AN INVESTIGATION INTO THE SELECTION PROCESS OF CONSULTANTS AND CONTRACTORS IN THE PUBLIC CONSTRUCTION SECTOR IN ZAMBIA

BY

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A DISSERTATION SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ENGINEERING IN CONSTRUCTION MANAGEMENT

THE UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
LUSAKA
2008
DECLARATION

I, Mukumbwa Brian Brown Makumba, do hereby declare that this dissertation is the result of my own investigation and research, except to the extent indicated in the Acknowledgements and References and by comments included in the body of the report, and that it has not been submitted in part or full for any degree to any other university.

Signature: Brown

Date: 01/07/08
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This dissertation of Mukumbwa B. Brian is approved as fulfilling the partial requirements for the award of the degree of Master of Engineering in Construction Management by the University of Zambia.

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ABSTRACT

Procurement of consultants and contractors in the public construction sector is regulated in most countries. In Zambia, all public procurement is regulated by the Zambia National Tender Board Act No. 30 of 1982. Various procurement methods are used for the selection of consultants and contractors in the public sector. In Zambia, the Quality and Cost Based Selection method (QCBS), Quality Based Selection method (QBS), Fixed Budget Selection method (FBS), and Least Cost Selection method (LCS) are the traditional methods used in the selection of consultants. The National Competitive Bidding (NCB) and the International Competitive Bidding (ICB) are the two methods used for formal tendering for selection of contractors. Informal tenders are used for the selection of both consultants and contractors for tenders below some prescribed threshold. The European Union (EU) and the Government of Japan also use the competitive traditional method of procurement. However, in Japan, cost was established to be the main factor considered in the selection of consultants and contractors.

Good procedures for selection of contractors and consultants are critical to the successful implementation of construction projects. The Auditor General’s reports, for the period 2000 to 2004, highlighted some anomalies in the procurement of construction projects. The reports also indicated poor workmanship, uncompleted and abandoned works as a result of non compliance to procedures. This study of the selection process of consultants and contractors sought to investigate and address problems in the procurement of consultancy and construction services in the public construction sector in Zambia. The aim of the study was therefore to develop best practice models for the selection of consultants and contractors. The research was undertaken through literature review, data collection using research instruments, analysis of results and case studies and report preparation. Through the analysis of results and case studies, a best practice model was developed and validated. Conclusions and recommendations were then drawn from the analysis of results, case studies and the validation process for the best practice model. Three research instruments, a questionnaire, case studies and in-depth direct interviews were used.

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It was established that the traditional method of procurement was still the most popular method of procurement for the selection of consultants and contractors in the public sector in Zambia. The following elements, in ranked order, were considered important in the selection of consultants: understanding the assignment; level of education of professional staff; experience in relevant works; experience in relevant tasks, methodology; and the work plan. In the appointment of consultants, pre-contract negotiation was favoured. On the other hand, the following, in ranked order, were determined as important factors in the selection of contractors: qualified technical personnel; financial capacity; experience in relevant works; and availability of construction equipment. Post contract assessment of consultants and contractors was also favoured upon completion of all projects.

It was established that both project partnering and Public Private Partnerships (PPPs) were not commonly used procurement methods for construction projects in Zambia. However, they recognized for improving productivity in construction projects. To fully achieve the benefits of project partnering in Zambia, it was recommended that a clearly defined policy and legal frameworks for partnering be put in place. The major hindrance to the effective use of PPPs as a procurement method for construction projects in Zambia was the lack of political will to enact the legal framework for its implementation. E-procurement was also not a commonly used method of procurement in Zambia, however, it was acknowledged that it could quicken the procurement process and improve on efficiency.

An e-procurement model (Figure 6.1) was developed and validated as a best practice model in line with the aim of this study. It was established that this e-procurement model could bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia and was also user friendly.
The major limitation to this study was the failure by the researcher to access records for projects undertaken by other institutions other than National Assembly of Zambia and the Zambia Revenue Authority for use in the case study.
ACKNOWLEDGEMENTS

I wish to thank the following people for the different roles they played to enable me complete my dissertation.

Dr Mundia Muya, my dissertation supervisor for his guidance and advice throughout the process of writing this dissertation. His comments were always valuable. He was there for me all the time. MEng students in the Department of Civil and Environmental Engineering, with whom I shared a lot of fun and frustrations. Thanks to the University of Zambia for providing the necessary facilities.

To my wife and children for all their support.

Mukumbwa B.M Brian
University of Zambia
June, 2008.
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ACRONYMS

ADB  African Development Bank
BLTOP  Build, Lease, Operate, Transfer
CE  Concurrent Engineering
D&B  Design and Build
DBOT  Design, Build, Operate, Transfer
DBTO  Design, Build, Transfer, Operate
ICT  Information and Communication Technology
LCS  Least Cost Selection
LUOT  Lease, Upgrade, Operate, Transfer
EIZ  Engineering Institution of Zambia
EoI  Expression of Interest
EU  European Union
FBS  Fixed Budget Selection
ICB  International Competitive Bidding
NAPSA  National Pensions Scheme Authority
NCB  National Competitive Bidding
NHA  National Housing Authority
PPP  Public Private Partnerships
PSU  Purchasing and Supplies Unit
NCC  National Council for Construction
NRFA  National Road Fund Agency
OJ  Official Journal (of the European Union)
QCBS  Quality and Cost Based Selection
QBS  Quality Based Selection
RDA  Roads Development Agency
RFP  Request for Proposal
SSS  Single Source Selection
WB  World Bank
ZESCO  Zambia Electricity and Supply Corporation
ZIA  Zambia Institute of Architects
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CHAPTER ONE
INTRODUCTION TO THE STUDY

1.1 Introduction
Procurement of consultancy services and works in the public sector is increasingly becoming an important issue. This is because of the increase in demand for better services, the deregulation of the public services sector and the general trend of increasing outsourcing of works and services. Roodhoof and Abbeele (2006) stated that selection of consultants is complex and is considered to be difficult. This is because sometimes it requires the purchaser to assess a supplier’s ability to deliver an intangible product. The consultancy cannot realistically be tested prior to the purchase. Thus purchasing of consultancy is based on mutual trust and interaction. Success in consultancy projects has been attributed to interaction and communication between the buyers and the consultants at both professional and even social level. On the other hand, the traditional purchasing of works is based on Bills of Quantities. Thomas et al. (2001) stated that various procurement criteria are used in the selection of consultants and contractors. They stated that the most common procurement criteria include speed, certainty of completion time, certainty of cost, quality level, flexibility, complexity, responsibility, price competition and risk allocation depending on the nature of the project. They further stated that clients used various methods of procurement which included the discriminant analysis approach, multivariate approach, decision supporting systems, knowledge based systems, procurement rating systems, procurement path decision charts, the multi-attribute approach the analytical hierarchical process and the multi-criteria methods. The multi-criteria method is used in the traditional methods of procurement adopted in the public sector in many countries.

Governments and other public bodies are the major financiers of infrastructure development. In 2004, public procurement in the European Union accounted for 14 percent of the total gross national product amounting to over Euro One (1) trillion. Public procurement, therefore, plays an important role in the economy of any country or economic group. Governments also operate within a framework of public accountability and cost effectiveness, taking into consideration fair treatment of suppliers, compliance,
competitive tendering and procedures for ensuring propriety and regularity. Public projects, therefore, go through a lot of scrutiny. In Zambia, the Office of the Auditor General is empowered by legislation to scrutinize public spending.

The Auditor General’s reports, almost every year, highlight some anomalies in the procurement of construction projects. The reports also indicate poor workmanship, uncompleted and abandoned works. Deficiencies reported in the Auditor General’s reports for the years from 2000 to 2005 include those outlined below.

The Ministry of Local Government and Housing provided K500 million for renovations to Chalimbana Training School. A contract was awarded for K484,116,272.00 for a duration of fourteen weeks on 13th December, 2004. An inspection of the site in October, 2005 indicated that despite the contractor being paid K464,368,054.00 leaving a balance of K19,748,219.00, work worth K82,175,800.00 had not been done.

The Zambia Army had contracted Base Chemicals in October 2001 to construct thirty (30) pre-fabricated houses at Luena Barracks in Kaoma at a cost of K4.9 billion for a contract duration of 24 months. The contractor was paid an advance payment of K2.3 billion. On scrutiny, the records showed that:

- there were no tender procedures followed for the selection of the contractor and no tender authority was given for the project;
- there was no signed contract and the terms of the agreement could not be established;
- the contractor was not qualified to undertake the construction works as the contractor was only registered with the Ministry of Works and Supply in the general maintenance category;
- a site visit to Luena barracks in 2003 revealed that the quality of the construction works was poor as the structures had already developed cracks. It was recommended that affected houses be demolished; and
- it was clear that the contractor did not have the necessary expertise and capacity to undertake the project.
In November 2001, Zambia Air Force (ZAF) entered into an agreement with a local contractor for the rehabilitation of substations at its Mumbwa Base at a contract price of K387,148,063. The works included, among others, realigning four transformers and replacing 19 street poles. In this regard amounts totaling K125,897,987 were paid to the contractor between 2002 and October 2003. An inspection of the works conducted in March 2005 revealed that the contractor had replaced the nineteen street poles but had only re-aligned one transformer leaving three still tilting.

An examination of records showed that Livingstone City Council was paid K60 million in October, 2004 for the rehabilitation of Mukuni, Kaunda and Loop roads from Central Police to the market and repair of a grader. A site inspection of roads carried out in November, 2005 revealed that no works had been done. Neither was the grader repaired.

In 2002, the National Assembly of Zambia engaged a local company to construct a wall fence at the Speaker’s Lodge near Parliament Buildings. However, no contract was made available and therefore, conditions, terms and the costs of the contract could not be ascertained. The contractor submitted a claim of K180,879,265 out of which K100,000,000.00 was paid in July 2002. The payment was not supported by any stage completion certificates. A site visit in April 2003 revealed that works were not complete and the contractor had moved out of site. No satisfactory explanation was given as to why the construction work was abandoned.

The final cost of completed projects in most cases is more than the initial estimates or contract price. An example in Zambia is the construction of the Mongu Kalabo road. Consolidated Contractors Company (CCC) of Kuwait was awarded a contract of K13,646,112,006.00 by the Ministry of Works and Supply for the construction of the Mongu – Kalabo road. The contract sum later rose to K135,646,111,582.00 from K13,646,112,006.00 due to variations, down time costs and interest on delayed payments. As at May, 2004 a total of K77,736,200,006.00 of the contract price had been paid to the contractor leaving a balance of K57,909,911,576.
In August, 2004 the government had paid contractor K50,364,553,137 of the K57,909,911,576 outstanding. However, the contractors decided to terminate the contract and abandoned the works due to delays by government to settle the outstanding amount of K7,545,358,439.00. The outstanding amount was later settled by government in late August, 2004. However, it was observed that instead of settling K7,545,358,439 the Ministry of Works and Supply paid K7,684,439,851 resulting in an overpayment of K139,081,412. Other examples of projects exceeding their initial contract sums are as shown the Table 1.

Table 1.1: Overrun of selected projects at the Ministry of Works and Supply, Zambia

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Original contracts (Kwacha)</th>
<th>Revised contracts (Kwacha)</th>
<th>Variance (Kwacha)</th>
<th>Contract Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of Freight Terminal - Chirundu</td>
<td>13,422,476,130</td>
<td>14,491,079,063</td>
<td>+1,068,602,933</td>
<td>46 weeks</td>
</tr>
<tr>
<td>Construction of Water Treatment Plant - Chirundu</td>
<td>871,471,082</td>
<td>1,686,157,170</td>
<td>+814,686,088</td>
<td>26 weeks</td>
</tr>
<tr>
<td>Rehabilitation of Kanyala – Nakonde road</td>
<td>1,232,493,154</td>
<td>1,248,113,169</td>
<td>+15,620,015</td>
<td>40 weeks</td>
</tr>
<tr>
<td>Reconstruction and Realignment of Kasama - Luwingu</td>
<td>110,400,347,386</td>
<td>125,398,521,054</td>
<td>+14,998,173,668</td>
<td>24 months</td>
</tr>
</tbody>
</table>

Source: Auditor General’s report, 2005

One of the causes of these problems is attributed to the method of procurement of works. Procurement is aimed at selecting a consultant or contractor meeting the minimum requirements of offering their services to execute the works at the best evaluated cost. If, for example, without adequate machinery and skilled manpower, the contractor is contracted to undertake a construction project, the end result could be sub-standard works. Substandard works entail correcting the same works within a short period of time. This results in double cost for the project. Procurement documents should also have monitoring and evaluation procedures.

This study of the selection process of consultants and contractors seeks to investigate and address problems in the procurement of consultancy and construction services in the public construction sector in Zambia.

Procurement has also been riddled with corruption. Transparency International (2005a) defined corruption as giving money or anything valuable in return for a favour.
Corruption also involves abusing one’s position for personal gain. The WB (2004) on the other hand defined corruption as behaviors on the part of officials in the public and private sectors, in which they improperly and unlawfully enrich themselves and/or those close to them or induce others to do so, by misusing the position in which they are placed.

Corruption in project procurement is undertaken at different stages:

- at procurement stage which results in favouring and awarding the tender to a non competitive tenderer;
- at execution stage resulting in use of sub-standard materials and poor workmanship, unnecessary variations in favour of the consultant or contractor; and
- during valuation of works completed, resulting in over payment or paying for work not yet completed.

The Asia Organisation of Supreme Audit Institutions (2007) identified the types of fraud and corruption in contracts for goods, services and works as the following:

- **bribery and kickbacks** - money or any other form of reward or favour exchanged between a public functionary and a provider of goods and services in order to obtain some benefit e.g. acceptance of substandard goods, services, works or obtaining unauthorized information;
- **changes in original contracts** - changes are made in the original contract requiring flow of additional funds from the public body to the contractor, which may affect the basis on which the contract was awarded to the contractor in the first instance. This may also involve front-loading of contract in the hope of increasing the price of the original contract through change orders or subsequent modifications to the contract;
- **duplicate payments** - the contractor claims and receives payment for the same service or work done or goods supplied under the same or different contracts;
- **collusive or cartel bidding** - contractors form cartels to fix artificially high prices for goods and services supplied by them;
- **conflict of interest** - contracts are awarded on the basis of vested interests of the decision makers;
- **defective pricing** - the contractor submits inflated invoices;
- **false invoices** - the contractor submits invoices for goods that have not been delivered or do not properly represent the quantity or quality of goods and services supplied or work done as per contracted specifications;
- **false representations** - the contractor falsifies the goods' specifications or his ability to provide certain services;
- **splitting of purchases** - the purchases of goods, services or works are split either to avoid open competition or having to seek the approval of higher authority;
- **phantom contractor** - purchases are made from a fake supplier or contractor;
- **pilferage of public assets** - Public funds are used to acquire goods for personal use or public assets pilfered by officials; and
- **tailored specifications** - specifications and time limits are manipulated to favor a certain contractor or supplier.

Transparency International (2005a) further stated that corruption if allowed to persist undermines the quality and quantity of services. It corrodes economic development and jeopardizes the provision of basic public goods and services.

In her article, *World Bank blacklists firm*, Moore (2004) identified Acres International, a Canadian engineering company, of having been blacklisted from new contracts by the World Bank for three years. This was because the Bank had established that Acres International had been engaged in corrupt activities to influence the Highland Development Authority to award it contracts for the Lesotho Highland water project. Bribes of up to US $2 million were allegedly paid. On the other hand, in its 2005 global report, Transparency International stated that corruption in large scale public projects is a daunting obstacle to sustainable development. It further stated that corruption in procurement plagues both developed and developing countries. Transparency International urged public contracting authorities to ensure that contracts are subject to open, competitive bidding. Corruption in contracting processes leave developing countries saddled with sub-standard infrastructure and excessive debt.
Transparent International (2005) further listed the following as monuments of corruption, from its 2005 global report:

- the Cologne Incinerator Project in Germany, where US $13 million were allegedly paid in bribes during construction of the incinerator plant;
- the Bujali Dam in Uganda, where Veideke Limited admitted paying a bribe to a senior Ugandan civil servant. The Environmental Impact Assessment for the dam had never been submitted for assessment;
- the World Bank had also debarred two Lithuanian companies, AB Hidrosttyba and AB Parrevezzio Trestas for collusion in bidding for a US $3.28 million contract for the expansion of water supply and waste water networks; and
- in Zambia, Transparency International (2004) reported that former State House Press Secretary in the Chiluba regime, Richard Sakala was convicted and sentenced to three years imprisonment for flouting tender procedures when he awarded a building contract to a Zimbabwean construction company.

From the above examples, it is clear that poor project procurement is not only costly but may result in poor workmanship, non completion of projects and corruption.

### 1.2 Significance of the study

The selection of contractors and consultants is critical to the successful implementation of construction projects. In Zambia, the government has established procedures for use in public procurement of goods, services and works. These procedures were established to ensure accountability, transparency, competition and value for money for acquired goods, services and infrastructure. Public procurement of construction projects in Zambia is done through the traditional method of procurement. The traditional procurement process starts with the development of a project concept. Consultants are then appointed to design and produce engineering and architectural drawings and tender documents. The contractor is then appointed to execute the works. Poor consultant and contractor selection methods therefore have some negative consequences which include:

- selection of poorly qualified consultants or contractors due to poor selection procedures and criteria;
difficulties in contract management during implementation of the project. This could be because of unclear specifications, poorly prepared tender and contract documents, poor monitoring and control strategies; and

- encouraging corruption which is an indirect cost to the project and the economy. Corruption is a double cost to the project in two ways; first, the bribe itself is a cost on top of the contract price and once corruption takes place, there is room for compromise on quality.

1.3 **Aim of the study**
The aim of the study was to develop best practice models for the selection of consultants and contractors.

1.4 **Research objectives**
To achieve the aim of the research, the following were the objectives of the research:

- critically analyse current practices in the selection of consultants and contractors in other countries and compare them with those in Zambia;
- determine the deficiencies in the current practices in the procurement process of consultants and contractors and to propose changes to improve the process;
- outline process maps for the different procurement routes for the purpose of establishing best practices; and
- development of a best practice model.

1.5 **Research methodology**
To achieve the research objectives, the research was carried through literature review, the design and administration of research instruments, data collection and analysis before coming up with the recommendations and conclusions. The literature review was undertaken by review of relevant books, journals and conference papers. The internet also provided a wealth of information for this research. Three research instruments, a questionnaire, case studies and in-depth direct interviews were used. The results of the research instruments were documented and analysed. The results and the subsequent analysis formed the basis for conclusions. A best practice model was then developed.
taking into consideration the conclusions. The model was then validated by ten validators drawn from ten institutions involved in procurement of construction projects in the public sector in Zambia. Recommendations were then put forward taking into consideration the research findings.

1.6 Outline of the dissertation
This dissertation is presented as follows:

Chapter 1: Introduction to the study
In this chapter, the background to the problem was presented. The significance, objectives and aims of the study were also discussed.

Chapter 2: Literature Review
Relevant literature was reviewed in this chapter. This was done by reviewing journals, books, and technical papers relevant to the study.

Chapter 3: Research methodology and strategy
Various research instruments and strategies were reviewed. The case study and questionnaire were found suitable for use in this study.

Chapter 4: Data analysis and discussion of results
Data collected using the questionnaire was presented in this chapter. The data was then analysed and a discussion of the results was done.

Chapter 5: Case studies
Three case studies are presented and analysed in this chapter.

Chapter 6: E-procurement model and its validation
An e-procurement model is presented in this chapter as the best practice model for the selection of consultants and contractors in the public construction sector in Zambia.
Chapter 7: Conclusions
Conclusions were drawn in this chapter based on the analysis of results, case studies and analysis of results of the validation process of the e-procurement model.

Chapter 8: Recommendations
The recommendations taking into consideration the analysis of results, case studies and conclusions are presented in this chapter.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
The previous chapter dealt with the introduction to the study. It outlined why public procurement is important in the economy of any country. An overview of the anomalies reported by the Auditor General’s office on procurement of construction projects in the public sector in Zambia was also presented. The significance, aim and objectives of the study were also outlined.

The literature relevant to the procurement process of contractors and consultants in the public sector is reviewed in this chapter.

2.2 Public procurement of works and consultancy services in Zambia
Public procurement of consultants and contractors is usually regulated by legislation in many countries. For example, in Zambia all public procurement is regulated by the Zambia National Tender Board (ZNTB) Act No. 30 of 1982. The Act outlines guidelines for both formal and informal public procurement of goods, consulting services and works. The Construction Industry Development Board (2005) also states that public procurement in South Africa is regulated in all spheres of government and state owned enterprises through various pieces of legislation. The Government of the Republic of Zambia has also enacted the National Construction Council Act of 2003. This Act empowers the National Council for Construction (NCC) to register and regulate all contractors in the Zambian construction industry. The National Construction Council rates contractors according to their capacity and specialization. The Act provides that any contractor who carries out or attempts to carry out any construction works or portion of such works under a public sector contract and who is not a registered contractor commits an offence and shall be liable, on conviction, to a fine or imprisonment or both. The Act also requires foreign firms to register with NCC before they could be allowed to under take any works. The NCC have powers to recommend to the Minister of Works and Supply the conditions under which a foreign firm or foreign company may be registered to participate in construction projects in Zambia.
The Act also provide for the affiliation of professional bodies for architects, engineers and surveyors. The affiliated professional bodies provide the list of their registered members to the NCC.

The procedures of the Zambia National Tender Board are prescriptive. They are standard and meant to be followed to the book. They ensure fair and equal opportunity and satisfy financial accountability requirements based on established government budgeting, accounting and auditing norms and standards. The procedures are also intended to encourage competition. Proponents of competitive tendering state that its benefits are:

- cost reduction;
- increase in productivity through improved management of labour and resources, access to specialist skills, exploitation of economies of scale; and
- improved quality of service through innovation and flexibility in service delivery.

A report commissioned by the Australian Government on management and delivery of services using competitive tendering and contracting determined that there was generally a positive impact upon quality and accountability and cost savings (Australian Industry Commission, 1996). However, Steane and Walker (2000) stated that competitive tendering is premised more on faith that competition can deliver better outcomes than on any evidence of fact. They stated that competitive tendering brings with it elements of rigidity and reduces flexibility. They contended that competitive tendering was not the panacea for efficiencies and effectiveness in the procurement process.

