Construction Procurement Practices and It's Impacts on Ethiopian Road Construction

Case Study: - Ethiopian Road Authority

By

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Abbreviation

AHJ	Authority Having Jurisdiction
AIA	American Institution of Architects
BaTCoDA	Building and Transport Construction and Design Authority
BC	Building Contractor
BOT	Design Built Operate Transfer
BS	British Standard
CFP	Bid Price Under Consideration
CI	Construction Industry
CP	Construction Program
CTP	Technical Evaluation Score for the Bid Under Consideration
DB	Design Build
DBB	Design Bid Build
E.g	Example
EJCDC	Engineer Joint Contract Document Committee
ERA	Ethiopian Road Authority
ETB	Ethiopian Birr
FIDIC	Federation Internationale Des Ingenieurs-conseils
FPPAA	Federal Public Procurement and Property Administration Agency
FS	Bid Price Score
GC	General Contractor
GPN	General Procurement Notice
HTP	Highest Evaluation Technic
ICE	Institution of Civil Engineering
ITB	Instruction to Bidder
JV	Joint Venture
LFP	Lowest Bid Price
MOC	Ministry of Construction
MoWUD	Ministry of Works and Urban Development
NCB	National Competitive Bidder
PER	Professional Experience Resume
PMC	Project Management Consultant or Project Management Contract
PPA	Public Procurement Agency
QA	Quality Assurance
QAS	Quality Assurance System
QC	Quality Control
QSAE	Quality and Standards Authority of Ethiopia
RFP	Request for Proposal
SPN	Specific Procurement Notice
SWOT	Strength, Weakness, Opportunity and Threats
TCM	Tangible Construction Market
TSN	Normalized Bid Technical Proposal
VAT-	Value Added Tax

Abstract

In Ethiopia, road construction projects are playing the major role in the Ethiopian economic sector. The Ethiopian Roads Authority (ERA) is charged with the duties and responsibilities of providing adequate road infrastructure to support the socio-economic development of the country. To improve the Ethiopian economic somewhat appropriate and effective procurement approach is essential to reduce the impact in construction budget, completion time and performance in the road construction. The major aim of this research is to review, analyze and recommend construction procurement practice and its impact on Ethiopian road construction. Two major research methods are used to achieve the research objective, namely, primary and secondary data collection. To address the problems, a questionnaire was designed and distributed to contractors, consultants and employers participating in road construction sector. To supplement the questionnaire, a desk study was conducted on Ethiopian Road projects. A total of 91 questionnaires from client, consultants and contractors were collected and a desk study of 12 completed and ongoing road construction projects in Ethiopia were investigated. From the results it was found that most of the road construction projects suffered both time and cost overrun. The rate of time overrun ranges from a minimum of 25.75 % to the maximum of 79.86 % of the contract amount and cost overrun ranges from a minimum of 0% to the maximum of 26% of the contract amount, these results are based on the 12 projects. As a result, the findings show that the main factors that affects procurement practice in Ethiopian road construction projects are: improper planning, improper designing, construction methods, shortage of labor and technical personnel, quality and shortage of materials, construction mistakes and defective work, lack of training to project team in regard to procurement, lack of risk consideration, technical and financial capability and past experience of contractor and consultant are not verified in selecting contactor and consultant and poor monitoring and controlling, as well unclear process of closing a procurement have been found as the areas that needs improvement. Thus, provide training, seminars, workshop with regard to innovative project delivery system, establish other tender evaluation system other than low bid method to improve the cost overrun, time overrun and quality of the construction projects, and copy or modifying other country method may not be work full for our county are some of the recommendation made under this study on what actions should be taken in order to improve project procurement practice in the project.

Key Words: Procurement, Procurement Approach, Contract, Planning, Road Construction

CHAPTER ONE

INTRODUCTION

1.1 General

The construction industry is a large dynamic and complex industry that plays a major role in Ethiopia. Construction work can involve building of new structure, renovation involve additions, alterations, maintenance and repair of buildings or engineering projects such as highways or utility systems.

Now days, construction industry adopts new technologies and practiced as like other industries. Far from being a single activity, large scale construction is a feat of multitasking. From multitasks, procurement and its process is the primary and essential method in construction industry.

