contingency plans

These are plans that are drawn in order to career for unforeseeable aspects of the project during its implementation. These plans could either be reactive or proactive. The sole purpose of such plans is to cover eventualities where the initial plan fails to deliver.

2.5. Purpose of project planning

Project planning aims at identifying possible risks to the project and finding possible means of dealing with them during the entire lifetime of a project (Anderson, 2010). Maylor (2005) outlines three major benefits of project planning. He argues that firstly it helps in avoiding chaos resulting from unplanned activities. He further articulates that project planning provides a basis for evaluation of several alternatives in order to filter out those that might not be viable and economical. Lastly he states that project planning gives the planner an opportunity to identify problems at an early stage and gives him insights into deriving appropriate countermeasures.

According to Kezner (2009) the main objective of project planning is to completely define all the project work required so that it is readily understood and followed by the project team and stakeholders. This enables preplanning if the task is well understood prior to performance, ability to change resource allocation during implementation and in cases of

uncertainty allows for processing of more information so as to ensure effective project performance.

A project plan is a fundamental to the success of implementation and serves as a guide to the project team throughout the life of the project with acceptable regular revisions. Therefore a good project plan endeavours to (Kerzner, 2009);

i. eliminate conflicts between functional managers;
ii. distinguish between role of functional management and program management;
iii. present a standard communications tool throughout the project implementation period;
iv. avail the verification tools for project team's understanding the client's objectives and requirements;
v. ensures that there is means of identifying inconsistencies in the initial planning phases and apply necessary remedies; and
vi. enables the project team and stakeholders to identify problematic areas as well as risks at an early stage so as to avoid detrimental effects to the project performance.

In general there are four primary reasons for project planning;

i. to remove or minimise uncertainty;
ii. to ensure effective operations;
iii. to provide a detailed understanding of the project objectives; and
iv. to provide the reference for supervision, monitoring and controlling of project works implementation.

The alternative to systematic detailed project planning is decision making based on history. This method results into surprises calling for extra efforts on crisis management, conflict management and firefighting therefore project planning is the only route to effective project implementation (Kerzner, 2009).

2.6. Benefits of project planning

2.6.1. Stakeholder involvement

The involvement of the various stakeholders at the definition stage of the highway or bridge improvement planning process ensures the capturing of possible concerns that might affect the later stages of project implementation. The problem definition occurs at the state, regional or local level depending on the scale of the proposed improvement. According to FHWA (2012) the problems identified at this stage usually fall into one or more of the following four categories:

i. The existing physical structure needs major repair/replacement (structure repair).
ii. Existing or projected future travel demands exceed available capacity, and access to transportation and mobility need to be increased (capacity).
iii. The route is experiencing an inordinate number of safety and accident problems that can only be resolved through physical, geometric changes (safety).
iv. Developmental pressures along the route make a reexamination of the number, location, and physical design of access points necessary (access).

Whatever problems are identified, it is important that all parties affirm the existence of the problem and agree to either fix them or maintain status quo. Sometimes road access can be a problem but the community may go against the idea of increasing access for reasons such as increased accidents.

During problem definition, key decisions are made that will affect and limit the design options in subsequent phases. Some questions to be asked at the planning stage include (Ibid):

i. How will the proposed transportation improvement affect the general physical character of the area surrounding the project?
ii. Does the area to be affected have unique historic or scenic characteristics?
iii. What are the safety, capacity, and cost concerns of the community?

Physical Character	**Safety**	**Capacity**
Cost		**Other**
Environmental Quality	**Historic and Scenic Characteristics**	**Multimodal Consideration**

Figure 2.2: Multi-sectoral approach towards planning (FHWA, 2012)

2.6.2. Incorporation of multi-sectoral professions

With proper project planning, various professions are involved and coupled with the concerns raised from public submissions, design and consequently implementation becomes much easier.

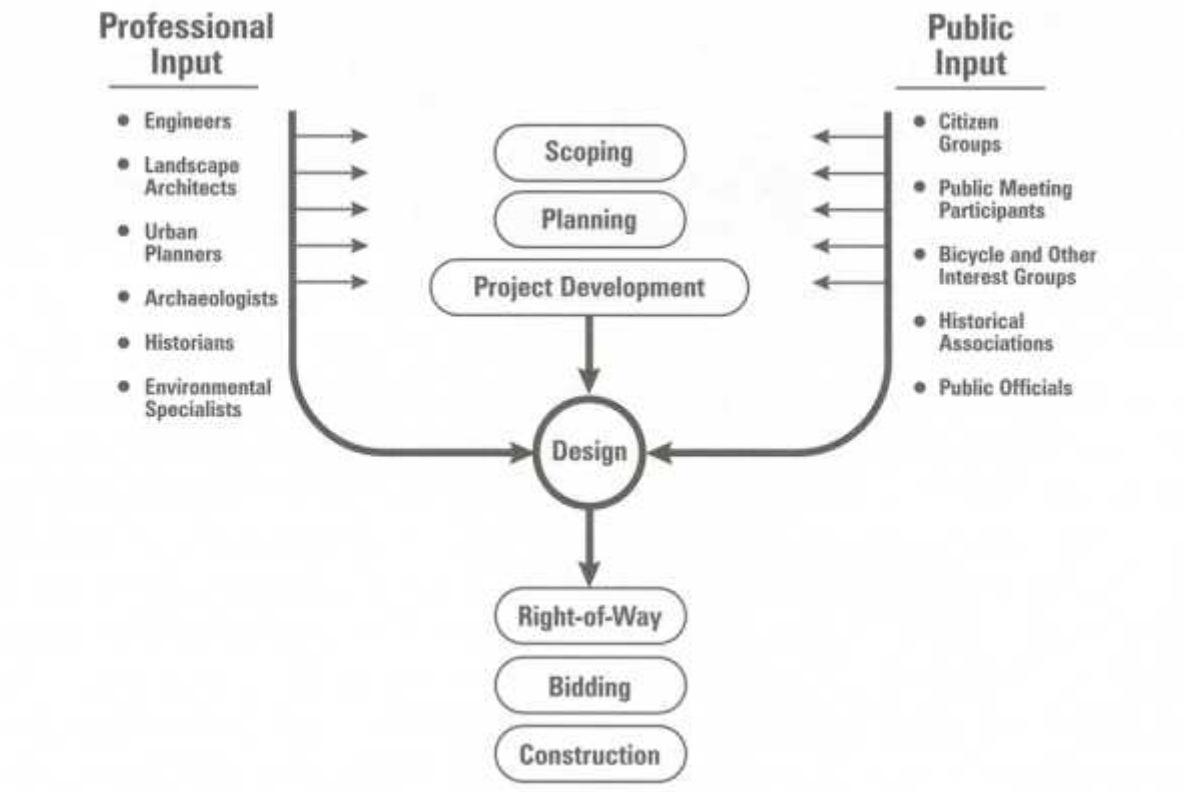


Figure 2.3: Stakeholder incorporation in project planning (FHWA, 2012)

2.6.3. Better scope definition

Scope definition is part of the planning process and a well-defined scope enables the monitoring team to easily identify and follow the expected deliverables. A fully defined scope makes it easier for the team to tell whether the project is headed for success.

2.7. Poor planning

Mochal (2005) argues that poor planning is probably the most common problem on projects. He further states that if you have ever been on a troubled project, chances are you looked back and said, "We should have spent more time planning." Projects that start implementation without fully defining the work to be done, by who and when are usually destined for problems. By the time it reaches the stage you realize that you are no longer in line with your sponsor requirements, it's usually very difficult to get back on track within the allocated budget and timeframe.

According to the FIDIC (2010) poor planning can include any of the following:

i. Lack of communication.

ii. Not breaking down development into phases or steps.

iii. Not prioritizing operational activities, objectives.

iv. Not obtaining stakeholder approval.

v. No business plan or inadequate business plan.

vi. Unrealistic expectations set, e.g., financial investment, time required, set-up costs.

vii. Inadequate funding/capital or poor use of funds/capital.

viii. Lack of time commitment.

ix. Unrealistic scheduling.

A study on project delays in India revealed that defective planning and contractual failures were largely responsible for cost overruns and consequently for wastage of public resources. The study further availed several measures that would help in addressing project planning troubles. It was suggested that to the extent possible, policy makers should avoid planning for large and big-cost projects as well as projects with long implementation phase. Reasons given were that such projects are vulnerable to future uncertainties, deterioration in project assets and the inflation. The researcher further recommends that wherever possible the project size as well as the implementation phase should be kept small and that projects that have to be inevitably large should be planned and implemented with utmost care (Singh, 2009).

The planning process needs to be subjected to a radical overhaul as it is more worthy investing resources to have precise initial estimates than paying the higher costs later on. The use of unit-price EPC contracts in preference to the fixed price should be limited as far as possible because neither the government official nor the contractors have incentives to

take contracts seriously. This results into vague contracts at signing and poor management afterwards (Ibid).

2.8. Effects of poor planning

A project that is poorly planned and estimated is difficult to implement, involves a lot of risks and can result into failure. Where a proper project plan is not in place, resources cannot be managed and organized, risks cannot be mitigated, dates and budgets cannot be forecasted, effective reporting cannot take place, and the measures of success will be flawed from the outset (Madsen, 2011).

Poor planning and project definition can cause many serious problems later along the path of implementation which among others include:

Lack of support- Whenever the major project characteristics and deliverables are not defined in advance, differences in expectations amongst stakeholders emerge. This is despite taking the initial direction from sponsor the reason being that as the project gets larger even the sponsor may lose hold of a complete picture of what needs to happen in order to have a successful project. Sometimes the sponsor might have a vision but there could be other better visions from the stakeholders and these conflicting situations may cause confusion on a project resulting in some parties withdrawing their support. This is quite common with government project where politicians develop visions and make pronouncements without engaging experts.

Poor estimates – It is always good practice to have project budgets and deadlines stated prior to the commencement of works. Usually if project definition and planning are not done in advance, the project kicks off with inadequate resources and this is mostly not realised until at advanced stages of implementation. Many failed projects are categorised as such based their overrun on budgets and time.

Poor scope control – Any successful project ensures that the team sticks to the scope and operates within the terms of reference. If the scope of the project is defined at the planning stage of the project and communicated for agreement, then the project team should

anticipate problems at implementation stage which are likely to recipe failure (Mochal, 2003).

Lartey (2011) in his evaluation of donor-funded infrastructure projects in Zambia argues that there were serious problems with planning processes that led to projects not being completed on schedule or budget. He stated that with planning had not been very efficient and effective resulting into implementation bottlenecks. Amongst the implementation bottlenecks discovered were;

i. Government counterparts.
ii. Implementation problems such as no coordination among stakeholders.
iii. Misunderstanding and differences within the community.
iv. Some contractors lack the financial capacity to handle the projects.

He concluded that these problems contributed to none or poor performance of donor funded projects therefore in most cases the community where not provided with the desired facility (Lartey, 2011).

2.9. Prioritising of roads for development

It has been observed in past studies in Africa that poor prioritisation of developmental projects is one of the problems affecting planning. Several times either none important or urgent projects are fronted instead of crucial ones which might address the outstanding problems. Worse off it was recorded that sometimes a same project might have parallel implementing structures resulting in duplication and this has mainly been the case with donor funded projects (Byakika, 2012).

The common professional practice in project selection is to prioritise economic investment based on road deterioration and traffic demand. According to the case study on the RDA it was revealed that Zambian road project selection is mostly based on population density and poverty levels. Areas with low population density were prioritised between 2008 and 2011 and also areas with higher poverty rating were considered priority this led to low road infrastructure development in areas with higher economic activities such as Copperbelt (Raballand, 2013).

Oppong's (2014) study on infrastructure development in Africa concluded that most governments do not set the right priorities in project selection. It further went to state that most projects were ad hoc and misplaced. Good project planning efforts entail that selected projects meet intended objectives and expectations of the general public rather than being white elephants.

An increase in rehabilitation projects is an indication enough that extra efforts are required in maintenance of infrastructure. It is generally observed in Sub-Saharan region that maintenance projects have little perceived benefits and therefore they don't receive adequate support for funding by both executives and parliaments. The general conclusion is that in environments of weak governance practices and politically dominated budgeting processes, maintenance of infrastructure is not prioritised. Zambia is ranked amongst the three countries with high spending on road infrastructure rehabilitation along with the Democratic Republic of Congo and Ethiopia whose amounts are about 15 times higher than those of middle income countries (Briceño-Garmendia et al., 2008).

The SADC infrastructure report of 2011 listed Zambia amongst the countries which have allowed 30 to 60 percent of their infrastructure stocks to drop into the poor condition category. The report alluded his to funding deficiencies as well as implementation of maintenance works (Ranganathan & Forster, 2011).

Table 2.1: Condition of the SADC's regional road network, by member country (%)

	Condition				Type		
	Good	Fair	Poor	Unknown	Paved	Unpaved	Unknown
Angola	71.4	5.5	23.2	0	71.4	28.6	0.0
Botswana	40.5	8.1	51.3	0	100.0	0.0	0.0
Congo, Dem. Rep. of	14.2	12.6	61.5	11.7	17.7	82.1	0.2
Madagascar	59.5	24.9	15.2	0.3	77.6	22.4	0.0
Mozambique	12.5	59.2	15.1	13.2	77.9	21.1	1.0
Malawi	61.8	32.7	5.5	0.0	95.5	4.5	0.0
Namibia	49.5	41.0	7.8	1.7	100.0	0.0	0.0
Swaziland	58.0	42.0	0.0	0.0	100.0	0.0	0.0
Tanzania	44.9	35.7	3.7	15.7	60.0	40.0	0.0
South Africa	88.2	4.3	0.2	7.2	99.4	0.0	0.6
Zambia	51.9	14.5	33.6	0.0	99.3	0.7	0.0
Zimbabwe	0.0	100.0	0.0	0.0	100.0	0.0	0.0
SADC	**46.7**	**24.1**	**22.8**	**6.4**	**74.0**	**25.8**	**0.2**
East Africa (EAC+)	**29.8**	**26.5**	**11.7**	**32.0**	**57.2**	**25.4**	**17.4**
EAC	**38.0**						
ECCAS	**29.1**	**18.4**	**39.3**	**13.2**	**42.6**	**56.7**	**0.7**
ECOWAS	**45.1**	**28.4**	**22.5**	**4**	**91.9**	**8**	**0.1**

Source: AICD various sources.

Note: ECCAS = Economic Community of Central African States; ECOWAS = Economic Community of West African States; EAC = East African Community.

2.10. Procurement of contractors and consultants

Most times contractors to implement various projects are procured even before the project promoters are assured of financing. Zuofa & Ochieng (2014) brings out the aspect of inadequate budgetary allocations as a contributory factor towards project failure in Nigeria. He argues that the Nigerian Public Procurement Act only authorizes a procuring entity to proceed with the procurement process upon ensuring the availability of funds to meet the obligations. He however goes on to justify that the procuring entities have not stuck to this part of law hence the resulting problems. This can be related to the Zambian case where Part VI and Section 42 of the *Public Procurement Act 2008* only allows the procuring

entity to initiate the procuring process upon the confirmation of availability of funds and seeking necessary approvals. This is supposed to take care of concerns of signing a contract without any funds to implement the contract.

The Zambia Public Procurement Authority (ZPPA) an institution responsible for public procurement in Zambia has adopted the World Bank approach to procurement of public goods and services which is highly based on the lowest bidding price as a selection criterion. However some researchers have criticised this approach citing it as an agent for both cost and schedule overruns in developing countries. Chileshe & Berko (2010) argues that most contractors consider their lowest offer as the most important criterion for evaluation and so aim at submitting the lowest bid at the expense of economics as well as feasibility and they don't understand consequences of their actions. The study further states that this has been the case even in developed countries with some failing to pay their worker's salaries. Sometimes technocrats are compelled to reject realistic proposals from competent bidders just because a cheaper price has been offered (Dada & Jagboro, 2007).

Byakika (2012) observes that most financial evaluations are not taken seriously in awarding contracts. Most African governments pay their contractors late therefore the project management approach adopted in the continent requires pre-financing. The study notes that bidders deliberately quote low prices with a prepared strategy of how escalations will be employed which results in claims and disputes. The RDA has a vendor rating system which is aimed at tracking contractor and consultant performance in being awarded contracts but as to whether it works efficiently it is not known (Byakika, 2012).

At the beginning of every year the RDA has a complete Annual Work Plan (AWP) along with the Budget. However, a study by Raballand et al. (2013) revealed a growing trend of procurement of unplanned projects in the RDA. The paper justifies that once a workplan is drafted it should be deliberately very difficult to make additions. This would deter external influence on the procurement as well as implementation of public projects.

It is upon the procuring entity to ensure that before and after tendering the documents have all the necessary clauses and details that will enable the success of the project. Aigbavboa

(2014) observed insufficient preparation of documents and designs as part of the causes for construction project delays in Lusaka.

2.11. Poor estimates

Whenever a private or public infrastructure development project is being planned, it is possible that the planers can arrive at bad estimates of time and resources. At often times these have negatively affected the projects. Estimates can be classified poor if they are over or underestimated beyond contingence limits and of all cost underestimation seems to create most project implementation problems. There are basically four kinds of cost underestimation; technical, economical, psychological and political (Flyvbjerg, 2000).

Cost estimates are forecasted construction costs at the time of decision to build whilst actual costs are the real costs determined at the time of project completion. Flyvbjerg (2002) argues that cost estimates occur at various stages of project implementation thus planning, decision to build, tendering, contracting and negotiations and that at each successive stage options become leaner with greater detail of designs, higher accuracy of quantities and better information about unit price. Therefore he concludes that estimates become more accurate with time and estimates at decision making are far from the final.

Most project promoters tend to have biases at cost estimation stages in order to arrive at optimistic estimates which will convince the sponsors to allow the project to take off (Fouracre et al., 1990). Wachs (1990) reveals that some project promoters and forecasters deliberately underestimate costs in order to please public officials that they are cutting costs in public interest. The argument of such planners is that "keeping costs low is more important than estimating costs correctly." Flyvbjerg (2002) warns that the argument that cost underestimation saves money should be rejected as in most cases results into wastage of taxpayers' money because a none economic viable project may be started at the expense of a viable one. In his study he concludes that 9 of 10 infrastructure project costs are underestimated and for road projects actual costs are on average 20% higher than estimated costs. The study further reveals that cost estimation is global problem that has existed and not improved over the past 70 years.

Byakika (2012) narrates a situation in Uganda in which the construction of a bypass road took twice the estimated time the main reason given being that the road was being constructed through the swamp which prompted more activities and costs. However it is important to note that the swamp existed even before the project was planned to take off. This is just exhibits that planners need to have a full understanding of the road project environment as they arrive at estimates to enable decision makers arrive at the most optimal option.

High accuracy in cost estimation at conception of the project is very cardinal to the whole process of proper project planning. According to Mahamid (2013) conceptual estimates are those forecasts made prior or before completion of project design with the minimal available information. Normally these estimates are less accurate but they are critical as they enable executives to consider the feasibility of conducting the project as well as examining alternatives, setting out objectives and identifying possible sponsors (Holm et al, 2005). Various models can be employed at this stage with multiple regressions in order to refine estimates to fall with the accuracy range of 25% to 50% (Schexnayder & Mayo, 2003).

Briceño-Garmendia (2008) reports that deficiencies in planning, project preparation, and public procurement conspire to create delays that prevent countries from spending more than two-thirds of the public investment allocated to infrastructure in the budget. Therefore addressing the causes of low budget execution in public infrastructure development projects would increase public investment without any increase in budgeted resources. The study further concludes that without addressing this will render it difficult to achieve higher investment levels in public infrastructure development even if more external resources were injected.

2.12. Delusion and deception in planning of road projects

Sometimes project planners deliberately or not underestimate risks, threats or uncertainties and overwhelmingly overestimate benefits thereby increasing the benefit to cost ratio of the particular project. This is usually explained by the two phenomena; delusion and deception.

Delusion refers to cases where executives arrive at decisions based on illusion optimism rather than rational weighting of gains, losses and probabilities. They involuntarily underestimate costs and overstated benefits to be realised after implementation of the particular project. As a result managements follow initiatives that never complete on time and budget and therefore affecting the overall success rating of the project. This phenomenon has always been attributed to biasness connected to an inside view in forecasting. This means that planners barely consider a particular project as a unique undertaking and so they don't want to look for similar projects and relate the potential threats. The reason to this is that most especially large infrastructural development projects are once in a lifetime for the planners involved and so they have no lessons to learn from (Flyvbjerg, 2009).

Deception is a situation where politicians, planners or project champions deliberately and strategically overestimate benefits while understating costs in order for the project to gain approvals. This normally takes place because of different preferences and incentives of the players in the system. This results in management proceeding with an investment which does not complete on budget/time and yield the desired benefits. Typical examples would be where a politician pushes for an infrastructure development project in a bid to have something to present to the electorates in a forthcoming election (Ibid).

Delusion is more of a psychological problem whilst deception arises from differences in preferences amongst the players and this is the major difference between the two. Research has proved that both delusion and deception have resulted in several project failures as a consequence of flawed decision making (Ibid).

For planning to be efficient, it is advised that the process incorporates the two important principles among others; comprehensive analysis and neutrality. Comprehensive analysis would mean the executives considering and exhausting all possible options and threats objectively before arriving at a particular choice. On the other hand neutrality demands that the decision maker be not biased or in favour of any one option. In the absence of these two important principles would create what is known as planning distortions (Litman 2012).

According to Penrose (2012) most projects are overly optimistic in terms of planning and programming where key issues are not properly considered therefore the project proceeds without the following;

i. Formal appointments and warranties with the designers.
ii. Formal contracts in place.
iii. Fully defined scope of work and specification.
iv. Defined logistics plan which has been agreed with the site's neighbours.
v. Where the assignment of risk is improperly considered and left with a party who is in a position to manage it.

Sherlock Holmes noted

Most people, if you describe a train of events to them, will tell you what the result would be. They can put those events together in their minds, and argue from them that something will come to pass. There are few people, however, who, if you told them a result, would be able to evolve from their own inner consciousness what the steps were which led up to that result

Since most people overly state benefits at conception stage than considering a planning approach that considers all risks, projects tend to either suffer scope creep or overruns at later stages (Penrose, 2012).

If a project is poorly planned, the aspect of cost control is either underestimated or overlooked. Successful, self-confident executives will tend to underestimate the risk and the problems involved in controlling the costs. More often after the project experiencing a cost catastrophe, most politicians and top executives will find individuals to blame (often with fair reasons) and miss the points of what basic structures of the project organization that made the mistakes possible and the cost overrun very likely to happen. This simply means that without proper planning it is likely impossible to allocate responsibility for undesirable cost surprises (Eikeland, 1997).

Flyvbjerg et al. (2002) concluded that most cost estimates used in public decision making for transportation infrastructure development were highly, systematically, and significantly

deceptive along with the cost-benefit analyses into which cost estimates were routinely fed to calculate the viability and ranking of projects. The study further argued that misrepresentation of costs
was likely to lead to the misallocation of scarce resources resulting into implementation of unsuccessful projects.

2.13. Punishment of designers for poor work

It has been observed that most project problems are either allocated to the contractor or client alone without considering situations in which both are accountable or none of them is accountable at all (Byakika, 2012). Most public infrastructure development agencies delegate their design and sometimes supervision authority to consultants to act on their behalf. However some errors that result from these designs are hard to believe if at all these consultants even visit sites when designing. Even after being paid huge sums of money and adequate time allocated to design, projects still undergo serious avoidable variations. According to Langford (2000), he observed that most professionals were avoided due to high rate chargers so most consultants resorted to engage less experienced and unqualified people resulting in faulty designs. He further goes on by concluding and recommending the need to develop a quality culture in the construction industry in order to ensure continued quality performance.

Other studies in Uganda revealed that most consultants developed inadequate contract documents in that they lacked necessary clauses. Sometimes both designs and contract documents are reviewed by the client. However, in most public institutions there is no ownership of mistakes resulting from err documents and so the officers handle these matters with a laissez faire attitude (Byakika, 2012). In Zambia it is a requirement by law that all persons and firms practising engineering must be registered with the Engineering institution of Zambia (EIZ). It is also the responsibility of the EIZ that firms practising engineering in the country engage competent and registered people as to whether this is ensured is not so certain as there has been some cases were inexperienced engineers handle big projects.

Bordat (2004) outlines the importance of considering the consultant's performance based on the volume of change orders on the projects they have designed. This will ensure responsibility for the wasted resources in terms of avoidable change orders and faulty designs.

Gwilliam et al. (2008) argue that on average about 30 percent of main road networks are over-engineered in the Sub – Saharan region whilst 10 percent are under-engineered whichever case reveals none adherence to appropriate engineering standards. Most consultants given to design various projects just copy and paste what was applied on other projects without considering real ground situations. It is suggested that consultants should learn to adapt road design standards to local conditions and materials so as to avoid wastage, the study further proposes intervention such as low-volume sealed roads (Gwilliam et al., 2008).