They further stated that the advent of competitive tendering has resulted in the separation and alienation of stakeholders that used to collaborate to achieve the best overall results for the clients. They further stated that the assumed cost savings are transitory and the costs increase as the contract is performed. This is as a result of incomplete knowledge of the full costs involved and the loss-leading strategies undertaken by some contractors to win tenders. They further contend that competitive tendering was not suitable for works with unforeseen downstream work. Competitive tendering was therefore very suitable for one-off short term contracts.
However, Mohan et. al (2000) do not support the prescriptive approach. They instead propose that a holistic approach to broader procurement choices be considered. Thomas et al (2001) also stated that many researchers have advocated for the development and application of a systematic approach to the selection of procurement processes. Different procurement selection models aimed at improving the decision making process have been proposed. Different procurement procedures are used depending on the country and the source of funding for the project. For example, for all projects funded by the World Bank (WB), the Bank insists that its procurement procedures be followed. This also applies to other project financiers such as the European Union, African Development Bank, the United States and Britain.

The World Bank procurement procedures have been acknowledged and adopted in many countries. The World Bank in fact demands that all procurement using its resources should be done according to its procedures. In Zambia, the tender procedures for public sector procurement have been adapted from the World Bank procurement procedures. Tenders are divided into formal and informal tenders. Formal tenders are open to all consultants or contractors satisfying certain criteria. They are gazetted and also advertised in the press. Informal tenders on the other hand involve shortlist of consultants or contractors. These are not gazetted or advertised in the press. The procedure to be used depends upon the thresholds granted to the Purchasing and Supplies Unit (PSU) of the institution or ministry involved. ZNTB grades the PSUs according to their capacity and the thresholds are regulated according to these grades. Table 2.1 indicates the thresholds for 2007 for PSUs in different grades.

2.2.1 Selection of consultants
Roodhooft and Abbeele (2006) stated that the procurement of consulting services is difficult in that there is “invisibility”. Unlike products, the services may be consumed as they are being performed. The product of consulting services may therefore be produced and consumed simultaneously. They further stated that problems in consulting services are encountered in specification development, monitoring and control of implementation process. Various reasons have been put forward for use of consultants. They include:

- the need to reduce work load;
• the need for increased knowledge or competence because of the lack of expertise within the organization;
• the need for a third party from outside the organization to give an independent and objective view; and
• consultants have a role as agents of change.

### Table 2.1: Procurement Thresholds by Zambia National Tender board, 2007

<table>
<thead>
<tr>
<th>No.</th>
<th>Threshold</th>
<th>Authorising Office</th>
<th>Type of Tender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up to K5 million</td>
<td>Senior Officer</td>
<td>Informal</td>
</tr>
<tr>
<td>2</td>
<td>Above K5 million – K10 million</td>
<td>Head of Department</td>
<td>Informal</td>
</tr>
<tr>
<td>3</td>
<td>Above K10 million – K50 million</td>
<td>Controlling Officer</td>
<td>Informal</td>
</tr>
<tr>
<td>4</td>
<td>Uncertified PSU (Government and Parastatals)</td>
<td>Institutional tender Committee</td>
<td>Informal</td>
</tr>
<tr>
<td></td>
<td>i Above K5 million – K50 million</td>
<td>ii Central Tender Committee (ZNTB)</td>
<td>Formal</td>
</tr>
<tr>
<td>5</td>
<td>Category A PSU (Government and Parastatals)</td>
<td>Institutional tender Committee</td>
<td>Informal</td>
</tr>
<tr>
<td></td>
<td>i Above K5 million – K50 million</td>
<td>ii Institutional Tender Committee</td>
<td>Formal</td>
</tr>
<tr>
<td></td>
<td>ii Above K5 million – K2.0 billion</td>
<td>iii Central Tender Committee (ZNTB)</td>
<td>Formal</td>
</tr>
<tr>
<td>6</td>
<td>Category B PSU (Government)</td>
<td>Institutional tender Committee</td>
<td>Informal</td>
</tr>
<tr>
<td></td>
<td>i Above K5 million – K50 million</td>
<td>ii Institutional Tender Committee</td>
<td>Formal</td>
</tr>
<tr>
<td></td>
<td>ii Above K5 million – K2.5 billion</td>
<td>iii Central Tender Committee (ZNTB)</td>
<td>Formal</td>
</tr>
<tr>
<td>7</td>
<td>Category B PSU (Parastatals)</td>
<td>Institutional tender Committee</td>
<td>Informal</td>
</tr>
<tr>
<td></td>
<td>i Above K5 million – K50 million</td>
<td>ii Institutional Tender Committee</td>
<td>Formal</td>
</tr>
<tr>
<td></td>
<td>ii Above K5 million – K4.0 billion</td>
<td>iii Central Tender Committee (ZNTB)</td>
<td>Formal</td>
</tr>
<tr>
<td>8</td>
<td>Category C PSU (Government)</td>
<td>Institutional tender Committee</td>
<td>Informal</td>
</tr>
<tr>
<td></td>
<td>i Above K5 million – K50 million</td>
<td>ii Institutional Tender Committee</td>
<td>Formal</td>
</tr>
<tr>
<td></td>
<td>ii Above K5 million – K4.0 billion</td>
<td>iii Central Tender Committee (ZNTB)</td>
<td>Formal</td>
</tr>
</tbody>
</table>

The World Bank (2004) identified the following processes in the selection of consultants:

(a) an Expression of Interest (EoI) is invited and consultants meeting the minimum standards are shortlisted. All willing consultants submit their EoI bid for the consultancy services; and

(b) the shortlisted consultants are issued with a Request for Proposal (RFP). The RFP is a document that allows the consultants to bid for the consultancy services. The World Bank identified six methods of selection of consultants. These are outlined below.
(i) **Quality and Cost Based selection (QCBS) method**

QCBS uses a competitive process among firms and takes into account the qualifications of personnel for the assignment and the cost of the services in the selection of the successful firm. Relative weights are given to both quality and cost depending on the nature of the assignment, and the firm with the highest score is awarded the tender. This is done by the use of the two envelope bidding system. Drew et al (2001) stated that allocation of consultancy work based on price and quality is critical since it is recognized that a quality service cannot be obtained if just the lowest tender is accepted. The bidders, therefore, must strike a balance between quality and price. Tang et al (2001) also argued that consultants competing for work through the two envelope fee tendering have been urged to consider variability differences between fees and technical score, since the criterion with the greatest variability can influence which consultant is awarded the contract.

(ii) **Quality Based Selection method (QBS)**

This method is appropriate for assignments that are:

(a) complex or highly specialized in nature;
(b) assignments that have a high downstream impact; and
(c) for assignments that can be carried out in substantially different ways such that proposals will not be comparable for example management advice.

The emphasis of this procurement method is on quality rather than cost.

(iii) **Fixed Budget Selection method (FBS)**

This method is appropriate when the assignment is simple, can be precisely defined and the budget is fixed.

(iv) **Least Cost Selection method (LCS)**

This method is appropriate for selecting consultants for assignments of a standard or routine nature, for example engineering design of non complex works.
(v) **Selection based on Consultant’s Qualification**  
This method is used for small assignments for which the need for preparing and evaluating competitive proposals is not justified. The selection process is not rigorous and may involve picking consultants of certain minimum qualifications. The method of payment may be by use of standard rates.

(vi) **Single Source Selection method (SSS)**  
This method is mainly used:

(i) for tasks that represent continuation of previous work carried out by the firm;
(ii) in emergency cases such as disasters;
(iii) for very small assignments; and
(iv) when only one firm is qualified or has experience of exceptional worth for the assignment.

The simplified process undertaken in coming up with a procurement strategy for the selection of consultants is as shown in Figure 2.1. Figure 2.2 shows the process undertaken in the procurement of consultants in the public sector in Zambia.

![Diagram](image)

**NOTES:**
- QCBS – Quality and Cost Based Selection
- OBS – Quality Based Selection
- FBS – Fixed Budget Selection
- LCS – Least Cost Selection

**Figure 2.1:** Procurement strategy for consultants
(c) Evaluation of proposals

The RFP document contains the criteria for evaluation of proposals depending on the selection method used.

(d) Negotiations and award of contract

Under the traditional methods of selection of consultants, negotiations are normally held prior to award of contract. However, rates for provision of services are not negotiable.

2.2.2 Selection of contractors

Mohan et. al (2000) stated that selection methodologies and decisions are critical both at the upstream formulation of procurement and operational systems as well as down stream selection of various project participants. They further stated that various approaches have been developed for procurement of contractors. One approach is for the division of a big construction project into work packages. Packages may include the design and production of tender documents, actual construction of works and supervision and management of
the whole project. The World Bank (2004) has the following procedures for the procurement of contractors to undertake works.

(a) **Prequalification of bidders**

Pre-qualification of contractors is necessary for large or complex works. The process enables the purchaser to shortlist contractors who meet the qualifications and set criteria. The following is taken into consideration during the prequalification process:

(i) experience and past performance on similar contracts;
(ii) capacity with respect to technical and managerial personnel;
(iii) capacity in terms of equipment; and
(iv) financial capacity.

Jennings and Holt (1997) stated that procurement of a construction contractor involves some form of pre-qualification. They further stated that a multi-criteria approach is usually adopted in choosing the right contractor. Prequalification is normally done for national and international competitive bidding to reduce the period for the procurement process. The types of tender in Zambia are as shown below.

(i) **National Competitive bidding (NCB)**

This method is restricted to a particular country. In Zambia, this is restricted to contractors registered with the NCC.

(ii) **International Competitive bidding (ICB)**

This method is open to all eligible countries in the world.

(iii) **Informal tenders.**

This method is used for small works that do not justify competitive bidding. This is done by considering contractors on the register of the NCC. Yiu et. al (2002) stated that for small works, the advice of consultants in the selection of contractors was expensive and therefore, not feasible.
(b) Tender evaluation

The tender evaluation procedure under the traditional method of procurement is determined prior to issuance of bid documents. The bid documents clearly indicate the procedure to be used in evaluation of tenders. All tenders are scrutinised for material deviations.

(c) Award of contract

Award of contract is made to the lowest most competitive bid after evaluation. The lowest most competitive bid is one which has no material deviations.

The combined traditional process for the selection of consultants and contractors for the for construction projects in the public sector in Zambia is shown in Figure 2.3.

Ngowi (2000) stated that the traditional competitive method of selection process of consultants and contractors faces difficulties in phasing and sequencing of functions. It lacked coordination between participants and is subject to adversarial contract conditions and unsatisfactory competitive tendering.

Figure 2.3: Combined process in project procurement of Consultants and Contractors
Procurement of contractors cannot be completed without consideration of the appointment of sub-contractors. Sub-contractors are either nominated by the client or appointed by the contractor. Ngowi (2000), however, stated that when using traditional methods, not all the information about the project is captured by the design team at the conceptual stage. More information is requested especially when contractors are engaged.

2.3 European Union procurement in the public sector

2.3.1 Introduction

The European Union (2006) stated that the purpose of procurement procedures was to:

- ensure the transparency of procurements; and
- obtain the desired quality of services, supplies or works at the best possible price.

The European Union (EU) applies different procurement procedures, each allowing for a different degree of competition. Thresholds are used to determine the method of procurement of construction projects. The EU (2006) further warned against artificially splitting projects to circumvent the procurement thresholds. The thresholds and applicable method of procurement are shown in Table 2.2.

**Table 2.2:** Procurement thresholds for procurement of consultants and works in the EU

<table>
<thead>
<tr>
<th></th>
<th>Euro</th>
<th>Euro</th>
<th>Euro</th>
<th>Euro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSULTANTS</strong></td>
<td>200,000 &amp; above</td>
<td>&lt;200,000 but &gt; 5,000</td>
<td>5,000 or less</td>
<td></td>
</tr>
<tr>
<td>International</td>
<td>Restricted Tender</td>
<td>1. Framework contracts 2. Competitive negotiated procedure</td>
<td>Single tender</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WORKS</strong></td>
<td>5,000,000 &amp; above</td>
<td>&lt;5m but equal to or less than 300,000</td>
<td>&lt;300,000 but &gt;5000</td>
<td>5,000 or less</td>
</tr>
<tr>
<td>1. International open tender</td>
<td>Local open tender</td>
<td>Competitive negotiated procedure</td>
<td>Single tender</td>
<td></td>
</tr>
<tr>
<td>2. International restricted tender (exceptional cases)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Practical guide to contract procedures for EC external actions (EU)
2.3.2 Procurement of consultants

As shown in Table 2.2, the procurement of consultants and contractors depends on the thresholds drawn by the EU. Figure 2.4 below shows the various procurement methods for consultants used under the EU.

2.3.2.1 International restricted tender

This procedure is used for tenders worth Euro 200,000.00 and above. Consultants express interest in the tender. Short-listed consultants are then issued with a RFP for consultancy services. Tenders are evaluated and an award made depending on the selection criteria.

2.3.2.2 Competitive negotiated procedure

The EU (2006) stated that this method was also called the simplified method. In this method, the Contracting Authority draws up a list of at least three consultants of their choice. The shortlisted consultants are invited to submit their proposals. Negotiations are then entered into with the most favourable consultant before an award is made.

2.3.2.3 Framework contracts

The EU (2006) defined a framework contract as one laying down the essential terms governing a series of specific contracts to be awarded during a given period, in particular as regards duration, subject, prices, conditions of performance and the quantities envisaged.
2.3.3 Procurement of Contractors

The procurement of contractors under the EU is done according to the framework shown in Figure 2.5.
Estimated contract of or more than Euro 5million

NO

Are there exceptional circumstances to warranty restricted tender

YES

International Open Tender
- publication of notice and tender in OJ

NO

Contract under Euro 300,000
- application of simplified procedure
- minimum three quotations
- single sourcing is accepted for work under Euro 5,000, though not encouraged

YES

Restricted tender
- prepare shortlist of contractors
- send bidding documents to shortlist

Pre-qualification
- prepare shortlist
- send bidding documents to short-listed contractors

Contractors obtain tender documents and submit bids

-evaluation of tender
- award of contract
- implementation
- post assessment of contract and contractors

NOTE: OJ – Official Journal of the European Union

Figure 2.5: Selection of contractors using EU procedures
2.3.4 Comparison of the EU and World Bank procedures

The procurement procedures by the World Bank (WB) and the EU are similar. They both advocate for competitive tendering using different methods depending on the value of the contract. However, the major difference is at post contract. The EU procedures demand that post contract assessment of consultants and contractors is undertaken.

2.4 Public procurement in Japan

2.4.1 Introduction

In Japan, central government, local governments and public corporations generally contract out works and projects to private firms.

2.4.2 Selection of consultants

Selection of consultants is based on Terms of References provided. Consultants provide the price for doing the consultancy according to the Terms of Reference. The lowest bid is accepted for contract award.

2.4.3 Selection of contractors

The Japanese Public Accounting Law stipulates that public works contracts be awarded by public tender. The public body prepares designs, specifications, bills of quantities and contract drafts. The tenderers are also shown the sites were possible. Based on these documents and site observations, tenderers estimate construction costs and lodge individual bids. Contractors are classified according to capacity and are only allowed to bid for works within their thresholds. The lowest bidder is chosen. However, the lowest bid should be within the price estimate for the project. Where no bidder quotes a price within the price estimate for the project, further bids are invited until a bid falls within the estimated price.

2.4.4 Differences between the Japanese, World Bank and European Union procedures

Unlike the World Bank and EU, the Japanese government has not so far introduced a system under which public bodies select successful tenderers based on an evaluation of
both price and technical capacity. Bidders are therefore only required to submit the price under this system.

2.5 Project partnering

Humphreys et. al (2003) defined project partnering as a long term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant’s resources. It is a commitment between two or more parties in a collaborative relationship to create value by striving to achieve shared competitive goals and operational benefits through the spirit of mutual trust and openness.

This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based on trust, dedication to common goals, and developing each other’s individual expectations and values. Humphreys et. al (2000) advocated for a partnering approach to construction procurement as opposed to the traditional methods of procurement. They stated that sub-contractors and suppliers are playing an important role in construction projects and that it is not uncommon for as much as 90 percent of a project to be undertaken by subcontractors. The result of this increased involvement is that main contractors are now concentrating their efforts on managing sub-contractors rather than employing direct labour. This shifts the selection criteria for the main contractor from an executioner to a manager. The main contractor in this case is a professional service provider consisting of architects, engineers, planners, surveyors, project managers, contract managers, estimators and buyers responsible for planning, organizing, directing and controlling of projects rather than the physical construction. The selection of consultants and sub-contractors in this case is the responsibility of the main contractor. Humphreys et. al (2003) also stated that the reliance on sub-contractors has put stress on the main contractor-sub contractor relationships.

In the United Kingdom, the government initiated research to find out ways of improving the sector’s performance with strong emphasis on reduced costs and enhanced customer value through supply chain improvement measures. The results of the research were
published in the "Re-thinking construction report." In the report, Egan (1998) recommended the use of partnering in procurement of construction projects. Project partnering, he stated, should form the basis for integration, quality, innovation, improved performance, commitment and long term relationships. The aim of project partnering is to pull firms together with a common goal and once together, encourage to try and stay together, to learn and develop, building each other's strengths as a team. Egan showcased the benefits as substantial improvements in terms of cost reduction, quality, work environments, relationships, productivity, profit margins, cash flow, planning for future work loads and image building. The report recommended a shift from the old traditional way of doing things, from the "them" and "us" syndrome. Moore (2003) identified the principles of partnering as commitment, common objectives, open communication, ethical behaviour and team work.

Proponents of project partnering contend that its benefits are derived from the following:

- increased technological products;
- improved and specialized methods of construction as a result of availability of new technology;
- synergy;
- improved communication and team work;
- earlier involvement of sub contractors and suppliers at design stage; and
- long term collaboration result in strategic partnering for more than one construction project.

Humphreys et al (2003) identified the model for project partnering as shown in Figure 2.6.

The selection of firms in partnering uses the following criteria:

- past performance on similar types of projects;
- ability to meet the quality requirements of projects;
- ability to resource projects to a sufficient level;
Figure 2.6: Project procurement model for partnering
(After Humphreys et. al, 2003)

- positive working attitude;
- past safety performance;
- sound financial background;
- proven site and head office management; and
- willingness to forge long term relationships.

Humphreys et. al (2003), however, warned that partnering is not a panacea to all construction problems. They stated that partnering requires a change of mindset if it is to be successfully utilized and that the biggest test arise when there is a problem between partnering companies.

2.6 Public Private Partnerships

2.6.1 Introduction

A Public-Private Partnership (PPP) is a contractual agreement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards involved in the delivery of the service or facility.
There are six critical components of any successful PPP. While there is no set formula or an absolute foolproof technique in crafting a successful PPP, each of these keys is involved in varying degrees.

2.6.1.1 Political Leadership

A successful partnership can result only if there is commitment from "the top". The most senior public officials must be willing to be actively involved in supporting the concept of PPPs and taking a leadership role in the development of each given partnership. A well-informed political leader can play a critical role in minimizing misperceptions about the value to the public of an effectively developed partnership. Equally important, there should be a statutory foundation for the implementation of each partnership.

2.6.1.2 Public sector involvement

Once a partnership has been established, the public-sector must remain actively involved in the project or program. On-going monitoring of the performance of the partnership is important in assuring its success. This monitoring should be done on a daily, weekly, monthly or quarterly basis for different aspects of each partnership.

2.6.1.3 A Well thought-out plan

It must be known what to expect of the partnership beforehand. A carefully developed plan will substantially increase the probability of success of the partnership. This plan most often will take the form of an extensive, detailed contract, clearly describing the responsibilities of both the public and private partners. In addition to attempting to foresee areas of respective responsibilities, a good plan or contract will include a clearly defined method of dispute resolution (because not all contingencies can be foreseen).

2.6.1.4 A dedicated income stream

While the private partner may provide the initial funding for capital improvements, there must be a means of repayment of this investment over the long term of the partnership. The income stream can be generated by a variety and combination of sources (fees, tolls,
shadow tolls, tax increment financing, or a wide range of additional options), but must be assured for the length of the partnership.

2.6.1.5 Communications with stakeholders

More people will be affected by a partnership than just the public officials and the private-sector partner. Affected employees, the portions of the public receiving the service, the press, appropriate labor unions and relevant interest groups will all have opinions, and frequently significant misconceptions about a partnership and its value to all the public. It is important to communicate openly and candidly with these stakeholders to minimize potential resistance to establishing a partnership.

2.6.1.6 Selecting the right partner

The "lowest bid" is not always the best choice for selecting a partner. The "best value" in a partner is critical in a long-term relationship that is central to a successful partnership. A candidate's experience in the specific area of partnerships being considered is an important factor in identifying the right partner.

For a partnership to succeed, it must have the following characteristics:

- It must be a real partnership, with shared burdens and shared rewards for both the public and private participants;
- There must be real incentives for the private sector or they will not participate;
- The public-sector must use its resources effectively and judiciously, focusing on projects where there can be success;
- Keep it simple for the private-sector by minimizing the bureaucratic procedures that can cripple a project;
- "Land is King", it provides the public with the opportunity to control the projects; and
- Public-private partnerships are a necessary and important part of the process.

In their research, Li et. al (2005) found that PPP project procurement was perceived as the most attractive in terms of positive factors relating to better project technology and economy, greater public benefit, public sector avoidance of regulatory and financial
constraints and public sector saving in transaction costs. Adams et. al (2006) stated that the use of PPP is to reduce the burden on tax payers in the delivery of both capital and long term service contracts by the introduction of private capital, private expertise and competitive business practices in the provision of public services.

Despite these benefits of PPPs, by 2007, the government of the Republic of Zambia had not provided the policy for implementing PPPs in Zambia. The government, had however recognized the significant contributions of PPPs to the economies. In 2007, a consultative process was undertaken with stakeholders with a view of enacting a Bill for the implementation of the PPPs in Zambia. In these consultations, government identified the following as key to attain successful implementation of PPPs in Zambia:

- Policy and legal framework;
- Capacity building in both public and private sector;
- Identification of possible PPP projects;
- Prioritising PPP projects; and
- Implementation programme.