Procurement mean the framework in which construction projects are designed, financed, constructed, used, transferred and residual disputes are resolved [1]. And also it has its own process of designing, specifying, sourcing, issuing, ordering and arranging of material, service and equipment's within an organization. Nowadays, there are several types of project delivery systems being widely used in the Ethiopian construction industry. Design and Build, Design-Build-Operate, Management Contracting, etc. are some of project delivery systems, it has its own procurement property. Each type of procurement method determines how the projects would be managed from the commencement or/and design up to commissioning stage.

The selection of the procurement approach is very important to the successful completion of any type of construction project. In order to decide what procurement strategy is appropriate, we need to consider client's objective, how design and construction obligations are to be allocated and which party is accepting specific risks such as time, cost, and quality.

Cost, time and quality are the three most important parameters to measure project performance in Ethiopian Road Construction. It has been stressed that in today's highly competitive and uncertain business environment, clients are demanding for better value from their investment. They want their project to be completed on time, within the estimated cost and with the right quality. The use of the various project procurement systems shows that the construction industry is now trying to meet the clients' needs. This is because the different procurement

method will have different effect on the cost, time and quality of the project. Each project procurement system has its own peculiarity in terms of the pre-tender and post tender activities and processes, division of risks between client and contractors, and the effectiveness of project monitoring and control.

It is very important at the very beginning of the project to carefully consider all factors when selecting the most appropriate procurement approach for a construction project. This is because each system has its own feature and uniqueness that will have effect on the cost, time and quality of the project i.e. the project performance. For the successful execution of a project, effective procurement process is vital.

1.2 Statement of the problem

Project procurement is distinguished from other forms of procurement in that it's not a onetime action taken rather it's a series of procurement activities carried out during the execution of a project. Based on this, Procurement can be seen as a fundamental part of project management because it is crucial to the success of the project that procurement activities are appropriately planned and executed (Jarocki, 2014).

According to PMBOK (2013), the Project Procurement Management processes include planning procurement, conducting procurements, controlling and closing Procurements. Thus, a project procurement management practice needs to consider these points in order to be effective and efficient. A good procurement planning before undertaking a procurement process is a key contributor to project success (Deme A., 2009). According to PMBOK (2013), conducting procurements is about obtaining bidder responses, selecting a bidder, and awarding a contract. As construction participant play a vital role in success of the procurement it should be well conducted to have the desired outcome. Thus, having a procurement practice well-defined in a project will be of favor to successful outcome of the project.

It is an argued fact that Ethiopian road projects executed over the years were faced with the project cost overrun, delay in project execution, completing projects at sums higher than the initial sum. Therefore, working with accurate project evaluation is necessary at the commencement of a project work, which would reduce uncertainty and provide a plat form for project success. It is usually commented and discussed at different seminars, magazines, institutional lectures, journals etc. that the client satisfaction from built facilities declined

from time to time as a result of poor quality performance, in addition to the perennial problems of time and cost overrun in the Ethiopian construction industry.

1.3 Research Question

- What type of procurement practices and project delivery are availability in Ethiopian road construction industry?
- How can one project delivery system effectiveness of versus the other delivery system
- To what extent are the client, consultants, and contractor are satisfied in Ethiopian procurement practice?
- To what extent procurement system influence project effectiveness, success from project cost, quality, and completion time? and
- What are the factors that affects process of procurement in Ethiopian Road Construction?

1.4 Objective of the research

1.4.1 General objective of the research

The main objective of this research is;

- To study the different procurement practices in the Ethiopian road construction industry and its impact in project budget, completion time and quality of work.

1.4.2 Specific objective of the research

- To identify availability of procurement Practices and project delivery in Ethiopian road construction industry and effectiveness of one delivery system versus the other delivery system
- To investigate extent of satisfaction of client, consultants, and contractor because of the procurement system
- To compare the extent to which procurement system influence project effectiveness, looking at success from project cost, quality, and completion time.
- To identify factors affecting process of procurement in Ethiopian Road Construction

CHAPTER TWO

LITERATURE REVIEW

2.1 Construction Procurement

2.1.1 Definition of procurement

Different authors define procurement in different terms, some of them are:

Procurement means the framework in which development of projects are designed, financed, constructed, used, transferred and residual disputes are resolved. And also it has its own process of designing, specifying, sourcing, issuing, ordering and arranging of material, service and equipment's within an organization [1].

Procurement is a term which describes the activities undertaken by a client or employer who is seeking to bring about the construction of a building [2].