Byakika (2012) proposes that the design and supervisions tasks of road project consultants should be separated so as enhance efficiency. The traditional approach in Uganda is such that the appointed design consultant is also assigned to supervise for reasons of cost savings through none repeated procurement and time saving as the design consultant is already familiar with the project environment. However, he argues that this arrangement may lead to insincere designs and feasibility studies so as to justify implementation, aside that the design may not be adequately addressed knowing that at next stage there will not be an independent scrutiny (Byakika, 2014).

Zuofa (2014) advises that clients should strongly stand against the use of none professionals in implementation of projects. Project implementation officers should be involved based on qualifications and competencies. The study further proposes that punitive measures against erring project vendors should be taken as a result of corrupt and unethical practices.

2.14. Political interference on infrastructural projects

Most infrastructural development projects are initiated by politicians with a major view of gaining political mileage. This creates natural tension because delivery times for projects typically run beyond the election cycle, meaning that any future payoff might accrue to

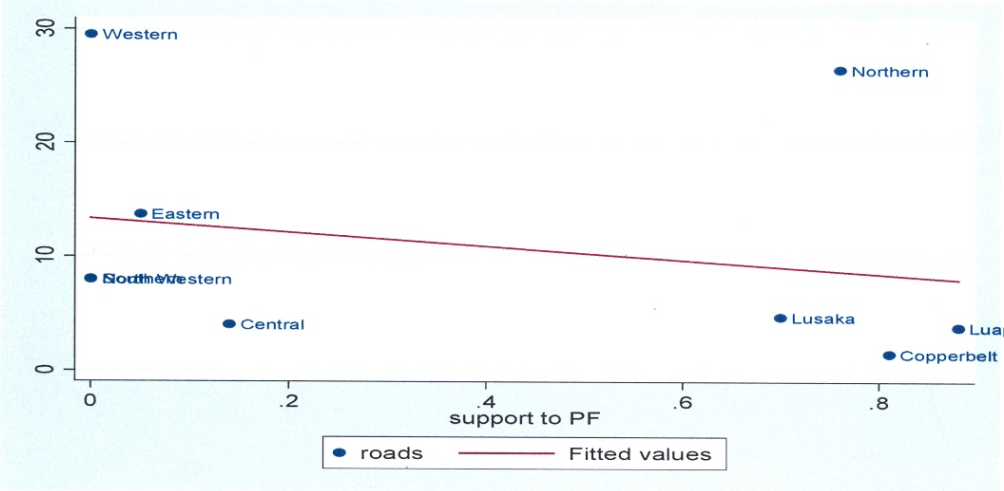
political opponents. In addition, governments are often reluctant to spend money at the outset, preferring to appear thrifty even if there will be far higher costs later on. The politicians would be in a hurry to initiate and launch a project before all necessary studies are conducted to weigh the pros and cons as well as planning for the risks. All in all the project planning process is rushed so as to meet election deadlines thereby affecting the project implementation negatively. Politicians would be sceptical to support financing of the project planning process whose outcome would only be seen beyond their term of office as they fear contributing to the prosperity of future office bearers (Beckers, 2013).

Sometimes politicians propose a certain intervention without really considering economics and logics but rather for the sake of not being seen inferior when compared to other constituencies. For instance, a member of parliament would instigate the construction of a paved road in their constituency even when the cost – benefit analysis does not justify but just because a similar intervention was applied in a neighbouring constituency. Since the executives of government implementing agencies are appointees of politicians they bend along for the fear of falling out of favour.

Czarniawska (2012) on her study of planning and politics argues that project planning is always entangled with politics in Europe. She stresses that politics are more in the public sector than in private sector implemented projects. In the Zambian case from the time performance contracts were introduced in public service in 2003, there has been a growing trend of publicizing the top management in public service bodies (Mwangala, 2010). The study by Raballad (2013) revealed a negative correlation between support for the ruling party and allocation of road projects. It was discovered that roads had been used as a source of political patronage in Zambia which means that implementing institutions were not insulated against political influence. Areas where the ruling party had less support were allocated more resources for road projects even if there were less economic returns just to win political favor. The study further records that almost 40% of the road projects implemented over the period 2008 – 2011 were unplanned as a result of political pressure. The report cites the implementation of the accelerated urban roads rehabilitation program termed “formula one” which was outside the road sector workplan as well as the overall strategic plan which emphasised more on maintenance than rehabilitation. However it is

important to note that despite political influence in the planning process towards which most engineers tilt, when things go bad only engineers are punished are blamed a situation that suggests that there must be ways of shielding professionals involved in public infrastructural planning to avoid political interference. The report on constituency development fund by the public accounts committee of the parliament also affirmed the presence of political interference especially at procurement stages of projects (Zambia. Public Accounts Committee. National Assembly, 2013).

Graph 7: Correlation between road allocation and support to PF



Notes: Y axis is the province road commitments over total road commitments (measured in percentage). X is the support to PF in 2008 (measured by the number of PF seats over total province number of seats).

Figure 2.4: Correlation between road allocation and support to the PF (World Bank, 2013)

2.15. Experiences of other project teams

Swies (2008) argues that in Jordan, both Consultants and Contractors cited poor project planning and scheduling as the most critical causes of infrastructural development project failures. Other factors like too many variation orders were also cited which still relate to the overall project planning.

Major infrastructure projects world over have suffered a variety of severe problems related to planning, the final cost of the Eurotunnel between the United Kingdom and France, for instance, was significantly higher than originally planned, while the Betuwe cargo railway

linking the Netherlands and Germany came in at twice the original €2.3 billion budget and more than four times the original estimate. Very recently in Asia, the construction of Kuala Lumpur's new airport terminal faced huge cost overruns and significant delays following frequent design changes. The specific causes to these detrimental effects are both directly and indirectly related to project planning practices, among the typical causes of failure identified were the following (Beckers, 2013);

a. Gold plating and overestimating revenue, growth or potential benefits due to skewed incentives among project originators
b. Sponsors and developers fail to plan delivery and stakeholder and project management in a sufficiently professional way
c. Engineering and construction companies pay insufficient attention to mitigating and controlling risk during the design phase.

2.16. Opinions on what ought to be done

A study in India revealed that defective planning and contractual failures were largely responsible for cost overruns and consequently for wastage of public resources. The study further availed several measures that would help in addressing project planning troubles. It was suggested that to the extent possible, policy makers should avoid planning for large and big-cost projects as well as projects with long implementation phase. Reasons given were that such projects are vulnerable to future uncertainties, deterioration in project assets and the inflation. The researcher further recommends that wherever possible the project size as well as the implementation phase should be kept small and that projects that have to be inevitably large should be planned and implemented with utmost care (Singh, 2009).

The planning process needs to be subjected to a radical overhaul as it is more worthy investing resources to have precise initial estimates than paying the higher costs later on. The use of unit-price EPC contracts in preference to the fixed price should limited as far as possible because neither the government official nor the contractors have incentives to take contracts seriously. This results into vague contracts at signing and poor management afterwards (Ibid).

It is good practice before the client decides to proceed and build the project to ensure that preparation, planning, authorisation and ex ante evaluation are done in such ways that problems are negotiated and eliminated which may otherwise resurface as delays during implementation. In a similar manner, after the decision to build a project, it is of crucial importance that the project organisation and project management are set up and operated in ways that minimise the risk of delays (Flyvbjerg, 2004).

A study on schedule overrun and quality shortfalls on construction projects in Zambia identified a number of causal factors. The study identified inadequate project planning as one of the frequent and severe causal factors for schedule overrun as well as low quality of products. Many other factors identified as causal factors could be related to the project planning cycle (Kaliba, 2010).

A research by Mwiya (2015) listed 25 factors that affected project costs in Zambia's road construction industry after a pareto analysis. Of the 25 identified influential factors, project planning was ranked at the fourth position.

Table 2.2: List of construction cost influential factors

1. Location	10. Duration	18. Contractor selection method
2. Hauling distance	11. Project scope	19. Material shortages
3. Delayed payment	12. Detour construction	20. Contractor size
4. Project planning	13. Contract financing	21. Overhead & profit
5. Material source	14. Labour	22. Corruption Perception Index
6. Equipment availability	15. Contract cash-flow	23. Fuel
7. Project need	16. Political risk	24. Project supervision & management
8. Exchange rate	17. Topography	25. Client type
9. Contractor type		

2.17. Content analysis of the reviewed literature

Table 2.3 presents a content analysis of the technical papers, journals, books and reports reviewed under this chapter in chronological order.

Table 2.3: Content analysis of literature reviewed

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
1	Mwiya, B. et al.	2015	To identify the essential factors that affect unit cost estimation and their breakdown using artificial neural networks.	Literature review Questionnaire survey	The paper listed 25 factors that affected project costs in Zambia's road construction industry after a pareto analysis. Of the 25 identified influential factors, project planning was ranked at the fourth position.	The study was inclined towards road construction projects. However, it did not explicitly look at project planning.
2	Oppong, R. A.	2014	To highlight some of the challenges in Africa's infrastructure development and provide suggestions on how to overcome them.		The study identified a huge gap between infrastructural demand and supply along with the availability of funds. It was further concluded that Governments did not set priorities right in infrastructure development and so most projects were ad hoc and did not meet the intended objectives.	The study generally mentioned good governance as the only antidote against the identified challenges without categorically relating it to planning.

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
3	Zuofa, T. & Ochieng, E. G.	2014	To identify the main factors responsible for project failure and suggest strategies aimed at curbing project failure and facilitating development in the future.	Focus groups	The study revealed that the Nigerian law only permits a procuring entity to proceed with procurement upon confirmation of availability of funds but that unfortunately this has been abrogated several times.	The method used was purely qualitative and the sample size was small.
4	Aigbavboa, C.	2014	To assess the construction professionals' perception on the major causes of construction project delays and there consequential effects on the Lusaka – Zambia, construction industry.	Literature review Questionnaire survey	The study identified ineffective project planning and scheduling among the leading causes for construction project delays in Lusaka.	The study looked at construction sector as a whole and was limited to projects implemented in Lusaka. There is need to streamline to road sector and consider countrywide situation.

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
5	Raballand, G. et al.	2013	To assess whether political interference in a low-governance environment has diminished after a semi-autonomous road agency model was set in Zambia.	Literature review Personal interviews	The study concluded that the institution of the semi-autonomous agency model has not minimised the selection or supervision of projects and that there was an increase the lack of accountability of civil servants in this sector. The research also unveiled the growing trend of procuring unplanned projects in RDA.	The study was well analysed and brought various governance issues. However, the study was inclined towards political interference in road projects.
6	Mahamid, I.,	2013	To develop simple conceptual cost estimation models for contracted road construction projects that can be handled using a calculator or a simple computer program.	Literature review	The findings reveal that the models that used bid quantities as independent variable are more accurate than those that used road length and width as independent variable, but they require more information.	The study concentrated on cost estimation which is a component of planning.
7	PAC	2013	To examine queries raised by Auditor-General on administration of	Literature review Personal	The report on constituency development fund by the public accounts committee of the parliament also affirmed	The conclusions from this report are likely to be accurate because

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
			Constituency Development Fund (CDF).	interviews	the presence of political interference especially at procurement stages of projects	implementing officers were called to respond.
8	Byakika, S. N.	2012	To highlight major challenges in developing countries' project implementation	Project reviews	The paper identified double handling of projects, lack of seriousness in considering financial evaluation at tendering, unserious designers and continuous blame on contractors for project failure. And concluded that majority of challenges could be addressed through accurate project planning and implementation control.	The study did not categorise the challenges to particular construction sector hence the generalised view might not be applicable to the road sector.
9	Litman, T.	2012	To describe principles for comprehensive transportation planning. To evaluates conventional transport planning practices with	Literature review	The report suggests that for planning to be efficient, it is advised that the process incorporates the two important principles among others; comprehensive analysis and neutrality. It concludes that the absence of these two important	The study mainly covered developed countries such as Canada, USA and New Zealand with less on developing

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
			regard to these principles. To identifies common planning distortions.		principles would create what is known as planning distortions.	countries.
10	Olalusi, O & Otunola, A.	2012	To investigate factors that lead to construction projects being abandoned in Nigeria.	Personal interview Questionnaire administration Review of existing literature	The study highlighted incorrect estimation, lack of skilled personnel, inadequate planning, poor risk management, misunderstanding project scope and corruption as some of the leading reasons for failed construction projects in Nigeria	The study was limited to building construction projects in Nigeria.
11	Lartey, E. W.	2011	To evaluate the planning processes of donor funded social service infrastructure projects and the involvement of beneficiaries.	Questionnaire survey Personal interviews	The study identified serious problems with the planning process in that it had not been efficient and effective thereby negatively affecting project schedules and costs.	The study was limited to donor funded projects and within Lusaka alone further no road projects were covered under this study.

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
12	Ranganathan, R	2011	To benchmark the infrastructure situation in the region against that of other African peers. To identify the main gaps in the regional infrastructure backbones. To quantify the costs and benefits of regional integration, as well as their distribution across member states.	Workshop Specialist interviews Literature reviews	The study listed Zambia amongst the countries which have allowed 30 to 60 percent of their infrastructure stocks to drop into the poor condition category	The study was cross country and conducted over a period of 5 years meaning certain factors could have changed as well as may not be presented as accurately related to the current Zambian road sector situation.
13	Chileshe, N. & Berko, D. P.	2010	To assess the main factors that influence the project cost overruns within the Ghanaian road construction sector. To examine their relative importance.	Questionnaire survey	The duo argue that most contractors consider their lowest offer as the most important criterion for evaluation and so aim at submitting the lowest bid at the expense of economics as well as feasibility and they don't understand consequences of	The survey was restricted to road construction which relates well with this research.

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
					their actions	
14	Kaliba, C.	2010	To establish significant causes of cost escalation, schedule overruns and quality shortfalls and propose mechanisms that could be used to systematically address the causal factors.	Literature review Questionnaire survey	The study identified inadequate project planning as one of the frequent and severe causal factors for schedule overrun as well as low quality of products. Many other factors identified as causal factors could be related to the project planning cycle.	This study justifies the need to look into project planning as an independent causal factor.
15	Briceño-Garmendia et al.	2008	To analyze recent public expenditure patterns in order to identify ways to make more fiscal resources available for infrastructure	Literature and records review	The study concluded that by evidence of large spending on road infrastructure rehabilitation in Sub Saharan Region, maintenance of these facilities have not been given adequate attention. The study revealed that about 30 percent of the region's infrastructure was in need of rehabilitation with half the countries exhibiting a 40 percent shortfall in terms of	The study well covered a number of project management aspects and identified the deficiencies in project planning as one of the causal factors.

S/N	Author	Year	Objectives	Methodology	Conclusion	Comments
					maintenance.	
16	Bordat, et al.	2004	To assess the extent of the problem of cost overruns, time delays, and change orders associated with Indiana Department of Transportation (INDOT) construction projects.	Literature review Questionnaire survey	The statistical analyses in the study showed that the major factors of cost overruns, time delays, and change orders in Indiana were contract bid amount, difference between the winning bid and second bid, difference between the winning bid and the engineer's estimate, project type and location by district. The paper outlines the importance of considering the consultant's performance based on the volume of change orders on the projects they have designed.	This study relates highlighted overrun causal factors related to project planning and design. Hence the need to assess the influence of road construction project planning on cost and schedule overruns in Zambia.
17	Fouracre, P. R.	1990	To assess performance of metro projects.	Literature reviews in 21 developing cities	Most project promoters tend to have biases at cost estimation stages in order to arrive at optimistic estimates which will convince the sponsors to allow the project to take off.	The research focused on railway projects.

2.18. Summary

From the above review of literature, it is easy to realise that project planning is quite a vital stage in the project management cycle and if mishandled can bring about adverse effects. In their study Olalusi and Otunola (2012) highlighted incorrect estimation, lack of skilled personnel, inadequate planning, poor risk management, misunderstanding project scope and corruption as some of the leading reasons for failed construction projects in Nigeria. This justifies the need for an inquiry into the road construction project planning procedures especially that no studies of this sort have conducted in Zambia.

CHAPTER THREE: METHODOLOGY

3.1.Introduction

The previous Chapter presented the literature reviewed in relation to the subject under study. The section outlined various problems identified with project planning flaws from various parts of the world. In concluding the chapter revealed that even though some related studies have been conducted in Zambia and other parts of the world, no studies particularly relating to Zambian roads project planning have been conducted before hence justifying this research.

Chapter three endeavours to outline the procedures and methods the researcher used in conducting the research.

3.2.Research approach

In general terms there are two main approaches to research namely qualitative and quantitative research. Quantitative research is usually associated with positivist or post positivity paradigm. It is more concerned with the collection and conversion of data into numerical formats so that analyses and conclusions can be easily made. Objectivity is very important in this kind of research and therefore the researcher takes extra care to ensure that their own presence, behaviour or attitudes are distanced from the study. This approach emphasises on the deductive process of moving from a more generalised picture to the specific portion of the study area sometimes referred to as the top down approach (Cooper & White, 2012).

Qualitative approach as the term suggests is more concerned with the social constructivism paradigm which promotes the socially constructed nature of reality. It aims at understanding and exposing certain human behaviour and experience together with contradictory beliefs and norms. The approach is a direct opposite of the former in that it is inductive in nature meaning it aims at moving from the specific to the more general scenario. This approach does not emphasise on the numerical form of data and usually does not analyse data by use of statistical means (Ibid).

This study used both approaches to form what some researchers refer to as pragmatic approach to research or mixed methods. The researcher realised that both methods had pros and cons which could complement each other to the success of the study. The researcher used a procedure similar to the one outlined in Figure 3.1 to arrive at the decision of picking this pragmatic approach. This enabled the researcher to use the methodological triangulated approach of using interviews, a survey and case studies.

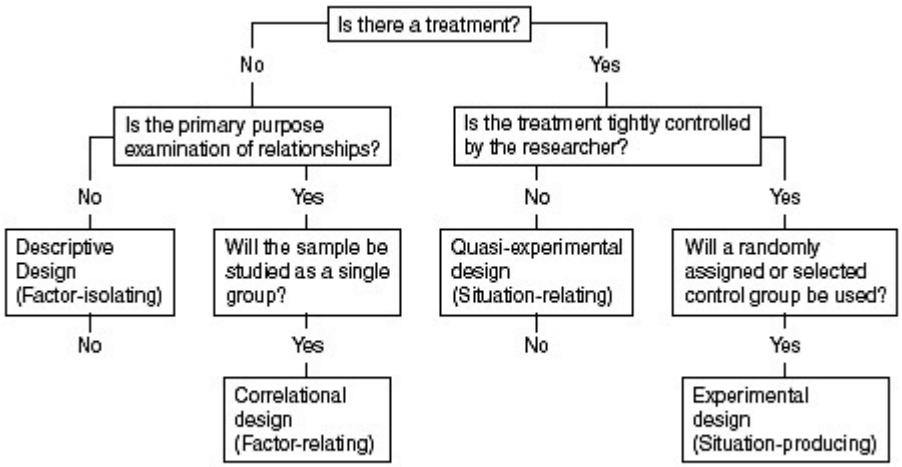


Figure 3.1: Decision tree matching research design to category (University of Wisconsin)

3.3.Research techniques

Various research techniques are considered before one proceeds with their study. These are basically main categories under which the researcher places their study which could be; a survey, case study, observation or literature review. These techniques are briefly described below except for literature review which was exhaustibly discussed in the previous chapter.

3.3.1. Surveys

These involve asking questions to a selected number of people about their skills, experiences and perception with regards to the topic under study. Mostly questionnaires and interviews are used as well as structured observations.

The main advantage of a survey is that it easily enables dealing with a large group. On the contrary, they are time consuming and results are highly dependent on the respondent's willingness (Banda, 2014).

This study incorporates a questionnaire survey as well as a structured interview survey in its data collection.

3.3.2. Case study

A case study involves treating the whole study population as a single entity. A case could be an individual, organisation, a group, a community or an institution which is considered a bounded system in itself. The assumption around case studies is that the selected case represents many other similar cases and therefore any deduction generated from it will be representative. It is very useful in exploring an area where very little is known or understanding a phenomenon in greater depth (Gilbert, 2008).

Case studies have an advantage of acquiring detailed information about a particular topic under study. The main limitation is that the analysis and reporting of findings highly depends on the researcher's objectivity hence its prone to unreliability (Ibid).

Three case studies were considered under this research so as to help the researcher get detailed information about the issues emerging from interviews.

3.3.3. Observation

This involves the researcher being part of the population under study at the same time collecting the necessary data. The researcher can either participate anonymously or by disclosing his intentions and the purpose of study (Ibid).

The main advantage is that the researcher gets a deeper and better understanding of the phenomenon as they interact with the group. There is however a danger that along the way the researcher might lose objectivity (Ibid).

This research made use of this approach by considering a selected number of project sites and interacting with the project team as well as looking at the actual project progress.

3.4.Methodology types

Research methodology is the systematic and logical layout of how the researcher conducts their study. It involves outlining the procedures adopted in answering research questions, how tasks are carried out and explaining the “DOs” and “DONTs”. Outlined below are some of the research methodology types.

3.4.1. Experimental

Under this methodology participants are randomly assigned to one of the several treatments. The methodology is formed on a basis that there should be a group that is exposed to some kind of treatment (experimental group) and another group that is not assigned any treatment (control group). If some significant differences are noticed between the two groups which did not exist before treating the experimental group, then the researcher conclude that the differences are as a result of the manipulation.

The main advantage of this methodology is that conclusions about causality can be drawn. However, there is a constraint of usually failing to represent the real natural environments.

3.4.2. Quasi – experimental

This methodology involves comparing a group that has received a particular intervention with another one of similar characteristics that has not been exposed to the intervention. The key principle here is that there is no random assignment as the groups are preselected.

This methodology has an advantage of the ability to simulate real natural situations. There is a disadvantage of challenges in identifying and justifying causal conclusions.

3.4.3. Correlational

Correlation research aims at quantitatively analysing the strength of relationships amongst variables. The researchers who employ this method do not manipulate the variables but rather make comparisons based on the existing scenarios.

The main advantage of correlation is that it helps to analyse complex relationships amongst many variables. On the negative side the methodology is not able to bring out conclusions about casualty of a particular phenomenon.

3.4.4. Qualitative

This methodology aims at detailed describing a problem, situation, event or phenomenon without much emphasis on quantification. Normally scenarios are described as they are by use of observations, interviews as well as literature reviews.

Qualitative methodology is able to provide detailed in depth understanding of the topic under study. The main disadvantage is that the methodology can be very time consuming in terms of both data collection and analysis.

3.4.5. Cross – sectional

Here the researcher attempts to investigate matters as they are at that particular period of time meaning that data is collected at one time only.

This methodology involves a single contact with the study population and therefore is considered inexpensive, quick and easy to analyse. However, the main constraint is that it is not able to measure trends with time.

This study falls under this category as it considered road construction project planning practices in Zambia at the time of research and the population was only contacted once.

3.4.6. Longitudinal

This method is the direct opposite of cross-sectional method in that the researcher contacts the study population more than once thus in intervals. The contacts can either target the same respondents or different ones but the focus is still on the same population.

The main advantage of longitudinal researcher is the changes can be tracked with passage of time hence making it to make conclusions on trends. The methodology is perceived to be very expensive because of return visits and there is a risk of some respondents dropping out.

3.4.7. Micro-genetic

This methodology involves studying the same individual participant over a long period of time such as weeks or even months. This is normally used in educational circles as well as behavioural studies.

They avail the researcher with detailed information development of behaviour over passage of time. The main disadvantage is that these studies are expensive and tend to consume a lot of time.

3.4.8. Single – subject

This is similar to the micro-genic except that the one and only participant is exposed a selected treatment. Usually the baseline characteristics or behaviour are observed before the intervention and then the researcher looks to observe any changes or conservation after introduction of a particular intervention. It is important to note that there are no controls or comparison groups under this study.

The main advantage is that it provides detailed information about developing changes in a particular variable. It is however very difficult to generalise the findings to a larger population.

3.4.9. Action

This is where the researcher aims at examining practices critically in order to make certain improvements in identified problematic areas. The research is driven by the goal to take action based on the outcomes and usually the overall aim is improving quality of service

This methodology involves investigating practical challenges that affect specific operations. It has a disadvantage of acceptance of findings as most scientific researchers do not consider it research (Anderman, 2009).

This study mixed the qualitative and cross – section methodology approaches in its effort to get into depth understanding of the roads project planning procedures in Zambia and arrive at reasonable conclusions.

3.5. Research design

A research design is a detailed plan or blueprint of how the research is to be completed all the way through from problem identification to generalisation and reporting of findings. It identifies and develops procedures for completing the study at the same time providing quality assurance check so as to ensure validity of the procedures (Kumar, 2011).