Li et. al (2005) however, argued that negative aspects relating to factors such as the inexperience of participants, the over-commercialization of projects and high participation costs and time make PPP project procurement less attractive.

2.6.2 Forms of PPPs

Various forms of PPPs have been implemented in different countries in the world for more than twenty years. They include:

- Design and Build procurement strategy;
- Design, Build, Operate, Transfer;
- Design, Build, Transfer, Operate;
- Build, Lease, Operate, Transfer; and
- Lease, Upgrade, Operate, Transfer.
2.6.2.1 Design and Build

Most building construction projects are delivered in the traditional way where the architect designs and the contractor constructs. However, Lam et. al (2004) stated that building clients are becoming dissatisfied with the drawbacks, opting for more integrated options such as Design and Build. Design and Build (D&B) is a method of procurement in which the organization takes full responsibility and carries sole liability for both design and construction. In South Africa, Grobler and Pretorius (2002) stated that in 1999, 29% of building and civil engineering projects were delivered by D&B. They further stated that D&B could lead, amongst others, to shorter project duration, reduction in cost, enhanced constructability of the design, better relations and fewer disputes and claims. D&B also provides the advantage of a single point of responsibility. Ngowi (2000) stated that the organization that assumes responsibility for both design and construction may be a multi-disciplinary firm with in-house staff or a consortium involving a contractor, an architect, a structural engineer, electrical engineer, a service engineer and a surveyor. Lam et. al (2004) postulated that D&B projects require a greater level of managerial expertise from the contractor for the integration of design and construction. Evbuomwan and Anumba (1996) however argued that the D&B process has the following limitations:

- the outline design which forms the basis of tenders inhibits the ingenuity and creativity of the tendering consortia by limiting them to the initial consultant’s vision of the desired facility;
- delays often arise due to the initial time spent in developing the outline design, time spent by the successful consortium in clarifying client requirements and liaising with the initial consultants, and time spent sourcing and seeking approval for alternative materials and design changes; and
- there is significant potential for disputes and claims at the construction stage due the client’s requirements not being well-defined at the early stages.

2.6.2.2 Design, Build, Operate and Transfer

This is similar to the Design and Build. However, the main difference is that the organization that assumes the responsibility of designing and construction also operates
the facility for a certain agreed period. After this period of operation the facility is handed over to the authorised body, for example a municipal council.

The main draw back to this type of project procurement is that the organization entrusted with the facility may hand-over the facility after its usefulness has ceased.

2.6.2.3 Design, Build, Transfer and Operate
In this case, an organization is appointed to design and build the facility. The facility is then handed over to an Operator (transfer) who undertakes to operate the facility or appoints another firm to run the facility on its behalf.

2.6.2.4 Build, Lease, Operate and Transfer
In this case the organization appointed builds the facility. The facility is then leased for operation. After a specified agreed period, the facility is handed over to the authorised body.

2.6.2.5 Lease, Upgrade, Operate and Transfer
In this case the facility, for example, a stadium can be leased to an organization with an agreement that the organization will upgrade and operate the facility and then hand over to the authorised body after a specified time.

2.7 Concurrent Engineering (CE) procurement strategy
Concurrent Engineering, also called simultaneous engineering, principles have been successfully implemented in the manufacturing industry. Haque (2003) defined concurrent engineering as a systematic approach to the integrated concurrent design of products and their related processes including manufacture (construction) and support. Broughton (1990) summarised the aim of concurrent engineering as to achieve reduced times, improve quality and reduce cost by the integration of design and manufacturing activities and by maximizing parallelism in working practices. Other benefits of concurrent engineering according to Ngowi (2000) are:
(i) it enhances communication and cooperation between designers, managers and other
professionals involved in the product development process; and

(ii) it reduces uncertainty in the early phases of the project.

Dey (2000) summarised the benefits of concurrent engineering as co-ordination and integration, communication, co-operation, collaboration, commitment, consensus and compromise.

Dey (2000), however, argued that in order to successfully employ concurrent engineering techniques in construction projects in the public sector, there is need for organizational restructuring, improving management commitment and supplementing project planning by including the following:

- selecting technology and implementation methodology;
- selecting contract type for various work packages;
- selecting of owner group including project manager;
- selecting project team (consultants, contractors, vendors); and
- designing an incentive scheme for the owner group and project team for motivating them in completing its project.

This is also to ensure management of project risks, quality and improved communication among project members. The model of execution of concurrent project procurement is shown in Figure 2.7.

The owner project group, contractors, consultants and vendors form a project team to work together to accomplish a project. Therefore the selection of the project participants is absolutely critical to ensuring project success.

Haque (2003), in his research, listed the following as barriers to new product development via concurrent engineering:

- organisational structure;
- poor ownership/accountability and definition of roles;
- lack of resources (human, technological, financial);
- poor coordination and collaboration;
- poor communication; and
• culture related barriers.

![Diagram](image)

**Figure 2.7:** Process procurement of concurrent project team

### 2.8 E-Procurement

Many industries are in a period of rapid change brought about by technological breakthroughs. Improvements in communications and networking have allowed companies to expand their operations. The explosive growth of the internet is changing the way of conducting business. The internet has brought about e-commerce with its sub products such as e-procurement. Ruikar et. al (2003) stated that the uptake of e-commerce in construction has been relatively slow compared to that of other industries. The reason for this could be because of the fragmented nature of the construction industry and the one off nature of construction end products. Currently, information flow in the construction industry is mostly paper based and therefore, is slow. Such traditional means of communication involve producing numerous paper copies of documents and drawings. Management of these loose documents is often a time-consuming and tedious process. This process is not only time consuming, but also costly.
Lysons and Gillingham (2003) defined e-procurement as the combined use of Information and Communication Technology (ICT) through electronic means to enhance external and internal purchasing and supply management processes. It is a business to business purchase and sale of supplies and services over the internet. E-procurement removes the paper processes and reduces costs for both buyer and supplier, making trading simpler and more cost effective. E-procurement also reduces the additional expenses incurred in the delivery of project documents to project members who are geographically distributed. Kalakota (2006) also stated that the broad goals of e-commerce were to reduce costs, lower product cycle times, faster customer response, and improved service delivery. Kalakota (2006) further stated that the two pillars of supporting all e-commerce are:

- public policy to govern such issues as universal access, privacy and information pricing; and
- technical standards to dictate the nature of information publishing, user interfaces and transport in the interest of compatibility across the entire network.

The use e-commerce can be made possible by use of a Wide Area Networks (WAN) supported by digital switches, routers and hubs. Kalakota (2006) stated that a switched hub acts as the wiring center to diagnose, measure and manage traffic flows.

2.9 Papers reviewed

Table 2.3 is the summary of some of the technical papers reviewed.
<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Year</th>
<th>Title of study</th>
<th>Purpose of study</th>
<th>Methodology</th>
<th>Findings and recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wa'el, A. Mohd, R.A.K, Salim, A., and Emawati</td>
<td>2007</td>
<td>The significant factors causing delay of building construction projects in Malaysia</td>
<td>To identify the major factors causing delay in building construction projects in Malaysia</td>
<td>A questionnaire survey was used to carry out the study. The questionnaire consisted of 31 factors which were grouped into four major categories by responsibility—contractor factors, owner factors, consultant factors and external factors. The level of importance of the categories was measured and the relative importance of weights was ranked.</td>
<td>The study found that financial problems were the main factors followed by coordination problems causing delay in public construction projects in Malaysia. The results were analyzed to rank the causes of delay and further classify the types of delay.</td>
</tr>
<tr>
<td>2</td>
<td>Adams, J., Young, A. and Zhihong, W.</td>
<td>2006</td>
<td>Public private partnerships in China, System, constraints and future prospects</td>
<td>To examine the PPP system and the problems yet to be overcome at a time when China is seeking to widen the use of PPP in sectors as yet not open to it.</td>
<td>The paper examined the current PPP system in China and identified the constraints facing it in the context of several models of bureaucracy arguing that these are as valid in China as they have been in the West.</td>
<td>The Government has recognized the importance of effectively delivering PPP and has made efforts in the legal, supervisory and management spheres to try to ensure that value for money is achieved. The allocation of risk remains unclear and there remains the key problems of policy purpose and policy implementation, corruption (or the potential for it), continued weak supervision, access to investment capital and continued perceptions in the private sector of non-sustainable policy or possible deliberate changes to policy in relation to PPP.</td>
</tr>
<tr>
<td>3</td>
<td>Roodhooft, F. and Abbeele, A.V.</td>
<td>2006</td>
<td>Public procurement of consulting services, evidence and comparison with private companies</td>
<td>The aim of the paper was to shed light on the procurement process of consulting services within the public sector and to benchmark the obtained results with practices in the private sector.</td>
<td>A two-stage research design was used. First, in-depth personal interviews were conducted with six users of consulting services. The second stage involved a cross-sectional survey of purchasers of a broad range of business advisory services. This included private as well as public purchasers.</td>
<td>It was found that the procurement process of consulting services in the public sector differed significantly from that of private companies. It was further recommended that although the private sector engaged more in strategic partnerships, it may still be valuable for them to carefully define the selection criteria. It was also recommended that high-level management involvement, recognizing the importance of the procurement function within the public sector and supporting highly trained staff in implementing strategic procurement initiatives.</td>
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<td>No.</td>
<td>Author</td>
<td>Year</td>
<td>Title of study</td>
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<td>4</td>
<td>Li, B., Akintoye, A., Edwards, P.J. and Hardcastle, C.</td>
<td>2005</td>
<td>Perceptions of positive and negative factors influencing the attractiveness of PPP/PFI procurement for construction projects in the UK</td>
<td>To report the findings of research into perceptions of what makes the Private Finance Initiative (PFI) attractive or unattractive as a procurement system for projects in the UK.</td>
<td>The research used a postal survey questionnaire technique for primary data collection.</td>
<td>Public/private partnerships (PPP/PFI) project procurement is perceived as most attractive in terms of positive factors relating to better project technology and economy, greater public benefit, public sector avoidance of regulatory and financial constraints, and public sector saving in transaction costs. Negative aspects, relating to factors such as the inexperience of the participants, the over-commercialisation of projects, and high participation cost and time, make PPP/PFI procurement less attractive.</td>
</tr>
<tr>
<td>5</td>
<td>Tastle, S.L.Y. and Tastle, D.S.</td>
<td>2005</td>
<td>Extending the consensus measure: Analysing ordinal data with respect to extremum</td>
<td>To determine whether consensus could be measured and ranked for likert scale data</td>
<td>Desk research</td>
<td>The research determined that a measure of consensus by ordinal scale measures and ordering was possible</td>
</tr>
<tr>
<td>6</td>
<td>Lam, E.W.M., Chan, A.P.C. and Chan, D.W.M.</td>
<td>2004</td>
<td>Benchmarking design-build procurement systems in construction</td>
<td>To establish a conceptual framework of critical success factors (CSFs) for design-build projects in construction.</td>
<td>Study undertaken by survey</td>
<td>Benchmarking can be an effective way of helping organizations to deliver better services through continuous improvement</td>
</tr>
</tbody>
</table>
| 7   | Long, D.N., Stephen, O. and Do, T.X.L | 2004 | A study on project success factors in large construction projects in Vietnam | This paper expounded on the success factors for large construction projects in Vietnam | A survey questionnaire was used to collect data from practitioners. Factor analysis was employed to categorize these success factors perceived by 109 respondents from 42 construction-related organizations. | The following Critical Success Factors were identified:  
1. competent project manager;  
2. adequate funding until project completion;  
3. multidisciplinary/competent project team;  
4. commitment to project; and  
5. availability of resources. |
<p>| 8   | Harque, B. | 2003 | Problems in concurrent new product development: an in-depth comparative study of three companies | To provide a clear picture of the state of concurrent engineering its development | Three in-depth case studies in three different countries across Europe. | The case studies highlight the importance of process management, with a focus on process modeling and analysis of organisational factors, to improve the existing implementations of concurrent new product development. |</p>
<table>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Humphreys, P., Matthews, J. and Kumaraswamy, M.</td>
<td>2003</td>
<td>Pre-construction project partnering from adversarial to collaborative relationships</td>
<td>To compare a selected contractor’s performance with that of its competitors.</td>
<td>Study conducted by case study</td>
<td>It was concluded that this project partnering offered a number of benefits for the client, the main contractor, partnering subcontractors and professional consultants, such as, lower costs, improved team approach and less confrontation.</td>
</tr>
<tr>
<td>10</td>
<td>Ruikar, K., Anumba, C.J. and Carrillo, P.M.</td>
<td>2003</td>
<td>Reengineering construction business processes through electronic commerce</td>
<td>The objective of the study was to identify shortcomings in e-commerce in the construction industry by presenting how the current construction business process can be improved through the use of new and innovative e-commerce applications.</td>
<td>The study was undertaken through a survey by use of a questionnaire.</td>
<td>There was an enormous potential for the development of electronic commerce in the construction sector. One of the main benefits of adopting electronic commerce into the day-to-day working of the construction organisations could be a simplified construction business process that uses electronic tools (such as the IC) for exchange of data and information. In order to adopt IT and electronic commerce strategies into the day-to-day working of construction projects, companies will have to radically alter the traditional processes of managing construction projects and also the way in which project partners collaborate and communicate with one another.</td>
</tr>
<tr>
<td>11</td>
<td>Grobler, K. and Pretorius, L.</td>
<td>2002</td>
<td>An evaluation of design-build as a procurement method for building and civil engineering projects in South Africa</td>
<td>To determine the percentage of projects delivered by design and build concept, compare design and build to other procurement methods and assess the future of design and build in South Africa.</td>
<td>The research was undertaken through case studies and questionnaire</td>
<td>Approximately 29% of building and civil engineering projects in South Africa were delivered by design and build approach. Design and build leads to shorter project duration, reduction in cost, enhanced constructability of design, better relations and fewer disputes and claims. However, cost of bidding is high. The future was bright for design and build in South Africa.</td>
</tr>
<tr>
<td>12</td>
<td>Yiu, C.Y., Lo, S.M. Thomas, S. and Michael M.F.</td>
<td>2002</td>
<td>Contractor selection for small building works in Hong Kong</td>
<td>This paper reviews the building procurement mechanism in small building works in Hong Kong and argues that the employment of a property management agent is conducive to the contractor selection process. Accordingly, further investigations are warranted for a contractor selection model for small building works.</td>
<td>This research used case studies to show that a contractor selection model for large scale works does not perform well in small works without the advice of the consultant. The high proportion of specification costs in small works contracting deters the detailed design and documentation stage.</td>
<td>A contractor selection model for small building works was developed.</td>
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<tr>
<td>13</td>
<td>Ngowi, A.B.</td>
<td>2000</td>
<td>Construction procurement based on</td>
<td>To review project procurement systems and how concurrent engineering principles may be adopted to address the integration of the efforts of project participants from the inception of the project</td>
<td>The study was carried out in Botswana by means of interviews of professionals and clients in the built environment</td>
<td>The study found an overwhelming consensus that the procurement systems used in the in Botswana were inadequate in meeting the normal client requirements and at worst, they were adversarial. There was also a consensus that a procurement system that was based on concurrent engineering (CE) principles may alleviate these problems.</td>
</tr>
<tr>
<td>14</td>
<td>Steane, P.D. and Walker, D.H.T</td>
<td>2000</td>
<td>Competitive tendering and contracting public sector services in Australia – a facilities management issue</td>
<td>The study was aimed at determining whether short-term contract arrangements provided advantages in terms of cost, productivity and quality</td>
<td>Desk research</td>
<td>Good procurement of facilities was as a result of strategic linkages</td>
</tr>
<tr>
<td>15</td>
<td>Baruch, Y.</td>
<td>1999</td>
<td>Response Rate in Academic Studies – A Comparative Analysis</td>
<td>To explore what could and should be a reasonable response rate in academic studies.</td>
<td>One hundred and forty-one papers which included 175 different studies were examined. They were published in the Academy of Management Journal, Human Relations, Journal of Applied Psychology, Organizational Behavior and Human Decision Processes, and Journal of International Business Studies in the years 1975, 1985, and 1995, covering about 200,000 respondents.</td>
<td>It was suggested that the average response rate of 55.6% should be used as a norm for future studies.</td>
</tr>
<tr>
<td>16</td>
<td>Egan, J.</td>
<td>1998</td>
<td>Rethinking construction</td>
<td>To examine current practice and identify specific actions and good practice which would help achieve more efficient construction in terms of quality and customer satisfaction, timeliness in delivery and value for money</td>
<td>Case studies of the best practice in construction industry and other industries in the UK</td>
<td>To achieve targets the industry need to make radical changes to the processes through which it delivers its projects. These processes should be explicit and transparent to the industry and its clients. The industry should create an integrated project process around the four key elements of product development, project implementation, partnering the supply chain and production of components. Sustained improvement should then be delivered through use of techniques for eliminating waste and increasing value for the customer.</td>
</tr>
<tr>
<td>No.</td>
<td>Author</td>
<td>Year</td>
<td>Title of study</td>
<td>Purpose of study</td>
<td>Methodology</td>
<td>Findings and recommendations</td>
</tr>
<tr>
<td>-----</td>
<td>--------</td>
<td>------</td>
<td>----------------</td>
<td>------------------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>17</td>
<td>Australian Industry Commission</td>
<td>1996</td>
<td>Competitive tendering and contracting by public sector agencies</td>
<td>To study the extent and scope of contracting by Commonwealth, states, local governments and their agencies with the overall aim to improve performance.</td>
<td>A commission was set up by the Australian government to critically analyse the various contracting procedures and processes and make recommendations with a view of improving performance.</td>
<td>Various recommendations were made which included the following: Government should make public as much information as possible to enable interested people to assess contracting decisions made by agencies, have in place appropriate quality assurance systems, production of guidelines to sufficient detail to be of practical use, compulsory competitive tendering was not advocated as compulsory.</td>
</tr>
<tr>
<td>18</td>
<td>Love, P.E.D. and Gunasekaran, A.</td>
<td>1998</td>
<td>Concurrent Engineering: a multi-disciplinary approach for construction</td>
<td>To address the concept of concurrent engineering (CE) and its application to construction.</td>
<td>Case study approach was used</td>
<td>The construction industry had for far too long tolerated the fragmented nature of the construction process. This had made it difficult for organizations to co-operate, communicate and integrate with each other effectively. The construction industry must therefore adopt a more integrated approach to construction through the use of a multi-disciplinary team approach.</td>
</tr>
<tr>
<td>19</td>
<td>Jennings, P. and Holt, G.D.</td>
<td>1997</td>
<td>Pre-qualification and multi criteria selection: a measure of contractors' opinions</td>
<td>The purpose of this research was to solicit contractors' viewpoints on prequalification, in contrast to earlier works which have tended to present clients' perspectives.</td>
<td>The study was undertaken through a survey of contractor's opinions.</td>
<td>Contractors' perceived levels of importance (with respect to selection criteria considered by clients during the selection process) were evaluated and showed that, 'cost' the predominant selection factor, followed by 'contractor experience' and 'company reputation'.</td>
</tr>
</tbody>
</table>
2.10 Summary
The literature on the procurement of construction services and works was critically reviewed in this chapter. The traditional methods of procurement of construction projects in the public sector in Zambia were analysed. The selection processes for both consultants and contractors were also analysed. They include the QCBS, QBS, LCS, SSS, NCB, ICB and the informal tendering methods.

The other methods of project procurement such as from the EU and Japan were analysed. PPPs, Project Partnering and Concurrent Engineering methods were also analysed. E-procurement was also examined.

The next chapter deals with the research methodology and design undertaken to achieve the aim and objectives of this study.
CHAPTER THREE
RESEARCH METHODOLOGY AND RESEARCH DESIGN

3.1 Introduction
Literature on procurement in construction of services and works in the public sector was reviewed in the previous chapter. In this chapter, the research methods, design and strategy used in achieving the aim and objectives of this study would be examined.

3.2 Research methodology
Bailey (1987) defined methodology as the philosophy of the research process. It includes the assumptions and values that serve as a rationale for research and the standards or criteria the researcher uses for interpreting data and reaching conclusions. The methodology in this research was designed to ensure sufficient insights into the problem areas are obtained. This study was undertaken using the framework illustrated in Figure 3.1.

![Figure 3.1: Framework for the research process](image-url)
3.3 Research design

Herbert (1994) stated that the main criteria for research design can be summed up by two questions:

- Does the research generate answers to the research question?; and
- Does it adequately test the hypothesis if it is hypothesis-testing study?

Herbert (1994) further stated that the critical point to remember is that the research problem or question should determine the approach. Saunders et. al (2003) identified two approaches to research design as deductive and inductive. The deductive approach involves the development of a theory that is subjected to a rigorous test. It is the dominant research method in the natural sciences where “laws provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence and therefore allow them to be controlled”. It searches to explain causal relationships between variables. Rabson (1993) lists five sequential stages through which deductive research progresses:

- deducting the hypothesis (a testable proposition about the relationship between two or more events or concepts) from the theory;
- expressing the hypothesis in operational terms;
- testing this operational hypothesis. This involves an experiment or some other form of empirical enquiry;
- examining the specific outcome of the enquiry. This would either tend to confirm the theory or indicate the need for its modification; and
- if necessary, modify the theory in the light of findings. Verification of the revised theory by going back to the first step and repeating the whole cycle is then attempted.

On the other hand, research using the inductive approach is concerned with the context in which events are taking place. Potter (2006) supported this view by stating that induction is the process of drawing inferences from observations in order to make generalizations. Inductive methods analyse the observed phenomenon and identify the general principles, structures, or processes underlying the phenomenon being observed. It would be concerned with the context in which the events are taking place. Saunders et. al (2003) further stated that researchers in this tradition are more likely to work with qualitative data and to use a
variety of methods to collect these data in order to establish different views of phenomenon. Potter (2006) stated that the induction method consisted of four main stages described in the Table 3.1 below.

Table 3.1: Stages in the induction method

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Observation</th>
<th>Observe and record all facts without being selective or having any preconceptions about their significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>Analysis</td>
<td>Analyse, compare and classify these facts to identify regularities, without reference to any hypothesis</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Inference</td>
<td>From this analysis of regularity, infer generalizations about the relations between the facts, i.e. the “laws of nature”.</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Confirmation</td>
<td>Test these “laws of nature” through further observation of facts.</td>
</tr>
</tbody>
</table>

Source: Doing Postgraduate Research (Potter, 2006)

The processes of deductive and inductive thinking are shown in Figure 3.2.