Procurement is the purchase of good, services, or works from an outside external source. It is a mechanism which provides a solution to the question: "how do I get my project built?" [3].

Procurement is the process of purchasing goods or services. There are many different routes by which the design and construction of a building can be procured. The selected procurement route should follow a strategy which fits the long-term objectives of the client's business plan. Considerations are likely to include: speed, cost, quality, specific project constraints, risk, asset ownership, and financing [4].

The simplest definition, according to Nagy, Kiss and Hornyak (n.d) described "Procurement as the merging of activities undertaken by the client to obtain a building. When a client wishes to choose any type of procurement method for realizing his project, his major concerns are: to finish the project on time, the cost of the project and performance / quality, both in the design and construction of the building."

2.1.2 Construction Procurement

Procurement is an important administrative and financial function and process that allows a project to obtain value for money expended on work, good and services. This is because;

1. On one hand, its effective and efficient use of financial resources in a competitive and transparent manner, through a sound procurement process contributes to the achievement of the operational and strategic goals of a project; and

2. On the other hand, a project's procurement practice tends to present a reflection of aspects of its administrative and financial management systems.

Generally, Procurement is meant to serve a major function to ensure qualification and competitive offer for the project; that is:

1. Qualified for legal, eligibility and technical competence and capacity to the services or works or goods intended to be procured;
2. Competitive to cover both commercial and financial evaluations necessary to bring the competitor's to be evaluated on the same ground and from the same platform; and
3. Least to show the lowest among those qualified and evaluated based on the commercial and financial evaluation (if need be technical as well in times of adopted composite weightings).

Procurement fulfills the above requirements through ensuring the Five Rights and the Seven Characteristics [6]. The Five Rights are Right Quality, Right Cost, Right Time, Right Quality and Right Counterpart and the Seven Characteristics are Proof of Competition, Impartiality, Formality, Neutrality, Objective, Transparency, and Accessibility. The Five Rights and the Seven Characteristics are tabulated in Figure 2.1 and 2.2 and Table 2.1 and 2.2

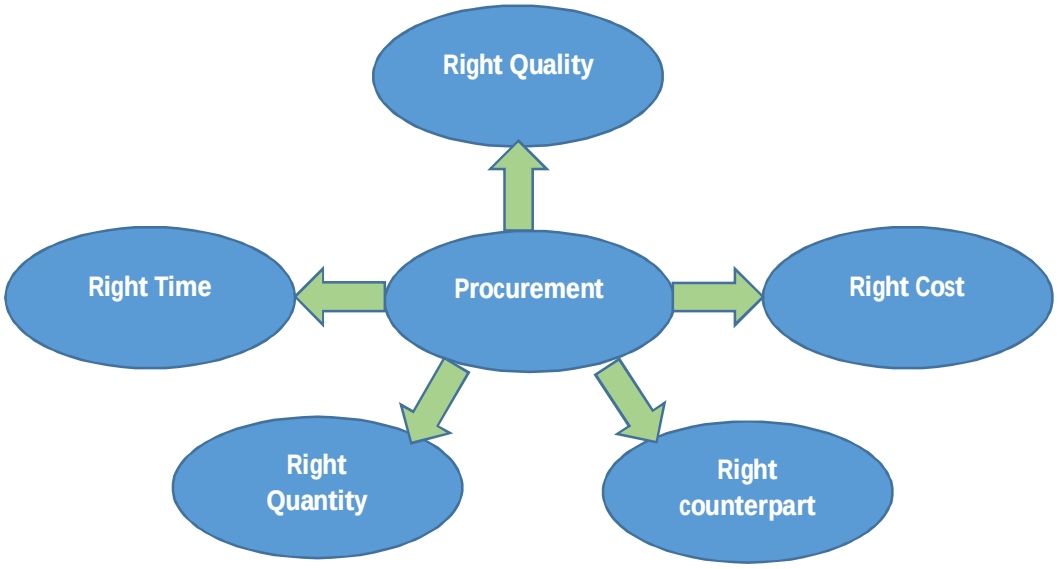


Figure 2.1 The Five rights of procurement [6]

Table 2.1 Rights of procurement [6]