The study employed both qualitative and quantitative approaches as it made use of structured as well unstructured data collection methods. Figure 3.2 presents key stages in the outline of the research.

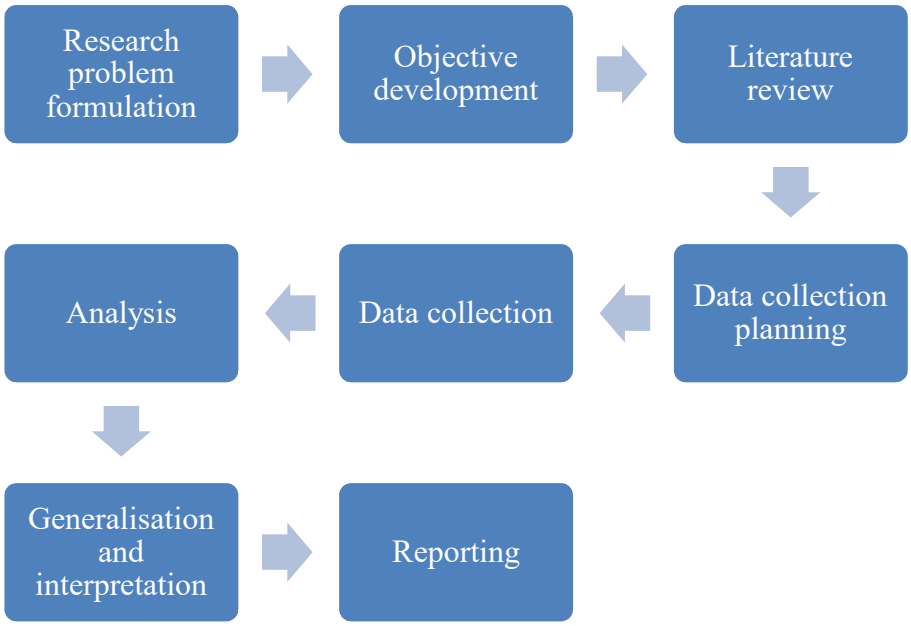


Figure 3.2: Key stages in the research process

3.5.1. Research problem formulation

The researcher identified the problems of road construction project delays, budget overruns and quality shortfalls. Since project planning was identified as the causal factor for these problems and very little research had been done regarding this subject an inquiry was inevitable. During this stage the research questions were also to be developed.

3.5.2. Objective development

A research can also be described by how objectives have been presented thus; descriptive, correlational, explanatory or exploratory.

Descriptive research describes the problem or phenomenon systematically and logically in order to present causation and effects. Correlational research aims at discovering or establishing relationships between two or more aspects of a phenomenon thus it is more based on comparisons. Explanatory research tries to explain certain relationships amongst the existing situations. Exploratory research attempts to unveil knowledge about an area where little or none at all is known, it explores the phenomenon so as to bring into light various issues. Looking at the objectives set out in the first chapter of this paper, this research falls in the descriptive research category (Bickman & Rog, 2009).
During this stage objectives were set to enable the research address the research questions raised during problem statement.

3.5.3. Literature review

This step involved a detailed review of recent available literature in relation to the topic under study. Various sources were consulted to appreciate the work done by others which included scientific journals, dissertations, books, online publications, official government publications and newspapers. A critical literature content analysis was also conducted to identify gaps in information, ideas and generalisations by other authors in order to see where this study would relevantly fit in.

3.5.4. Data collection planning

This stage involved the decision on what kind of approaches were to be used for data collection. Data collection involved both primary sources such as administering of questionnaires to sampled professionals, observations and interviews with specific road project managers and secondary sources such progress and annual reports.

A questionnaire was developed with the view of targeting professionals who have been involved in road construction project planning as respondents. Road construction projects for contracts signed between January 2011 and January 2016 were sampled whose contract

managers were interviewed, documentation reviewed as well as physically observed. The limiting of projects under consideration to this duration was due to the fact that at the time of data collection meaningful progress would have occurred on these projects either positively or negatively.

Sample sizing for the sampled projects as well as respondents was done at this stage by means of statistical principles.

3.5.5. Data collection

The developed questionnaires were delivered by hand and mail modalities. A cover letter was attached to each questionnaire introducing the researcher, the topic and stating the reasons for research. The letter also assured the respondents the privacy to their answers. An envelope with a prefixed postage stamp was enclosed for the mail delivered questionnaires.

Appointments were made with contract managers for the selected projects for unstructured interviews to gain detailed insights into the projects. For the running contracts, project sites were inspected for physical observation and on-site interviews.

3.5.5.1.Data collection methods

Data collection is an essential part of every research therefore the methods employed in collecting data should be such that will ensure credibility of the collected data. There are various methods of data collection categorised and known by the procedures engaged in collection. This part of the text is going to discuss some of the methods used for data collection in terms of their advantages and disadvantages.

a. Questionnaires

This is a method of collecting data by pre-listing a set of questions on paper and distributing it to the identified people for responses. The questions can either be open ended or closed type depending on the researcher preference and the research type.

This method provides advantages of the ability to collect data from large number of people in a short space of time thus it is faster. The researcher tailors the questions to meet the

needs of the research therefore rules out unnecessary data. This method makes it is easy for quantitative research as the data can easily be converted into graphs and charts which makes an easy presentation of research findings. If well administered and to the right people, this method has been proven to be inexpensive. Above all this method offers the greatest anonymity if so chosen as respondents often times are asked not to include their names.

The method still has a number of cons which includes misunderstanding of questions by respondents resulting in inappropriate answers. Sometimes questionnaires take a lot of time to prepare as well as finding the right people to fill in. Questionnaires have been known for their low response rate sometimes even below 50%, however it is important to note that if it is administered collectively then this defect is ruled out. This method has a limitation of targeting only illiterate respondents meaning valid responses could be left out from the illiterate, old, very young and handicapped. There is no opportunity to clarify certain issues that the respondent might not fully understand.

b. The internet

This is a relatively new method of data collection and most research institutions do not authenticate it. The method involves the research typing key words or particular questions onto the search engines and reviewing the results.

The main advantage is that it is quite fast in accessing information. The other pro is that there is a lot of readily available information on the internet. With this method it is very easy to find information.

The main disadvantage of this method is that some of the information is not credible thus it could just emerge from forum discussions or even just bloggers with certain interest so extra care has to be taken whenever sourcing information. Copyright issues can easily be violated sometimes. Some sites are not reliable as they can upload anything. Some internet sites lack stability, the URL can be changed anytime or the content removed so referencing can be a problem.

c. Interviews

This is one of the reliable sources of primary data for research. It involves asking a selected specialised people questions on the subject area. The interviews can either be structured or unstructured.

Information is accurate and reliable if the right specialists are picked. The researcher is able to get in-depth data about a particular phenomenon as questions can be varied. There is an opportunity for further clarity for both the researcher and respondent. This method is able to cross literacy and poverty barriers. There is also an opportunity for important spontaneous responses. This method provides the advantage of leads to other important sources of information that the researcher might not have known initially.

d. Books

Books provide a good starting point for research and are highly certified by most research professionals. This method involves reading through books to find relevant information on the topic under study.

The main advantage of this method is that books are likely to be reliable because of the many processes involved in publishing a book. The other important aspect is that books can specific to topic therefore making it for the researcher to find relevant data.

Despite the above pros, books have cons such as being expensive because they are produced at a cost which has to be paid for. There are also copyright issues to be considered with books. Sometimes this method can be time consuming browsing through a set of irrelevant books before getting to the right one. The last disadvantage is that books may be outdated because it takes a lot of time and resources to update a book.

e. Focus groups

This is a method of data collection whereby a group of individuals with similar experiences and understanding are brought together to focus on a specific topic. Under this method a topic is developed and explored either by the researcher or the group members and the discussion proceedings are recorded.

Amongst the notable advantages of this method is that it enables the researcher to get people's attitude and perception easily towards a particular subject. The results from these interviews or discussions are easy to understand. This method has proven to be inexpensive compared to individual interviews as all specialist are brought in one place. Group members also stimulate each other leading to detailed information gathering. The other advantage is that the researcher is able to interact with the participants therefore providing more opportunities for clarity.

The disadvantage of this method is that skill and experience of the moderator is cardinal as they need to really know and understand the data needed. Sometimes getting the right groups assembled can be time consuming and difficult. The data resulting from these discussions also requires skills and experience in order to analyse and generalise it. Normally these discussions involve small sample sizes and therefore it might not present a good representation of the general populous. The further disadvantages are that group discussions can be challenging to control and dominant participants can take over the views of others. (Irowe, 2012)

Like earlier mentioned this study adopted a triangulated approach to ensure reliability and validity of the study process. Questionnaires, interviews, books as well as internet sources were consulted during the course of study.

3.5.5.2.Sampling

The target population was proportionately stratified into four categories for purposes of ensuring uniform representation from the four implementing institutions of public road works in Zambia as guided by Kumar (2011) who argues that the accuracy of collected data depends on the variability of the study population. Purposive sampling which is a form of non-probability sampling technique was employed in this research as there was a need to identify experts in the field of project planning who will give relevant responses in addressing the research question. The homogenous sampling strategy of purposive sampling as outlined by Saunders (2009) in this case came in firstly by only picking institutions involved in the implementation of public road works and secondly, by only targeting a population of those officers involved in project planning within these

institutions. Selection of samples from the four categories was by probabilistic means thus statistical tables were used. A total of 50 target respondents were identified for this study comprising of planning professionals from the local authorities, Ministry of Local Government and Housing, Zambia National Service/ Rural Roads Unit and the Road Development Agency as presented in Table 3.1. Stutely (2003) advise that a minimum number of 30 can be considered appropriate for statistical analyses. The total population of professionals involved in the planning of public road projects was 109. At 95 percent level of certainty and 5 percent margin of error, the correct sample was estimated at 79. However, it was discovered that close to half of officers in the implementing institutions were not available which brought the actual population to about 62 professionals.

Table 3.1: Target respondents from public implementing institutions

S/N	Institution	No.
1	Local Authorities	30
2	Ministry of Local Government and Housing	5
3	Zambia National Service / Rural Roads Unit	5
4	Road Development Agency	10
	Total	**50**

Therefore after in-putting a population of 50 into the estimator Table 3.2, the estimated sample size at 95 percent certainty and 5 percent margin of error was 44. Therefore the selected sample of 50 was considered suitable.

Table 3.2: Sample sizes for different sizes of population at a 95% confidence level

	Margin of error			
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

Source: Saunders (2009)

The table was developed based on the formula below;

$$n = \rho\% \times q\% \times [\frac{z}{e\%}]^2$$

where

n is the minimum sample size required
ρ% is the proportion belonging to the specified category
q% is the proportion not belonging to the specified category
z is the z value corresponding to the level of confidence required
e% is the margin of error required.

Equation 3.1: Sample size calculation

To the convenience of the researcher, with the view of achieving the two aims of avoiding bias and achieving maximum precision, 3 projects were selected for observation so as to validate the research findings as listed under Table 3.3. The projects were purposively selected using a quota sampling technique with only one single guiding rule that the contract commencement date was not earlier than 5 years ago. This selection method was

justified by the researcher's ease of access to the population as well as convenience whilst carefully ensuring elimination biasness.

Table 3.3: Projects selected for case studies

S/N	Project	Start Date	Original End Date
1	Rehabilitation and Upgrading of Kawambwa – Mushota – Luwingu Road	April 2013	April 2015
2	Rehabilitation of the Nacala Corridor Lot 1	September 2013	September 2015
3	Upgrading of Mumbwa to Itezhi-tezhi Road	March 2014	March 2016

3.5.6. Analysis

The collected data was presented in a manner that helped easy analysis and understanding.

3.5.7. Interpretation and generalisation

The analysis results were interpreted in such a manner that meaningful sense was drawn in relation to the problem under study. The interpretation were generalised so as to apply to larger population since only a sample was used in the study. It is at this stage that need for developing a road planning model was justified.

3.6.Summary

The research was conducted using the cross – sectional study design with the study population comprising of professionals involved in public roads construction project planning at national and district levels. The respondents were selected from those in involved in planning at the Road Development Agency, Ministry of Local Government and Housing, Zambia National Service / Rural Roads Unit as well as Local Authorities at

district level. Sampling of respondents from this population was by statistical means so as to arrive at uniform representation.

The respondents were contacted by mode of telephone before delivering a questionnaire to them either by post or email. A covering letter from the University Zambia shall accompany the questionnaire to request for the respondents consent as well as providing information about the purpose of the questionnaire and study.

A number of running projects were also sampled by none-probabilistic means to have detailed interviews with project managers and resident engineers. The sites of the selected projects were also visited for observations.

The gathered data was then be analysed and prepared into a report.

CHAPTER FOUR: DATA COLLECTION AND ANALYSIS

4.1. Introduction

The previous chapter dealt with methods of conducting this study. It presented the various research techniques and methodology types along with their advantages and disadvantages. It was also discussed that the data collection and analysis was going to follow a triangulated approach of running structured interviews, which would lead to questionnaires and later on case studies.

Therefore this chapter presents the collected data beginning with that collected from interviews and how it was analysed.

4.2. Interviews

Structured interviews were conducted in the months of April and May 2016 which targeted professionals involved or with vast knowledge about public roads project planning in Zambia. The interviewees were drawn from the public sector, regulating institutions as well as some renowned engineering consulting firms. The purpose of the interviews was to get an insight into the general perception of project planning from experienced professionals.

4.2.1. Interviewee description

Thirteen professionals were targeted for the interview comprising of two from regulatory bodies, three from engineering consulting firms and eight from government departments and agencies involved in public roads projects. Out of the targeted only ten were interviewed, the remainder exhibited willingness but were at several times committed to other duties so efforts proved futile. All the interviewees had over eight years of experience in management of roads infrastructure project and had at least a bachelor's degree in civil engineering related field. All the interviewees were in senior management except for one who was in middle management. This combination of respondents ensured credibility of issues raised during the interviews.

4.2.2. Overview

All respondents highlighted the importance of adequate project planning in roads infrastructure development projects. The various issues raised by individual respondents were coded and arranged into categories of themes for easy discussion as outlined below. Eighty-seven issues emerged which were coded, the codes were grouped into eighteen subthemes which were later developed into nine themes as presented by Figure 4.1. The details of coded issues are outlined in appendix v.

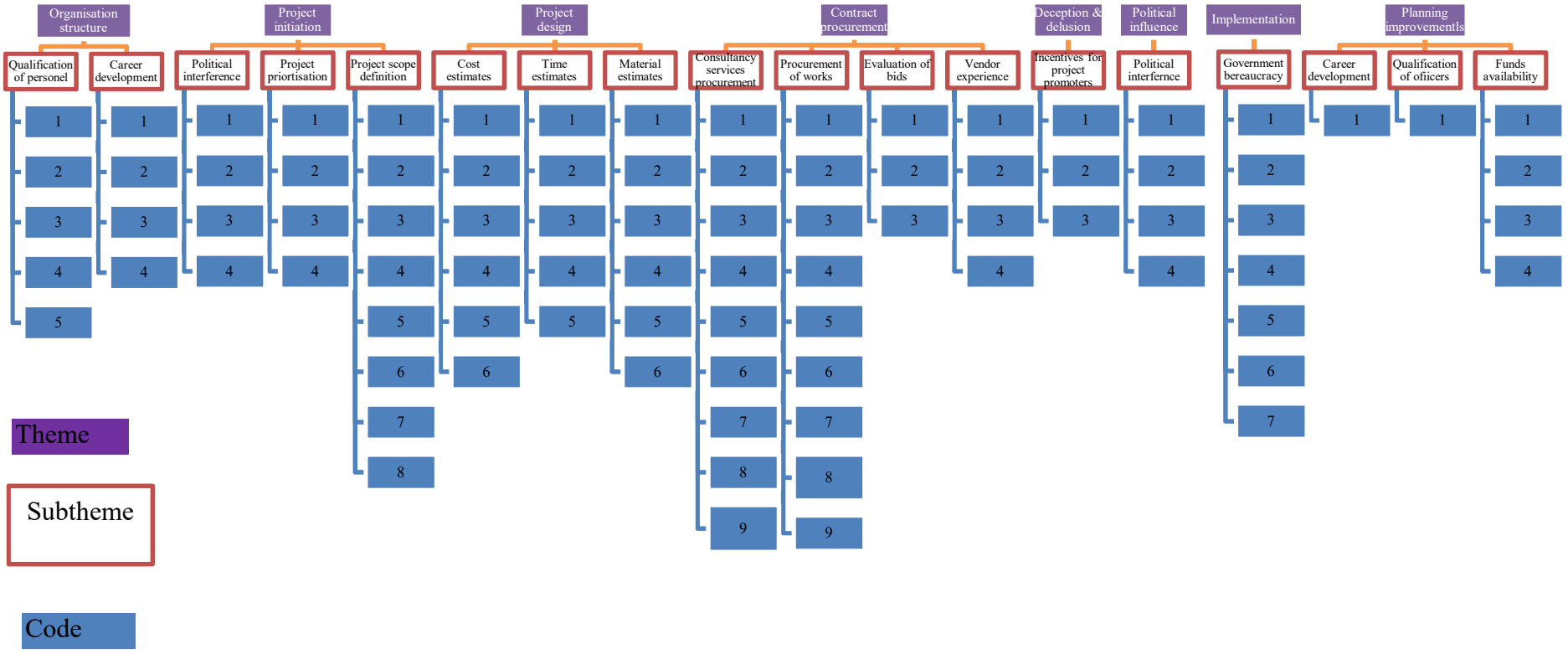


Figure 4.1: Classification Tree - Road construction project planning

4.2.3. Organisation structure

A number of issues emerged under this theme which were categorised into two sub-themes; qualification of planning personnel and career development.

a) Qualifications of planning personnel

The interviewees argued that most implementing institutions did not have adequate experienced planning personnel in various planning units and departments. It was highlighted that most planners and designers did not have the adequate experience to perform detailed project planning. Expert involvement in project planning was also reported to be lacking.

b) Career development

Lack of Continuous Profession Development (CPD) programmes was cited to be amongst the leading causal factors for the problems in these planning units/departments. The interviews revealed that most young graduate planners in these units/departments had not been exposed to how things are done in developed countries so as to appreciate various planning techniques.

4.2.4. Project initiation

Under this theme three sub-themes were identified; political interference, project prioritisation and project scope definition.

a) Political interference

Most interviewees felt that politicians were at the centre of project initiation. The ideal situation as presented was that local authorities identify roads earmarked for development which were submitted to provincial offices and later to relevant headquarters but this process has been highly influenced by politicians at all levels. The experts at the three structural levels had very little influence in selecting projects. Some respondents cited examples were councillors in local authorities would just generate lists for council management to submit for development. It was also highlighted that senior management

positions for offices running public institutions were appointed by politicians hence they always tilted decisions to favour appointing authorities as a way paying allegiance and avoid losing jobs. Continued change of senior management in public institutions by appointing authorities (politicians) was also cited as a bottleneck under this category.

b) Project prioritisation

It was observed that most projects were not initiated according to professional project management prioritisation criteria mainly due to the earlier mentioned political interference. Techno-economic studies and cost benefit analyses were not done and in few cases if conducted then recommendations were not adhered to. Interviewees also stated that stakeholder involvement in prioritisation of projects was not considered cardinal as most projects were selected for political mileage. It was noted that priority lists generated in most cases but never adhered to. Project goals and outcomes were in most cases not clearly defined for easy monitoring and evaluation.

c) Project scope definition

Just like goals and outcomes were reported to be not fully and clearly stated, the scope for most projects was just stated on paper but not adhered to. The interviewees stated that most projects had suffered scope creep leading to escalated costs. It was highlighted that optimal interventions were not explored in some cases leading to costly inappropriate interventions. Contract documents also lacked sufficient clauses to clarify scope issues as well as protect the project. Amongst other issues identified under this sub-theme was rubber stamping of feasibility studies and inappropriate designs.

4.2.5. Project Design

Three subthemes were identified under this category; cost estimates, time estimates and material estimates. All the respondents mentioned the three in one way or another expressed their impacts on project implementation in Zambia.

a) Cost estimates

Most interviewees argued that the lack of detailed feasibility studies greatly impacted project costs. It was noted that some designers generated cost estimates without visiting sites. Various options were not explored in detail as designers developed cost estimates. The respondents argued that most contract variations were as result of poor cost estimates.

b) Time estimates

Time estimate can be used as a measure for designer competence according to most interviewees. It was noted that most projects regardless of scope, location, length, topography or geography had the same project duration. For instance most upgrade interventions were given twenty-four months whilst periodic maintenance were given eighteen months. It was evident even from past studies none of these projects had finished and closed within that stipulated time variation orders were effected at some point.

c) Material estimates

Some respondents cited examples where the client had poorly estimated materials and the contractors strategically quoted high rates knowing that variations were a must. In general most interviewees stated poor material estimation as a contributory factor to avoidable costly estimations. Just like cost estimates lack of detailed feasibility studies and condition surveys (site visits) were cited as main causal factors for this scenario. It was noted that most designers never cared whether the estimates were correct as there were no punitive measures against them for err estimates. Cost estimates were in most cases considered as a traditional part of requirement in fulfilling the design assignment for payment, meaning so long the designer got paid what followed later was none of their business.

4.2.6. Contract procurement

Most interviewees brought out the relationship between procurement plan and overall project plan. Four sub-themes were developed under this theme namely; consultancy services procurement, procurement of works, evaluation of bids and vendor experience.

a) Consultancy services

Some respondents expressed their thought that implementing institutions like RDA had basically become procuring agencies without a procurement target. It was also noted that on most projects, consultancy services were procured way after the commencement of works contract a situation which professionally irregular. In some cases the design consultant for a particular project was also engaged to do the design review and construction supervision for the same project. The main argument around this was cost control but it could be further argued that spending a little extra on consultancy services would enhance quality of works. It was also noted that past performance for the bidding consultants was not considered in their selection. All the respondents acknowledged that on most complicated contracts handled by foreign firms at least though not in kay positions, locals were involved which assures technology transfer.

b) Procurement of works

Like discussed before, the issue of procurement target popped up again. Much had not been done to ensure local firms were awarded tenders thus even after introduction of such good policies as 20% subcontracting policy. The regulation of firms participating in tenders is not rigorously conducted by regulatory authorities. There was also an argument by almost all interviewees that most works contracts were signed and some cases commenced without designs. For a few that had designs you would find that the period between design and works procurement would be so long such that either condition would have changed on the ground or rates no longer be economical because of time and economy dynamics. All the respondents stated that procurement of works was the most affected by political interference. It was also discovered that most works contracts commenced even without assurance of availability of funds from treasury and such projects had cash flow challenges at later stages.

c) Evaluation of bids

Interviewees highlighted that most bids were evaluated on average more than twelve months after close of tender. As if that were not enough more months would elapse before the best evaluated bidder would be awarded. The use of engineer's estimate as the main

basis for financial evaluation also came out as one of the causal factors for project failure as it was identified as the recipe for corruption. Evaluation of bids was recorded.

d) Vendor past performance

Most of the interviewees felt there was no punishment especially for the designers whose designs had not been fit for purpose. Some projects had delayed because of design problems and in some cases variation orders had to be effected which went through lengthy procedures. Institutions like the RDA had a Vendor Rating System which was developed to assess track performance of vendors in the road sector. However some respondents expressed the concern that this tool has not benefited the sector as most non-performing vendors have been seen being awarded new contracts.

4.2.7. Deception and delusion

Most interviewees felt that there was deception and delusion in the planning of road infrastructure development projects. Only one subtheme was identified under this theme which is incentives for project promoters.

a) Incentives for project promoters

It was discovered and generally discussed that most project promoters had personal interests in project planning. If the planning services had been outsourced, the planner/designer would ensure they put across points that would pass the project so that they can be assured of jobs. Politicians also exerted pressure for the enhancement of non-viable projects so as to please their electorates. Respondents also revealed that some planners justified some projects as the saw some opportunities for corruption. Therefore it was generally concluded that some incentives derived from the projects had a bearing on the project planning process. It was also observed that most top executives of the implementing agencies were appointed by politicians therefore they could not make independent profession decisions in planning projects as they always have to please their appointing authorities. Since the top executives were mostly appointed by politicians they felt certain projects could only be pushed whilst they were still favoured by the incumbent government as any political changes would also affect their stay in the organisation.

4.2.8. Political influence

Most interviewees stated that to some extent there was political influence in the way projects were planned; under this theme a subtheme of political interference will be discussed.

a) Political interference

As if to agree with the findings of the research on RDA by the World Bank, it was noted by all respondents that public institutions involved in project planning were not free from external influence (Raballand, 2013). As earlier discussed this can be related to the project initiation, procurement as well appointment of top executives. Most respondents felt that political interference was at all levels of project planning and that politicians had more authority over project plans than professionals.