![Diagram showing deductive and inductive approach](image)

**Inductive approach**  
**Deductive approach**

Figure 3.2: Deductive and inductive thinking

The deductive method is therefore concerned with theory-testing, while the inductive method is concerned with theory-generating. In the inductive method, theory follows data whilst in
the deductive method, data follows theory. Saunders et. al (2003) postulated that followers of the inductive approach criticise the deductive approach because of its tendency to construct a rigid methodology that does not permit alternative explanations of what is going on. However, Potter (2006) stated that the theories generated in the inductive approach could only be tested by applying the deductive method.

In this study, the inductive approach was used. This was because it was undertaken within the context in which the events took place. This approach also enabled the cause-effect link to be made between particular variables. This approach was also suitable because of its flexibility in permitting the alternative explanations of what was going on. Further, the induction approach answered the overall configuration of the research in relation to what kind of evidence was to be gathered and from where and how such evidence was to be interpreted in order to provide appropriate answers to the basic research objectives.

3.4 Research strategy
Research strategy is a general plan of how a researcher goes about answering the research question(s) he/she has set. It contains clear objectives, specify clear sources of data, and considers the constraints. Saunders et al (2003) identified eight research strategies, namely: experiment, survey, case study, grounded theory, ethnography, action research, cross-sectional and longitudinal studies and exploratory, descriptive and explanatory studies.

3.4.1 Experiment
An experiment is a form of research that owes much to the natural sciences. It typically involves:

- the definition of a theoretical hypothesis;
- the selection of samples of units from known populations;
- allocation of samples to different experimental conditions;
- introduction of planned change on one or more of the variables;
- measurement on a small number of the variables; and
- the control of the other variables.
This strategy was found not suitable for this research. This was because it was going to be expensive and difficult to undertake controlled experiments in the procurement process.

3.4.2 Survey

Bailey (1987) stated that a survey consists of asking questions of a representative cross-section of the population. Surveys therefore allow the collection of large amount of data from a sizeable population in a highly economical way. Based most often on the questionnaire, these data are standardized allowing for easy comparison. Other methods of doing a survey are by structured observation and structured interviews. Using this method allows the researcher more control over the research process. The disadvantages of a survey are that, sometimes, it is time consuming and depends on the goodwill of the respondents.

This strategy was used in this study. This was because it is perceived as authoritative by many people (Saunders et. al 2003), and also that it is easy and provides more control over the research process. A structured questionnaire and interviews were used.

3.4.3 Case study

Herbert (1994) defined a case study as a reconstruction and interpretation of a segment of a subject’s life story based upon the most reliable evidence available. Rabson (1993) also defined a case study as the ‘development of detailed, intensive knowledge about a single “case”, or a small number of related “cases”’. This strategy is useful if the researcher wishes to gain a rich understanding of the context of the research and the process being enacted. Rabson (1993) further stated that the case study approach also has considerable ability to generate answers to the “why”, “what” and “how” questions.

Herbert (1994) outlined the procedure in undertaking a case study as follows:

- state clearly the problems and issues;
- collect background information;
- put forward explanations (conjectures/hypotheses) and solutions on the basis of the information available;
• search again for and admit for consideration sufficient evidence to eliminate as many of the suggested explanations (hypotheses) as possible, in the hope that one of them will be close to reality as to account for the evidence and be contradicted by none of it;
• enquire critically into the sources of evidence as well as the evidence itself;
• examine carefully the internal logic, coherence and external validity of the entire network of hypotheses formulated to explain predicament and proposals to solve the problems;
• select the likely interpretation, provided it is compatible with the evidence;
• work out the implications of your explanations for intervention or some other action; and
• prepare the case report as a scientific account.

This strategy was used in this study. This method was suitable for projects that were implemented in the past for which records were still available. It called for observation of records and interviewing participants to the same projects for clarifications. It was also a suitable method of study for projects that have already been completed.

3.4.4 Grounded theory
In grounded theory, data collection starts without the formation of an initial theoretical framework. Theory is developed from data. Theory is generated by a series of observations. This strategy was found not suitable for this research and was therefore not used in this study. This method is suitable for exploratory projects seeking to generate a direction for further work.

2.4.5 Ethnography
This emanates from the field of anthropology. Ethnography attempts to relate the social world the research subjects inhabit and the way in which they interpret it. This type of research is time consuming and takes place over an extended time period. This strategy was, therefore, not found suitable for this study.

3.4.6 Action research
This involves the carefully documented and monitored study of an attempt by the researcher to actively solve a problem or change a situation. Thus action research differs from other
forms of research because of its explicit focus on action, in particular promoting change
within an organization. The researcher is involved in the action of change. This strategy was
found not suitable for this study as it was found impossible to implement.

3.4.7 Cross sectional and longitudinal studies
Cross sectional studies involve study of a certain phenomenon across a cross section of
society, for example the effect of information technology on design among engineers.
Longitudinal studies on the other hand are mainly used to study change and development. In
longitudinal studies the basic question is ‘has there been any change over a period of time?’

These two strategies were found not suitable for this research because of the time scale
involved to achieve the results.

3.4.8 Descriptive studies
Saunders et. al (2003) stated that the object of descriptive studies is to portray an accurate
profile of persons, events or situations. Descriptive studies are not favoured by many
researchers because of their failure to draw on conclusions and recommendations. The
description may be well captured, but ‘so what?’ This strategy was therefore found not
suitable for this research.

3.4.9 Exploratory studies
Exploratory studies are a valuable means of finding out ‘what is happening; to seek new
insights; to ask questions and to assess phenomena in new light’. It is a particularly useful
approach if one wished to clarify their understanding of a problem. It is likened to the
activities of a traveller or explorer. Saunders et. al (2003) stated that there are three principal
ways of conducting exploratory research:

- a search of the literature;
- talking to experts in the subject; and
- conducting focus group interviews.
The greatest advantage of this method is that it is flexible and adaptable to change. Thus the researchers must be willing to change their direction as a result of new data which appears and new insights which occur to them. This strategy was not used because it was time consuming.

3.4.10 Explanatory studies
Explanatory studies are those which establish causal relationships between variables. The emphasis here is on studying a situation or a problem in order to explain the relationships between variables. For example a study to determine rate of ‘return jobs’ and experience of artisans. Some form of explanatory studies was done in this study through the use of a questionnaire.

3.4.11 Multi-method approach
Saunders et. al (2003) stated that research approaches and strategies do not exist in isolation and therefore could be mixed and matched. Saunders et. al (2003) identified two advantages of using the multi-method approach as:

- different methods and approaches when used together provided confidence that the most important issues were being addressed; and
- it enabled triangulation to take place. Triangulation is the application of three research methodologies in the study of the same phenomenon. Each method has its unique strengths and weaknesses. For example, use of semi-structured interviews may be a valuable way of triangulating data collected by other means such as a questionnaire. Triangulation was used in this study by use of a questionnaire, interviews and the case studies.

In this study, the survey and case study approach were used. A survey method allowed for the collection of large amounts of data from a sizeable population in a highly economical way, based mainly on a questionnaire. Judgemental sampling was done. Saunders et al (2003) stated that the use of judgement in samples enables the researcher to select cases that would best enable the researcher to answer research questions and meet the objectives. This is a non-probability sampling technique. Judgemental sampling is used to locate all possible
cases of a highly specific nature within a population. In this study, the target group was engineers, quantity surveyors, architects and procurement specialists as they were involved in the selection of consultants and contractors in the public sector. The major players in the construction projects in the public sector in Zambia include certain ministries, professional bodies for engineers, quantity surveyors and architects and quasi-government institutions. The target group was senior officers involved in procurement of construction projects in the public sector in Zambia. Using judgement based on the questionnaire, the following were identified as the target population for this study:

**Table 3.2: Target population for research**

<table>
<thead>
<tr>
<th>Item</th>
<th>Institution</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ministry of Works and Supply, Purchasing and Procurement Unit</td>
<td>02</td>
</tr>
<tr>
<td>2</td>
<td>Ministry of Education</td>
<td>03</td>
</tr>
<tr>
<td>3</td>
<td>Ministry of Housing and Local Government</td>
<td>02</td>
</tr>
<tr>
<td>4</td>
<td>Ministry of Finance and National Planning</td>
<td>02</td>
</tr>
<tr>
<td>5</td>
<td>Buildings Department</td>
<td>03</td>
</tr>
<tr>
<td>6</td>
<td>National Council for Construction (NCC)</td>
<td>04</td>
</tr>
<tr>
<td>7</td>
<td>Zambia Electricity and Supply Corporation (ZESCO)</td>
<td>03</td>
</tr>
<tr>
<td>8</td>
<td>Zambia Revenue Authority (ZRA)</td>
<td>04</td>
</tr>
<tr>
<td>9</td>
<td>Bank of Zambia (BOZ)</td>
<td>02</td>
</tr>
<tr>
<td>10</td>
<td>National Pensions Scheme Authority (NAPSA)</td>
<td>02</td>
</tr>
<tr>
<td>11</td>
<td>Zambia State Insurance Corporation (ZSIC)</td>
<td>02</td>
</tr>
<tr>
<td>12</td>
<td>Roads Development Agency (RDA)</td>
<td>03</td>
</tr>
<tr>
<td>13</td>
<td>National Road Fund Agency (NRFA)</td>
<td>02</td>
</tr>
<tr>
<td>14</td>
<td>National Housing Authority (NHA)</td>
<td>02</td>
</tr>
<tr>
<td>15</td>
<td>Zambia National Tender Board (ZNTB)</td>
<td>02</td>
</tr>
<tr>
<td>16</td>
<td>Zambia Institute of Architects (ZIA)</td>
<td>04</td>
</tr>
<tr>
<td>17</td>
<td>Engineering Institution of Zambia (EIZ)</td>
<td>04</td>
</tr>
<tr>
<td>18</td>
<td>Surveyors Institute of Zambia (SIZ)</td>
<td>04</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

The target population was therefore 50 for this survey.

Bartlett, et. al (2001) stated that one method of determining sample size was to specify margins of error for the items that are regarded as most vital to the survey. They further stated that for categorical data, the margin of error of 0.05 (or 5%) was a norm. Saunders et. al (2003) also supported this view by stating that researchers normally worked with a 95% level of certainty. Easterby-Smith et. al (2006) stated that Formula 1 was used for determining the sample size.
Formula 1: Sample size determination for a survey

\[ n = \frac{P(100-P)}{E^2} \]

Where: \( n \) is the sample size required, \( P \) is the percentage occurrence of the state and \( E \) is the maximum error required.

Based on Formula 1, sample sizes have been worked out taking into consideration the margins of error (Saunders et. al 2003). Table 6 is an extract of the required sample sizes for different populations and margins of error. Therefore, for a population of 50 and margin of error of 5%, the sample size is 44. Therefore, 44 was used as the sample size for this study.

Table 3.2: Sample sizes for different sizes of population at 95% certainty

<table>
<thead>
<tr>
<th>Population</th>
<th>Margin of error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>50</td>
<td>44</td>
</tr>
<tr>
<td>100</td>
<td>79</td>
</tr>
<tr>
<td>150</td>
<td>108</td>
</tr>
<tr>
<td>200</td>
<td>132</td>
</tr>
<tr>
<td>250</td>
<td>151</td>
</tr>
<tr>
<td>300</td>
<td>168</td>
</tr>
<tr>
<td>400</td>
<td>196</td>
</tr>
</tbody>
</table>

(After Saunders et. al, 2003)

Other than the survey method, the case study method was also used in this study. Three case studies were undertaken. A case study provides detailed intensive knowledge about a single case or a small number of related cases. The case studies were undertaken through analysis of documents and interviews with stakeholders of the cases involved.

The two methods, the survey and case studies, were used because they complemented each other. In undertaking a survey for this study, two research instruments were used. These were the structured questionnaire and direct interviews. The case study method was also undertaken by critically analyzing three projects. One project was completed, but not without problems. Another project had its contract terminated. The last project stalled. These three
cases enabled the researcher to gain insights on factors of procurement in construction projects in the public sector that resulted in problems in the accomplishment of the projects.

3.5 Data collection and analysis

Both qualitative and quantitative data were collected. Quantitative data was collected by the use of structured questionnaires. Qualitative data was collected from direct interviews. The case studies also provided qualitative data. Saunders et. al (2003) identified two types of data collected from quantitative methods as categorical and quantifiable data. Categorical data refer to data whose values cannot be measured numerically but can be classified into sets, categories, according to the characteristics in which the researcher is interested or placed in rank order. Categorical data is further divided into; descriptive (or nominal) data and ranked (or ordinal) data. Descriptive data is the type whose values can not be measured numerically.

In this study, ordinal data from the research questionnaire was ranked after establishing consensus. Consensus was used to describe a group’s shared feelings towards a particular issue. Tastle et. al (2005) stated that a modest extension of the consensus formula permits likert scale data to be assessed with respect to a predetermined extreme value. This measure of strength of consensus was used to rank perception. Tastle et. al (2005) provided the following formula for calculation of measure of consensus.

**Formula 2: consensus measure**

\[
\text{sCns}(X) = 1 + \sum_{i=1}^{n} P_i \log_2 \left( 1 - \frac{|X_i - 1|}{2dx} \right)
\]

Where: sCns is the percentage consensus, X is the likert scale, P_i is the probability of each X, dx is the width of X and X_i is the particular Likert attribute.

Quantitative data was collected and analysed by use of tables, graphs and charts. In the analysis of quantitative data, 50% was considered as a cut off point for any element.
The process of qualitative data analysis according to Saunders et. al (2003) involves the following activities:

- classifying data into categories;
- unitizing data. This involves attachment of ‘bits’ or ‘chunks’ data referred to as units of data to the appropriate categories;
- recognising relationships; and
- developing and testing hypotheses. As patterns are revealed and categorized within the data, hypotheses are developed. A hypothesis is defined as ‘a testable proposition’.

The appearances of apparent relationships or connections between categories were tested through the validation of the proposed model.

3.6 Validating of model

The aim of this study was to develop best practice models for the selection of consultants and contractors. Validation process for the models developed was through a questionnaire (Appendix 4). The questionnaire was pilot tested on two officers at two public institutions involved in the selection of consultants and contractors. The questionnaire was then sent to ten senior officers from different organizations involved in the selection of consultants and contractors in the public construction sector in Zambia.

3.6 Summary

In this chapter the research methods, design and strategies employed in achieving the aim and research objectives of this study were reviewed. The following research strategies were reviewed: the experiment; the survey; the grounded theory; ethnography; action research; descriptive studies, exploratory studies; explanatory studies; cross sectional and longitudinal studies; and the case study methods.

The survey and case study methods were identified as the best methods to achieve the research objectives for this study. The population of the study was determined at 50. The sample size for the study with a margin of error of 5% was determined as 44, using Table 3.2. In the analysis of quantitative data, 50% was considered as a cut off point for any
element. The percentage consensus would be calculated and used as a basis for ranking elements of different categories. In the next chapter, data collected by use of the questionnaire would be analysed and discussed.
CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Questionnaire results and analysis

4.1.1 Introduction
The research methodology, design and strategy employed in achieving the aim and objectives of this study were reviewed in chapter three. The following research strategies were reviewed: the experiment; the survey; the grounded theory; ethnography; action research; descriptive studies, exploratory studies; explanatory studies; cross sectional and longitudinal studies; and the case study methods.

The survey and case study methods were identified as the best methods to achieve the research objectives. A research questionnaire, case studies and direct interviews were the research instruments used in the collection of data. The use of the questionnaire allowed for the collection of large amounts of data from a sizeable population in a highly economical way. The three research strategies, therefore, complemented each other.

The questionnaire was piloted among four persons in three different organizations to identify any deficiencies in it. Forty four questionnaires were prepared for distribution. Of these, forty one were distributed to the stakeholders in the construction industry countrywide and 33 were returned completed. Three questionnaires could not be distributed because of failure to contact the target. The reasons for failure to respond to the questionnaire by the eight non-respondents were not given. Saunders et al (2000) stated that the response rate in research was calculated by use of formula 3.

Formula 3: Calculation of response rate

\[
\text{Response rate} = \frac{\text{total number of responses}}{\text{total number in sample} - (\text{ineligible} + \text{unreachable})}
\]

The percentage of positive respondents was therefore 80.
Baruch (1999) stated that a study was conducted to explore what could and should be a reasonable response rate in academic studies. One hundred and forty-one papers which included 175 different studies were examined. It was concluded that the average of 55.6% response rate be used as a norm for future studies. There, 80% response rate in this study was therefore acceptable.

The stakeholders who responded to the questionnaire included senior officers from government ministries and departments, quasi government institutions, engineering, architectural and quantity surveying consulting firms and contractors involved in construction projects in the public sector. The list of respondents is indicated in Appendix 1.

4.1.2 Professions in the procurement of construction projects in the public sector

Engineers, architects, quantity surveyors and procurement personnel are the main professions involved in the procurement of construction projects in the public sector. These would either represent the client, consultants or contractors.

The number of respondents in this survey according to their professions is shown in Figure 4.1.

![Figure 4.1: Number of respondents according to professions](image)

Judgmental sampling was used to target these professions directly involved in procurement of construction projects in the public sector. The results in Figure 4.1 therefore show a fair and balanced representation of all professions involved in the procurement of projects in the public sector.
4.2 Selection processes in the public sector in general

Different procurement procedures were used in the procurement of consultants and contractors in the public sector in Zambia. They included the ZNTB, the WB, the European Union (EU), the African Development Bank (ADB) and other procurement procedures of the governments of Norway, Sweden, United States of America (USA) and Japan. These were used depending on the source of the project funds.

When asked about the types of procurement procedures the respondents had been involved in, the results were as shown in figure 4.2. The respondents that had been involved with the ZNTB were 35 percent, while 28 percent were involved with the WB procedures, 16 percent with the EU procedures, 12 percent with the ADB procedures and 9 percent with other procurement procedures of the governments of Norway, Sweden, USA and Japan.

![Figure 4.2: Procurement procedures used by respondents (%)](image)

The results clearly showed that the ZNTB procedures were the most widely used procedures in the procurement of construction projects in the public sector in Zambia followed by the WB, the EU and the ADB. The results also showed that some of the main project financiers for public sector construction projects in Zambia were the government of the Republic of Zambia followed by the WB, the EU and the ADB. This was because project financiers in Zambia dictated the procurement methods to be used.
4.3 Selection of consultants

4.3.1 Factors considered important in the selection of consultants
The following factors are considered in the selection of consultants and contractors.

Technical approach and methodology
The tenderers are requested to indicate the technical approach and methodology that they would employ once awarded the tender.

Qualifications of key technical personnel
The tenderers are requested to indicate the qualifications of their key technical personnel such as the project manager, the civil/structural engineer, the mechanical or services engineer, the electrical engineer, the architect, the quantity surveyor and the technicians to be involved in the project.

Experience in relevant works
In this factor, the tenderers are requested to provide information about works relevant to the assignment at hand that the tenderers had been involved in. For example involvement in earth works if the project under consideration was for example “The construction of an earth dam”.

Specific experience of assignment
In this factor, the tenderers are requested to supply information about experience which is specific to the assignment at hand. For example, if the project under consideration was “The construction of an earth dam”, the involvement in design and construction of earth dams by the tenderer would be considered as specific experience.

History of non performing contracts
In this factor, the tenderers are requested to tabulate contracts that they had been involved that had problems of performance.

Organisation management experience
In this factor, the tenderers are requested to provide information on the projects the firms had been involved in, usually for a specified period.
Experience in relevant tasks

In this factor, the tenderers are requested to provide information if they had performed certain tasks before, which were relevant to the project at hand.

Respondents were asked to indicate what they considered as important factors in the selection of the consultants. The results are shown in Figure 4.3. Figure 4.3 also shows the consensus (sCns) among respondents. sCns is calculated by use of formula 2 provided by Tastle et. al (2005). The percentage consensus was used for ranking the factors. In Figure 4.3, A, DA, SDA and sCns stand for Strongly Agree, Agree, Disagree, Strongly Disagree and percentage consensus respectively. The same applied to Figures 4.9 to 4.24 thereafter.

![Chart showing factors in selection of consultants]

A - Technical approach & Methodology  
C - Specific experience of assignment  
E - Experience in relevant tasks  
G - Organisation management experience  
SA - Strongly Agree; A - Agree; DA - Disagree; SDA - Strongly Disagree; sCns - Percentage consensus

Figure 4.3: Factors in selection of consultants

Respondents strongly agreed that technical approach and methodology, qualifications of key technical personnel, specific experience of assignment and experience in relevant works ranked in that order were important factors in the selection of consultants by the respondents. Experience in relevant tasks was also considered important as 55 percent of the respondents stated so. Organisation management experience and history of non performing contracts were considered not important. However, when the respondents for ‘strongly agree’ and ‘agree’
were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, each of the two factors had a combined score above 50 percent, and therefore may be considered as factors in the selection of consultants, but may be given lower weightings during technical evaluation.

4.3.2 Traditional methods of selection of consultants

There are various methods used in the selection of consultants. The traditional method of procurement involves the appointment of consultants to design the works to be undertaken, production of tender documents and supervision of the works during execution. The contractors are then selected to undertake the execution of works. In the appointment of consultants in Zambia, thresholds are used to determine the method of procurement to be used. Under category C of the Purchasing and Supply Units (PSUs) in government, for example, for any tender estimated at K500million or above, it is a requirement to do a public open tender. The tender is gazetted and also floated in the press. For any tender estimated between K50million and K500million, a restricted competitive tender is undertaken, usually by short-listing a minimum of three consultants. For a tender estimated below K50million, shopping through the collection of quotations or proposals is undertaken.

When asked whether the respondents favoured the traditional methods of selection of consultants based on thresholds, 72 percent agreed while 21 percent disagreed and 7 percent did not respond. From these results, it was clear that the majority of respondents favoured the selection of consultants using traditional methods based on thresholds.