The 5 R's:	This means:
• The **R**ight quality of goods	• Obtaining goods that are fit for the purpose to which they will be put
• In the **R**ight quantity	• In quantities that are appropriate to your needs
• At the **R**ight time	• In time for when you need them so that you're not waiting for them to arrive or, at the other extreme, holding unnecessary stocks
• From the **R**ight supplier	• From suppliers that understand your needs, with whom you've agreed terms and that provide you with a high quality service
• At the **R**ight price	• At prices that reflect market conditions and represent good value i.e. paying less for the same quality of goods or paying the same price for a higher quality (where that higher quality is justified)

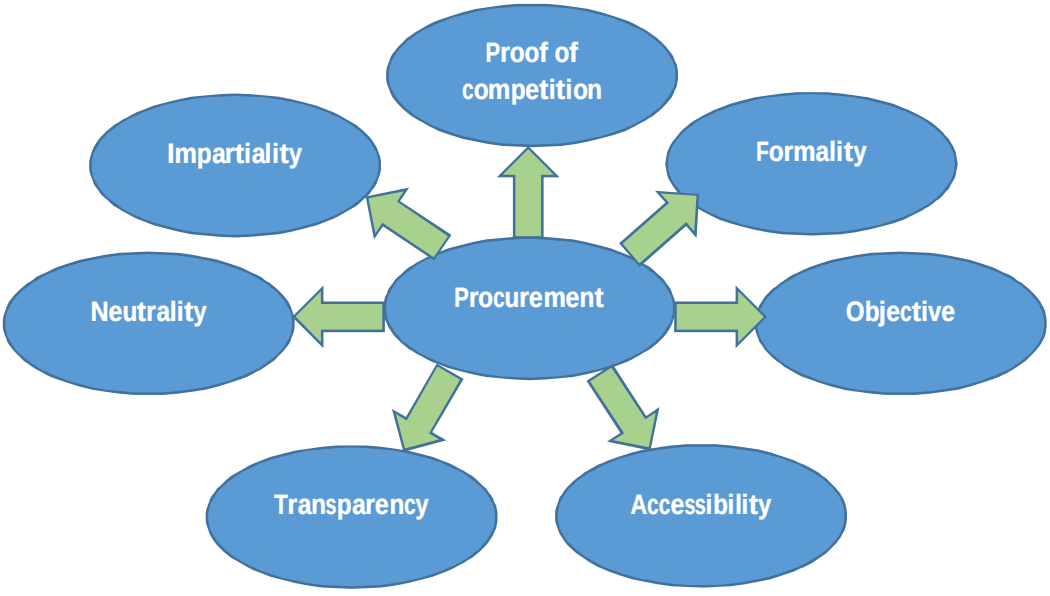


Figure 2.2 Characteristics of procurement [6]

Table 2.2 Seven Characteristics of Procurement [6]

Characteristics	Descriptions
Proof of Competition	Open Competitive Tendering as much as possible.
Impartiality	Equal treatment to all potential tenderers.
Formality	Documented and Recorded procurement process.
Neutrality	Avoidance of specifying a single product or firms.
Objectivity	Defining concise compliance & requirement evaluation including verification methods
Transparency	Public Procurement Process including Advertisement Notice
Accessibility	Bid documents shall be provided reasonably to all bidders from clearly known place(s).

2.1.3 Procurement Methods

Procurement types can be classified based on the things to be procured and the way how they are procured. There are six bases for classifying procurement methods, these are [26]:

Table 2.3 Procurement Classification [26]

Bases	Things Procured	Bidders' Coverage	Geographical Coverage	Procurement Awareness	Procurement Steps
Types	Goods Services Works	Competitive Negotiated	International Regional National Local	General PN Specific PN	Single Two Staged Pre-Qualification Post-Qualification

1. Things to be procured: Goods vs Services vs Works;

Based on things to be procured, procurement types can be classified into three major categories; namely, Procurement of Goods, Services and Works. Depending on the delivery system chosen during the contract planning [26]

A. Procurement of Goods: Physical resources like Materials and Equipment's are made available using Procurement of Goods.
B. Procurement of Services: In the construction Industry (CI) procurement of services are often termed as consultancy services procurement. These include services like Pre-feasibility and Feasibility studies, Design and Contract Administration of projects, Construction Management Consultancy Services, Research or Study based Consultancy Services etc.
C. Procurement of Works: In the CI procurement of works mean the procurement of contractors to carry out the actual physical infrastructures [30].
D. Procurements of Services and Works: Procurement of services and Works means the procurement of consultancy and the construction of actual physical infrastructures done by a single firm.