4.2.9. Project implementation

Government bureaucracy was the only subtheme identified under this theme.

a) Government bureaucracy

It was generally observed that project planning encountered problems because of the government bureaucratic procedures. Some cases were cited were projects were planned with adequate duration but required certain clearances with Attorney General (AG) which sometimes took over a year hence affecting the overall process. In some cases effecting a necessary and critical variation would require clearance by either AG or ZPPA which obviously took long and affected the projects. Similar cases were brought out by respondents regarding tax exemptions on donor aided projects. Some interviewees expressed concerns that sometimes projects are planned with proper cost estimates but later have to be trimmed to suit the financial ceilings provided by Ministry of Finance. And others stated that the bureaucracy could be alright but sometimes the laissez-faire attitude in government institutions is what affects project planning and overall project implementation. Otherwise it was generally agreed that this subtheme affected all the processes of the roads projects implementation.

4.2.10. Improvement proposals

All respondents provided what they thought could be solutions to the problems in the project planning cycle discussed above. Four subthemes were identified thus; career development, qualification of officers, funds availability as well as regulation and punishment.

a) Career development

All the respondents indicated that career professional development was lacking in the planning units and departments, therefore proposed that enhancing this aspect would promote improved planning of projects. It was also noted that exchange programmes for the planning practitioners with those from developed nations would also be a good source of knowledge to fill the gap. Others suggested that pre-project planning be conducted in detail for any project before it can be tabled for feasibilities with questions such as; is it really necessary, who will fund, are the funds available, etc.

b) Qualification of officers

Some respondents felt that planners in the planning departments/units did not have adequate qualifications and experience. It was also discussed that experts should be involved and consulted during planning of these projects especially at local authority and national level (Ministry of Finance). Suggestions of internship were proposed as well as learning institutions to consider reinforcing project planning lessons in their curricula.

c) Availability of funds

Most respondents suggested that projects should only be procured upon confirming that funds have been transferred from Ministry of Finance to NRFA. Issues of procurement targets were also emphasised by some respondents who felt implementing institutions should balance procurement of new projects with running ones so as to enhance management. Some also suggested that at the beginning of each year the Ministry of Finance should release funds for specific projects in full and wait on the implementers to carry out mandates who should be held accountable for any failure.

d) Regulation and punishment

Some interviewees suggested that the Retention Money Methods applied to contractors for the defects liability period should also extend to Design and Supervision Consultants as it will also prompt seriousness amongst these vendors. Initiatives introduced to empower local indigenous vendors should also involve tracking their performances. Respondents felt that the regulatory institution such as EIZ and NCC should take interest in monitoring vendor performance and downgrade the poorly performing vendors. Other suggested that punitive measures for poorly planned projects should not just end at firms and institutions further down to individuals engaged which might include revocation of professional licences or blacklisting.

4.3.Questionnaire survey

A questionnaire was generated with nine sections representing the themes that emerged during interviews. Relevant questions were formulated under these sections to further probe the emerging issues.

A five point Likert scale was used in the survey to weigh respondents' responses as indicated in Table 4.1. Strong agreement to a particular question was rated five on the scale while the least rating of one was given to strong disagreement.

Table 4.1: Likert scale used in the study

Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1	2	3	4	5

In the analysis, the top two box score approach was used because of its simplicity of interpretation. This means that percentage scores for strongly agree and agree were added to arrive at the agree score whilst the strongly disagree and disagree scores were also added to arrive at the disagree percentage score. The overall score for each question was arrived at upon which one of the two added score was high. It is however to note that since the study adopted the cross-sectional model, indices may not be appropriate because there were no

trends being studied, therefore the researcher opted to present the data in percentage format. Other researchers like Mukumbwa (2008) had used the similar approach in an effort to present data in the easiest manner.

This study is meant to carry out an assessment whose results will help public infrastructure project implementing institutions better there way of planning projects. Therefore since this method provides more variation in the data it is much easier for the busy top executives to identify critical areas of poor performance which might need extra attention without getting confused by complicated statistical presentations. However caution has to be taken by noting one disadvantage of this method which is the fact that scores are oftenly too high which might lead to complacency if recorded in the positive (Sambandam, 1998).

4.3.1. Respondent rate

Saunders (2009) states that a researcher needs to obtain high response rate in order to ensure that the selected sample is truly representative. The study advised that a 35 percent response rate for academic studies involving top management executives would be considered reasonable. In a separate study, Baruch (1999) concluded that the general most prevailing acceptable response rate for academic surveys was 55 percent.

The following formula was used to calculate the response rate;

$$active\ response\ rate = \frac{total\ number\ of\ responses}{total\ number\ in\ sample - (ineligible + unreachable)}$$

where

ineligible = respondents who do not meet research requirements

unreachable = respondents who could not be located or accessed.

Equation 4.1: Response rate calculation (after Saunders, 2009)

For this survey, 50 questionnaires were distributed and only 34 were responded to translating into 68% response rate. This response rate was considered adequate going by both criteria outlined above.

4.3.2. Respondent profile

The questionnaire targeted planning professionals from institution involved in public road infrastructure development. Of those that responded to the questionnaire, 94% were of the civil engineering profession whilst the remainder comprised of other professions as indicated in Figure 4.2. This implied that most planning units in public road infrastructure development institutions had officers who understood the road construction business and operation.

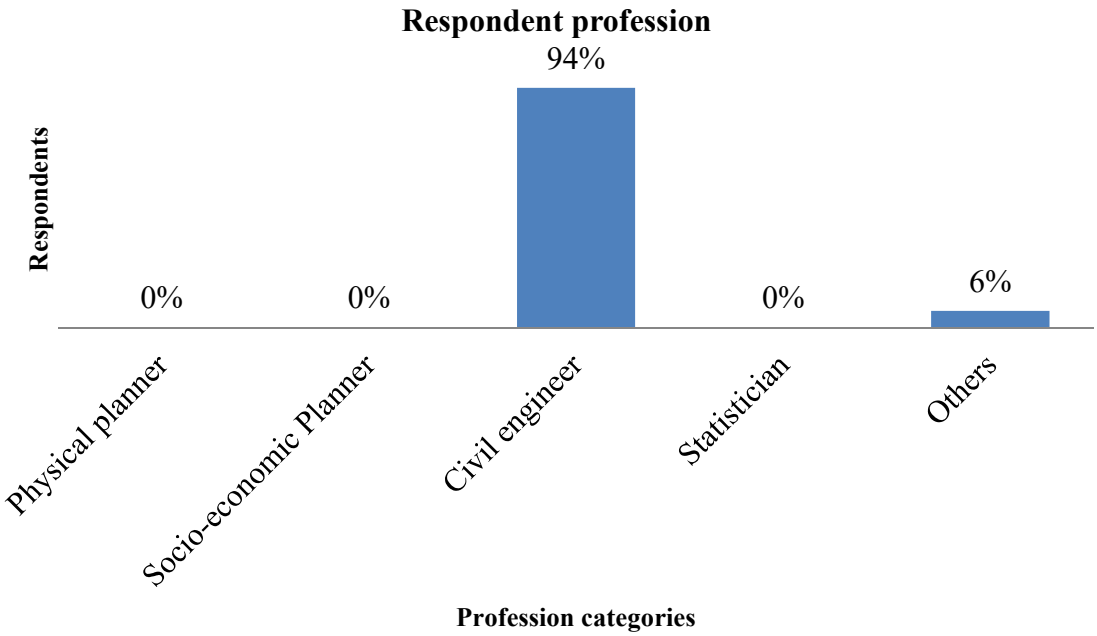


Figure 4.2: Respondent profession profile

Majority of the respondents had six to ten years of experience in handling road infrastructure development projects representing 49% of the population and only 18% had less than five years of experience. This means that the planning unit in the public road construction sector is represented by professionals with adequate experience in this field. The distribution of years of experience is presented in Figure 4.3.

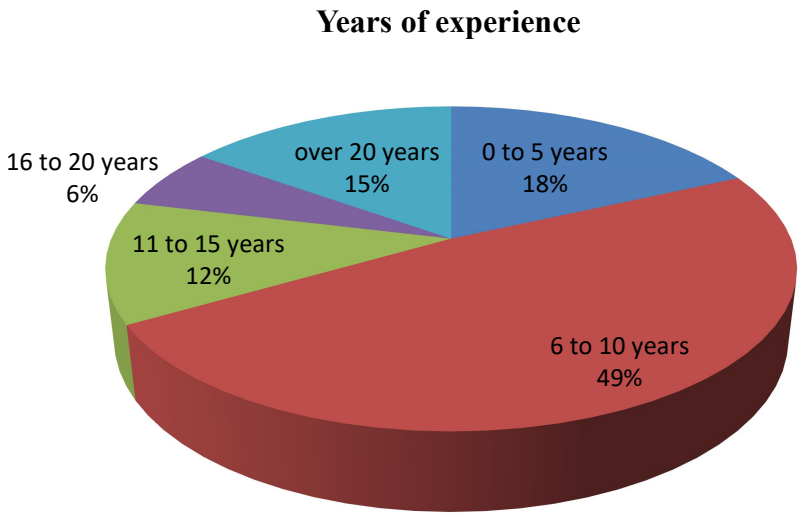


Figure 4.3: Respondent years of professional experience in road project planning

The questionnaire also endeavoured to inquire into levels of education of the personnel handling project planning in the road sector. The results as summarised in Figure 4.4 were that 82% had a first degree, 15 % had a master's degree and the rest had a PhD which can lead to a conclusion that most officers tasked with the planning responsibility had adequate education to meet the challenge.

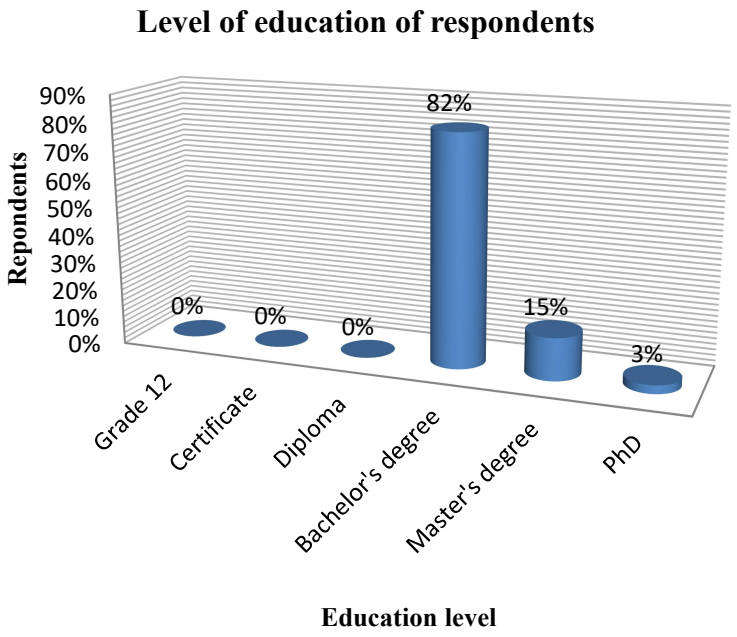


Figure 4.4: Highest education level attained by respondents

4.3.3. Organisational structure

This section looked at the institutional arrangements in terms of existence and functionality of the planning units in various public infrastructure project implementing institutions.

Of the sampled institutions, 93% had established planning units/departments to handle project planning. And at the time of research the units/departments were running. This gave a rough idea on public institutional will to have planning units in place to enable efficient operation.

In terms of staffing, 55% of the running units were adequately staffed with close to 40% understaffed as presented in Figure 4.5. This could negatively impact on the planning processes in that the units in deficit would resort to short cuts due to overload or totally mess the whole planning process due to misunderstanding. However the positive side to it is that 80% of the staff in these units had project management knowledge which is an appropriate requirement for project planning.

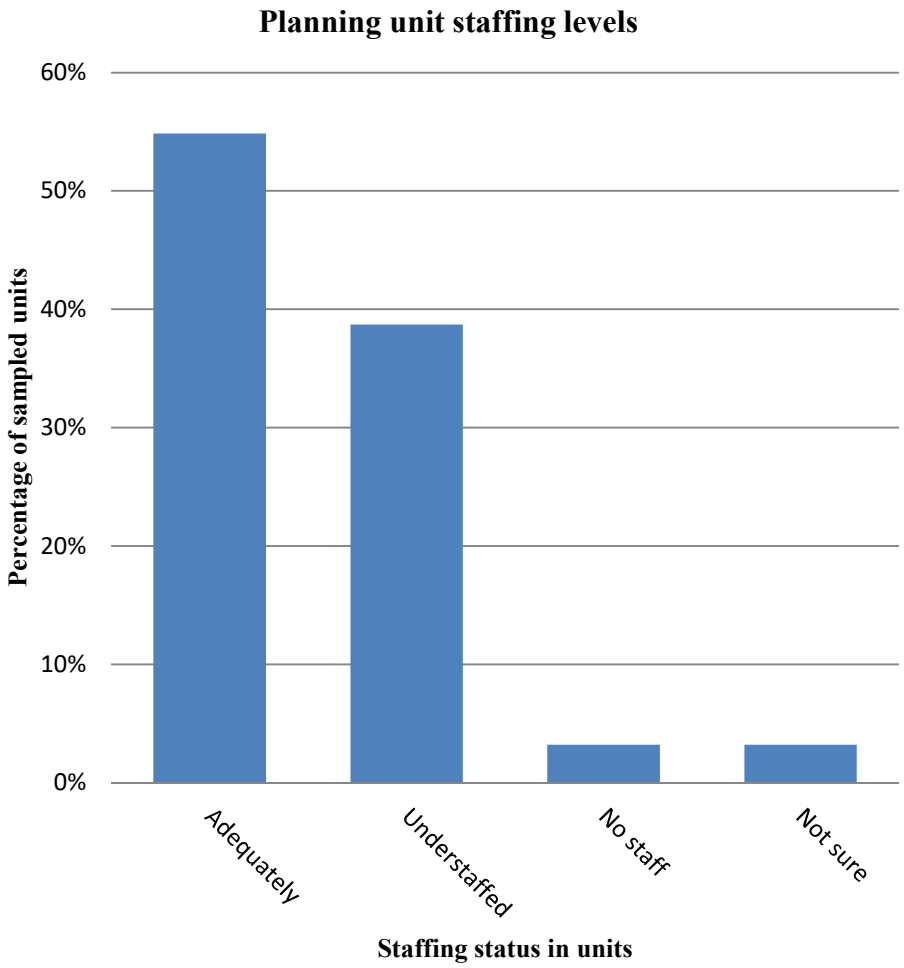


Figure 4.5: Staffing levels in planning units/department

Results revealed that all the institutions had strategic plans with 77% indicating that the strategic plans were prepared by management and the other portion outsourced to consultants. As portrayed in Figure 4.6, most institutions did not fully adhere to their own strategic plans obviously for reasons that this study unveils.

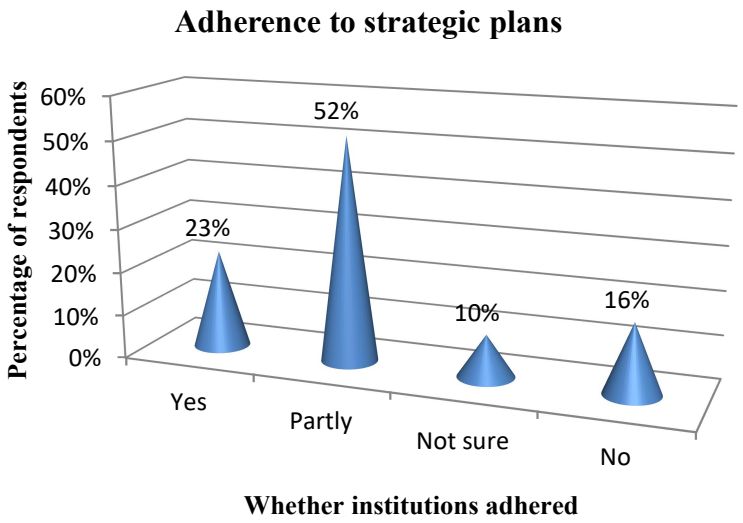


Figure 4.6: Institutional adherence to strategic plans

In terms of general perception of project planning in these public institutions it was observed that this component of project management was considered important as shown in Figure 4.7.

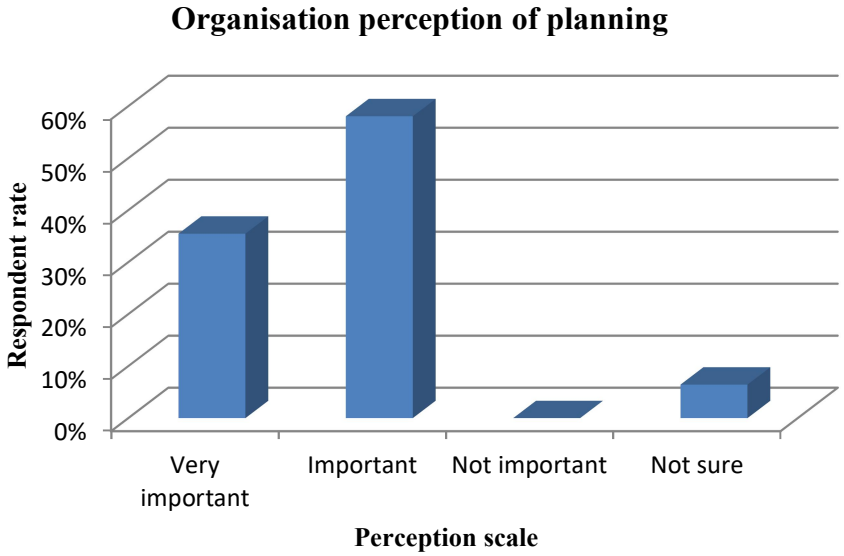


Figure 4.7: Organisational perception of road project planning

4.3.4. Project initiation

Project initiation is the starting point of any project as it defines objectives, states the scope, intended purpose as well as the expected deliverables of a particular undertaking. It is at this stage where two most important questions of "can we do the project" and "should we do the project" are answered hence the need to assess its placing in Zambia's road construction projects. Oberlender (2000) stresses the importance of this stage by stating that during early project stages major changes can be made with little or less influence on construction costs as well as schedule and quality as indicated in Figure 4.9.

Regarding project initiation, 60% of respondents expressed that projects were initiated by politicians and top management executives. This was to suggest that most projects were initiated without considering the economics but mostly for political mileage as indicated by 66% of the respondents. This also meant that technocrats had very little to say if when they doubted the feasibility or viability of the selected projects as they would be seen to oppose their superiors. Most respondents agreed to the fact that politicians were important stakeholders in the initiation of projects because they were a channel of community participation in the initiation process. It was also agreed by the 73% of the respondents that stakeholders were involved in some aspects of project initiation. It was however noted 40% of the respondents thought projects were not initiated in conformity with strategic plans whilst 43% said there was prioritisation in the manner projects were initiated. These results are summarised in Figure 4.8.

Politicians could be a good means of getting community requirements and assessing needs for development as well as advocating for financing, however allowing them to be at centre of initiating projects would create problems as they always have a biased view. The indication of stakeholder involvement in project initiation is evidence enough that the implementing institutions were not sole initiators of these projects but responding to community needs.

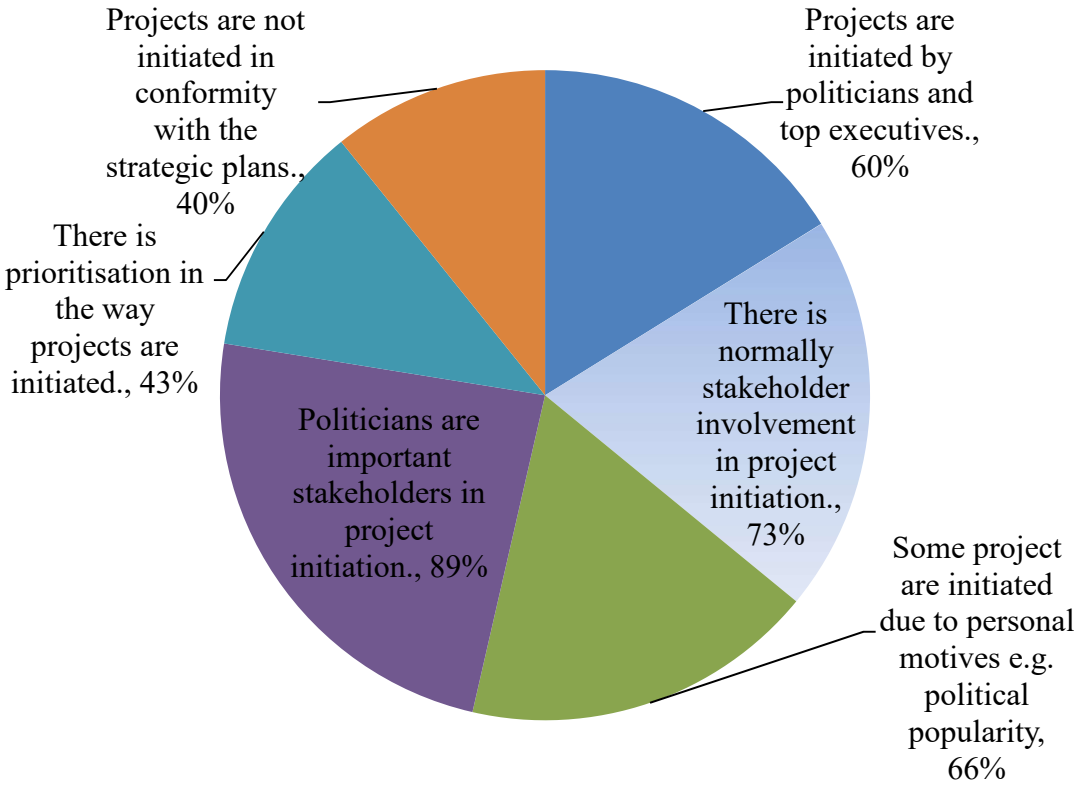


Figure 4.8: Presentation of agreed responses under project initiation

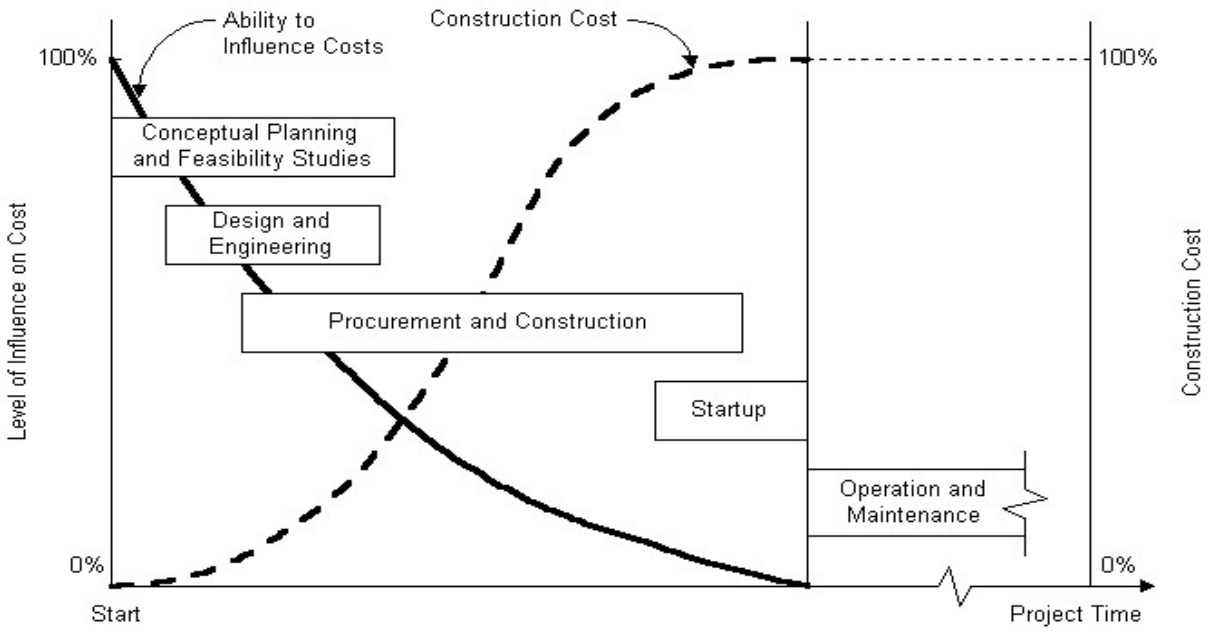


Figure 4.9: Ability to influence project changes at different phases

(After Hendrickson, 2000)

4.3.5. Project design

According to Oberlender (2000) at this stage of project development the engineer should convert the sponsor's conception and ideas into some workable engineering scope. At this stage issues of cost estimates and budgeting are also put into consideration so as to come up with designs that shall be within the financial reach of the sponsor. Good project management practice at this stage is also to carry out scheduling of events so as to determine realistic flow of planned activities, determine optimum duration to help in arriving at start and end dates. Therefore this section looks at the design procedures as with public roads infrastructure in Zambia.