The 72% respondents who favoured the traditional method of procurement based on thresholds advanced the following reasons for favouring this method:

- 15 out of 20 (75%) respondents stated that this allowed consultants and contractors to bid according to their capacities;
- 12 out of 20 (57%) stated that certain methods required certain levels of scrutiny; and
- only 7 out 20 (36%) indicated that bids of lower value do not warranty the cost of bidding.
Other reasons given were that:

- thresholds saved time and money for contractors and consultants by not bidding for projects or tenders they could not win;
- thresholds minimised unfair competition; and
- traditional methods were backed by legal statutes.

4.3.2.1 Advantages and disadvantages of traditional procurement method

Respondents were asked to state the advantages of the traditional method of procurement. The results were as shown in Table 4.1

<table>
<thead>
<tr>
<th>ADVANTAGE</th>
<th>YES (%)</th>
<th>NO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It encourages competition among contractors</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>It discourages corruption as the process is transparent</td>
<td>86</td>
<td>14</td>
</tr>
<tr>
<td>It encourages independence of opinion of consultants</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>The same designs can be replicated and used at various sites</td>
<td>25</td>
<td>75</td>
</tr>
</tbody>
</table>

From the above results, the major advantages of traditional project procurement method were that it:

- encouraged competition among contractors;
- discouraged corruption as the process was transparent; and
- encouraged independence of opinion of consultants.
Other reasons given by respondents were that:

- it created opportunities for down stream work;
- it was used were the budget was uncertain for down stream work; and
- quality was enhanced through detailed specifications.

When further asked what respondents thought were the disadvantages of this method, the results were as shown in Table 4.2

**Table 4.2: Disadvantages of traditional procurement method**

<table>
<thead>
<tr>
<th>ADVANTAGE</th>
<th>YES (%)</th>
<th>NO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No contractor input at design stage</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Leads to adversarial relationships between consultants and contractors</td>
<td>29</td>
<td>71</td>
</tr>
<tr>
<td>Does not encourage collaboration</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>Does not encourage strategic partnership</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Tendency of the consultants to over-design</td>
<td>61</td>
<td>39</td>
</tr>
</tbody>
</table>

From the above results, the major disadvantages of traditional procurement method of construction projects were that it:

- does not encourage strategic partnerships; and
- provided an opportunity for consultants to over-design especially if their fees were percentage based.

Other disadvantages put forward by respondents were that it:

- was susceptible to corruption through connivance and cartels; and
- delayed implementation of the projects.

### 4.3.3 QCBS selection method

The QCBS method uses a competitive process among firms and takes into account the qualifications of personnel for the assignment and the cost of the services in the selection of the successful firm. Relative weights are given to both technical (quality) and cost (financial) depending on the nature of the assignment, and the firm with the highest score is awarded the tender. This is done by the use of the two envelope bidding system.
The respondents were asked to state whether they had been involved with the QCBS method of procurement of consultants. The results were as shown in Figure 4.5. The results showed that the QCBS method was a popular method of procurement of consultants.

![Figure 4.5: Results of respondents who had used the QCBS method](image)

The QCBS considered both quality and cost in the evaluation of proposals. The elements considered under the quality evaluation were the understanding of the assignment, educational background of proposed personnel, experience in relevant works, methodology, experience in relevant tasks and the work plan of how the assignment would be undertaken.

The respondents were asked what their preferred scores were under the quality (technical) evaluation of consultants. The results were as shown in Table 4.3.

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>40%</th>
<th>30%</th>
<th>20%</th>
<th>10%</th>
<th>Other</th>
<th>Modal Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the assignment</td>
<td>17</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>40%(17)</td>
</tr>
<tr>
<td>Work plan</td>
<td>8</td>
<td>14</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>30%(14)</td>
</tr>
<tr>
<td>Methodology</td>
<td>11</td>
<td>10</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>40%(11)</td>
</tr>
<tr>
<td>Education</td>
<td>15</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>40%(15)</td>
</tr>
<tr>
<td>Experience in relevant works</td>
<td>9</td>
<td>18</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>30%(18)</td>
</tr>
<tr>
<td>Experience in relevant task</td>
<td>11</td>
<td>11</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>40%, 30%(11)</td>
</tr>
</tbody>
</table>

The score with the highest number of respondents (modal analysis) was used to determine the preferred score. Seventeen out of 30 respondents preferred the 40% score for the understanding of the assignment, 15 out 29 respondents preferred the score of 40% for
education of technical personnel. Therefore, more than half the respondents preferred the score of 40% for understanding the assignment and education of technical personnel.

Eighteen out of 29 respondents preferred 30% for experience in relevant works. This was more than half of the respondents.

From the above, it could be concluded that the preferred scores for education of technical personnel and understanding of the assignment was 40% while the preferred score for experience in relevant works was 30%.

However, the results for the experience in relevant tasks indicated a tie. Eleven out of 28 each preferred 40% and 30% respectively. Therefore, 22 out 28 preferred a score of 30-40%.

Under methodology, 11 out of 30 respondents preferred the 40% score while 10 out of 30 respondents preferred the score of 30%. Therefore, 21 respondents preferred the score of 30-40%.

Under the work plan, 14 out of 29 respondents preferred the score of 30%, these were less than half of the total respondents. Six and eight respondents, respectively, preferred 20% and 40%. The score for the work plan, would therefore be subjective, but between 20% and 40%. The results in Table 4.3 therefore showed that the determination of scores was subjective. This was dependant on the assignment at hand. However, understanding of the assignment and education of professional staff should be given higher weightings followed by experience in relevant works, experience in relevant tasks and methodology. The work plan may be given a lower weighting among all the elements.

Under QCBS, the total technical and financial scores are aggregated to get the final score. Figures 4.6 and 4.7 show the results of the preferred scores by respondents for the financial and technical evaluation, respectively.
Seventeen respondents out of 26 preferred the financial score of 20-40%, while five respondents preferred the score of 40-60%, 2 respondents, each, preferred the scores of 0-20% and 60-80%. Therefore, the 20-40% score was the most preferred for financial evaluation.

No respondent preferred the technical scores of between 0-20% and 20-40%. Five out of 27 respondents preferred any score between 40 and 60% while 22 respondents preferred the score of 60-80%. Therefore, any score between 60% and 80% was the most preferred score under technical evaluation.
The summary of the preferred scores were therefore as follows:

- Financial (cost) preferred score 20-40%
- Technical (quality) preferred score 60-80%

Thus, if the technical score was determined at 80%, then the financial score would be 20%.

4.3.4 Pre-contract negotiations

Pre-contract negotiations are sometimes undertaken before a contract is finalized. Respondents were asked to state whether they favoured the conclusion of contracts being subjected to negotiation. Seventeen out of 28 respondents agreed that they favoured negotiation prior to award of contract. Three of them disagreed, while 8 did not respond.

Those that favoured negotiations in the conclusion of contracts were further asked what factors they thought should be negotiated. The results are shown in Figure 4.9. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Figure 4.8: Preference of pre-contract negotiation](image)

From the results in Figure 4.9, respondents strongly agreed that the methodology followed by the scope of work were considered important elements in pre-contract negotiation. Rates, duration of the project and technical personnel were considered not very important in pre-contract negotiation as their scores for strongly agree and agree were below 50%.
Figure 4.9: Factors considered important in pre-contract negotiation in the selection of consultants

However, when the respondents for ‘strongly agree’ and ‘agree’ were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, the three factors; rates, duration of the project and technical personnel with combined scores of 78%, 82% and 81% respectively may be considered in pre-contract negotiation. However, procurement regulations in Zambia do not allow for negotiation of rates. Therefore, only the remaining two factors should be considered for re-contract negotiation. However, the two factors, if possible should be negotiated simultaneously as they are interrelated. This meant that a change in one triggered a change in the other. For example, substitution of a highly qualified and experienced technical person with a lowly qualified one could result in low cost but extended duration of contract.

Of the three out of twenty eight respondents who did not favour the conclusion of contracts for consultants through negotiation, they put forward the following as the reasons for not favouring negotiation before the conclusion of the contract:
• it lacked transparency and was a source of corruption;
• it was against tendering procedures for public works in Zambia;
• it compromised quality, and the contractor or consultant could get away with it in case of failure; and
• it disadvantaged other bidders.

4.3.5 Poor quality works attributed to consultants

Despite the elaborate procedures in the selection of consultants, a lot of works designed and supervised by consultants have not been completed to required quality. Figure 4.10 is a summary of the analysis of results of the reasons why a lot of works designed and supervised by consultants were not completed to the required standards despite the elaborate procedures in the selection of the same consultants. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart showing percentage respondents for different reasons](chart.png)

- **A** - Low quality monitoring procedures
- **C** - Failure to enforce specifications and standards
- **E** - Corruption
- **G** - Poorly qualified consultants

SA - Strongly Agree; A - Agree; DA - Disagree; SDA - Strongly Disagree; sCns - Percentage consensus

**Figure 4.10:** Poor quality works attributed to consultants

The respondents did not overwhelming strongly agree or agree to any of the reasons in Figure 4.10. However, if the respondents for ‘strongly agree’ and ‘agree’ were added
together and compared to the sum of respondents for 'disagree' and 'strongly disagree', then, low quality monitoring procedures and failure to enforce specifications contributed to poor quality works as their combined scores were 83% and 53% respectively.

4.4 Selection of contractors

4.4.1 Factors considered important in the selection of contractors

The following factors are considered in the selection of contractors; technical qualification of key personnel, the financial capacity of the contractor, construction equipment (owned or hired), organization management experience of construction projects, relevant and specific construction experience and a history of non performing contracts that the contractor had been involved in, in the past.

Respondents were asked what they thought were important factors in the selection of contractors. The results were as shown in Figure 4.11. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

It is clear from Figure 4.11 that respondents strongly agreed that qualified technical personnel, financial capacity, experience in relevant works and organization management experience, ranked in that order, were important factors in the selection of contractors. However, construction equipment, history of non performing contracts and specific construction experience were considered not very important in the selection of contractors as the scores for 'strongly agree' and 'agree' were lower than 50%. However, when the scores for 'strongly agree' and 'agree' were added together, the combined scores were 82%, 93% and 80% respectively for the three factors. They could therefore be considered as factors in the selection of contractors, but should be given lower weightings during evaluation.
4.4.2 Use of NCC register for shortlisting contractors

The NCC was established to register and regulate all contractors in the Zambian construction industry. The NCC grades the contractors in categories according to their capacity and specialisation.

When asked as to whether respondents felt contractors were registered according to possessed capacity, 68% agreed and 32% disagreed. Respondents were further asked whether the register at NCC could be successfully used for short-listing of contractors. Sixty eight percent (68%) agreed while 32% disagreed. From these results, it can be concluded that contractors were registered at NCC according to capacity and graded accordingly and that the register at NCC could be used to shortlist contractors. The NCC register could therefore be used by any institution to shortlist contractors for construction projects.

The 32 percent respondents who stated that contractors were not registered according to possessed capacity were further asked to give reasons. Figure 4.12 shows the reasons why the
32 percent respondents thought contractors were not registered at NCC according to possessed capacity. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart showing percentage of respondents for different categories]

- A - Construction equipment not belonging to firm are registered as belonging to the firm
- B - Technical personnel not belonging to firm are registered as belonging to the firm
- C - Poor monitoring and inspection by NCC to confirm capacity of contractors
- D - Exaggeration of experience by firms

SA - Strongly Agree; A - Agree; DA - Disagree; SDA - Strongly Disagree; sCns - Percentage consensus

**Figure 4.12:** Analysis of capacities of contractors registered with NCC

The results above show that cheating by some contractors on registration with NCC was a major problem. Some contractors cheated on actual technical personnel and equipment they possessed and they exaggerated their experience. The respondents also indicated that the NCC had poor monitoring and inspection procedures that resulted in contractors being registered and graded as possessing certain capacity, when in fact they did not.

### 4.4.3 Reasons for failure to complete projects to required satisfaction

Selection of contractors in the public construction sector in Zambia from funds made available by the government of the Republic of Zambia was done according to the ZNTB procedures. These are prescriptive procedures according to thresholds and prevailing situation. Despite the elaborate procedures in the selection of contractors, many construction projects have not been completed to satisfaction. Figure 4.13 shows the results of what the respondents considered as factors contributing to failure in completing projects to required...
satisfaction by contractors despite the elaborate ZNTB procedures. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Figure 4.13: Contributing factors to unsatisfactory completion of projects](image)

A - Poor supervision  B - Lack of proper equipment  C - Lack of qualified and experienced technical staff  
D - Competitive bidding led to under quoting  E - Poor specifications  F - Poor designs  
G - Corruption  H - Non involvement of contractors at design  
SA - Strongly Agree; A - Agree; DA - Disagree; SDA - Strongly Disagree; %Cns - Percentage consensus

From the results in Figure 4.13, respondents strongly agreed that poor supervision contributed to projects not being completed to satisfaction despite the elaborate ZNTB procedures in the selection of contractors. Lack of proper equipment and lack of qualified and experienced technical staff also contributed to projects not being completed to satisfaction. However, if the results of the respondents for 'strongly agree' and 'agree' were aggregated, then corruption and the fact that competitive bidding led to under quoting, with combined scores of 56 and 68 percent, respectively, also contributed to projects not being completed to satisfaction.

4.5 EU procedures

EU procedures emphasised on post contract assessment. Respondents were asked what they considered as the advantages of post contract assessment. Figure 4.14 is the summary of the analysis of results of the advantages of post contract assessment. Formula 2 was used to calculate percentage consensus for the purpose of ranking.
Figure 4.14: Advantages of post contract assessment

From the results in Figure 4.14, the following, in the same ranked order, were considered as the advantages of post contract assessment: it was used for rating of contractors and consultants for future contracts, to evaluate problems encountered in the project and propose solutions for future projects; and to provide feedback on performance of contractors and consultants. The reason that post contract assessment was used as basis for establishment of long-term relationships had a combined score for ‘strongly agree’ and ‘agree’ of 77 percent. This also showed that it was also considered one of the advantages for post contract assessment.

4.6 Project Partnering

Project Partnering is defined as a commitment by all parties in a project regardless of size to a long-term relationship based on clear, mutually agreed objectives. When asked whether the respondents had ever been involved in project partnering, 19 out of 28 (68%) respondents disagreed, seven (25%) agreed while two (7%) did not respond. This showed that project partnering had not taken root as a popular project procurement method in Zambia.
4.6.1 Benefits of project partnering

Respondents were further asked what they thought were the benefits of project partnering. The results were as shown Figure 4.16. Formula 2 was used to calculate percentage consensus for the purpose of ranking.
From the results in Figure 4.16, 52 percent of the respondents strongly agreed that the benefit of project partnering was that firms involved had shared goals. Sixty four percent also agreed that project partnering allowed for joint participation in design and construction. The other reasons of increased quality, reduced cost of project, economies of scale, reduced project time and reduced inventory could also be considered benefits of project partnering in that order as their respective combined scores for ‘strongly agree’ and ‘agree’ of 80%, 70%, 74%, 76% and 60% were above 50%.

One of the disadvantages of traditional method is that it does not encourage and promote strategic partnerships and instead promote one-off adversarial relationships. This had an adverse effect of affecting productivity. When the respondents were asked whether project partnering could improve productivity of construction projects, 78% agreed, 11% did not agree and 11% did not respond.

![Figure 4.17: Whether project partnering can improve productivity](image)

### 4.6.2 Reasons for failure of project partnering in general

The respondents were asked what they thought were the reasons for failure of project partnering in general. The results were as shown in Figure 4.18. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

Respondents did not overwhelmingly strongly agree with any of the reasons for failure of project partnering. Respondents, however, agreed that lack of trust, lack of total quality commitment, corporate culture differences, lack of benefits or risk sharing, lack of benefits or risk sharing, poor upfront planning and lack of shared goals were reasons for failure of project partnering in general.
If the scores for ‘strongly agree’ and ‘agree’ were added together, then the other reasons of poor communication, lack of strategic direction, lack of policy, top management differences, lack of legal framework and distance barriers with respective combined scores of 83%, 78%, 73%, 69%, 70% and 60% also contributed to failure of project partnering in general.

![Bar Chart]

Figure 4.18: Reasons for failure of project partnering

4.6.3 Problems that hindered project partnering in Zambia

Respondents were further asked what they considered to be the problems that hindered project partnering in Zambia. The results are shown in Figure 4.19. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

From the results in Figure 4.19, respondents did not overwhelmingly strongly agree to any of the reasons. However, 52%, 60%, 53% and 52% respondents agreed, respectively, that
contractual problems between partners, complacency through uncompetitive practices, lack of confidentiality and failure to agree on separation (termination) plan hindered project partnering in Zambia. The combined scores for 'strongly agree' and 'agree' for the reasons that 'the project method is not known' and 'the fear of domination of one partner by another' were 69% and 86% respectively. Therefore, they could also be considered as factors that hindered project partnering in Zambia.

![Graph showing percentage of respondents for various reasons]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>44</td>
<td>43</td>
<td>18</td>
<td>42</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>52</td>
<td>63</td>
<td>60</td>
<td>27</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>DA</td>
<td>4</td>
<td>10</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>SDA</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>12</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>sCns</td>
<td>83</td>
<td>77</td>
<td>68</td>
<td>68</td>
<td>63</td>
<td>60</td>
</tr>
</tbody>
</table>

A - Contractual problems between partners  
B - Fear of domination of one partner by another  
C - Complacency through uncompetitive practices  
D - The project method is not known  
E - Lack of confidentiality  
F - Failure to agree on separation (termination) plan  
SA - Strongly Agree; A - Agree; DA - Disagree; SDA - Strongly Disagree; sCns - Percentage consensus

**Figure 4.19: Problems that hinder project partnering in Zambia**

### 4.7 Public-Private Partnership (PPP)

A Public-Private Partnership (PPP) is defined as a contractual agreement between a public agency and a private sector entity. Through this agreement, the skills and assets of each sector public and private are shared in delivering a service or facility for the use of the general public.
4.7.1 Involvement of respondents in PPPs

Respondents were asked to state the PPPs they had been involved in. The summary of the analysis of results of the involvement of respondents in PPPs were as shown in Table 4.4.

Table 4.4: Types of PPPs undertaken by respondents

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>More than once (%)</th>
<th>Once (%)</th>
<th>Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Build</td>
<td>50</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>Design, Build, Operate and Transfer</td>
<td>10</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Design, Build, Transfer and Operate</td>
<td>0</td>
<td>5</td>
<td>95</td>
</tr>
<tr>
<td>Build, Lease, Operate and Transfer</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Lease, Upgrade, Operate and transfer</td>
<td>0</td>
<td>8</td>
<td>92</td>
</tr>
</tbody>
</table>

From the results in Table 4.4, it was clear that only the Design and Build (D&B) procurement method had been used by more than 50% of the respondents, more than once. The second most popular was the Design, Build, Operate and Transfer. However, this method was not popularly used in Zambia as only 25% of the respondents had used it before.

4.7.2 Hindrances to PPPs in Zambia

Respondents were asked what they thought were the hindrances to PPPs in Zambia. The summary of the responses were as shown in Table 4.5.

Table 4.5: Hindrances to PPPs in Zambia

<table>
<thead>
<tr>
<th>Hindrance</th>
<th>YES (%)</th>
<th>NO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of political will</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Lack of public sector involvement</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Bureaucratic procedures</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>Failure to plan for the PPPs</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>The economy is not big enough to support some PPPs</td>
<td>36</td>
<td>44</td>
</tr>
</tbody>
</table>

From the results, the respondents cited the following as hindrances to PPPs in Zambia:

- lack of political will;
- lack of public sector involvement; and
- bureaucratic procedures.
Other reasons cited by respondents were that:

- no legal or policy framework had been established by government;
- few people understood the concepts and that the same few who understood the concepts lacked the will to share with others; and
- it was a new concept in Zambia.

4.8 Role of procurement in the execution of works

Procurement plays a role from the appointment of consultants and contractors to the post contract assessment. Respondents were asked whether procurement played a role during execution of works in the management of project costs, management of quality, management of contracts and post contract management. The summary of the analysis of results were as shown in Figure 4.20. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart](image)

**Figure 4.20:** Roles of procurement in the execution of works

From the results in Figure 4.20, respondents strongly agreed that procurement played a role in the execution of works in management of project costs, management of quality, management of contracts and post contract management.
4.9 Causes of project overruns

Most projects overrun on time and cost. Causes of the overruns could be attributed to the contractors, consultants, the client or even external factors. When asked what they thought were the causes of these overruns on projects, the respondents answered as shown below.

4.9.1 Causes of projects overruns by contractors

The summary of the analysis of results of the causes of overruns by contractors were as shown in Figure 4.21. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart showing percentage respondents for various causes of project overruns]

**Figure 4.21:** Causes of projects overruns by contractors

From the results in Figure 4.21, 58 percent respondents strongly agreed that poor skills of technical personnel were a major cause of project overruns. However, when the respondents for ‘strongly agree’ and ‘agree’ were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, poor planning, poor management of materials on
site, financial problems, shortage of labour on site and lack of coordination on site were factors that contributed to project overruns with combined percentage scores of 95%, 60%, 60%, 50% and 50% respectively.

4.9.2 Causes of projects overruns by consultants

The summary of the analysis of results of the causes of overruns by consultants were as shown in Figure 4.22. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart showing causes of project overruns by consultants]

**Figure 4.22: Causes of project overruns by consultants**

From the results in Figure 4.22, there was no overwhelming reason given by the respondents as the main cause of overruns by consultants. However, when the respondents for ‘strongly agree’ and ‘agree’ were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, only delays and slow decision making on the part of consultants and poor monitoring and control methods with aggregated percentage scores of 61% and 63%, respectively, were causes of project overruns by consultants.
4.9.3 Causes of projects overruns by clients

The summary of the analysis of results of the causes of overruns by clients were as shown in Figure 4.23. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

![Bar chart showing causes of projects overruns by clients]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>67</td>
<td>41</td>
<td>25</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>A</td>
<td>30</td>
<td>31</td>
<td>25</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td>DA</td>
<td>3</td>
<td>21</td>
<td>32</td>
<td>31</td>
<td>24</td>
</tr>
<tr>
<td>SDA</td>
<td>0</td>
<td>7</td>
<td>18</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>sCns</td>
<td>89</td>
<td>71</td>
<td>55</td>
<td>55</td>
<td>49</td>
</tr>
</tbody>
</table>

A - Delayed payments  B - Constant change of project specifications
C - Delays and slow decision making  D - Lack of coordination with consultants  E - Lack of working knowledge
SA - Strongly Agree  A - Agree  DA - Disagree  SDA - Strongly Disagree  sCns - Percentage consensus

Figure 4.23: Causes of project overruns by clients

From the results, 67 percent of the respondents strongly agreed that delayed payments were a major cause of project overruns by clients. However, when the respondents for ‘strongly agree’ and ‘agree’ were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, the other reasons, namely: constant change of project specifications; delays and slow decision making; lack of coordination with consultants and lack of working knowledge in that order, with summed percentage scores of 72%, 50%, 51% and 52% respectively also contributed to project overruns by clients.
4.9.4 Causes of projects overruns by external factors

The summary of the analysis of results of the causes of overruns by external factors were as shown in Figure 4.24. Formula 2 was used to calculate percentage consensus for the purpose of ranking.