According to the survey most respondents indicated that feasibility studies were thoroughly being conducted prior to detailed design and that techno economic assessments were done during designs. Options for executing the projects were fully explored as stated by 57% of the respondents whilst 60% indicated that the selected options were usually backed by technical justification. Of the respondents 53% said cost estimates were accurately done during design whilst 43% thought material estimates were well dealt with at design stage. Coming to the appropriateness of designs 77% said designers proposed fit for purpose interventions and 87% suggested that designers mostly proposed interventions that aimed at addressing identified problems. Claims that designers were lead causers of contract variations were refuted by 40% of the professionals whilst 47% thought project designs were adequately reviewed prior to construction. Further it was discovered that clients incorporated professional indemnity in design contract as represented by 48% of the professionals. These were the positive scores as revealed by the survey with regards to the design stage of project development.

On the contrary, some negative practices were also identified during the survey. Forty one percent of the respondents indicated that designers never advised the clients to stop projects in cases where they saw it being non-viable, further 40% said clients do not stop projects even if they were advised on the non-viability of projects. On engaging the same consultant to design and supervise the works, 77% confirmed the existence and persistence of this practice. In cases were the designers delivered err of faulty designs, 55% of professionals

stated that there was no punishment to such designers. Figure 4.10 presents a summary of survey results on the items considered under project design stage.

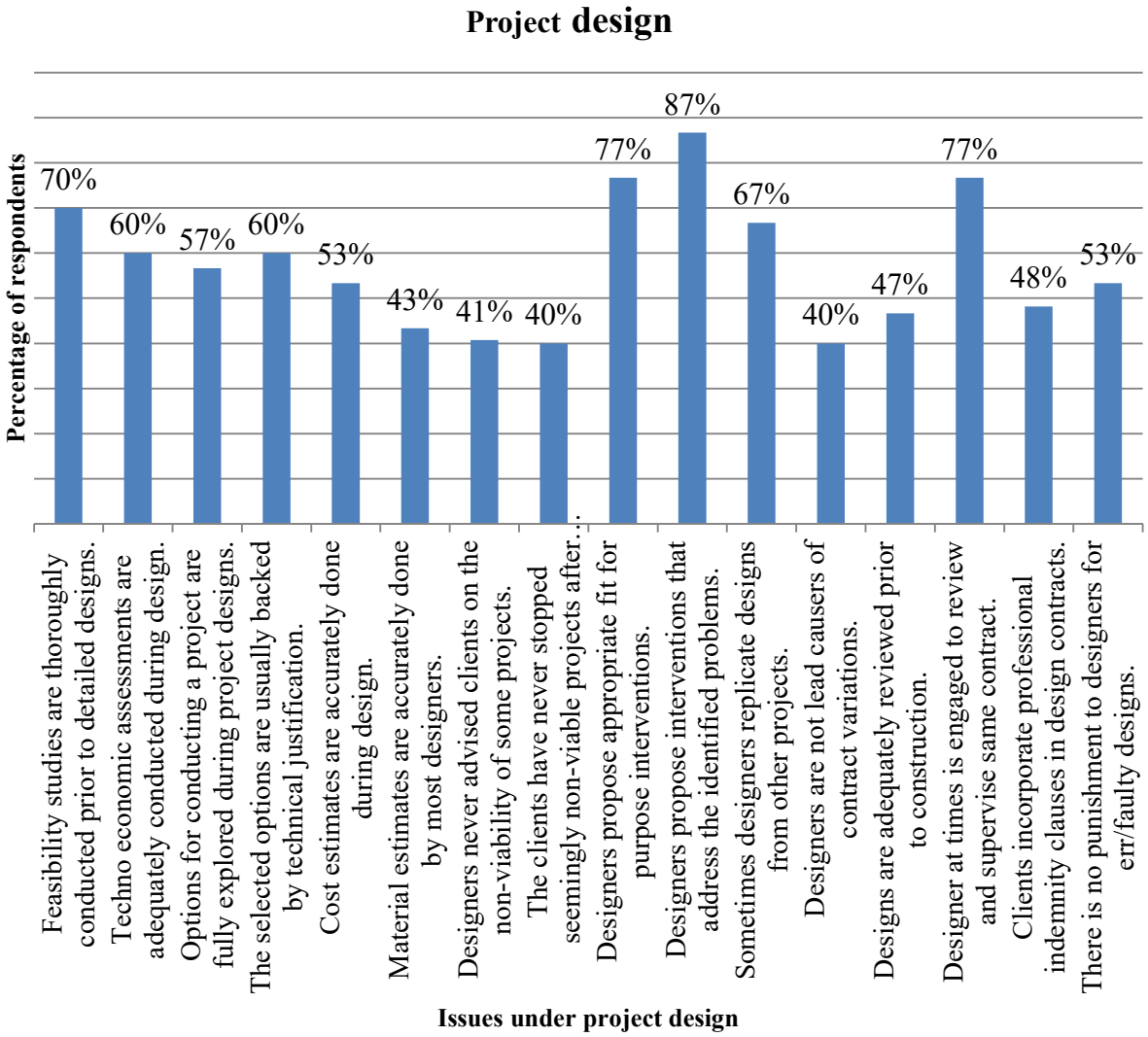


Figure 4.10: Respondents who agreed to the outlined issues on project design

4.3.6. Project procurement

According to CIPS (2013) Procurement is a business tool that enables management to identify, select, source, access and manage external resources that an organisation needs or may need to fulfil its strategic objectives. In public construction projects this is a very important as well as sensitive function as it defines and affects the overall project delivery. Therefore understanding its placement and handling in the Zambian road construction

industry was of paramount importance in assessing the project planning processes. The results of the inquiry into the procurement procedures of road infrastructure projects were as summarised in Figure 4.11.

The survey probed into the conformity of procured project execution services to the procurement plan in road construction works and the results were that 48% said projects were procured according to plans.

On the procurement of consultancy services, 67% of the respondents said that these services were mostly procured much later after works contracts. This meant that most contractors started works without the supervising consultant and in some selected cases the implementing institutions supervised who might not have the adequate capacities in terms of numbers as well as equipment and focussed commitment. At least 39% of the respondents cited undue external influence on the project procurement processes, meaning procurement structures were not left to operate independently. The procurement act guides public spending agencies to procure services only after confirmation of availability of funds to the contrary this does not happen as stated by 64% of the respondents. Further 55% of professionals indicated that rates analyses were not detailedly conducted as part of bid evaluation, this meant that some of bids could have unrealistic rates which would impede the implementation of the project at a later stage but go unnoticed during tender evaluation. On contract document completeness, 63% of the professionals said most contracts lacked necessary clauses to protect the contract. About 79% of the respondents stated that mostly the project procurement process was unduly delayed and 91% said the delayed procurement processes had an overall negative effect on project delivery. At interview stage the delays were related to late clearance by Attorney General as well as the ZPPA.

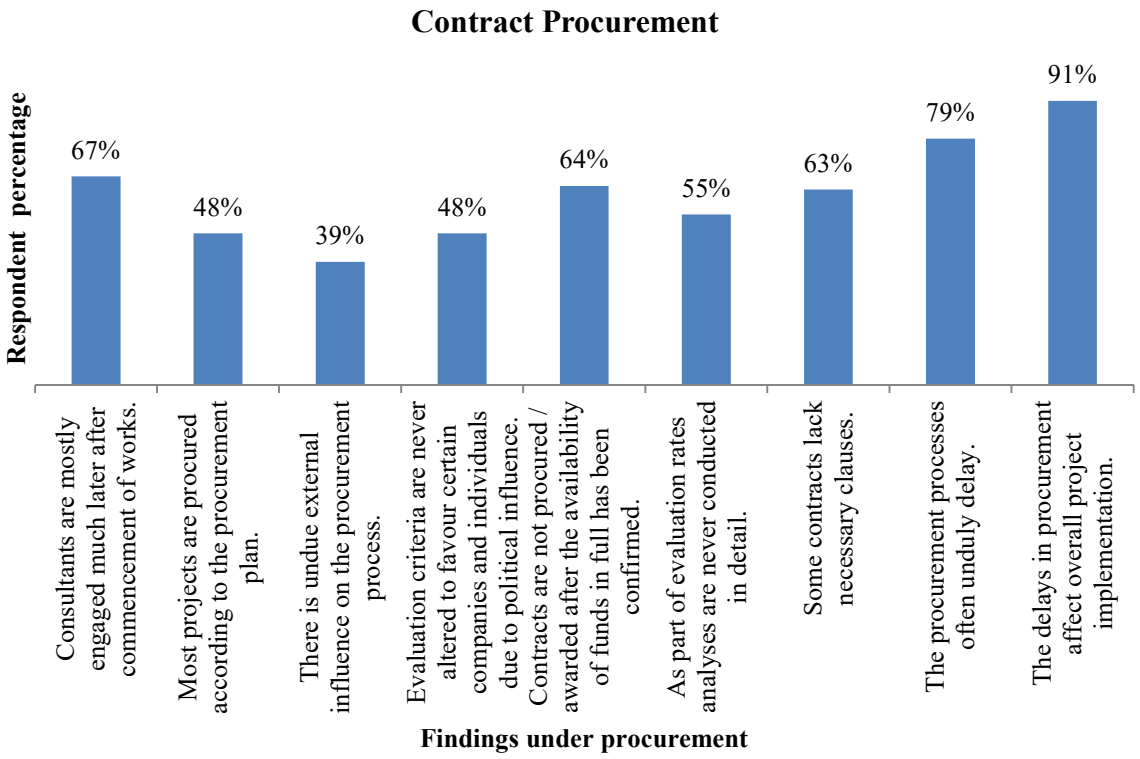


Figure 4.11: Respondents who agreed the outlined findings on project procurement

4.3.7. Deception and Delusion

Flyvbjerg (2009) argues that both delusion and deception have resulted in several project failures as a consequence of flawed decision making. Deception refers to cases where planners deliberately overestimate benefits of an undertaking whilst underestimating risks so as to convince financiers. On the other hand delusion is where planners involuntarily overestimate benefits of an undertaking without fully assessing the risks involved. This research also assessed this aspect to see if it had any opportunities in public road infrastructure projects in Zambia.

As indicated in Figure 4.12, 34% of the respondents indicated that engineer's estimates were not accurately presented in some selected projects which led to management passing a particular project based on the perceived low cost which would rise during implementation. Using project cost as an indicator 30% of the professionals said that deception existed in the planning of roads projects related to personal or organisational incentives. Further still

36% of the respondents indicated the presence delusion in the planning of public road infrastructure development projects.

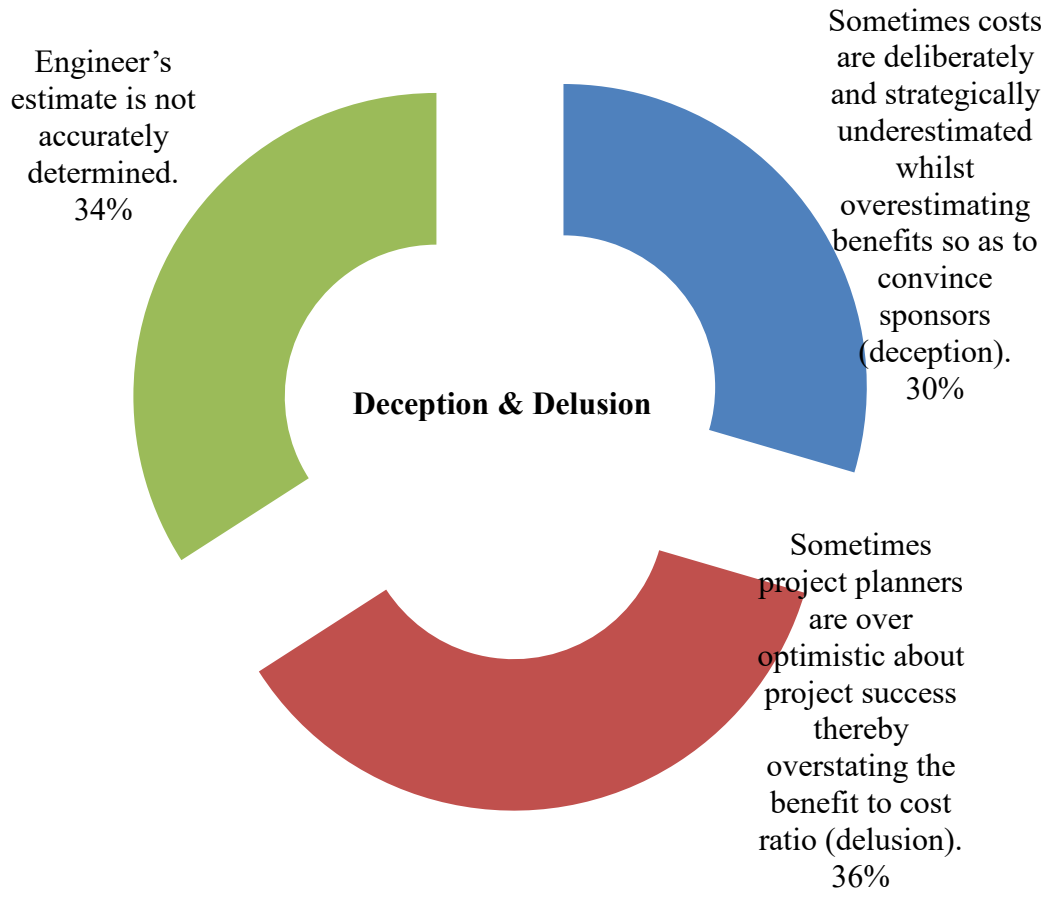


Figure 4.12: Percentage of respondent agreement to views on deception and delusion

4.3.8. Political influence

Way (2016) defined political influence as the political power exercised by individuals or organisations that do not have formal legal authority to make and enforce certain government decisions on public policy but utilize it to condition, modify and control the official decision making behaviour of those in public office mandated to make and implement decisions. Political influence in public projects can be both positive and negative, whenever it negatively affects the project it is termed as political interference. In

this case political influence was assessed to find out its effect on project planning as well as the overall project delivery and the results were as summarised in Figure 4.13.

The survey revealed that politicians made pronouncements about road development without consulting planners and therefore compelling the planners to conform to their pronouncements as stated by 79% of the respondents. Another 85% of the respondents stated that sometimes implementers yielded to political pronouncements and deviated from plans, this was an aspect that explained the many contract variations on various projects. Also 70% of the professionals highlighted that executives appointed by politicians did not discharge their duties without political interference. Most institutions implementing public infrastructure development projects in Zambia were political appointees. At least 64% of the respondents confirmed the presence of political interference in the planning processes of public infrastructure projects.

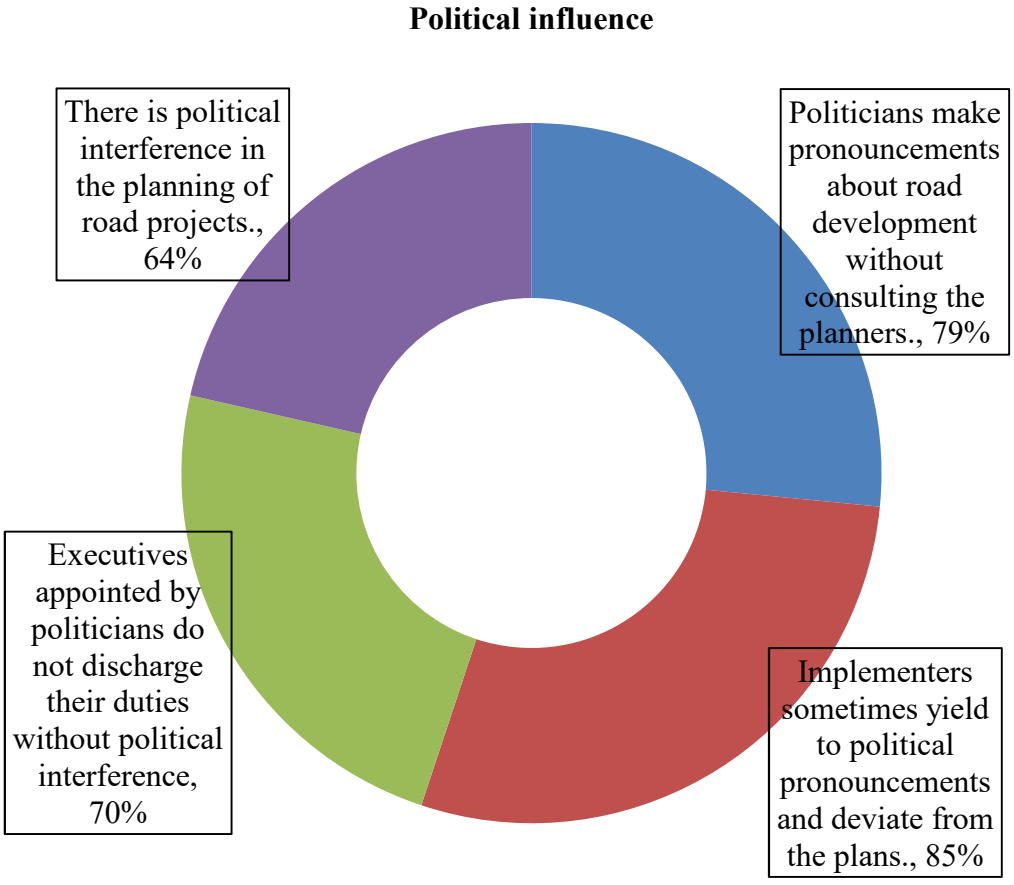


Figure 4.13: Respondents who agreed to statements on political influence in planning

4.3.9. Project implementation

Implementation or execution refers to that part of a project when planned activities are rolled into action or deliverables. The study looked at this aspect so as to understand effects on the planning process on the actual implementation of the project.

Of the respondents 48% stated that there were usually supervision funds for client supervised projects. This was to react to some concerns that for projects supervised by client under force account, funds were not available.

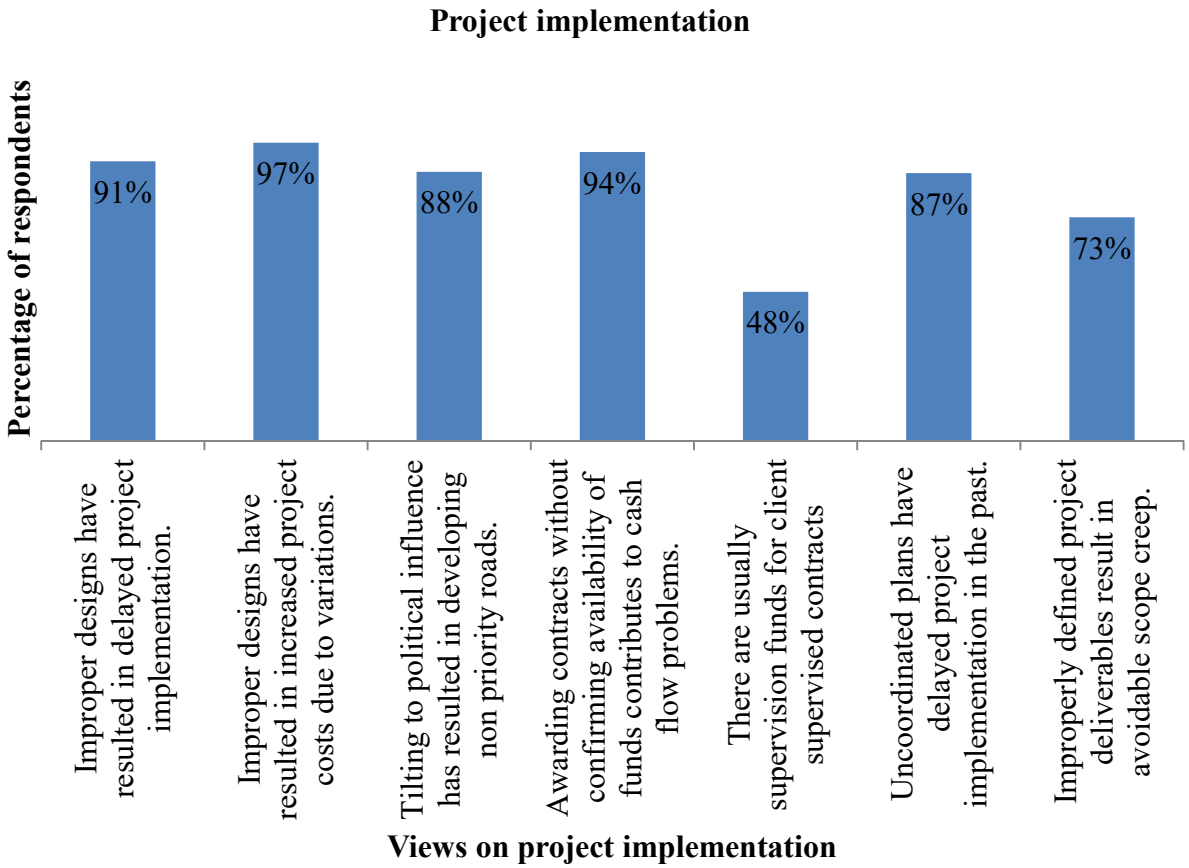


Figure 4.14: Respondents who agreed to the outlined views on project implementation

Respondents representing 91% agreed to the thought that improper designs have resulted in delayed project implementation whilst 97% claimed that contributed to increased project

costs through avoidable contract variations. About 88% of the professionals said that tilting to political pressure by both planners and executives had several instances affected the prioritisation of projects. A further 94% highlighted that the tendency of implementing institutions awarding contracts before confirming the availability of funds for particular projects had resulted in cash flow problems. At least 87% of respondents indicated that uncoordinated plans had delayed implementation of road projects. Out of all the respondents 73% said improperly defined project deliverables led to avoidable scope creep.

4.3.10. Project planning improvement proposals

During interviews a number of issues emerged as possible solutions to the identified project planning problems. The issues were refined and subjected to a questionnaire so as to validate their appropriateness. The results from the survey were as presented in Figure 4.15.

All the respondents agreed to the fact that road infrastructure project planners should have some basic knowledge about project management. This implied that institutions engaged in implementation of public road projects should have a deliberate policy to continuously train their planners in project management skills. Eighty five percent of respondents suggested that retention money should be introduced on designer contracts so as to enhance seriousness amongst the bidders. The current practice is that the design consultants get their full payment upon delivery of the designs but there is no punitive measures should the designs fail to deliver. Ninety four percent of the professionals agreed to the proposal that no contract should be awarded or signed until there is a confirmation of funds at NRFA. Another 91% agreed to the proposal that top executives of road infrastructure development implementing institutions should not be political appointees. A further 91% said there should be a deliberate policy of reporting any politicians that were seen to interfere with the procurement processes of road infrastructure development projects. Of the respondents, 97% suggested that techno-economic studies should be the main basis for determining the particular intervention for road development such as periodic maintenance, routine maintenance, spot improvement, surface dressing and asphalt surfacing. Another 97% indicated that the rate of contract variation should be part of the tools for assessing designer performance. Others, comprising 97% of the respondents, said past performance in works of similar nature should be used for design consultant selection. All the respondents agreed

to the proposal that the Engineering Institution of Zambia (EIZ) should revoke licences for all poorly performing design consultants, especially if the project fails or overruns as a result of their designs. All respondents indicated that poor performing designers should be barred from participating in future public road development contracts, that is to say they should be blacklisted.

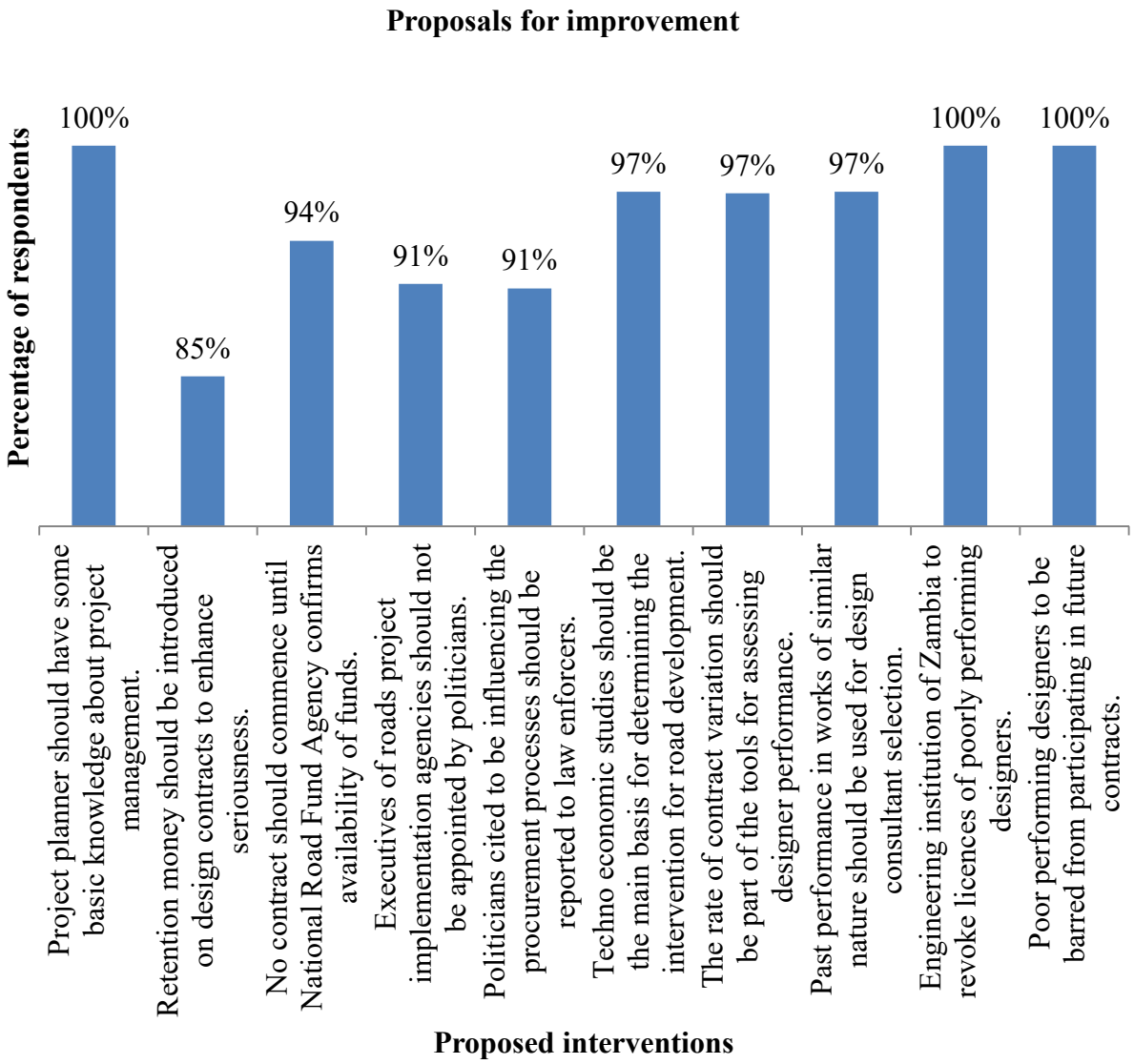


Figure 4.15: Respondents who agreed to the outlined planning improvement proposals

4.4.Summary

This Chapter presented results obtained from interviews and the questionnaire survey along with their analysis. A total of ten professionals form regulating institutions, engineering consulting firms and government agencies as well as departments were interviewed. Eight seven issues emerged from interviews which were sorted by means of the classification tree into eighteen subthemes and further into eight thematic areas. A questionnaire was generated based on the eight themes and administered to sixty-two professionals out of thirty-three were responded to and received representing fifty-three percent.

Ninety-four percent of the officers involved in road infrastructure planning for the sampled institutions were occupied by civil engineers which gave an impression that the organisations were well informed about the particular undertakings as they had experts. About 93% of the sampled institution had a planning unit and all of them had strategic plans. However in terms of adherence to these plans, most of the organisations did not conform. Political interference was discovered at various stages in the project planning process and it was identified that it had both positive and negative strands. It was also discussed that there was no specific punishment for the err project designers hence it was discovered that some designers lacked seriousness in delivering. Over 90% of the respondents indicated that project procurement processes unduly delayed and thereby negatively the implementation process. Therefore it was important that the planning to into consideration this item as it was an external factor the implementing institutions.

Various improvement interventions were also proposed by interviewees which were further verified by the questionnaire. The next chapter will detailedly examine the issues brought out by this chapter and also the appropriateness of the proposed interventions.

CHAPTER FIVE: CASE STUDIES

5.1.Introduction

The previous chapter presented the findings from the interviews and questionnaire survey. A number of issues were brought out which highlighted various bottlenecks in the planning cycle of the road construction projects in Zambia.

In this chapter the researcher looks at three case studies to help in the validation of issues raised from interviews and questionnaire survey. The case studies helped the researcher in assessing the influence of the identified issues on the road planning processes.

5.2.Case study A

Rehabilitation and upgrading of the Kawambwa–Mushota– Luwingu Road and the Chisembe–Chibote–Chief Chama Road in Luapula Province.

5.2.1. Background

The Government of the Republic of Zambia through the Road Development Agency embarked on a project to rehabilitate the road from Kawambwa to Luwingu via Mushota and Chisembe to Chief Chama via Chibote under one contract. The project was aimed at improving accessibility to the proposed Luena farm block which was identified as a potential agricultural area.

The design services were outsourced to Roughton International Limited of the United Kingdom who were paid in full upon completion of design. Both feasibility and design studies were done and concluded in 2011.

According to the design, an environmentally optimised design approach was adopted for the total project length of 158.7 km broken down into the outlined sections below. Section 1 included 24 km of the road between Kawambwa and the Tea Estate (D17). Section 2 was 19.5 km from Mushota turn-off to Mushota village with an extension to the harbour. Section 3 included 27.5 km of the section between Mushota and Chisembe villages. Section 4 extended from Chisembe for a distance of 48 km to M3 near Luwingu. The last section was 40 km from Chisembe village through Chibote to Chief Chama palace.

The budgeted design interventions were to provide a gravel wearing course on all sections except for village areas where an Otta Seal was proposed to minimise dust pollution and in hilly sections, surfacing was proposed to reduce on erosion.

However later on during design review, Sections 2, 3 and 4 were to be surfaced in full to bituminous standard while Section 1 would receive a single seal using 6.7mm aggregate. Section 5 was to have bituminous surfacing limited to the selected sections through villages. The balance of Section 5 was to be constructed to engineered gravel standard. This adjustment meant a change in the cost of the project.

5.2.2. Project designs

The detailed designs were reviewed and a number of deficiencies were identified. Amongst some of the identified deficiencies was the road alignment. The proposed alignment allowed the road to pass about a meter from high voltage electricity towers. The design did not provide for both temporal and permanent access to properties. This led to the locals blocking side drains by either filling earth or building un-engineered structures so as to allow them access such places as schools, clinics and villages.

Figure 5.1: Access culverts improvised by communities

It was further noted that key items in the Bill of Quantities (BoQ) were underestimated. For instance, the removal of trees from 1 to 2 m was estimated at 50 trees when the actual encountered was over 1500 trees. The roadbed preparation was estimated at 5,000m^3 when the actual required material was 300, 000m^3. The required fill material for the dambos was 320, 000m^3. However, in the BoQ, only 150, 000m^3 was provided for.

The study also revealed that some key items were completely omitted from the original BoQ that was used for tendering. For instance, at Chisembe Hills which is a mountainous terrain, provisions for cut and fill materials were not made. Being a mountainous terrain, cutting out the hilly section would not be avoided otherwise construction would be impossible and overall no vehicle would pass this section.

5.2.3. Contract procurement

In February 2013, the Road Development Agency engaged Unik Engineering Construction limited to execute the works at the total contract value of ZMW 258, 773, 699.00 for a period of 24 months. According to project progress reports, the contractor fully mobilised to site and commenced works on 15th April 2013.

Months later, towards the end of June 2013, Brian Colquhoun High O' Donell (BCHOD) were engaged to provide consultancy services for the design review and construction supervision of the works at a contract value of ZMW 7, 302, 332.30 for a period of 26 months. The consultant mobilised to site in July 2013 exactly 93 days after commencement of works.

5.2.4. Variation orders

Due to the many omissions and underestimations, it was necessary that some variations be made to the contract so as to provide for key items in the construction chain. However, the contract variation exceeded 25% of the initial contract value and it was difficult for the project managers to justify approval because the normal practice is to have a variation falling within 25% of the contract value.

5.2.5. None payment

According to the contract signed by the two parties, the contractor was to be paid within 56 days of certification of works. At the time of the research, the contractor was owed ZMW 60 million by the client without interest and the intention to claim interest had been passed. This negatively affected the project cash flow to the point of suspension of works as the contractor could not finance the project anymore on behalf of the client.

5.2.6. Subcontracting

The Zambian Government had a deliberate policy of subcontracting at least 20% of contracts of over ZMW 30 million in value to local small scale contractors so as to build capacity. However, this well meant initiative was mishandled on this particular project as incompetent subcontractors were imposed. This led to the abandonment of works and in some cases not mobilising at all. For instance, some subcontractors were not domiciled in the vicinity of the project area which made it difficult for them to mobilise and break even with the provided rates.

5.2.7. Analysis of problems

The following were the identified problems under this case study in relation to project planning.

a. The design deficiencies listed above could be related to the fact that the designers might not have visited the site during designs. This was adduced from the fact that alignment issues and key material quantities could not have been estimated with so much error had they fully understood the site conditions. However, the designers got their full payment and the client could not hold them accountable for such a failed product as there were no particular causes to that effect. This weakness could be addressed by the client introducing retention money in in consultancy contracts.
b. Securing the supervision contract much later after commencement of the works also highlights a weakness in the project planning cycle. Without a consultant on site, the contractor could do shoddy works or in some instances fail to make key decisions. Clients should ensure that supervision contracts are in place before commencing works.

c. Variation orders at most of the times are a cost to the project. In cases like this, where the variations are a result of design faults, designers should be held accountable. Clients should also consider rates of variation orders as the criteria for assessing designer performance.
d. The client's failure to pay for the certified is a sign of poor project planning at initial stages of the project. If the client had secured funds before commencement of the project, it would have not suffered cash flow problems. Clients should not award or sign any contracts until the availability of funds is confirmed in full.

5.3.Case study B

The Upgrading of Road D769 from Mumbwa / Itezhi-tezhi Junction on M009 to Itezhi-tezhi (109km) including 2.2 km of the Ikonkaile to Itezhi-tezhi Boma Access Road in Central Province.

5.3.1. Background

The GRZ through the RDA had embarked on an accelerated road construction programme aimed at transforming Zambia into a truly land-linked country dubbed Link Zambia 8000. The programme involved upgrading to bituminous standards of approximately 8000 km of roads linking districts and provinces throughout Zambia.

Among such roads earmarked for development under this programme was the D769 from Mumbwa / Itezhi-tezhi junction to Itezhi-tezhi Boma. It was hoped that at completion of the project connectivity of the district to the other parts of the country will be enhanced, travel times reduced and promote delivery of goods and services. The project was also aimed at piloting the use of local contractors to fully handle surfacing road projects.

The scope of works comprised excavations, grading, earthworks, surfacing, concrete works, drainage works and signage. Part of the project section traversed through the Kafue National Park hence security and environmental considerations were of high importance.

5.3.2. Project designs

Techno-economic studies were conducted by Zulu Development Consultants Limited in 2015. According to the reviewed records, the contractor mobilised to site before designs were done or rather to say without designs. Months later after the contractor had already mobilised the consultant had to start designing the road in phases of 10 km to avoid idle stand time. This already indicates that there could have been no adequate time for design review as the contractor was always waiting for this output so he could make some progress.

5.3.3. Procurement

The RDA floated a tender in the local media through Open National Bidding for Citizen Owned Companies in Category R and Grades 1 or 2 of the NCC.

The works contract was signed in February 2014 between RDA and Buildtrust Construction Limited in joint venture with Powerflex (Z) Limited at a total cost of ZMW 285, 866, 120.49 for a 24 months duration commencing 18th March 2014.

The supervision contract between RDA and Zulu Development Consultants Limited was signed in February 2015 at the value of ZMW 3, 999, 845.18, it has to be noted that this was months much later after commencement of the works contract. The contract was initially supervised by the RDA regional office whose total presence on site could not be attained due to staffing challenges.

5.3.4. Contract management

Before the commencement of the contract, the road from M009 junction to Itezhi-tezhi was in a deplorable state. The contractor was verbally instructed by the client to grade the entire stretch to make it trafficable prior to the actual works. The contractor complied but later conflict arose as the client could not effect payment owing to the fact that there was no such provision in the BoQs.

At the time of site visitation, it was discovered that one of the parties to the joint venture was missing from the site. The representative of the missing party was neither seen in

actual physical work participation or site meetings. Section 1.14 (c) of FIDIC stipulates that the contractor shall not alter its composition or legal status without prior consent of the employer. Absence on site of this party to the joint venture could be qualified as an alteration to the contract.

The client had initially availed advance payment to the contractor to enable him mobilise to site. The contractor fully mobilised with all key equipment, some of which was hired. However, some of the mobilised equipment could not be of use in the initial stages of the project and hence was kept idle for a long time which was not cost-effective to the contractor.

5.3.5. Delayed payments

The contractor's cash flow was negatively affected by the client's failure to honour payments for the certified works. The contractor had made credit arrangements with suppliers of cement and equipment but the ties were broken due to his failure to meet his credit obligations. As earlier stated, this was a local contractor who did not have any cheaper access to credit facilities compared to other international competitors, meaning Interim Payment Certificate (IPCs) payments were his immediate source of income.

Figure 5.2: Idling Owned and hired plant

5.3.6. Stalled works

At the time of the visit to the site, the works had literally stopped mainly due to financial problems. Both owned and hired plant were idling. Protected sections where roadbed preparation and formation were already done had been opened to traffic because the diversions were not trafficable anymore. The action of traffic on stabilised works led to loss of material and in some cases damage of layers by trucks. Therefore, if at any point the project would be redeemed from its financial challenges, then it means all these sections would have to be reworked, resulting in wastage of resources.

Figure 5.3: A section completed for priming opened to traffic action

5.3.7. Extra burden of works

When the Vice President visited the project in 2014, a directive was issued that urban road works administered by the MLGH be withdrawn and allocated to Buildtrust along with variations to extend the road to Masasabi Resettlement Scheme and another section to Inkonkaile. If this directive were to be adhered to, it would mean the contractor having an extra 25 km of works above what he was already committed to. The urban roads were awarded to a separate contractor and another consultant; hence if this change was effected then litigation costs might also come in depending on how it was handled.

5.3.8. Analysis of problems

The following section explored the problems identified under this case study with respect to project planning.

a. Engaging the contractor without designs also entails that the project went to tender without detailed engineering designs which should be a basis for project cost estimation. This was a planning flaw as good practice is always to have designs in place even before the tender is floated.
b. On top of not having designs, the consultant to supervise the works was engaged much later after commencement of the works contract. This could be a recipe for shoddy works by the contractor as there would be no one to check and backstop what he was doing. Mostly, supervision contracts are of lesser monetary value compared to works, hence they would be much easier to secure and finance.
c. Another planning problem was the client issuing instructions without figuring out the sources of funds to finance the instructions. This was regarding the grading of the entire stretch and consequent failure by the client to pay. Unfortunately, the instruction was verbal making it very difficult for the contractor to make claims as nobody wanted to be held accountable.
d. Mobilising equipment that was not relevant at immediate stages of project implementation could be termed as being irresponsible because plant is always a cost especially if kept idle. The contractor should have planned his works so well that only relevant plant was mobilised at particular stages of the project. This could be related to the timely absence of the consultant to give advice.
e. Failure by the client to pay for the completed works had rendered the project expensive due to extra expenses on interest as well damage to property and partly constructed sections. Had the client well planned, then the project would have not been commenced until the availability of funds was confirmed.
f. Political pronouncements like those issued by the Vice President would have an effect on both the cost and schedule of implementation of this project. At the time of pronouncement the cost benefit analysis of the proposed variations had not yet been done.

5.4.Case study C

Rehabilitation of the Great East Road (T4) Lot 1: Luangwa Bridge – Nyimba in Eastern Province of Zambia.

5.4.1. Background

The Nacala Road Corridor covers 1,033 km of roads in Zambia, Malawi and Mozambique. It runs from the Port of Nacala in Mozambique through Lilongwe in Malawi to Lusaka in Zambia. GRZ, with support from the European Union (EU) and African Development Bank (ADB), decided to embark on the rehabilitation of the Great East Road (T4) extending from Lusaka to Mwami Border on the Zambia Malawi Border so as to ease the movement of goods and promote trade. The EU funded section was divided into the following lots:;

(a) Lot 1: Luangwa Bridge – Nyimba 98.96 km;
(b) Lot 2: Sinda – Katete – Mtenguleni 95.50 km; and
(c) Lot 3: Mtenguleni – Chipata – Mwami Border 50.39 km.

The ADB supported section covered 114.78 km of the stretch from Nyimba through Petauke to Sinda. This study considered Lot1 of the EU funded section.

The scope of works, without limitation, comprised; reconstruction and widening of the existing pavement; provision of paved shoulders; improvement to junctions and sections of roads in the villages; replacement of drainage structures; and replacement or improvement of bridges.

5.4.2. Design

It was observed that the stabilising agent quantities were understated in the tendered BoQ. The BoQ indicated 11, 500 litres when the actual required volume was 11, 500, 000 litres. This error and difference translated to ZMW 221, 304, 114.50 which hugely contributed to the contract variation sum.

It was also noted that the new road, especially in the escarpment region, had several sudden vertical and horizontal alignment changes which were of safety concern.

The new road also had narrow curves, this posed a great safety hazard especially that the road was to be traversed by heavy duty vehicles transporting goods across country.

On this lot, the designers recommended the use of bitumen emulsion to stabilise recycled pavement material for use on the base except for a 1.2km realigned stretch where a crusher run base was used.

5.4.3. Contract procurement

In July 2013 the Ministry of Finance through the National Authorising Office of the European Development Fund as the Contracting Authority signed a works contract with Mota – Engil Engenharia e Construcao, SA of Portugal at the total sum of 37, 147, 271.51 Euros for 24months duration commencing on 2nd September 2013. Earlier in June 2013 the Contracting Authority signed a supervision contract with Louis Berger of USA for the supervision of the same works.

The RDA in this particular project was the supervisor for the implementation of work and the appointed consultant was called Supervisor's Representative. This implied that the RDA was not administering the contract but rather Ministry of Finance.

5.4.4. Project implementation

At the time of site visitation, it was observed that the initial 20km of the project beginning at 0+000 Luangwa Bridge had undergone some severe rutting and cracking. The section also exhibited some wheel path rutting especially on selected horizontal curve alignments. Materials shovelling and pavement cracking were noticed on selected points of the paved surface.

Severe bleeding was also noticed throughout the first paved 60km except for the 1.2km which had been realigned on a stone base.

It was also observed that even though the EU funded package was divided into three lots, all the lots were awarded to the same contractor. This might be the case because in the solicitation documents there was no express clause to stop same contractor from being awarded more than one lot.

Figure 5.4: One of the cracked sections on Luangwa - Nyimba road weeks after construction

The contract governing the project was tax and duty free. However duty and tax exemption certificates were very difficult to receive which affected the operations of the project in terms of material and equipment procurement.

Figure 5.5: One of the prematurely rutted and shoveled sections on Luangwa - Nyimba road

Generally the project had less challenges because finances were well planned for, reserved and dedicated to the project. The project was one of the few that were to be completed on schedule despite the above highlighted challenges.

Figure 5.6: Part of the bleeding section of Luangwa - Nyimba road

5.4.5. Analysis of problems

a. This case presents a typical example of a well-planned financing model. The Ministry of Finance only went ahead to secure project contracts upon confirmation of availability of funds. No interest charges were accumulated due to avoidable payment related delays.

b. However, the administration of the contract by ministry of finance rather than the actual institution mandated to handle road projects (RDA) was irregular. The RDA was placed as a supervisor who did not have any final say or authority over any project decision making milestones. Therefore the specialised input would have lacked at the planning stage of the project as it was not fully handled by an expert institution.

c. Underestimation of the nature explained above would be as a result of limited design review. The RDA has been handling contracts of similar nature and therefore a slump of that magnitude in contract value would have flagged a signal which would have led to detailed rates analysis. This was one of the identified flaws in the planning processes.
d. The sudden alignment changes could also be related to inadequate safety audit at the design stage of the planning processes. Knowing that the project was adequately funded and of regional importance, options of curve widening as well as climbing lanes for heavy laden vehicles would have been exploited. The whole project stretch did not have climbing lanes which could have been considered especially for the mountainous sections.
e. The use of recycled material stabilised by emulsion bitumen could not have been detailedly studied before being incorporated on the section. Firstly the section passes through a mountainous terrain and secondly a valley with extremely high temperatures for the most part of the year. Therefore this intervention could have been suspected for the failure owing to the fact that the section that was realigned and built on stone base did not exhibit any of the stated failures.
f. The EU funded package was split into three lots which were tendered separately possibly for easy contract management. However awarding all the three lots to the same contractor was deemed unfit as it inhibited competition. This move could also promote familiarity between project managers and the contractor therefore compromising on several project management principles. Had this item been exclusively considered at planning stage, then a clause would have been incorporated in the bidding documents to state that a contractor shall only be considered for one lot only.
g. Tax exemption certificates would not have been a problem for such a project of key national interest had the project planning team also planned exclusively. The channels for getting such certificates would have been well arranged with institutions responsible for taxes and specific officers attached to this particular project.

5.5. Summary

This chapter looked at three case studies; two purely GRZ funded thus the Kawambwa to Mushota and Mumbwa to Itezhi – tezhi road projects and one donor funded that is Lot 1 of the Nacala Road Projects. These gave the researcher an insight into the issues that emerged from the interview and questionnaire survey. Indeed it is true that there are some problems in the manner road project planning is conducted in Zambia as presented by this study.

With an input of proposals raised by the interview, verified by the questionnaire and considered in detail via case studies, the following chapter aims at developing a model that would help in addressing the above listed planning problems.

CHAPTER SIX: PROPOSED ROAD PROJECT PLANNING MODEL

6.1.Introduction

The previous chapter considered three case studies involving road construction projects. Of the three cases, two were GRZ funded while one was funded by the EU. All the three cases revealed some planning problems and this agreed with the findings that resulted from the interviews and questionnaire survey. This chapter endeavoured to develop and present a simple model which if implemented would eliminate or minimise the occurrence of certain problems in the road project planning processes in Zambia. The model was subjected to the validation process so as to test its appropriateness as well as identify possible challenges or limitations.

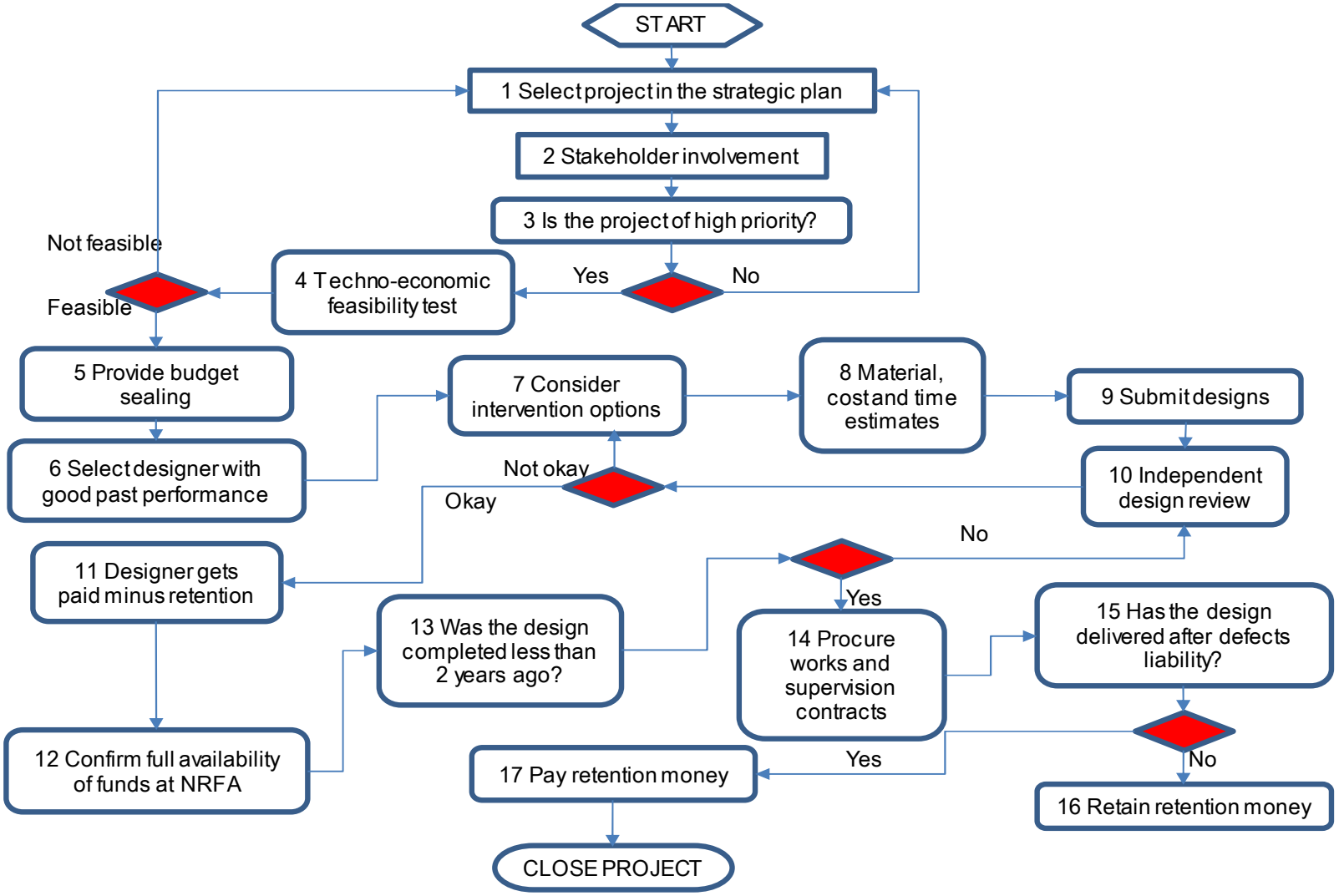


Figure 6.1: Flow chart of the road project planning model

6.2.Road project planning model

The developed model was presented with the aid of a flow chart in Figure 6.1. The following paragraphs explain the 17 steps in the developed model.