From the results in Figure 4.24, there was no overwhelming reason given by the respondents as the main cause of overruns by external factors. However, when the respondents for ‘strongly agree’ and ‘agree’ were added together and compared to the sum of respondents for ‘disagree’ and ‘strongly disagree’, then, only poor economic conditions such as inflation and currency fluctuations, with summed percentage score of 51 percent was a main cause to project overruns by external factors.

![Figure 4.24: Causes of project overruns by external factors](image-url)

- A - Poor economic conditions (inflation, currency fluctuations, etc)
- B - Lack of materials on the market
- C - Lack of tools and equipment on the market
- D - Delays in obtaining permits from public agencies
- E - Change in Regulations (e.g. Tax Regulation, Environmental Regulations, etc)
- F - Poor weather conditions
- G - Poor site conditions

SA - Strongly Agree; A – Agree; DA – Disagree; SDA – Strongly Disagree; sCons – Percentage consensus
4.10 E-procurement

E-procurement is defined as the combined use of Information and Communication Technology (ICT) through electronic means to enhance external and internal purchasing and supply management processes. It is a business to business purchase and sale of supplies, works and services over the internet.

Respondents were asked whether they knew what e-procurement was in procurement of construction projects, 53% agreed, 36% disagreed while 11% did not respond. From these results, it showed that the majority of the respondents knew what e-procurement was in relation to construction projects.

Figure 4.25: Knowledge of e-procurement among respondents

When further asked whether they had ever used e-procurement tools in procurement of construction projects, 89 percent of the respondents stated that they had never used e-procurement in procurement of construction projects. Four (4) percent said they had used e-procurement before, while 7 percent did not respond. From these results, it was clear that e-procurement was not a common method of procurement for construction projects in Zambia.
4.10.1 Advantages of e-procurement
Respondents were asked to state what they considered as the advantages of e-procurement in procurement of construction projects. They stated that, it:

- could be used to communicate with contractors in remote areas;
- enabled access to wider market and global contractors and consultants;
- reduced cost of procurement;
- allowed for easy audit trail of construction projects;
- enabled quicker access to information for various needs; and
- reduced on malpractices which occurred through human handling.

4.10.2 Disadvantages of e-procurement
Respondents were further asked to state what the disadvantages of e-procurement in procurement of construction projects were. The following three reasons were put forward.

(a) Difficult to assess quality of contractors or consultants
This was true for contractors who were not registered with a regulatory body, such as the NCC. However, for contractors registered with regulatory bodies, this was easy to check.
(b) **It eliminated smaller contractors with no capacity in ICT**
This was true to some areas not covered by the internet. However, with the availability of internet on mobile phones by vendors such as Celtel in Zambia, access to internet is assured. However, smaller contractors may not have the actual capacity to use the internet.

(c) **May not promote transparency as there would be no witnesses to the process**
Public tender opening allows contractors’ representatives to witness the tender opening. Provisions are made to stamp all the tenders and to sign on the bid form. E-procurement may not provide such checks.

4.11 **Summary**
In this chapter, the statement of results and analysis of results was presented. The response rate of respondents of 80 percent was considered acceptable. The results from the factors considered important in the selection of consultants and contractors were analysed. The results from respondents on the different procurement procedures in the public construction sector and the causes of project overruns in the public sector in Zambia were also analysed. Results on use of e-procurement in Zambia were also elaborated. In the next chapter, three case studies will be reviewed.
CHAPTER FIVE
CASE STUDIES

5.1 Introduction
In the previous chapter, the statements of results and analysis were presented. The response rate of respondents was 80 percent which was considered acceptable. The results of the factors considered in the selection of consultants and contractors were analysed. The results of the different procurement procedures and the causes of project overruns in the public sector in Zambia were also analysed.

In this chapter, three case studies would be reviewed. The case studies involved three projects. One project, the installation of security systems at National Assembly, was completed, but not without problems. The second project, the construction of Katima Mulilo border facilities, had its contract terminated. The last project, the construction of the Visitors and Media centre at National Assembly, stalled. These three cases enabled the researcher to gain insights on factors of procurement in construction projects in the public sector that resulted in problems in the accomplishment of the projects. Two case studies from one institution were used because the researcher was denied access to project records in other institutions apart from the National Assembly of Zambia and Zambia Revenue Authority (ZRA).

5.2 Case study – Construction of Katima Mulilo border facilities
This project was reported in the Auditor General’s report of 2005. The project was supervised by the Buildings Department of the Ministry of Works and Supply. The construction of the Katima Mulilo Border infrastructure was commissioned in 2004 in order to provide an efficient flow of people and enhance socio-economic cooperation between Zambia and Namibia that share the boundary at this point.

5.2.1 Appointment of consultants
The initiation of this project was done by ZRA. A request for Expression of Interest (EoI) was done by the Zambia Revenue Authority. At that time, ZRA was the client, project
financier and major end user. RFPs were sent to the shortlisted consultants. The following
consultants were then appointed through this competitive tender process:

Nkole Bwalya and Associates
North Atlantic Engineering
Kiran Musonda and Associates
Comark

Lead consultant;
Electrical consultants;
Structural Engineers; and
Quantity Surveyors.

The fees for the consultants were as follows:
- Architects 6%;
- Engineers 3%; and
- Quantity surveyors.

The consultants were paid in time by ZRA. The consultants performed their duties very well,
in line with the agreed Terms of References. At the end of the design phase, the consultants
prepared the construction drawings and tender documents and handed them over to ZRA in
readiness for the appointment of the contractor. The cost estimates for the construction of the
works were not prepared. This was to safeguard leakage of information to tenderers.

5.2.2 Relationship between the Client and the Consultants
The relationship between the consultants and the client (ZRA) was good during the design
phase of the contract. The contract for the design phase was concluded without any major
problem and on time. The contract was executed on time and the client honoured its
obligations. During this phase, there were no major disputes requiring external resolution.

5.2.3 Appointment of the contractors
The tender for the appointment of the contractor was advertised in the press by the ZNTB.
The project was also transferred to Buildings Department to act as client on behalf of the
government of the Republic of Zambia. This was because this was considered a public
project that was to service other government agencies such as the Immigration Department,
the Drug Enforcement Commission, the Zambia Police and ZRA. ZRA as the major end user
was co-opted in the project team at Buildings Department.
The tender was open to contractors in grade five (5) of the NCC register. After the bids were opened, the consultants undertook the evaluation and recommended the preferred contractor. Fair Face Contractors was recommended by the consultants as the most competitive bidder. The bid by Fair Face Contractors was the third lowest in price in comparison to other bids.

When Buildings Department, through the Ministerial Tender Committee, reviewed the evaluation report from the consultants, they instead proposed and recommended Yangts Jiang Enterprise as the most competitive bidder. Yangts Jiang Enterprise submitted the second lowest bid on price. The recommendations were sent for approval to the ZNTB. However, after reviewing the evaluation report from Buildings Department, they also changed the recommendation and approved the lowest priced contractor, a Joint Venture between Nanshinga Construction Company Limited and Emsworth Investments Limited.

On 29th November 2004 the ZNTB conveyed its authority to the Buildings Department to award the contract to Nanshinga Construction Company Limited /Emsworth Investments Limited (joint venture) for the construction of the border facilities at Katima Mulilo Border Post at a contract price of K14,561,051,235 inclusive of VAT, with a completion period of fifty (50) weeks. The contract was signed on 20th December 2004 and was to start on 7th February 2005 and end on 23rd February 2006.

The consultants and Ministerial Tender Committee found the bid by Nanshinga / Emsworth Joint Venture non responsive due to the fact that one of the contractors in the joint venture, Emsworth Investments Limited, was in a lower category of contractors on the NCC register as opposed to grade five (5), specified in the tender document. The Auditors General’s report therefore, considered the awarding of the contract to Nanshinga/Emsworth Joint Venture as irregular.

The scope of works comprised the construction of one (1) office block, two (2) guard houses, external works, drive ways, car park, boundary walls, storm water drainage and water reticulation, among others.
5.2.4 Funding of the project

In 2004 and 2005, provisions were made in the estimates of revenue and expenditure projects as shown in Table 5.1.

<table>
<thead>
<tr>
<th></th>
<th>Provision (ZMK)</th>
<th>Releases (ZMK)</th>
<th>Variance (ZMK)</th>
<th>% Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>3,060,180,000</td>
<td>2,049,159,794</td>
<td>1,011,020,206</td>
<td>33</td>
</tr>
<tr>
<td>2005</td>
<td>5,566,785,000</td>
<td>1,450,000,000</td>
<td>4,116,785,000</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>8,626,965,000</td>
<td>3,499,159,794</td>
<td>5,127,805,206</td>
<td>59</td>
</tr>
</tbody>
</table>

Note: ZMK – Zambian Kwacha

Source: Auditor General’s report (2005)

As can be seen from the Table 5.1, the project was under funded due to inadequate provisions and releases. In particular the release of only K3,499,159,794 against the provision of K8,626,965,000 was less by K5,127,805,206. Further a comparison of the total releases against the contract price of K14,561,051,235 revealed a short fall of K11,061,891,441 or 76%.

5.2.5 Contract arrangements

The following were the contract arrangements:

- Buildings Department acted as the client on behalf of the government of the Republic of Zambia. ZRA was co-opted into the project team at Buildings Department;
- The Clerk of Works on site was an employee of the government under the Buildings Department and was reporting to the consultants on this project;
- The Consultants reported to the client and were supervising the contractor; and
- The Contractor (joint venture) was reporting to the consultants.

This was a typical arrangement of contract in the traditional procurement method of construction projects in the public sector.
5.2.6 Progress on site

The Ministry paid the contractor a total sum of K3,045,000,000 comprising an advance payment of K2,200,000,000 and K1,045,000,000 towards interim payment certificates issued by the contractor. The progress report produced on 9th May 2005 revealed that the value of executed works amounted to only K950,977,088 despite the advance payment of K2,200,000,000 paid to the contractor in January 2005, sixteen (16) weeks after the advance payment had been made.

A site inspection carried out in February 2006 revealed that despite the contractor having been on site for more than fifty (50) weeks (the full contract period) only earth works had been done. This showed that there absolutely little progress on site.

The following were put forward as the major reasons for slow progress on site.

(a) Capacity of the contractor

The capacity of the contractor for the works was low. He did not have the necessary equipment and tools on site. For example it took so much time to set out the buildings because of non provision of necessary tools on time. Further, the person appointed by the contractor as the Site Engineer was rejected by the consultants. This was because he had a history of poor performance on previous projects supervised by the same consultants. The contractor prevailed and the result was that coordination on site was poor.

(b) Relationships between the contracting parties

The relationships between the consultants and the Buildings Department and between the consultants and the contractor were not good. Buildings Department was expected to act as a client, however, Buildings Department through its actions assumed the role of the supervisor of the contractor. There was a lot of interference in the supervision of the contract. The following acts show the relationship of the contracting parties on the project:

- when the consultant requested the contractor to provide the insurance cover for the works, the contractor resisted and Buildings Department supported him. The insurance cover for the works were never provided;
• the contractor as a requirement in the contract provided the advance and performance bonds drawn from the insurance company. The consultants refused to accept the bonds and requested the contractor to obtain the bonds from a reputable bank. Buildings Department prevailed over the matter and the bonds were subsequently admitted as part of the contract, thus increasing the risk on the project;

• the interim certificates for the consultants and the contractor were submitted at the same time. However, the contractor's certificates were honoured in time and those of the consultants were not. This resulted in Kiran Musonda and Associates, the structural engineers, to withdraw from the contract;

• the Buildings Department as a client was issuing instructions directly to the contractor. The contractor also started communicating directly to Buildings Department. This isolated the consultants;

• the contractor was requested to furnish the consultants with the expenditure schedule of the money advanced to the contractor and how the money was utilized. The consultants were performing this role within the contract. The contractor refused and Buildings Department intervened; and

• the Clerk of Works was half of the time drunk. It was difficult to remove him from site. This was because he was an employee of the Buildings Department and therefore paid more allegiance to Buildings Department instead of carrying out the instructions from the consultants.

5.2.7 Contractor's actions
The contractor had only done work worth K950,977,088 despite the advance payment of K2,200,000,000 paid in January 2005 and K1,045,000,000 interim payment certificates honoured by February 2006 at the end of the contract. The Auditor General reported the anomaly. The contractor (Joint Venture), looking at the challenges they faced decided to go into voluntary liquidation.

5.2.8 Performance of the contractor on another contract
Nashinga Construction Company was engaged by the government of the Republic of Zambia, through the Ministry of Education, School Infrastructure section to construct seven
schools in eastern province at a contract sum of US$983,661.58. The project was funded by the African Development Bank. The project commenced on 1\textsuperscript{st} March, 2004 and scheduled to be completed in 31\textsuperscript{st} October, 2004. The completion period was revised to 28\textsuperscript{th} February, 2005. Payments were done on schedule. There was slow progress at six sites. The contractor did not have a presence at one of the sites. The contractor did not also have qualified and experienced personnel on all the sites. The contractor lacked adequate equipment on site. The contractor therefore had no capacity to undertake works simultaneously at seven sites.

The slow progress on site led to adversarial relationship with the Project Manager at the Ministry of Education. The contract was finally terminated on 28\textsuperscript{th} February, 2005 for non performance. At the time of termination, only the substructure works were in progress at six sites. No progress was recorded at one of the sites.

5.2.9 Analysis of problems
The following were considered to have contributed to the unsuccessful completion of the construction of border facilities at Katima Mulilo.

(a) Appointment of contractor
There seemed to have been no clear guidelines for the selection of the contractor in the tender document. This resulted in changes at every stage of evaluation and review of the evaluation. A clearly defined evaluation criteria in the tender document, is therefore, very important. It should not be assumed.

(b) Contract arrangements
The reporting structures for the project were not clear. The client (Buildings department) started issuing instructions to the contractor instead of the consultants. This resulted in the contractor paying more attention to the client and neglecting the instructions from the consultants.
The Clerk of Works did not also execute his duties effectively because half of the time he was drunk. He also paid more attention to Buildings Department than to the consultants because he was an employee of Buildings Department.

The overpayment in the interim certificate of K1,045,000,000 contrary to the amount of work done (K950,977,088) also raises questions on the role of the quantity surveyor in the consultancy team. It shows that no physical verification was done on site before recommending for this payment.

(c) Capacity of the contractor
The contractor had no capacity. Both the general and site management of the project was poor. In fact, one of the contractors was registered in a lower category than what was required.

5.3 Case study – Installation of security systems at the National Assembly of Zambia
5.3.1 Introduction
The installation of security systems at the National Assembly of Zambia was undertaken at the time Lusaka was facing instability because of a spate of bombings on strategic public buildings in 2002.

5.3.2 Appointment of consultants
There were no consultants appointed on this project to undertake the designs and production of tender documents.

5.3.3 Appointment of the contractor
The appointment of the contractor was done without following laid down tender procedures. The contractor was written to in February 2002, to inspect the facilities and commence the works immediately. The contractor complied. No documentation between the client, National Assembly of Zambia, and the contractor, DCS Holdings Limited, such as the contract, schedule of works, project arrangements and payment terms were put in place. The cost of the initial works was US$430,000. These works were not budgeted for. The works involved:
• construction of the boundary wall fence;
• access control installations;
• electric fencing; and
• electronic gates and doors;

As pointed out above, no designs for the project were done. Therefore, there were no drawings and no specifications were provided for the materials and equipment to be installed. The contractor was doing the sketches as the works progressed.

In 2003, efforts were made to seek retrospective approval from the ZNTB to regularize the contract by National Assembly. The ZNTB refused to grant retrospective approval and referred all matters to the Auditor General’s office. In refusing to grant approval, the ZNTB stated that they noted that the contractor was engaged in an irregular manner that lacked transparency as competitive procedures were not followed.

5.3.4 Contract (project) arrangements
Initially the contractor was reporting to the Chief Executive Officer. However, at a later stage, the supervision of the contractor was transferred to the Security Department. The person appointed as project manager for the project did not have project or contract management knowledge and experience. He also did not have the technical know how. The lack of project management skills on the part of the project manager resulted in the escalation of the project costs to more than US$1million mainly as a result of unapproved variations.

5.3.5 Project implementation
The execution of the project was poor. It was on and off. For example, the wall fence took more than four years to complete. The different components of the security system were not scalable and therefore any future expansion would require a complete design of the new system. The rate of failure of equipment was high. An inventory of the installation was only done fours years after installations were completed. The project also experienced a high turnover of staff.
5.3.6 Analysis of problems
Failure to follow procurement procedures in the management of the project was evident in the execution and output of the project. The project attracted audit queries from the Auditor General’s office. It was also debatable if the National Assembly of Zambia got good value for money.

5.4 Case study – Construction of Visitors and Media Centre at the National Assembly of Zambia

5.4.1 Introduction
The National Assembly embarked on a project to construct the Visitors and Media Centre. The purpose of undertaking the project was to provide a facility where visitors to the National Assembly could be served with information about parliamentary work. The facility was also intended to provide media services to journalists covering parliamentary activities within the parliament grounds. The main objective was to increase the number of visitors to Parliament and also to increase public awareness on the proceedings at parliament.

The target audience/beneficiaries for this facility were ordinary Zambians, students, other stakeholders as well as media practitioners interested in following the proceedings of the National Assembly in its legislative and oversight functions.

5.4.2 Appointment of the consultant
The appointment of consultants was done by a shortlist of nine consultants. A pre-bid meeting was held to clarify any queries with regard to the RFPs. The QCBS method was used for the selection of the consultants. PJP Associates were selected as the Lead Consultant. Other members of the consultancy team were Civilstruts Consulting Engineers, DH Engineering Consultants and Peter Richards International.

Negotiations were held to clearly understand the Terms of Reference and to streamline the methodology and work plan. A contract was then drawn and signed in November, 2004 for a period of 13 weeks, at a contract sum of US$16,804.06.
5.4.3 Funding arrangements
The design of the facilities including the production of tender documents of the project was funded by PACT Zambia. The government of the Republic of Zambia was to finance the construction of the project.

5.4.4 Execution of the project
The consultants completed the designs and tender documents on schedule in February, 2005. The designs and tender documents were approved. However, the project stalled because the government did not fund the construction of the facility. To date, no funds have been made available for the construction of the Visitors and Media Centre. Long et. al (2004) stated that the project success factors in large construction projects were a competent project manager, adequate funding until project completion, competent and committed project team and availability of resources. Adequate funding in this case was lacking.

5.4.5 Analysis of the main problem of the project
This case study showed the importance of provision of a dedicated budget or funding of the projects to ensure successful completion. Many projects have been started in similar manner in the past but abandoned along the way. Examples include the construction of the Hospital in Chinsali which was started in the 1970s, but to date has not been completed.

5.5 Summary
In this chapter, three case studies were undertaken. The case studies involved three projects. One project, the installation of security systems at National Assembly was completed, but not without problems. The second project, the construction of Katima Mulilo border facilities, had its contract terminated. The last project, the construction of the Visitors and Media centre at National Assembly, stalled. These three cases enabled the researcher to gain insights on problems related with procurement of construction projects in the public sector.

In the next chapter an e-procurement model would developed and validated as a best practice model.
CHAPTER SIX
E-PROCUREMENT MODEL AND ITS VALIDATION

6.1 Introduction
In the previous chapter, three case studies were undertaken. The case studies involved three projects. These three cases enabled the researcher to gain insights on problems related with procurement of construction projects in the public sector. From chapters four and five, it was deduced that the traditional method of procurement was still the most preferred method of procurement of consultants and contractors. It was further deduced that the NCC register could be successfully be used to shortlist contractors in the public sector. It was also deduced that pre-contract negotiation was important in the selection of consultants while post contract assessment was important after completion of the construction projects. It was further indicated that although e-procurement was not commonly used as a procurement method for construction projects in Zambia, it could improve on efficiency and cost of procurement of construction projects.

In this chapter, an e-procurement model would be developed, taking into consideration the research findings in chapters four and five. The validation process for the model is also described in this chapter. The activities involved would be described by numbers as they appear in the model.

6.2 E-procurement model
The aim of this study was to develop best practice models for the selection of consultants and contractors. The purpose of developing these best practice models was to suggest ways so that the process of procurement of construction projects in the public sector in Zambia:
- was cost effective and efficient;
- was transparent and fair to all stakeholders;
- increased productivity through the improvement of management of labour and resources;
- improved quality through innovation and flexibility in service delivery; and
- that it was user friendly.
From the findings, e-procurement provided the following benefits: quickens the procurement process and improves efficiency; could be used to communicate with contractors in remote areas, provided access to wider market and global contractors and consultants, reduced cost of project procurement, provided easy audit trail of the procurement process, provided quick access to information for various needs and reduced on malpractices which occur through human handling. It could therefore be deduced from these findings that a model based on e-procurement could bring about efficiencies in cost and time, transparency, increased productivity and quality.

From the research findings, the traditional method of procurement was still favoured for the selection of consultants and contractors in the public construction sector in Zambia by the majority of respondents to this study. PPPs and project partnering were however, not commonly used methods of procurement for construction projects in the public sector in Zambia. The concept of PPPs was new in Zambia and the government had just completed the process of consultation with stakeholders in 2007 with a view of enacting a Bill for the regulation of PPPs in Zambia. PPPs allow governments to have access to private resources to develop infrastructure. Seventy eight (78) percent of the respondents also stated that project partnering could improve productivity of construction projects.

The selection of the private partner by the public partner in a PPP could be done in similar manner as for the selection of a contractor in the traditional method of procurement.

Humphreys et. al (2000) stated that sub-contractors and suppliers are playing an important role in construction projects and that it is not uncommon for as much as 90 percent of a project to be undertaken by subcontractors. The result of this increased involvement is that main contractors are now concentrating their efforts on managing sub-contractors rather than employing direct labour. This shifts the selection criteria for the main contractor from an executioner to a manager. The main contractor in this case is a professional service provider consisting of architects, engineers, planners, surveyors, project managers, contract managers, estimators and buyers responsible for planning, organizing, directing and controlling of projects rather than the physical construction. The selection of consultants and sub-
contractors in this case is the responsibility of the main contractor. The selection of the main contractor can therefore be undertaken using the traditional method of procurement.

It can therefore be deduced that:

- a model based on e-procurement tools could be used as a best practice model;
- this best practice model should be user friendly for use by accommodating the traditional method of procurement, PPPs and project partnering.

From these findings it can be stated that a model based on e-procurement tools could bring about best practice in the selection of consultants and contractors. This best practice model should be able to accommodate the traditional method of procurement, PPPs and project partnering.

The e-procurement model, Figure 6.1, was therefore developed as the best practice model for the selection of consultants and contractors in the public construction sector in Zambia.

6.3 Explanation of the model

An electronic hub is established for receiving and distribution of tenders at ZNTB. It is proposed that the list of registered members by NCC be used in the selection of contractors. The Zambia Institute of Architects, Engineering Institution of Zambia and the Surveyors Institute of Zambia are affiliated to the NCC. The list of registered members of the Zambia Institute of Architects, Engineering Institution of Zambia and the Surveyors Institute of Zambia can therefore be used in the selection of consultants.

The ZNTB provide Identification Numbers and Pass Words to registered consultants and contractors. The ZNTB also provide the purchasers (ministries and public institutions) with Identification Numbers and Pass Words.
Figure 6.1: E-procurement model for the selection of consultants and contractors
For informal tenders, purchasers send the tender documents electronically to the electronic hub at the ZNTB together with the proposed shortlist. The tender documents are then redistributed to the shortlisted consultants or contractors electronically by ZNTB. The eligible consultants and contractors are also able to view the tenders on the ZNTB hub.

For NCB formal tenders, the same process as above is followed. But in this case, the purchaser indicates the category for contractors or consultants. The grade is also included in the selection of contractors. When the tender is deposited on the electronic hub, ZNTB redistributes the tender to all contractors or consultants of the required category and grade as indicated by the purchaser and according to set criteria. The tender is also gazetted and advertised as required by law. The eligible consultants and contractors are also able to view the tenders on the ZNTB hub.

For ICB formal tenders, the same process as for NCB formal tenders is followed. But in this case, the international bidders who wish to tender for the works have to register with the NCC as required by Article 7 of the National Construction Council Act of 2003. The ZNTB then provides them with Identification Numbers and Pass Words.

The tenderers submit their tenders electronically to the ZNTB hub. These are recorded electronically and sent to the respective purchasers (procurement units) for evaluation and approval (No Objection) by the relevant authorizing body for contract award. The authorized bodies could either be the Controlling Officer or the relevant Tender Committee, depending on the threshold.

6.3.1 Explanation of numbered items on the model

1 Is the project highly complex/specialised and requires pre-qualification/EOI

Highly complex or specialized projects would require an 'Expression of Interest' for the selection of consultants or a pre-qualification for the selection of contractors. This is to ensure that only consultants or contractors with the minimum qualifications bid for the works.
Purchaser posts electronically pre-qualification tender/ EOI on ZNTB hub
For the tenders that require ‘Expression of Interest’ or ‘Pre-qualification’ the purchaser determines the minimum qualification for the required works. This is done to eliminate consultants or contractors who do not have the necessary qualifications and experience, for the purpose of speeding up the process.
The ‘Expression of Interest’ or the ‘Pre-qualification’ document is then electronically posted to the ZNTB hub. The tender documents are also accessible to the eligible consultants or contractors on the ZNTB hub.

Purchaser electronically posts tender document/RFP on ZNTB hub
For works that are not highly complex and specialized, the requirement of an ‘Expression of Interest’ for the selection of consultants or a ‘Pre-qualification’ for the appointment of contractors may not be a requirement. For such works, the purchaser prepares the tender document clearly defining the requirements. These requirements would include the specialization, qualifications and experience of consultants or contractors. This RFP or tender document is then electronically posted to the ZNTB hub.

ZNTB sends e-mail to contractors/consultants according to set criteria
The ZNTB sends an e-mail to all consultants and contractors meeting the set criteria. If tender document set ‘grade V’ contractors as a minimum criteria, then the ZNTB sends e-mails with the tender document attached to all contractors in grade V and higher grades (grades I to IV). For consultants, if the RFP is for consultants involved in road works, then all consultants involved in roads are sent an e-mail with the RFP attached. The tenders are then electronically advertised and gazetted. The tender document is also made accessible by eligible consultants or contractors on the ZNTB hub.

For informal tenders, the purchaser sets the minimum qualifications and experience of the consultants and contractors in the RFP or tender document. For this model, the ZNTB determines the most transparent method of shortlisting. This could be by
setting the minimum number of consultants or contractors to be shortlisted. The ZNTB also indicates the criteria for shortlisting.

5 **Interested contractors/consultants submit their bids/proposals electronically to the ZNTB hub**

The consultants or contractors who are interested in the works then post electronically their proposals or tender documents to the ZNTB hub. Those that are not interested in the works simply ignore the tender.

6 **The ZNTB records the tenders/Proposals and sends them electronically to the Purchaser**

The Proposals or Bids submitted by the tenders electronically to ZNTB are received and recorded. They are then sent electronically to the purchaser.

7 **Bid evaluation by Purchaser and recommendation to relevant authority for a ‘No Objection’**

Upon receipt of the proposals or bids, the purchaser evaluates the proposals or bids and makes a recommendation to a relevant authority for a ‘No Objection’ (approval). The relevant authority includes the Controlling Officer, the Institutional Tender Committee or the Central Tender Committee at the ZNTB.

8 **Response from relevant authority**

The relevant authority either ‘objects’ or gives a ‘No Objection’ to the recommendation.

9 **No Objection**

The ‘No Objection’ response from the relevant authority, authorises the purchaser to proceed to the next step in the awarding of the tender.
10 Objection
The relevant authority can object to the recommendation in (7) above in two ways; annulment of tender or recommendation for re-submission of evaluation report.

11 Option of recommendation to re-submit evaluation report
The relevant authority may detect some anomalies in the evaluation and may defer its decision on the recommendation. They may recommend for a re-submission of the evaluation report taking into consideration the detected anomalies. In such a case, the RFPs or bids are re-evaluated and re-submitted for re-consideration.

12 Tender annulled (re-tender)
The relevant authority may also not approve the recommendation giving its own reasons. In such a case, the tender is annulled. The purchaser would have to start the process of procurement all over again.

If the relevant authority gives a ‘No Objection’, the following will be the cause of action depending on the type of procurement:

13 If tender is for Pre-qualification/EOI
If the tender was for pre-qualification or expression of interest, contractors and consultants respectively, are shortlisted; or

14 If tender is for appointment of consultants
If the ‘No Objection’ by the relevant authority to the recommendation by the purchaser was for the appointment of the consultants, then the purchaser can proceed to negotiate with the recommended consultant/s; or

15 If tender is for appointment of Contractors
If the ‘No Objection’ by the relevant authority to the recommendation by the purchaser was for the appointment of the contractors, then the purchaser can proceed to award the contract.
Contractors/consultants shortlisted. Shortlist sent electronically to ZNTB hub with tender/RFP document
The purchaser prepares the tender documents or RFP, indicating the shortlisted contractors or consultants. The tender document or RFP indicating the shortlist is then sent electronically to the ZNTB hub. The tender documents or RFPs are also made accessible to eligible consultants or contractors on the ZNTB hub.

ZNTB sends tenders/RFPs electronically to shortlist. Contractors/consultants submit their bids/proposals electronically to ZNTB hub
The ZNTB then sends the tenders/RFP electronically to the shortlisted consultants or contractors. The consultants or contractors post their bids or RFPs electronically to the ZNTB.

Pre-contract negotiation
According the research findings in this study, pre-contract negotiation was favoured in the selection of consultants. The following were considered important elements in pre-contract negotiation:

- methodology;
- scope of work; and
- project duration.

Award of contract
Contract award authorizes the successful bidder to sign the contract and start the execution of the works.

Notification of unsuccessful bidders
Once the contract is awarded and signed, the purchaser notifies the unsuccessful bidders. The purchaser may debrief the unsuccessful bidders, to indicate why their bids were unsuccessful. This should be done only at the request of each unsuccessful bidder.
21 **Implementation**

The process of implementation starts upon signing of the contract. The contract indicates the start and completion date for implementation. The contract also indicate the scope of works and the cost.

The research findings in this study concluded that the following contributed to successful completion of projects on time and cost and therefore, should be taken care of during implementation, as follows:

- provision of a dedicated budget for the completion of the whole project;
- devise an effective monitoring procedures to enforce specifications and contract requirements;
- putting in place project management processes;
- putting in place mechanisms to minimize constant change of the requirements or project specifications on the part of the client and consultants; and
- improved communications systems to counter delays in decision making by clients and consultants, lack of coordination between the contractors and suppliers, consultants and contractors, and consultants and the client (internal project team).

22 **Post contract assessment (Report done to ZNTB)**

The research findings in this study also concluded that post contract assessment of the contract was important for the following reasons:

- it was used for rating of contractors and consultants for future contracts;
- it was used to evaluate problems encountered in the project and propose solutions for future projects;
- it was used to provide feedback on performance of contractors and consultants; and that
- it was also used as basis for establishment of long-term relationships.
The purchaser, the consultants and contractors use this report to evaluate the problems encountered during implementation and use the information to come up with solutions for future projects.

The post contract assessment report is then sent to the ZNTB by the purchaser within one month of its compilation. ZNTB, through this report takes note of poorly performing contractors, those that are fulfilling contracts, major problems being faced during implantations. ZNTB then uses this information to evaluate the public procurement policies. The ZNTB can also use the reports as a basis for evaluation of consultants and contractors.

6.4 Validation of the proposed model

6.4.1 Definition

The wikipedia encyclopedia defines validation as a process of checking if something satisfies a certain criteria. It may relate to meeting the needs of an external customer or user of a product, service or system. Muya (1999) on the other hand stated that validation implies that something is assessed to be valid. He further stated that validation was undertaken by competent adjudicators. The bases of the concept of validation are neither empirically nor theoretically available. Muya (1999) therefore stated that anyone conducting the process of validation was unlikely to properly account for their judgement or define the relevant standards they used. However, notwithstanding these shortcomings, he stated that the concept of validation is an acceptable form of critique.

6.4.2 Determination of validation sample

As stated above, theoretical data available on validation of models was limited. It was therefore difficult to determine the adequate sample. The population was the 33 respondents to the questionnaire in Appendix 2. However, in the absence of a defined sampling method, the United States Defense Contract Management Agency (US DCMA) has produced a zero-based sampling table. According to US DCMA, for a population of 33 at 95% confidence, the sample size was approximately ten. The researcher, therefore, prepared a questionnaire
for distribution to ten senior persons involved in public sector procurement of construction projects. All the ten persons responded to the questionnaire.

6.4.3 The validation process
As stated in Section 6.4.2, a questionnaire was prepared for distribution to ten persons for the validation process. These were senior officers from various institutions and different professions directly involved in the selection of consultants and contractors in the public construction sector in Zambia as shown in appendix 5. They were thus considered to be competent to judge the validity of the model.

6.4.4 Validation data collection and analysis of results
The professions involved in the validation process were as shown in Figure 6.2.

![Figure 6.2: Professions involved in the validation process](image)

Therefore, all the major professions involved in the selection of consultants and contractors participated in the validation of the model.

6.4.4.1 Usefulness
The respondents were asked whether e-procurement could bring about efficiencies in the selection of consultants and contractors. All the ten respondents agreed that e-procurement could bring about efficiencies in the selection of consultants and contractors.
The ten respondents were further asked whether the proposed e-procurement model could be used in the selection of consultants and contractors in the public construction sector in Zambia. All the ten respondents agreed. When further asked what improvements could be made to the proposed model, the following was put forward:

- instead of sending e-mails containing the tender document to eligible consultants or contractors, the system should be designed to ensure that all eligible consultants and contractors access the tenders on the ZNTB hub. It was stated that this could improve on efficiency and reduce on the risk of mail not being sent to some eligible consultants or contractors. The researcher agreed to this and included this on the model;
- the model assumed availability and use of internet by all concerned. However, a ‘short messaging system’ using mobile phones, can improve on prompt communication and therefore, increased efficiencies; and
- ZNBT to establish and maintain an automatic server based records systems.

Respondents were further asked whether the proposed model could bring about fairness and transparency. All the ten respondents agreed.

6.4.4.2 Functionality and user friendliness

Respondents were asked whether the proposed model was user friendly. Eight of the ten respondents agreed. One disagreed stating that not all consultants and contractors are computerized. One respondent did not give any position, stating that user friendliness is based on interaction or lack of it, and that in the absence of the model’s software characteristics, it was difficult to give an opinion. Based on modal analysis, it was concluded that the model was user friendly. One of the respondents even proposed that the model could be used as a generic model for the selection of consultants and contractors by private sector firms as well.

From the results of this validation process, it was deduced that the proposed e-procurement model can bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia. The model was also user friendly.
6.5 Challenges for proposed framework
The respondents identified the following as the disadvantages and challenges of e-
procurement:

- the model at a certain time would need to be decentralized to the purchasers to localise
  informal tenders;
- it was difficult to assess the quality of contractors. This challenge could be overcome by
  strict registration, inspection and monitoring procedures at NCC;
- elimination of smaller contractors with no capacity in information technology. This
  challenge has been overcome by availability of internet facilities through cell phone
  providers to all districts in Zambia. However, the challenge of owning a computer and
  printing facilities for drawings and documents need to be dealt with;
- may not promote transparency as there would be no witnesses to the process. This
  challenge could be dealt with by strict inspection and monitoring of procurement process
  by ZNTB;
- bonds still have to be sent through the normal channel to the Purchaser or ZNTB;
- provision of security features to ensure security of data when transmitting bids should be
  provided; and
- the challenge of training the stakeholders involved.

6.6 Summary
In this chapter, an e-procurement model was developed as a best practice model. The model
was validated by ten senior officers from institutions that were involved in public
procurement of construction projects. It was deduced that the e-procurement model could
bring about efficiencies in the selection of consultants and contractors in the public
construction sector in Zambia. The model was also user friendly.

In the next chapter, conclusions would be made taking into consideration the analysis of
results, case studies and the development of the best practice model.
CHAPTER SEVEN
CONCLUSIONS

7.1 Introduction
In the previous chapter, an e-procurement model was developed as a best practice model for the selection of consultants and contractors in the public construction sector in Zambia. The model was validated by ten senior officers from institutions that were involved in public procurement of construction projects. This chapter presents conclusions from the research.

7.2 Selection of consultants and contractors
Various methods are used in the selection of consultants and contractors in the public sector. In Zambia, the traditional method of procurement is the most used. It involves the appointment of consultants to design the works to be undertaken, production of the tender documents and supervision of the works during execution. The contractors are then selected to undertake the works. Thresholds are used in the traditional method of procurement in Zambia. Thresholds of Purchasing and Supplies Units (PSUs) of the ministries and other government institutions are determined by the ZNTB. The thresholds for 2007 are indicated in Table 2.1. Seventy two (72) percent of the respondents favoured the traditional method of procurement based on thresholds. Various reasons for favouring this method were put forward by respondents. It was therefore deduced from the above that the traditional method of procurement based on thresholds was the most favoured procurement process in the public construction sector in Zambia. The traditional method of procurement was also backed by law in Zambia. It could therefore be concluded that the traditional methods of procurement was the most popular method of selection of both consultants and contractors.

Under the QCBS method of procurement of consultants, it was deduced that the preferred scores for technical and financial were:

- Financial preferred score 20-40%; and
- Technical (quality) preferred score 60-80%.

It could was further deduced that pre-contract negotiation was favoured in the selection of consultants.
It was further deduced in the study on the construction of Katima Mulilo border facilities, that the evaluation criteria for the selection of contractors needed to be clearly defined in the tender document and that it should never be assumed. The project structures also need to be clearly defined in the contract to ensure accountability and separation of powers. From the case study on the construction of Visitors and Media Centre, it was clear that for any project to be completed successfully, funds needed to be sourced and secured for the whole project.

7.3 Deficiencies in the traditional method of procurement

Some of the deficiencies identified in the traditional method of procurement were as follows:

- poor audit trail of the procurement process;
- susceptibility to corrupt practices through connivance and cartels as a result of human handling;
- it was slow and this led to delays in project implementation; and
- It did not allow for post contract assessment.

The failure to undertake post contract assessment became evident when the ZNTB suspended the practicing certificates of forty two contractors in March, 2008 for alleged failure to honour contracts. The forty contracts, it is alleged, continued to get new contracts from government, despite failing to perform on previous contracts. Had ZNTB been in possession of post contract assessments, the decisions to award further contracts to the forty two contractors would have been averted in time.

7.4 Process maps and best practice model

It was clear from this study that the traditional method of procurement was still the most favoured method of procurement. However, as indicated in Section 7.3, this method had deficiencies. It can therefore be concluded that, a model that could take into consideration these deficiencies could be used as a best practice model for the selection of consultants and contractors in the public construction sector in Zambia.
It was deduced that e-procurement could be used in the procurement of construction projects even though it was not a commonly used method and that it could quicken the procurement process, improve efficiency, be used to communicate with contractors in remote areas, provide access to wider market and global contractors and consultants, reduce cost of project procurement, provide easy audit trail of the procurement process, provide quick access to information for various needs and reduce on malpractices which occur through human handling. It was therefore concluded that although e-procurement was not commonly used as a procurement method for construction projects in Zambia, it had the ability to improve efficiency and cost of procurement of construction projects. A model based on e-procurement could therefore be used as a best practice model.

An e-procurement model was developed and validated in chapter five. It was deduced that the e-procurement model could bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia. The model was also user friendly. It can therefore be concluded that, the e-procurement model (Figure 5.1) could be used as a best practice model for the selection of consultants and contractors in the public construction sector in Zambia.

7.5 Summary
Conclusions were drawn in this chapter based on the analysis of results, case studies and analysis of the e-procurement model. It was concluded that the traditional method of procurement was a popular mode of procurement of consultants and contractors in construction projects in the public sector in Zambia. The deficiencies in the traditional methods of procurement were also highlighted in this chapter. It was further deduced that although e-procurement was not commonly used as a procurement method for construction projects in Zambia, it could overcome most of the deficiencies in the traditional methods of procurement. It was therefore concluded that the e-procurement model developed in chapter five, could be used as a best practice model as it could bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia. The model was also user friendly.
In the next chapter, recommendations based on the analysis of results, case studies and conclusions will be presented.
CHAPTER EIGHT
RECOMMENDATIONS

8.1 Introduction
In the previous chapter, conclusions were drawn from the analysis of results and case studies. It was concluded that the traditional method of procurement was a popular mode of procurement of consultants and contractors in construction projects in the public sector in Zambia. The deficiencies of the traditional method of procurement were highlighted. It was concluded that a model based on e-procurement tools could bring about best practice in the selection of consultants and contractors. It was also concluded that the e-procurement model developed in chapter five, could be used as a best practice model as it could bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia. The model was also user friendly.

In this chapter, recommendations taking into consideration the analysis of results, case studies and conclusions would be presented.

8.2 General recommendations
8.2.1 Registration of contractors
It was concluded in chapter six that contractors were registered at NCC according to possessed capacity and that the register at NCC could be used successfully to shortlist contractors. However the registration of contractors by NCC had the following shortcomings:

- lack of honest by contractors during registration; and
- poor monitoring and inspection procedures by NCC.

From the case study on the construction of Katima Mulilo border facilities, it was concluded that the capacity of the contractor to undertake works should be taken into consideration in the selection of contractors.

The role that NCC played in the registration of contractors was very important. For the NCC register to be successfully used in the selection of contractors, the purchasers should have
confidence in its use. It was therefore, recommended that NCC should develop strict assessment and monitoring procedures for registration of contractors.

8.2.2 PPP procurement method

In chapter six, it was determined that the use of PPPs reduced the burden on tax payers in the delivery of both capital and long term service contracts by the introduction of private capital, private expertise and competitive business practices in the provision of public services. PPPs have also been known to operate within budget and could also lead to shorter project duration, reduction in cost, enhanced constructability of the design, better relations and fewer disputes and claims and provided the advantage of a single point of responsibility. The major hindrance to PPPs in Zambia had been the lack of legal framework to drive the concept forward. However, government of the Republic of Zambia in 2007 had completed the process of consultation with stakeholders in the construction industry with a view of presenting a Bill on PPPs for enactment to Parliament. It was therefore recommended that this process of putting in place a legal framework for the implementation of the PPPs in Zambia be speeded up.

8.2.3 Project partnering procurement method

It was stated in chapter six, that project partnering can bring about productivity in construction projects as it provided for economies of scale, allowed for joint participation in design and construction and also allowed contractors to share goals. The following were identified as problems that hindered project partnering; failure to agree on separation (termination) plan, lack of confidentiality, complacency through uncompetitive practices and contractual problems between partners. The reasons for failure of project partnering in Zambia were identified as; lack of trust, lack of total quality commitment, lack of shared goals, lack of strategic direction for long term relationships and corporate culture differences.

It was therefore recommended that a clearly defined framework (policy), including the guidelines, rules and regulations, within which all the partners have to operate be put in place by the Government of the Republic of Zambia for the concept of project partnering to work efficiently and effectively in Zambia.
8.2.4 E-procurement

It was concluded in chapter six that although e-procurement was not a commonly used as method of procurement for construction projects in Zambia, it had the ability to improve on efficiency and cost of procurement of construction projects. An e-procurement model was therefore developed and validated in chapter seven. From the results of the validation process in chapter seven, it was deduced that the e-procurement model can bring about efficiencies in the selection of consultants and contractors in the public construction sector in Zambia. The model was also user friendly. It was concluded that, the e-procurement model could be used as a best practice model for the selection of consultants and contractors in the public construction sector in Zambia.