6.2.1. Select project in the strategic plan

According to the survey results, all the public institutions from which respondents were drawn had strategic plans to direct their operations in terms of road projects implementation. However, adherence to these plans was a challenge due to external influence. To curb this, the model's entry point to project planning is that any project perceived to be a potential target for development should first be verified in the strategic plan. If the project being proposed is not in the strategic plan then it should not be allowed to proceed further.

6.2.2. Stakeholder involvement

If the proposed road was found to be in the strategic plan for the implementing institution, then stakeholder meetings can be held at various levels. This is to get the targeted community's views and expectations over the proposed project as well to ensure acceptance of the project by beneficiaries. It is during such stakeholder meetings that several other views can be captured about people's expectations. This stage is also very important because it rules out development of projects due to personal motives. During interviews, a case was found where one of the township roads ended at someone's private residential property instead of closing at a nearby public school and such matters can be ironed at this stage. This step would also ensure elimination of white elephant projects such as the case where a pedestrian suspended bridge was built on one of the highways but is never used by the community.

6.2.3. Is the project of high priority?

After considering the input from stakeholders as well as technical and professional judgement, the priority of the road proposed for development can be assessed. This is to ensure that resources are only channelled to high priority projects. Priority shall be defined

by conducting road conditional surveys and later feeding the results into planning models such as Highway Development and Management-IV (HDM-4) developed by the World Bank which institutions were familiar with. If it is realised that at that particular moment the proposed road is of low priority, then it is set aside and replaced by a project which might solve many problems in the same location and from the strategic plan. Only after confirming that the project is of high priority should the team move to the next step.

6.2.4. Techno-economic feasibility test

This involves a team of experts visiting the site and assessing the possibility of implementing the project. It is at this point also that detailed economic studies are done so as to come up with cost-benefit analyses. The experts have to advise management on the viability of the project so as to avoid wastage of resources.

6.2.5. Provide budget sealing

This stage involves management providing direction on how much money could be reserved, set aside and locked for the particular undertaking. At most instances, management could wait until designs are provided to have an estimate of the cost of the project. However, for this particular case, a sealing is provided so that as the designers are designing the project, they aim at staying within budget.

6.2.6. Select designer with good past performance

This stage would involve assessing the past performance of various bidding designers before considering them for award of design contracts. About 97% of the respondents indicated that the rate of past contract variation should be part of this assessment. Meaning if the designer has been given works to design in the past and at implementation there have been exceedingly avoidable variations attributed to the designer, then such bidders should not be considered.

6.2.7. Consider intervention options

This stage involves the designer looking at various interventions i.e. spot improvement, periodic maintenance, routine maintenance, rehabilitation or construction depending on the

level of service as well as importance of the selected road. It is also at this stage where detailed analyses will be done whether to do Otta seal, surface dressing, asphalt paving, heavy or light gravelling or merely just grading. In summary, the selected design shall explore all the options to arrive at the most economical, viable and appropriate intervention to execute the project.

6.2.8. Material, cost and time estimations

After selecting the intervention to be used on a particular project, the required materials as well as their cost at that particular time are also measured at this stage. The designers also consider the scheduling at this point so at to arrive at the most optimal duration to complete the project. Whilst all these factors are being calculated drawings are also being prepared.

6.2.9. Submit designs

After material, cost and time estimates along with drawings have completed, a report is compiled and submitted to management of a particular implementing institution.

6.2.10. Independent design review

Management shall constitute a team of experts either within the implementing institution or outsourced if the funds permit so as to critically look at the submitted design. The individuals sitting on these design review committees should be individually as well as severally be held accountable for any possible failure or none performance of the design. If the review brings out a lot of grey areas then it should be sent back to the designers for reconsideration and only until this team is satisfied shall the next step be pursued.

6.2.11. Designer gets paid minus retention

Once the employer has been satisfied with the design provided by the designer then payments shall be effected but not in full. There shall be an agreed sum of money say 10% withheld by the client and only paid out after the design has performed as expected within stated period of time. As discussed in the findings, performance shall be the gauged rate of variations resulting from design deficiencies as well as appropriateness of designs after construction. If there be variations beyond the accepted -/+ 25% of the contract value as

result of design deficiencies, structural failure within the defects liability period, reduced road safety and other design related defects then the retention money shall not be released unless in cases where the designer bears the costs for such remedying.

6.2.12. Confirm full availability of funds at NRFA

Once the designs have been completed and the designers paid, then management shall confirm availability of funds at the NRFA for executing the particular project. The implementing institutions shall not procure any contracts until such funds are confirmed to be available at the NRFA.

6.2.13. Was the design completed less than 2 years ago?

This questions probes into the validity of the design. Without any fixed rule, 2 years would be considered to be sufficient time for the design to be valid. After 2 years several factors could have changed including, material costs, site condition and others from what was estimated at design. This had been a problem on a number of the projects where designs would become obsolete and lead to variations. In cases where the designs would have been more than 2 years at the time of availability of funds, then the designs have to be re-subjected to a review before proceeding to the next step. It has to be noted that it is much better to incur costs in reviewing and redesigning than going ahead to meet avoidable variation orders. Depending on the complexity and the agreed defects liability period for the design contract, if the defects liability expires within the 2 year period, then the client has to release the retention money and remain with the option of either re-engaging the same designer or employing another one.

6.2.14. Procure works and supervision contracts

If the designs have been found to be within 2 years, then the implementing institution can go ahead to secure works and supervision contracts for the project.

6.2.15. Has the design delivered after defects liability?

This stage ensures that designers provide a product which is buildable and of high quality. At this stage, the implementing institution evaluates whether the delivered product

conforms to the perceived design. The defects liability period should be decided by the client and incorporated into the design contract before engaging a consultant for design works.

6.2.16. Retain retention money

In an event that the final product is sub-standard as a result of design deficiencies, then the retention money should be retained by the client. The retention money should be used both as punishment to erring designers as well as contributing to correctional expenses.

6.2.17. Pay retention money

In case that the design is fit for purpose and has delivered to expectations, then the designer should be paid the retention retained.

6.3.Validation of the model

Validation can be defined as an assessment of whether a decision or action is meeting its intended purpose and adding value. In this case, the researcher aimed at enquiring if the proposed model was fit to improve the management of road infrastructure projects. Muya (1999) argues that validation is an accepted form of critique especially in cases where there are no alternatives than subjective judgement.

A questionnaire was therefore developed to help the researcher in validating the developed model.

6.3.1. Respondents

The validation questionnaire was purposively administered to fifteen professionals sampled from the list of those who had earlier responded to the questionnaire survey. The list of respondents is as attached in the appendices. All the sampled professionals had a civil engineering degree and were at the management level in their various organisations. The respondents had considerable experience to qualify them to give adequate critique to the proposed model.

6.3.2. Appropriateness

The respondents were asked whether the model addressed design challenges in road project planning. Of the ten, five agreed while the remainder disagreed. The reasons given for disagreement were that means of verifying designer performance were not clearly stated in the model. Furthermore, others argued that the model did not propose a legal framework for designer professional indemnity. Meaning there should have been some suggestions of legal provisions to practically deter designer unprofessionalism. The validation questionnaire asked the respondents if at all they thought the model aimed at minimising road project cash-flow challenges. Nine respondents agreed while one argued that the model did not look at Medium Term Expenditure Framework (MTEF) whose input did not always match the final output. The practice was that spending agencies would provide their budgets to the MoF as an input into the national budget. However, after profiling, the amounts provided in the MTEF were usually much lower than budgeted.

6.3.3. Adequacy

Respondents were asked whether they thought the model would minimise political interference in road project planning. All the respondents disagreed stating that the model did not state viable means of managing political interference in the project planning process. The validation questionnaire also enquired if the proposed model was going to be efficient in addressing cost and schedule overrun challenges. Out of the ten respondents, two disagreed stating that the introduction of budget sealing prior to design was not good practice as there were risks of cost underestimation. The other reason was that variations were not avoidable even under the best design cases; therefore the model would have proposed a means of incorporating variation orders. On whether the proposed model was sufficient to carter for quality shortfalls, all respondents agreed. Some commented that quality short falls would be well addressed with strong monitoring and evaluation systems.

6.3.4. Usability

Despite the above listed deficiencies, all the respondents indicated that the model was easy to use. It is evident from the above argument that the proposed model was appropriate to the existing challenges in the road project planning cycle and that it was highly usable.

However, it was concluded that the model was not adequate to address a number of challenges including political interference and funding. Therefore this model has to be developed further to enhance its functionality.

6.3.5. Suggestions and improvement

(i) Respondents suggested that the model should present clear means of determining designer retention money like in the case of works contracts.

(ii) Some respondents indicated that there was need to develop a deliberate policy that would ensure that no project is developed without a detailed feasibility study.

(iii) Others felt that designers should be held liable by a legal provision either in contracts or more generally policy.

(iv) It was also suggested that the model should give a clear budgeting process for the planned projects just after the detailed design stage.

(v) Some respondents suggested that the model should incorporate a detailed process of designer selection.

(vi) It was suggested that the model should include the development of a project charter which would guide assignment of public officers to projects and ensure responsibility.

(vii) Some professionals suggested that the model should have proposed means of ensuring that politicians don not have contact with RDA management but rather present all their concerns to the minister.

(viii) Some respondents suggested that study in general should have also developed a framework of dealing with political interference in the planning of public road infrastructure development projects.

6.4. Summary

This chapter explained the proposed model to improve the public road project planning processes in Zambia. The model covers the strategic planning aspect of the project, feasibility studies, economic analysis, project design and financing planning. It is hoped that the use of this model would minimise challenges encountered in the project planning process. In view of the limitations that emerged from the validation process, the researcher

felt the issues could not be holistically addressed within his time of study and resources available to him.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

7.1. Introduction

The previous chapter developed and discussed a road construction planning model. The model aimed at improving project planning practices in public institutions by proposing a number of phases through which a perceived project must be subjected to prior to its implementation. The model underwent validation by ten professionals involved in planning of public infrastructure.

This chapter presents the conclusion of the study along with recommendations. The chapter also presents the limitations of the research.

7.2. Conclusions

Infrastructure deficit in a nation, region or continent retards both social and economic development. According to KPMG (2014), three quarters of Africa's infrastructure is held by only 10 countries and this is a huge deficit especially for a continent with over 50 countries. Many African countries have stepped up to fill the stated gap in infrastructure delivery and Zambia is no exception. The country made a deliberate move in 2011 to develop and maintain part of its 67, 671 km of roads so as to promote trade and speedy transportation of goods and services across the country. Strategic programmes like the Link Zambia 8000 and Pave Zambia 2000 were initiated in a bid to meet the gap of road infrastructure deficit. However, the implementation of road projects has not been without problems. This study agrees with Kaliba (2009) that challenges of insufficient initial project analysis, cost and schedule overruns exist in the Zambia's public road development sector. According to the findings, some of these problems were as a result of deficiencies in the road project planning cycle.

Generally the idea of project planning was well perceived by most public road project implementing institutions as revealed by the survey. Almost all public road project implementing institutions considered project planning of high importance and hence had gone ahead to set up supporting structures. The development of strategic plans by all implementing institutions as well as recruitment of competent professionals was an

indication of organisational efforts to support project planning. Regardless of the above, it was concluded that most implementing institutions did not develop projects according to their strategic plans. This resulted in an uncoordinated initiation of projects which were later unmanageable.

It was established that most public infrastructure implementing institutions used a combined strategic approach to project planning but the most pronounced was the iterative approach. This is an approach which considers a variety of options and subjects them to an iterative process of assessment before arriving at the most favourable for final consideration. Efforts to use the bottom-up approach were frustrated by the fact that during national budgeting the local structure participation could just vanish. Another significant issue identified during the study was the fact that implementing agencies gave engineers to design projects without maximum budget ceiling, and thereafter use the design to derive project costs. This led to designers developing designs without any clue on funds availability which increased project costs.

The study established that project planning had a huge impact on the implementation of the envisaged projects. The awarding of contracts before confirmation of full availability of funds had negatively affected most projects leading to works stalling. Commencement of works contracts before the securing of supervision contracts was also identified as a frequent challenge resulting from poor planning. This definitely had an adverse effect on the execution of works. Furthermore, tendering and commencing works without designs was identified to be frequent. This was another weakness in the project planning cycle.

The study revealed that in most cases, the projected benefits from road infrastructure development had either been delayed or not derived at all due to weaknesses in the planning processes. Some projects had overrun their schedules beyond the accepted limits which meant further inconveniences to project area habitats as well as depriving the intended beneficiaries of their anticipated benefits from such facilities. Therefore a direct relationship between efficient road project planning and expected user benefits was identified in the study.

This study agreed with Raballand (2013) that there was political interference in the execution of public road projects and it contributed to implementation of unplanned projects. The study identified politicians as important stakeholders in the planning of road projects because they directly interacted with the communities to capture their needs. However, politicians had abused their role by interfering in the project planning processes which are solely supposed to be managed by experts. It was observed that planning professionals tilted to political pressure because the top executives of their organisations were political appointees.

The practices at the time of this research were such that the implementing institutions would draw plans along with budgets for projects to be implemented in each approaching year which were submitted to the national planning office. However, when the profiling was done at national planning office, the allocated funds did not respond to the institutional plans hence failing to meet the targeted needs. It was generally observed that the ministry responsible for national planning would just factor in fixed coefficients onto the amounts provided in the previous year for infrastructure and present in the new year's MTEF. This posed a challenge in the implementation of projects because the released funds would not always tally with what the implementing agencies expected. The flow of these finances to the implementing institutions was also not consistent which led to various projects stalling. It was also observed that most implementing institutions did not fully explore other alternatives of financing and implementing projects such as public private partnerships which could give some relief to the treasury.

It being the first on this topic in Zambia, this research has contributed to the body knowledge by highlighting practices, challenges and opportunities for improvement in the way public road construction projects are planned in Zambia. It provides the basis upon which rational decisions by policy makers can be drawn and a baseline for further research.

7.3. Recommendations

The aim of this study was to contribute to the improvement of public road infrastructure project management in Zambia. Therefore, general and specific recommendations are presented here below in a bid to achieve this aim.

7.3.1. General recommendations

Construction projects are highly dynamic and mostly site specific, but the findings in this research are mostly cross cutting.

It was concluded that most project implementing institutions did not select projects according to their strategic plans. Road project implementing agencies should ensure that they discipline themselves to stick to their strategic plans in developing road projects. This is going to set precedence such that in future, external influence will not find an easy way into the project planning procedures. This will further address the project management problems resulting from uncoordinated project initiation.

The study revealed that the local structure's input was not considered when it came to budgeting at national level. At the same time, the outcome of the MTEF did not represent the input of the relevant implementing organisations. The ministry responsible for national planning should ensure that there is local structure participation at all the levels through to the budgeting stage. This will promote the development of more realistic national plans for road infrastructure development.

According to the results of the study, most works contracts commenced without supervision contracts. The public road project implementing agencies should ensure that supervision consultancy contracts are secured before commencement of works. In cases where the implementing agency does not intend to outsource contract supervision services, arrangements should be put in place with fully dedicated resources before mobilisation of the contractor.

Public road infrastructure development organisations should invest more in project planning by recruiting competent staff, conducting continuous professional development training, stocking modern equipment and rendering financial support.

7.3.2. Specific recommendations

The Government of the Republic of Zambia should immediately adopt and implement the proposed model so as to enhance the management of road projects.

The minister responsible for works should present to both parliament and cabinet the findings on political interference as a means of promoting awareness amongst the politicians.

Implementing institutions should include the developed model in their project planning manuals and ensure that any proposed projects are subjected to the model. This will help in addressing undue external influence in the planning cycle.

Government institutions responsible for public road infrastructure development should consider reviewing the proposed model continuously in an effort to improve and refine it.

Attorney General should not clear any contract for signing without confirming availability of funds at NRFA. This is however not to say that AG should delay the approval processes, but rather confirm and give relevant feedback to the implementing institutions timely.

7.3.3. Recommendations for future research

The following are the recommendations for future research:

(i) The topic of construction project planning should be reconsidered by looking at the whole construction sector so as to arrive at a common best practices model;
(ii) The model should be explored further to incorporate the various concerns identified during validation;
(iii) A detailed study to look at political influence and how it can be managed in public infrastructure projects should be considered;
(iv) A separate study to look public infrastructure financing models should be conducted in response to the findings of this study.

7.4. Limitations of the study

This study looked at road construction projects implemented in Zambia, which implies that its findings should be used with careful consideration. The situations could be different in other countries or construction sectors.

The study was also limited to public road construction projects therefore it is important to note that some of the findings might not apply to the private road projects. The study only

considered contracts implemented in the period extending from the year 2011 to 2016. However, most of the findings apply to the past years.

References

Aigbavboa, C.O., Thwala, W.D. and Mukuka, M.J. (2014) Construction Project delays in Lusaka, Zambia: Causes and Effects. *Journal of Economics and Behavioural Studies*. 6 (11), pp. 848-857.

Anderman, E. (2009) *Research Methods: An Overview.* [Online] Available from: http://www.education.com/reference/article/researchmethodsanoverview [Accessed: 18th April, 2016]

Anderson, L. (2010) *Why Project Planning Is Critical To Attaining Strategy Goals*. [Online] Available from: https://www.projecttimes.com/lisa-anderson/why-project-planning-is-critical-to-attaining-strategy-goals.html [Accessed: 20th April, 2016]

Banda, D. E. (2014) *Research Methods, Lecture 4: Data Collection Approaches,* lecture PowerPoint slides, viewed 16th April 2016.

Bank of Zambia (2015) *Annual Report 2014.* Lusaka: BOZ.

Beckers, F., Chiara, N., Flesch, A., Maly, J., Silva, E. & Stegemann, U. (2013) *A Risk-Management Approach to a Successful Infrastructure Project Initiation, Financing, and Execution.* Singapore: McKinsey & Company

Bickman, L. & Rog, D. J. (2009) *The SAGE Handbook of Applied Social Research Methods. London:* Sage Publications, Inc.

Bordat, C., McCullouch, B. G., Labi, S. and Sinha, K. C. (2004) *An Analysis of Cost Overruns and Time Delays of INDOT Projects*. USA: FHWA.

Briceño-Garmendia, C., Smits, K. and Foster, V. (2008*) Financing Public Infrastructure in Sub-Saharan Africa: Patterns and Emerging Issues*. Washington: World Bank.

Byakika (2012) *Challenges of Implementing Construction Projects in Developing Countries: A Case Study of Uganda*. Pretoria: Tshwane University of Technology.

Cooper, K. & White, R. E. (2012) *Qualitative Research in the Post-Modern Era.* Canada: Springer.

Central Statistical Office (2014) *Zambia in figure 1964 – 2014.* Lusaka: CSO.

Chileshe, N. and Berko, D. P. (2010) *Causes of Project Cost Overruns within the Ghanaian Road Construction Sector.* Australia: Institute for Sustainable Systems and Technologies (ISST).

Czarniawska, B. (2012) Does Planning Belong to the Politics of the Past? *Contemporary Economics,* 6 (4), pp. 36-48.

Dada, J.O. and Jagboro, G.O. (2007) "An evaluation of the impact of risk on project cost overrun in the Nigerian construction industry", *Journal of Financial Management of Property and Construction,* 12 (1), pp. 37- 44.

Eikeland, P. T. (1997) The Precondititons of Cost Control in Building Projects. Norway: Scancor.

FHWA (2012) *Flexibility in Highway Design*. [Online] Available from: http://www.fhwa.dot.gov/environment/publications/flexibility/ch01.cfm. [Accessed: 20th April, 2016]

FIDIC (2010) *Conditions of Contract for Construction: Multilateral Development Bank Harmonised Edition General Conditions.* Geneva: Fidic.

Flyvbjerg, B., Garbuio, M. & Lovallo, D., (2009) Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster. *California Management Review*, 51(2), pp. 170 – 193.

Flyvbjerg, B., Holm, M. S. & Buhl, S. (2002) Underestimating Costs in Public Works Projects: Error or Lie? *Journal of the American Planning Association,* 68 (3), pp. 279-295.

Fouracre, P. R., Allport, R. J., & Thomson, J. M. (1990). *The performance and impact of railmass transit in developing countries* (TRRL Research Report 278). Crowthorne, U.K.: Transport and Road Research Laboratory.

Fox, S. (2014). *The Political Economy of Slums: Theory and Evidence from Sub-Saharan Africa*. World Development, 54 (12), pp. 191-203.

Gilbert, N. (2008) *Researching Social Life* (3rd ed.). London: Sage Publications, Inc.

Government of the Republic of Zambia. National Assembly (2013) *Report of The Public Accounts Committee on the Report of the Auditor-General on the Management of Constituency Development Funds and Grants to Local Authorities for the Financial Year Ended 31st December, 2012.* Lusaka: National Assembly, 3rd Session.

Gwilliam, K. Foster, V., Archondo-Callao, R., Briceño-Garmendia, C., Nogales, A. & Sethi, K (2008) *The Burden of Maintenance: Roads in Sub-Saharan Africa.* Washington: The World Bank.

Hartzell, S. (2013). *Types of Planning: Strategic, Tactical, Operational & Contingency Planning.* [Online] Available from: http://education-portal.com/academy/lesson/types-of-planning-strategic-tactical-operational-contingency-planning.html [Accessed: 17th May, 2016]

Hendrickson (2000) *Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects, and Builders*. Pittsburgh: Prentice Hall.

Holm, L., Schaufelberger, j., Griffin, D. and Cole, T. (2005) *Construction Cost Estimating: Process and Practices.* Pearson Eduaction, Inc., New Jersey.

Irowe, S. (2012) *Pros and Cons of Research Techniques.* [Online] Available from: https://staceylrowe.wordpress.com/2012/01/16/prosandconsofresearchtechniques [Accessed: 19th April, 2016]

Kalaluka, M. (2015) Roads debt up …Treasury is struggling to pay road contractors, RDA informs Lungu. *The Post Newspaper*. 17 November.

Kaliba, C. (2010) *Cost Escalation, Schedule Overruns and Quality Shortfalls on Construction Projects*. Lusaka: University of Zambia.

Kerzner, H. (2009) *Project Management: A Systems Approach to Planning, Scheduling and Controlling* (10th ed.). New York: John Wiley & Sons.

Kidd, A. (2013) *The Definitions of 'Procurement' and 'Supply Chain Management'- CIPS Australasia*. [Online] Available from: https://www.cips.org/Documents/Knowledge/Procurement-Topics-and-Skills/13-SRM-and-SC-Management/Supplier-Relationship-Management/definitions_of_procurement_and_scm.pdf. [Accessed: 26 July 2016]

KPMG (2015) *KPMG Africa Limited, Sector report: construction in Africa.*

KPMG Zambia Limited. (2014) *2015 Budget Highlights.* Lusaka: KPMG.

Kumar, R. (2011) *Research Methodology: A step – by – step guide for beginners* (3rd ed.). London: Sage Publications, Inc.

Langford, D., Rowlinson, S. & Sawacha, E. (2000), Safety Behaviour and Safety Management: It's Influence on the Attitudes of Workers in the UK Construction Industry. *Engineering Construction and Architectural Management*, 7(2), pp. 133–140.

Lartey, E. W. (2011) *Evaluation of Donor-Funded Social Service Infrastructure Development Projects in Lusaka Compounds/Townships*. Kitwe: The Copperbelt University. [Online] Available:http://dspace.cbu.ac.zm:8080/jspui/handle/123456789/23/browse?type=author&order=ASC&rpp=20&value=Lartey%2C+Emmanuel+William [Accessed: 12th March 2016].

Laufer, A., Shapira, A., Cohenca-Zall, D., and Howell, G. A. (1993). Prebid and Reconstruction Planning Process. *Journal of Construction Engineering and Management*, *ASCE*, 119(3), pp. 426-444.