It is therefore, recommended that the e-procurement model be exploited further with a view of implementing it in Zambia.

8.3 Limitations to this study

The strategy for selection of case studies was to consider three cases in each of the three institutions. The strategy was to study three projects as follows:

- a project that had not been completed according to the required standard and schedule. This was to enable the researcher to gain insights on factors of project procurement that result in unsuccessful completion of projects;
- a project that had been completed according to the required standard and on schedule. This was to enable the researcher determine the attributes of good project procurement process; and
- a project that was completed and but overran on its cost and duration. This was to enable the researcher to study the cause-effect relationships of project overruns.

However, the researcher failed to obtain access to records of projects falling under these categories in many institutions. This limited the selection of cases for this study to two institutions.
8.4 Recommendation for future research

The following are recommended for future research:

- The proposed framework for e-procurement need to be explored further, as this is the future of global business. Detailed studies on available capacities with respect to the ZNTB, PSUs, the contractors and consultants need to be pursued.

- There was need for research on an increased role of the NCC in the provision of efficient and effective procurement of consultants and contractors.
REFERENCES


APPENDIX I
QUESTIONNAIRE

AN INVESTIGATION INTO THE SELECTION PROCESSES OF CONSULTANTS AND CONTRACTORS IN PUBLIC CONSTRUCTION SECTOR IN ZAMBIA

01 GENERAL INFORMATION

1.1 Position: ..............................................................

1.2 State whether (please tick appropriately):

<table>
<thead>
<tr>
<th>Architect</th>
<th>Engineer</th>
<th>Quantity Surveyor</th>
<th>Procurement person</th>
<th>Other State</th>
</tr>
</thead>
</table>

1.3 Name of organisation: ..............................................................

02 SELECTION PROCESSES IN PUBLIC SECTOR – GENERAL

2.1 State the project procurement procedures that you have been involved in (please tick applicable):

<table>
<thead>
<tr>
<th>Zambia National Tender Board</th>
<th>World Bank</th>
<th>European Union</th>
<th>Others, State</th>
</tr>
</thead>
</table>

2.2 What do you consider important in the selection of contractors (please tick applicable):

<table>
<thead>
<tr>
<th>Experience in relevant works</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific construction experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owned or hired equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified technical personnel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational management experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of non performing contracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, State them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3 State what you consider important in the selection of consultants (please tick applicable):

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific experience of assignment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical approach and methodology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualifications of key technical personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience in relevant works</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience in relevant tasks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational management experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of non performing contracts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, State them:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

03 SELECTION OF CONSULTANTS

3.1 Traditional selection methods for consultants and contractors is based on thresholds. Do you favour this strategy of procurement?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

3.2 If you favour the traditional methods of selecting consultants and contractors based on thresholds, state the reasons why:

<table>
<thead>
<tr>
<th>Tick all applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bids of low value do not warranty the cost of bidding</td>
</tr>
<tr>
<td>Certain methods require certain levels of scrutiny</td>
</tr>
<tr>
<td>OTHERS, State them:</td>
</tr>
</tbody>
</table>
3.3 If you DON'T favour the traditional methods of selecting consultants based on thresholds, state the reasons why?

| To afford all consultants and contractors an opportunity to bid irrespective of capacity |
| OTHERS, state them: |

Tick if applicable

3.4 Conclusion of contracts for consultants is sometimes subjected to negotiation. Do you favour negotiation before contract is awarded?

YES  NO

3.5 If you favour negotiations in conclusion of contracts, state by ticking and rating what should be negotiated? (please tick applicable).

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope of work and terms of references</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The rates of execution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of contract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER, state them:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.6 If you don't favour the conclusion of contracts to be subject to negotiations, state the reasons why?

(1) .................................................................

(2) .................................................................

(3) .................................................................

(4) .................................................................

3.7 The selection of consultants under the Quality and Cost Based Selection (QCBS) method, involves a two envelope system, one envelope for the technical proposal and the other for the finance proposal. A weighting system is used for this method.

3.7.1 Have you ever been involved with the QCBS method?

YES  NO

3.7.2 The following are considered important under the Technical Approach and Methodology in the quality evaluation. State your preferred scores for each item? (please tick applicable).

<table>
<thead>
<tr>
<th>Percentage Distribution</th>
<th>Understanding of the assignment</th>
<th>Work plan</th>
<th>Methodology</th>
<th>TOTAL 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.7.3 The following are considered important under the competence of key staff in the quality evaluation. State your preferred scores for each item? (please tick applicable).

<table>
<thead>
<tr>
<th>Percentage Distribution</th>
<th>Education in appropriate Field</th>
<th>Experience in relevant works</th>
<th>Experience in relevant tasks</th>
<th>TOTAL 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>30%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.7.4 Under QCBS, the total technical (quality) and financial score are aggregated to get the final score. State your preferred scores? (please tick applicable).

<table>
<thead>
<tr>
<th>Percentage Distribution</th>
<th>Technical (Quality) Score</th>
<th>Financial Score</th>
<th>TOTAL 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-80%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.8 Despite the elaborate procedures in the selection of consultants, a lot of works designed and supervised by consultants have not been completed as planned. What could you attribute this to? (please tick applicable).
4 SELECTION OF CONTRACTORS

4.1 The National Council for Construction (NCC) was established to register and regulate all consultants and contractors in the Zambian construction industry.

4.1.1 Do you think contractors and consultants are registered according to possessed capacity? 

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1.2 Can the register at NCC be successfully used for shortlisting of contractors and consultants?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1.3 Indicate likely reasons why you think the register at NCC does not portray actual competences of contractors and consultants? (please tick applicable)

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technical personnel not belonging to the firm are registered as belonging to the firm
Construction equipment not belonging to the firm is registered as belonging to the firm
Exaggeration of experience by firms
Poor monitoring and inspections by NCC to confirm capacity of contractors or consultants
OTHERS, state them:

4.2 Selection of contractors in the public sector in Zambia is done according to the Zambia National Tender Board Procedures. These are prescriptive procedures according to situations. Despite the elaborate procedures in the selection of contractors, many construction projects have not been completed to satisfaction. Indicate level of contribution of the following, (please tick applicable).

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Poor supervision
Lack of proper equipment
Lack of qualified and experienced technical personnel
Poor specifications
Poor designs
Non involvement of contractors in design
Competitive nature of bidding leads to under-quoting
Corruption
OTHERS, state them:

4.3 In the traditional project procurement, consultants are engaged first to do the designs and tender documents. Contractors are invited to bid for the works based on these documents.

4.3.1 What you think are the advantages of this method?

<table>
<thead>
<tr>
<th>Tick all applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

It encourages competition among contractors
It discourages corruption as the process is transparent
It encourages independence of opinion of consultants
The same designs can be replicated and used at various sites
OTHERS, state them:
4.3.2 What you think are the disadvantages of this method?

<table>
<thead>
<tr>
<th>Disadvantage</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>No contractor input at design stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leads to adversarial relationships between consultants and contractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not encourage collaboration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not encourage strategic partnership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tendency of the consultants to over-design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. The EU procedures emphasise post contract assessment. What do you think are the advantages of post contract assessment? *(please tick applicable).*

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used for rating of contractors and consultants for future contracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used to evaluate problems encountered in the project and propose solutions for future projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide feedback on performance of contractors and consultants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used as a basis for establishment of long-term relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Project Partnering is defined as a commitment by all parties in a project regardless of size to a long-term relationship based on clear, mutually agreed objectives.

6.1 Have you ever been involved in project partnering?

| YES | NO |

6.2 What do you consider as benefits of project partnering? *(please tick applicable).*

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced cost of project</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced inventory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced project time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economies of scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint participation in design and construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3 One of the disadvantages of traditional methods is that it does not promote strategic partnerships and instead promotes one-off adversarial relationships. Do you think project partnering can improve quality and performance of construction projects?

| YES | NO |

6.4 What do you consider to be the problems that hinder project partnering in Zambia? *(please tick applicable).*

<table>
<thead>
<tr>
<th>Problem</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The project method is not known</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to agree on separation (termination) plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of domination of one partner by another</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of confidentiality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complacency through uncompetitive practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractual problems between partners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

130
6.5 What do you think are the reasons for failure of project partnering? (please tick applicable).

<table>
<thead>
<tr>
<th>Reason</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of trust</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of total quality commitment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor upfront planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of shared goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of strategic direction for relation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of benefits/risk sharing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Legal framework</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance barriers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top management differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corporate culture differences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7 A Public-Private Partnership (PPP) is defined as a contractual agreement between a public agency and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public.

7.1 State and rate which of the following PPPs you have ever been involved in? (please tick applicable).

<table>
<thead>
<tr>
<th>PPP Description</th>
<th>More than once</th>
<th>Once</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Build</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design, Build, Operate and Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design, Build, Transfer and Operate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build, Lease, Operate and Transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lease, Upgrade, Operate and transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.2 What do you think are the hindrances to PPPs in Zambia?

<table>
<thead>
<tr>
<th>Hindrance</th>
<th>Tick all appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of political will</td>
<td></td>
</tr>
<tr>
<td>Lack of public sector involvement</td>
<td></td>
</tr>
<tr>
<td>Failure to plan for the PPPs</td>
<td></td>
</tr>
<tr>
<td>The economy is not big enough to support some PPPs</td>
<td></td>
</tr>
<tr>
<td>Bureaucratic procedures</td>
<td></td>
</tr>
<tr>
<td>OTHERS, state them</td>
<td></td>
</tr>
</tbody>
</table>

8 ROLE OF PROCUREMENT DURING EXECUTION OF WORKS

8.1 What you think are the roles of procurement in the execution of works. (please tick applicable).

<table>
<thead>
<tr>
<th>Role of Procurement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of contract</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of project cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post contract management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.2 Most projects overrun on time and cost. What are the causes of these overruns? (please tick applicable).

<table>
<thead>
<tr>
<th>Overrun Causes</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor skills of Technical personnel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor management of materials on site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shortage of labour on site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low productivity of labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of coordination on site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of subcontractor skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of equipment and tools on site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adversarial relationships with consultants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultants</td>
<td>Absence of consultancy staff on site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of experience</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delays and slow decision making</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incomplete documents</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of experience on part of consultant</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of experience of consultant staff on site</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor designs</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor monitoring and control methods</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adversarial relationships with contractors</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client</th>
<th>Delayed payments</th>
<th>--</th>
<th>--</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lack of working knowledge</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Delays and slow decision making</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Lack of coordination with consultants</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Constant change of project specifications</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External factors</th>
<th>Lack of materials on the market</th>
<th>--</th>
<th>--</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lack of equipment and tools on the market</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Poor weather conditions</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Poor site conditions</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Poor economical conditions (inflation, currency fluctuations etc)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Change in regulations eg Tax regulation, environment regulations etc</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Delays in obtaining permit from Public Agencies</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

10. E-PROCUREMENT

10.1 Do you know what e-procurement is in project procurement?  YES NO

10.2 Have you ever used e-procurement tools in project procurement?  YES NO

10.3 If you have used e-procurement before, describe the process.

10.4 If you know what e-procurement is, describe the advantages and disadvantages of e-procurement in general

Advantages

1. 

2. 

3. 

4. 

Disadvantages

1. 

2. 

3. 

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## APPENDIX II

### List of respondents to questionnaire in Appendix I

<table>
<thead>
<tr>
<th>Position</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Director</td>
<td>Zambia Revenue Authority</td>
</tr>
<tr>
<td>2 Projects Manager</td>
<td>Zambia Revenue Authority</td>
</tr>
<tr>
<td>3 Quantity Surveyor</td>
<td>Zambia Revenue Authority</td>
</tr>
<tr>
<td>4 Assistant Director Maintenance</td>
<td>Bank of Zambia</td>
</tr>
<tr>
<td>5 Director</td>
<td>PJP Associates</td>
</tr>
<tr>
<td>6 Director</td>
<td>MNL Quantity Surveying &amp; Associates</td>
</tr>
<tr>
<td>7 Senior Quantity Surveyor</td>
<td>HB Chalwa &amp; Associates</td>
</tr>
<tr>
<td>8 Planning Engineer</td>
<td>Roads Development Agency</td>
</tr>
<tr>
<td>9 Manager – Monitoring &amp; Evaluation</td>
<td>National Road Fund Agency</td>
</tr>
<tr>
<td>10 Procurement Specialist</td>
<td>National Road Fund Agency</td>
</tr>
<tr>
<td>11 Head of Procurement</td>
<td>Ministry of Works &amp; Supply</td>
</tr>
<tr>
<td>12 Chief Engineer</td>
<td>Buildings Department, Ministry of Works &amp; Supply</td>
</tr>
<tr>
<td>13 Chief Quantity Surveyor</td>
<td>Buildings Department, Ministry of Works &amp; Supply</td>
</tr>
<tr>
<td>14 Projects Officer</td>
<td>Zambia Revenue Authority</td>
</tr>
<tr>
<td>15 Procurement Specialist</td>
<td>Ministry of Finance and National Planning (PEMFA)</td>
</tr>
<tr>
<td>16 Procurement Advisor</td>
<td>Ministry of Finance and National Planning (PEMFA)</td>
</tr>
<tr>
<td>17 Director (Head of Procurement)</td>
<td>Zambia National Tender Board</td>
</tr>
<tr>
<td>18 Senior Engineer</td>
<td>Ministry of Local Government &amp; Housing</td>
</tr>
<tr>
<td>19 Quantity Surveyor</td>
<td>AMK Surveying Consultants</td>
</tr>
<tr>
<td>20 Engineer – Schools Projects</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>21 Quantity Surveyor – School Projects</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>22 Quantity Surveyor</td>
<td>Landmate Engineering limited</td>
</tr>
<tr>
<td>23 Procurement and Supplies Manager</td>
<td>Zambia Revenue Authority</td>
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<tr>
<td>24 Principal Architect</td>
<td>Touchline Design Consultants</td>
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<td>25 Senior Procurement Officer</td>
<td>Ministry of Works and Supply</td>
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<tr>
<td>26 Senior Quantity Surveyor</td>
<td>Adam Hood Quantity Surveyors</td>
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<td>27 Quantity Surveyor</td>
<td>Buildings Department, Ministry of Works &amp; Supply</td>
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<tr>
<td>28 Maintenance Manager</td>
<td>Bank of Zambia</td>
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<td>29 Procurement Officer</td>
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<tr>
<td>30 Technical Advisor</td>
<td>Roughton International (RDA)</td>
</tr>
<tr>
<td>31 Director</td>
<td>National Council for Construction</td>
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<tr>
<td>32 Managing Director</td>
<td>M&amp;S Aluminium and Construction</td>
</tr>
<tr>
<td>33 Purchasing Manager</td>
<td>Zambia Electricity Supply Corporation (ZESCO)</td>
</tr>
</tbody>
</table>
APPENDIX III

CASE STUDY QUESTIONS

1.0 Appointment of consultants
1.1 How were the consultants appointed, who were they? Evaluation report
1.2 What/How was the relationship between the consultant and the client?
1.3 How was progress from inception to completion of designs?
1.4 Was the estimated cost advised?
1.5 Was the estimated cost budgeted for before the project started?
1.6 Was the estimated cost within the bids received?
1.7 How consultant was paid - reports

2.0 Appointment of contractors
2.1 How was the contractor appointed – evaluation report
2.2 Did the contractor have the necessary skills on site?
2.3 Did the contractor have the necessary equipment?
2.4 What about site management experience?

3.0 Project Execution
3.1 How was the project executed?
3.2 If not executed according to schedule? State reasons?

<table>
<thead>
<tr>
<th>Reason</th>
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</thead>
<tbody>
<tr>
<td>3.2.1</td>
<td>bid was too low</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Poor organization and management of project</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Did not have capacity to undertake the project</td>
</tr>
<tr>
<td>3.2.4</td>
<td>Poor supervision on the part of consultants – enforcement of specifications/ stds and schedule</td>
</tr>
<tr>
<td>3.2.5</td>
<td>Poor supervision on the part of contractor staff</td>
</tr>
<tr>
<td>3.2.6</td>
<td>Corruption</td>
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<tr>
<td>3.2.7</td>
<td>Adversarial relationship between the consultant and contractor</td>
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<tr>
<td>3.2.8</td>
<td>Design problems</td>
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<tr>
<td>3.2.9</td>
<td>Slow decision making by the consultants on changes to requirements on site</td>
</tr>
<tr>
<td>3.2.10</td>
<td>Unforseen circumstances such as bad weather</td>
</tr>
<tr>
<td>3.2.11</td>
<td>Delayed payments</td>
</tr>
<tr>
<td>3.2.12</td>
<td>Lack of coordination between client and the consultant</td>
</tr>
<tr>
<td>Others</td>
<td></td>
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</tbody>
</table>

4.0 Any other issues related to the project
APPENDIX IV
VALIDATION QUESTIONNAIRE

University of Zambia
School of Engineering
Department of Civil & Environmental Engineering
P.O Box 32379
Lusaka.

Dear Sir/Madam

Validation of the proposed e-procurement model for the selection of consultants and contractors

I am a student currently studying for a Master of Engineering Degree in Construction Management by Research at the University of Zambia. This is a follow-up to my earlier questionnaire which was circulated to you. The purpose of writing is to seek for your assistance in the validation of my research findings. I have attached a simple questionnaire and a proposed e-procurement model for the selection of consultants and contractors. The model proposes the use of e-procurement tools in the selection of consultants and contractors in both formal and informal tenders in the public construction sector.

Validation will assess the functionality, usefulness and friendliness of the proposed model. The information collected will be used purely for academic purposes and not for anything else and will be held in the strictest confidence possible.

I will be grateful if you could kindly study the proposed model and answer the accompanying questions.

Yours faithfully,

Mukumbwa Brian
Contact Nos. : Cell 097-7486126
Phone 01-290486
Figure 1: Proposed e-procurement model for the selection of consultants and contractors
Explanation of the model

An electronic hub is established for receiving and distribution of tenders at ZNTB. It is proposed that the list of registered members by NCC, Zambia Institute of Architects, Engineering Institution of Zambia and the Surveyors Institute of Zambia be used by ZNTB in the selection of consultants and contractors.

The ZNTB provide Identification Numbers and Pass Words to registered consultants and contractors. The ZNTB also provide the purchasers (ministries and public institutions) with Identification Numbers and Pass Words.

For informal tenders, purchasers send the tender documents electronically to the electronic hub at the ZNTB together with the proposed shortlist. The tender documents are then re-distributed to the shortlisted consultants or contractors electronically by ZNTB.

For NCB formal tenders, the same process as above is followed. But in this case, the purchaser indicates the category and grade for contractors or consultants. When the tender is deposited on the electronic hub, ZNTB re-distributes the tender to all contractors or consultants of the required category and grade as indicated by the purchaser and according to set criteria. The tender is also gazetted and advertised as required by law.

For ICB formal tenders, the same process as for NCB formal tenders is followed. But in this case, the international bidders who express interest to tender for the works have to register first with the NCC as required by law. The ZNTB then provides them with Identification Numbers and Pass Words.

The tenderers submit their tenders electronically to the ZNTB hub. These are recorded electronically and sent to the respective purchasers (procurement units) for evaluation and approval by the relevant authorizing body for contract award. The authorized bodies could either be the Controlling Officer or the relevant Tender Committee depending on the threshold.
QUESTIONNAIRE
E-procurement model for the selection of consultants and contractors - validation questionnaire

This questionnaire is intended to validate the functionality, usefulness and user-friendliness of the proposed e-procurement model in the selection of consultants and contractors in the public construction sector in Zambia. Kindly study the proposed model and answer the accompanying questions by ticking/writing in the boxes/spaces provided.

1. Profession
   Engineer ☐ Architect ☐ QS ☐ Procurement Specialist ☐

2. Do you think e-procurement can bring about efficiencies in the selection of consultants and contractors?  
   If ‘No’, state the reasons why:
   ☐ ☐

3. Do you think the proposed e-procurement model could be used in the selection of consultants and contractors?  
   If ‘No’, state the reasons why:
   ☐ ☐
   State any improvements to the proposed model:
   ☐ ☐

4. Do you think this model can bring about fairness and transparency?  
   If ‘No’, state the reasons why:
   ☐ ☐

5. Do you think the proposed model can improve on efficiencies on time and cost in the selection of consultants and contractors?  
   ☐ ☐

6. Do you think the model is user-friendly?  
   If ‘No’, state the reasons why:
   ☐ ☐

7. State any other comments with respect to the proposed model:
   ☐ ☐

Name:................................Signature:..........................Position:..........................Organisation:..........................

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APPENDIX V

List of respondents for the validation of the proposed model for e-procurement

<table>
<thead>
<tr>
<th>Position</th>
<th>Institution</th>
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</thead>
<tbody>
<tr>
<td>1 Assistant Director - Maintenance</td>
<td>Bank of Zambia</td>
</tr>
<tr>
<td>2 Projects Manager</td>
<td>Zambia Revenue Authority</td>
</tr>
<tr>
<td>3 Director</td>
<td>MNL Associates</td>
</tr>
<tr>
<td>4 Director</td>
<td>BEMIDAK &amp; Associates</td>
</tr>
<tr>
<td>5 Chief Engineer</td>
<td>Buildings Department, Ministry of Works and Supply</td>
</tr>
<tr>
<td>6 Chief Quantity Surveyor</td>
<td>Buildings Department, Ministry of Works and Supply</td>
</tr>
<tr>
<td>7 Head, Procurement and Supplies Unit</td>
<td>Ministry of Works and Supply</td>
</tr>
<tr>
<td>8 Public Procurement Specialist</td>
<td>Formerly, Zambia National Tender Board</td>
</tr>
<tr>
<td>9 Procurement Engineer</td>
<td>Road Development Agency</td>
</tr>
<tr>
<td>10 Procurement Specialist</td>
<td>Ministry of Finance and National Planning (PEMFA)</td>
</tr>
</tbody>
</table>