Leach, P. L. (2006) *Lean Project Management: Eight Principles for Success.* USA: BookSurge Publishing

Litman, T. (2012) *Comprehensive Transport Planning Framework Best Practices For Evaluating All Options And Impacts*. Canada: Victoria Transport Policy Institute.

Madsen, S. (2011) *Principles for Project Management Success – How to Avoid the Pitfalls*. [Online] Available from: http://www.susannemadsen.co.uk. [Accessed: 5th May, 2016]

Mahamid, I. (2013) Conceptual Cost Estimate of Road Construction Projects in Saudi Arabia. *Jordan Journal of Civil Engineering*, 7(3), pp. 285 - 294.

Mallory, J.; Randels, R.; Penrose, J.; Ludovisi, D (2012) Keeping cool while planning a major cooling system modification for a large base-loaded power plant. In. *Proceedings of the 2012 International Congress on Advances in Nuclear Power Plants - ICAPP '12, June 2012*. Chicago: ICAPP. pp. 1153-1160.

Marquis, L. B. & Huston, J. C. (2006) *Leadership Roles and Management Functions in Nursing; Theory and Application* (5th ed.). Philadelphia: Lippincott Williams & Wilkins.

Maylor, H. (2005) *Project Management* (3rd revised media ed.). Essex: Pearson Education Ltd

Mbulo, E. (2015) RDA cites uncoordinated plans for delays in Link 8000 works. *The Post Newspaper*. 26 June.

Mintzberg, H. (1981) Research notes and communications what is planning anyway? *Strategic Management Journal, 2 (1),* pp. 319–324. doi:10.1002/smj.4250020308

Miti, C. (2014) Shoddy Chipata-Lundazi roadworks sadden Luo. *The Post Newspaper*. 20 October.

Mochal, T. (2003) *Poor planning is project management mistake number one.* [Online] Available from: http://www.techrepublic.com/article/poor-planning-is-project-management-mistake-number-one/. [Accessed: 25th April, 2016]

Mukumbwa, M. B. (2008) *An Investigation into the Selection Process of Consultants and Contracts in the Public Construction Sector in Zambia.* Lusaka: University of Zambia.

Muya, M (1999) *A systematic approach for improving construction materials logistics*. Unpublished thesis, Loughborough University.

Mwangala, P. (2010). Review of Oversight Institutions in Zambia. *Mimeo*. Ministry of Finance and National Planning.

Mwiya, B. Muya, M., Kaliba, C. & Mukalula, P. (2015) Construction Unit Rate Factor Modelling Using Neural Networks. *International Journal of Civil, Environmental, Structural, Construction and Architectural Engineering,* 9(1), pp. 29 -34.

Olalusi, O., & Otunola, A. (2012). Abandonment of building projects in Nigeria -Review of Causes and Solutions. In: *International Conference on Chemical, Civil and Environment Engineering, Dubai, March 2012*. [Online] Available from: http://psrcentre.org/images/extraimages/28.%20312608.pdf [Accessed: 12th March 2016].

Oppong, R.A. (2014) Challenges Facing Africa's Infrastructure Development In: *3rd Applied Research Conference in Africa. (ARCA) Conference, 7-9 August 2014*. Accra, Ghana. 13-27

Public Procurement Act 2008 (No. 12). Lusaka: Government Printers

Raballand, G., Bridges, K., Beuran, M. & Sack, A. (2013) *Does the Semi-Autonomous Agency Model Function in a Low-Governance Environment? The Case of the Road Development Agency in Zambia*. Washington: The World Bank.

Ranganathan, R. & Foster, V. (2011) *The SADC's Infrastructure A Regional Perspective*. Washington: The World Bank.

Rodrigues, J. S., Costa, R. A. & Gestoso, G. C. (2014) *Project planning and control: Does national culture influence project success?* USA: Elsevier Ltd.

Sambandam, R. & Hausser, G. (1998) *An alternative method of reporting customer satisfaction scores*. Quirk's Marketing Research Review. [Online] Available from: http://www.trchome.com/docs/pdf-files/2-alternative-method-of-reporting-scores/file. [Accessed: 27 July 2016]

Saunders, M., Lewis, P. & Thornhill, A. (2009) *Research Methods for Business Students* (5th ed.). England: Pearson Education Limited.

Schexnayder, C. and Mayo, R. (2003). *Construction Management Fundamentals.* Boston: McGraw-Hill Higher Education.

Shulz, J. (2012) *Analysing your interviews*. [Online video]. 14th August 2012. Available from - https://www.youtube.com/watch?v=59GsjhPolPs. [Accessed: 27th May 2016].

Shulz, J. (2012) *Analysing your interviews*. [Online video]. 14th August 2012. Available from: https://www.youtube.com/watch?v=59GsjhPolPs. [Accessed: 27th May 2016].

Singh, R. (2009) *Delays and Cost Overruns in Infrastructure Projects: Causes and Consequences.* New Delhi: Mimeo.

Stutely, M. (2003) *Numbers Guide: The Essentials of Business Numeracy*. London: Bloomberg Press.

Sweis, G., Sweis, R., Abu Hammad, A. & Shboul, A. (2008) Delays in construction projects: The case of Jordan. *International Journal of Project Management*, 26 (2008), pp. 665–674.

Wachs, M. (1990). Ethics and advocacy in forecasting for public policy. *Business and Professional Ethics Journal*, 9(1-2), pp. 141-157.

Way, L. A. Jr. *Political Science 201H:The American System of Government: Politics & Government in the U.S.A.*[Online] Available from: http://www.proconservative.net/cunapolsci201partonec.shtml. [Accessed: 4 August 2016]

World Trade Organisation (2002) *Trade policy review Zambia.*

Zambia. Auditor General. (2015) *Report of the auditor General on the Road Development Agency for the period January 2006 to September 2009*. Lusaka: Auditor General.

Zambia. Ministry of Finance (2013) *Contract for the Supervision of Civil Works for the Rehabilitation of the Great East Road (T4) - Lot 1: Luangwa Bridge — Nyimba (FED/2013/318-330) between the Contracting Authority and Louis Berger in consortium with Rankin Engineering Consultants*. Lusaka: National Authorising Office of the European Development Fund.

Zambia. Ministry of Finance (2013) *Contract No. FED/2013/318-337 for the Rehabilitation of the Great East Road (T4) Lot 1: Volume 1 (a) Civil Works.* Lusaka: National Authorising Office of the European Development Fund.

Zambia. Ministry of Finance (2013) *Contract No. FED/2013/318-337 for the Rehabilitation of the Great East Road (T4) Lot 1: Volume 1 (b) Detailed Breakdown of Prices.* Lusaka: National Authorising Office of the European Development Fund.

Zambia. Ministry of Finance (2013) *Contract No. FED/2013/318-337 for the Rehabilitation of the Great East Road (T4) Lot 1: Volume 4 Tender with Appendix & any other Document Forming part of the contract.* Lusaka: National Authorising Office of the European Development Fund.

Zambia. Ministry of Finance (2013) *Contract No. FED/2013/318-337 for the Rehabilitation of the Great East Road (T4) Lot 1: Volume 2 Specifications and Environmental Management Plans.* Lusaka: National Authorising Office of the European Development Fund.

Zambia. Ministry of Finance (2013) *Contract No. FED/2013/318-337 for the Rehabilitation of the Great East Road (T4) Lot 1: Volume 3 Design documentation (Drawings)*. Lusaka: National Authorising Office of the European Development Fund.

Zambia. Public Accounts Committee (2013) *Report of the Public Accounts Committee on the Report of the Auditor-General on the Management of Constituency Development Funds and Grants to Local Authorities for the Financial Year Ended 31st December, 2012, for the Third Session of the Eleventh National Assembly Appointed by the Resolution of the House on 27th September, 2013*. Lusaka: National Assembly.

Zambia. RDA (2013*) Contract No. RDA/SP/030/12 between the Road Development Agency and Brian Colquhoun Hugh O'Donnel & Partners Consulting Services for the Supervision of Rehabilitation and Upgrading of the Kawambwa (D19)- Mushota-Luwingu (M3) Road and the Chisembe Chibote (R76)-Chief Chama (RD75) Road in Luapula Province*. Lusaka: RDA.

Zambia. RDA (2013) *Contract No. ZPPA/CE/011/12 between the Road Development Agency and Unik Engineering Construction Limited for the Rehabilitation and Upgrading of the Kawambwa – Mushota – Luwingu Road and the Chisembe – Chibote – Chief Chama Road in Luapula Province*. Lusaka: RDA.

Zambia. RDA (2015) *Contract No. RDA/SP/011/012/L06between the Road Development Agency and Zulu Burrow Development Consultants Limited in Association with Bothakga Burrow Botswana (PTY) Ltd for Consulting Services for the Techno – Economic Study, Detailed Engineering Design and Tender Document Preparation for the Upgrading 110km of Itezhi – tezhi Mumbwa Road in Southern and Central Provinces*. Lusaka: RDA.

Zambia. RDA (2016) *Monthly Progress Report for the Supervision of Civil Works for the Rehabilitation of the Great East Road (T4) – Lot 1: Luangwa Bridge to Nyimba (98.93km)*. Lusaka: Louis Berger SAS / Ranking Engineering.

Zambia. Road Development Agency. (2015) *Road Development Agency Annual Report 2014*. Lusaka: RDA Headquarters.

Zuofa, T. & Ochieng, E. G. (2014) Project Failure: The Way forward and Panacea for Development. *International Journal of Business Management,* 9(11), pp. 59 – 71.

APPENDIX I: **INTERVIEW GUIDE QUESTIONS**

TITLE: AN ASSESSMENT OF THE PLANNING CYCLE IN ZAMBIA'S ROAD CONSTRUCTION PROJECTS

This interview guide provides a set of guide questions to be used in a semi-structured interview with some selected professionals in the Zambian road construction industry prior to questionnaire development. The purpose of this interview is to get a general view of the project planning scenario from experienced professionals so as to identify issues to be included in the data collection tool (questionnaire) for this research. The interviewer shall be free to divert from this list of questions in order to get in-depth information but shall ensure that the flow of questions is maintained in the stated categories as well as making sure that each one of the below questions is at least addressed in one form or another.

1.0 GENERAL INFORMATION

1.1. What is your profession?

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1.2. What are your academic qualifications?

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1.3. How long have you worked in road construction industry?

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1.4. Would you tell me the nature of business of your organisation?

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2.0 QUESTIONS ABOUT PROJECT PLANNING INCORPORATION

2.1. Describe to me your general perception about roads project planning in Zambia?

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2.2. What can you say about the incorporation of project planning in Zambia's road projects?

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3.0 QUESTIONS ABOUT PLANNING APPROACHES ADOPTED BY IMPLEMENTING AGENCIES

3.1. What do you think are the various approaches to roads project planning?

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3.2. What approaches are adopted by Zambian implementing agencies of roads projects?

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3.3. How do you think the adopted approaches are faring in addressing particular roads project challenges?

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3.4. Who is mainly involved in planning of roads projects?

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4.0 QUESTIONS ABOUT SIGNAIFICANCE OF PROJECT PLANNING

4.1. What is the importance of project planning particularly to the road sector?

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4.2. What could be potential problems arising from poor project planning?

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4.3.How are roads projects normally initiated in Zambia?

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4.4.How are options explored before detailed planning?

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4.5.What can you say about procurement in connection to project planning?

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5.0 QUESTIONS EXPLORING RELATIONSHIPS BETWEEN PROJECT PLANNING AND ROAD INFRASTRUCTURE BENEFITS

5.1.What are the relationships between roads project planning and expected benefits?

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5.2.From your experience how have various project plans impacted the implementation processes as well as the final outcome?

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5.3. What can you say about variation orders in connection with project planning?

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5.4. What specific examples can you cite on the relationship between project planning and benefit derivation.

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6.0 QUESTIONS ABOUT POLITICIAN PARTICIPATION IN PROJECT PLANNING

6.1. From your experience what has been the role of politicians in project planning?

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6.2. What can you say about political interference in Zambia's roads project planning?

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7.0 QUESTIONS ABOUT IMPROVEMENTS

7.1.What are the possible solutions to the above identified problems?

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7.2.How can we improve project planning in Zambia's roads projects?

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7.3.Do you have anything else to say?

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END OF INTERVIEW!

APPENDIX II: SURVEY QUESTIONNAIRE

THE UNIVERSITY OF ZAMBIA
School of Engineering
Department of Civil and Environmental Engineering

Dear respondent

REF: AN ASSESSMENT OF THE PLANNING CYCLE IN ZAMBIA'S ROAD CONSTRUCTION PROJECTS

I am a Master of Engineering in Project Management student at the University of Zambia conducting a research under the above stated title. The main aim of this research is to propose a planning cycle that will improve the management of road infrastructure projects in Zambia as a means of minimising road construction, rehabilitation and maintenance costs.

You have been identified as a potential respondent to this questionnaire as a key stakeholder in public works road construction projects. Please find attached to this letter a questionnaire, based on your professional experience and understanding, kindly respond to all the questions in the stated manner. I would like to assure you that the information provided shall be used for the sole purpose of this research which is purely academic. The information provided shall be treated with strict confidentiality; you are therefore advised not to indicate your personal or institution details.

Yours faithfully

Makalani Mkuni
Cell: 0974247600
Email: macmkuni@gmail.com

Research Supervisor
Professor M. Muya (mundia.muya@unza.zm)

1. GENERAL INFORMATION

This section is about background information kindly tick (√) or cross (×) appropriately.

Which one best describes your profession?

a. Physical planner	
b. Socio-economic planner	
c. Civil engineer	
d. Statistician	
e. Other (specify):	

How many years have you been working in the roads sector?

a. 0 – 5	
b. 5 - 10	
c. 11 -15	
d. 16 - 20	
e. > 20	

What is your highest education level?

a. Grade 12	
b. Certificate	
c. Diploma	
d. Bachelor's degree	
e. Master's degree	
f. PhD	

2. ORGANISATIONAL STRUCTURE

This section aims at collecting general information about the structure of the planning unit/department in your organisation, kindly tick (√) or cross (×) appropriately.

2.1. Does your organisation have a functional planning unit/department? Yes ☐ No ☐

2.2. How adequately staffed is the planning unit/department?

Adequately ☐ | Understaffed ☐ | No staff ☐ | Not sure ☐

2.3. Do the officers have adequate knowledge in project management?

Knowledgeable ☐ | Not sure ☐ | No knowledge ☐

2.4. Do you have a strategic plan for your organisation?

Yes ☐ | Not sure ☐ | No ☐

2.5. Who prepares the strategic plan for your organisation?

Senior mgmt. ☐ | Management ☐ | Consultant ☐ | Individual ☐ | Not sure ☐

2.6. Is the strategic plan adhered to during implementation?

Yes ☐ | Partly ☐ | Not sure ☐ | No ☐

2.7. How is project planning perceived in your organisation?

Very important ☐ | Important ☐ | Not important ☐ | Not sure ☐

3. PROJECT INITIATION

This section intends to gather information about project initiation as part of the planning process, please tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	2	3	4	5
3.1.Projects are initiated by politicians and top executives.					
3.2.There is normally stakeholder involvement in project initiation.					
3.3.Some project are initiated due to personal motives e.g. political popularity					
3.4.Politicians are important stakeholders in project initiation.					
3.5.There is prioritisation in the way projects are initiated.					
3.6.Projects are initiated in conformity with the strategic plans.					

4. PROJECT DESIGN

This section presents questions about project design according to your experience, please tick (√) or cross (×) in the appropriate provided box.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	2	3	4	5
4.1.Feasibility studies are thoroughly conducted prior to detailed designs.					
4.2.Techno economic assessments are adequately conducted during design.					
4.3.Options for conducting a project are fully explored during project designs.					
4.4.The selected options are usually backed by technical justification.					
4.5.Cost estimates are accurately done during design.					
4.6.Material estimates are accurately done by most designers.					
4.7.Designers have in the past advised on the non-viability of some projects.					
4.8.The client has in the past stopped non-viable projects after advice.					
4.9.Designers propose appropriate fit for purpose interventions.					
4.10. Designers propose interventions that address the identified problems.					
4.11. Sometimes designers replicate designs from other projects.					
4.12. Designers are lead causers of contract variations.					
4.13. Designs are adequately reviewed prior to construction.					
4.14. Designer at times is engaged to review and supervise same contract.					
4.15. Clients incorporate professional indemnity clauses in design contracts.					
4.16. There is punishment to designers for err/faulty designs.					

5. CONTRACT PROCUREMENT

This section is about roads projects contract procurement procedures, please tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	**2**	**3**	**4**	**5**
5.1.Consultants are mostly engaged much later after commencement of works.					
5.2.Most projects are procured according to the procurement plan.					
5.3.There is undue external influence on the procurement process.					
5.4.At times evaluation criteria are altered to favour certain companies and individuals due to political influence.					
5.5.Contracts are only procured / awarded after the availability of funds in full has been confirmed.					
5.6.As part of evaluation rates analyses are conducted in detail.					
5.7.Some contracts lack necessary clauses.					
5.8.The procurement processes often unduly delay.					
5.9.The delays in procurement affect overall project implementation.					

6. DECEPTION AND DELUSION

Under this section the research gathers information about deception and delusion in road construction project planning, kindly tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	**2**	**3**	**4**	**5**
6.1.Sometimes costs are deliberately and strategically underestimated whilst overestimating benefits so as to convince sponsors (deception).					
6.2.Sometimes project planners are over optimistic about project success thereby overstating the benefit to cost ratio (delusion).					
6.3.Engineer's estimate is accurately determined.					

7. POLITICAL INFLUENCE

This section intends to gather information about political interference in roads project planning, please tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	**2**	**3**	**4**	**5**
7.1.Politicians make pronouncements about road development without consulting the planners.					
7.2.Implementers sometimes yield to political pronouncements and deviate from the plans.					
7.3.Executives appointed by politicians discharge their duties without political interference					
7.4.There is no political interference in the planning of road projects.					

7. PROJECT IMPLEMENATION

This section explores how project planning affects implementation; please tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	2	3	4	5
8.1.Improper designs have resulted in delayed project implementation.					
8.2.Improper designs have resulted in increased project costs due to variations.					
8.3.Tilting to political influence has resulted in developing non priority roads.					
8.4.Awarding contracts without confirming availability of funds contributes to cash flow problems.					
8.5.There are usually supervision funds for client supervised contracts					
8.6.Uncoordinated plans have delayed project implementation in the past.					
8.7.Improperly defined project deliverables result in avoidable scope creep.					

9. PROJECT PLANNING IMPROVEMENT PROPOSALS

This section presents possible interventions in improving project planning, please tick (√) or cross (×) appropriately.

On the scale ***1=Strongly disagree 2= Disagree 3= Not sure 4=Agree 5=Strongly agree***; how would you rate the following statements.

	1	2	3	4	5
9.1.Project planner should have some basic knowledge about project management.					
9.2.Retention money should be introduced on design contracts to enhance seriousness.					
9.3.No contract should commence until National Road Fund Agency confirms availability of funds.					
9.4.Executives of roads project implementation agencies should not be appointed by politicians.					
9.5.Politicians cited to be influencing the procurement processes should be reported to law enforcers.					
9.6.Techno economic studies should be the main basis for determining the intervention for road development.					
9.7.The rate of contract variation should be part of the tools for assessing designer performance.					
9.8.Past performance in works of similar nature should be used for design consultant selection.					
9.9. Engineering institution of Zambia to revoke licences of poorly performing designers.					
9.10. Poor performing designers to be barred from participating in future contracts.					

THE END!

APPENDIX III: VALIDATION QUESTIONNAIRE

THE UNIVERSITY OF ZAMBIA
School of Engineering
Department of Civil and Environmental Engineering

29th August, 2016

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Dear respondent

RE: VALIDATION OF THE ROAD CONSTRUCTION PROJECT PLANNING MODEL

This follow on questionnaire winds up the research on road construction project planning in which you participated by completing a survey questionnaire in June, 2016.

I am therefore writing to request for your participation in the validation of the proposed model of the planning cycle. The validation process will help in assessing the appropriateness, adequacy and usability of the proposed public road project planning model.

Kindly find attached to this letter a model and brief questionnaire which will take fifteen minutes of your time in completing. I would be grateful if you studied the model and respond to the questionnaire. I would like to assure you that the information provided shall be used for the sole purpose of this research which is purely academic and shall be treated with strict confidentiality.

Yours faithfully

Makalani Mkuni
Cell: 0974247600
Email: macmkuni@gmail.com

MODEL VALIDATION QUESTIONNAIRE

This questionnaire is meant for the validation of the appropriateness, adequacy and usability of the proposed public road project planning model. Kindly study the attached model and respond to the questionnaire. Kindly print **YES** or **NO** in the provided spaces and where necessary tick **(√)** appropriately.

1. Which one best describes your profession?

Physical planner	Socio-economic planner	Civil engineer	Statistician	Other

2. Do you think this model addresses design challenges in road project planning? | | |

If NO state the reasons

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3. Do you think model minimise political interference in road project planning? | | |

If NO state the reasons

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4. Does this model aim at minimising project cash-flow challenges in road projects? | | |

If NO state the reasons

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5. Do you think this model would efficient in meeting the challenges of cost and schedule overrun in public road construction projects? | | |

If NO state reasons

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6. Is the proposed model sufficient to carter for quality shortfalls in road projects? | | |

If NO state reasons

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7. Do you think the model can be used in planning public road projects in Zambia? | | |

If NO state reasons

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8. Do you consider the model user friendly? | | |

If NO state reasons

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9. Kindly propose your improvements to the model.

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Name……**Signature**……**Organisation**……

APPENDIX IV: VALIDATION QUESTIONNAIRE RESPONDENTS

S/N	Position	Organisation
1	Senior Manager Design	RDA
2	Senior Manager Research & Development	RDA
3	Senior Manager Audit	RDA
4	Senior Manager Technical Audit	RDA
5	Assistant Director	MLGH
6	Principal Engineer	MLGH
7	Principal Engineer Monitoring & Evaluation	RDA
8	Principal Engineer Quality	RDA
9	Senior Engineer	MLGH
10	Engineer Planning	RDA
11	Engineer Quality	RDA
12	Engineer Research & Development	RDA
13	Principal Internal Auditor	RDA
14	Director of Works	Chadiza Council
15	Technical Advisor – Planning & Design	Consultancy

APPENDIX V: DETAILS OF THEMES, SUBTHEMES & CODES

Theme																	
Organisation structure		Project initiation			Project design			Contract procurement				Deception & delusion	Political influence	Project implementation	Project planning improvement proposals		
Sub-theme																	
Qualification of personnel	Career development	Political interference	Project prioritisation	Project scope definition	Cost estimates	Time estimates	Material estimates	Consultancy services procurement	Procurement of works	Evaluation of bids	Vendor experience	Incentives for project promoters	Political interference	Government bureaucracy	Career development	Qualification of officers	Funds availability
Code																	
Lack of CPD for planners	Lack of CPD for planners	Projects initiated by politicians	Project goals and outcomes	Detailed studies	Detailed studies	Detailed studies	Detailed studies	Procurement target	Procurement target	Delayed contract procurement	Indigenous contractors	Personal interests	Projects initiated by politicians	Care	Lack of CPD for planners	Expert involvement	Pre-project planning
Unqualified planners	Unqualified planners	Politicians central to initiation	Projects initiated by politicians	Optimal interventions	Optimal interventions	Project cost and time estimates	Optimal interventions	Indigenous contractors	Indigenous contractors	Political interference	Regulation of firms	Allegiance of top executives	Politicians central to initiation	Maintenance			Procurement target
Inexperienced planners	Inexperienced planners	Allegiance of top executives	Stakeholder consultation	Project cost and time estimates	Project cost and time estimates	Feasibility studies	Feasibility studies	Regulation of firms	Delayed contract procurement	Vendor rating (past performance)	Defects liability for designers	Unstable management personnel	Allegiance of top executives	Construction			Front funding (at the beginning of each year)
Expert involvement	Inexperienced designers	Unstable management personnel	Priority list	Rubber stamping of feasibility studies	Exploration of options	Variation orders arising from inadequate planning	Variation orders arising from inadequate planning	Delayed contract procurement	Political interference		Punishment for designers		Unstable management personnel	Axle load control			Regulation and punishment
Inexperienced designers				Defects liability for designers	Feasibility studies	Inexperienced designers	Inexperienced designers	Political interference	Availability of funds					Enhancing lifespan			
				Inappropriate designs	Variation orders arising from inadequate planning		Contract documents	Availability of funds	Vendor rating (past performance)					Ceiling by Ministry of Finance			
				Inexperienced designers				Vendor rating (past performance)	Same consultant for design and supervision					Laissez-faire attitude			
				Contract documents				Same consultant for design and supervision	Funds be at NRFA before commencement of contract								
								Funds be at NRFA before commencement of contract	Contract signed without design								