2. Bidders' Coverage: Competitive vs Negotiated Tendering

Generally, procurement types can be classified into Competitive and Negotiated Tendering when bidders' coverage is taken as a basis for classification.

The objective of competitive bidding is to acquire the goods, or works, or services at the most economic cost to the project owner. This type of tendering is commonly used for the selection of better and capable winning bidder among the various eligible firms. Competitive bidding can either be Open or Limited Competitive Bidding in the form their invitations [27].

As their name implies, while Open competitive bidding allows all eligible bidders to participate; Limited competitive bidding allows a number of selected firms decided by the Project Owners in consultation with concerned parties for qualification. The major difference between open and limited competitive bidding is the addition of qualifying criteria beyond eligibility imposed on the procurement type for limited competitive bidding.

Limited Competitive Bidding is often used when the nature and urgency of the work justifies to do so. In this case limited numbers of eligible firms are invited to participate for the bid. Commonly short listed is done, based on the firms past performance, work load at present, presence of a firm in the vicinity of the projects, knowledge of similar type of works before

and financial and technical capabilities of the firms. Besides, the listing shall take into account the renewal of licenses of the firm and the specific requirements of the employer. These are some of the qualifying criteria used for Limited Competitive Bidding. In such tendering, bidders cannot be rejected as non-responsive for being unqualified technically. Usually in such type of procurement, cost of projects might be higher than expected. To minimize such effects, capable and competent professionals shall negotiate with the winning firm [26].

Negotiated tendering achieves a contract between a client and a contractor by direct negotiation, rather than competitive bidding. This type of negotiation is used to procure services in specialized areas [29].

Negotiated tendering occurs when the client approaches a single supplier based on their track-record or a previous relationship and the terms of the contract are then negotiated.

Negotiating with a single supplier may be appropriate for highly specialist contracts (where there may be a limited number of potential suppliers), or for extending the scope of an existing contract. It can give the client the confidence of working with a supplier they already know, can reduce the duration and costs of tendering and can allow early supplier involvement.

However, unless the structure of the negotiation is clearly set out there is the potential for an adversarial atmosphere to develop, even before the contract has been awarded. Carrying out negotiations in the absence of competition so that both parties feel the outcome is fair can be complex and time consuming.

Negotiated tendering under certain circumstances, which shall be rare in practice. It can be seen as anti-competitive and exclusive, with the potential for relationships to develop between the client and the supplier. Negotiated tendering may not be permitted by some organizations due to the perceived lack of accountability. On public projects, or projects that include a publicly-funded element it may be necessary to advertise contracts [28].

3. Geographical Coverage: International vs Regional vs National vs Local Tendering

Procurement can be made using any of the four methods based on geographical coverage: these are International, Regional, National and Local Tendering. Such types of procurements are generally caused by three major factors. These are Local Capacity, Financial Sources and Globalization.

When projects could not be carried out by local capacity, project owners are forced to make tendering out of their localities. Policies of the financial sources dictate the type of tendering

geographically. For instance, donor financed projects are often practicing International or Regional Tendering. The World trend for Globalization and the principles of Free Trade and Trade Liberalization also encourages international tendering [28]. In Ethiopia practice, Preference Margins in the range of 7.5% are applied to local, national or regional tenderers, which imply tender offers higher than 7.5% will be given preference to encourage local participation [41].

4. Procurement Awareness: General and Specific Procurement Tendering

To enhance proof of competition and increase accessibility, projects are recommended to create awareness starting from its initiation. Following this requirement, General Procurement Notice is made during projects planning phase and it is only interests of the bidders are aroused because sufficient tender documents are not available. This approach is used to the project owners to identify interested bidders to issue invitations by letters and save time, to identify bidders relevant for the procurement required and to protect loss of cost in preparing lots of tender documents. And this approach is used to the bidders to give sufficient time to assess the cost of the project, to protect loss of cost only to participate and to encourage competent bidders who wary about law-balling to participate.

General Procurement Notice (GPN) is of two types. These two types are based on their purpose why and when they are notified. The first type is when the purpose is to create awareness and let bidders' prior information about.

Upcoming projects such that they can follow up its developed and include them in their plan. This type of GPN is used for procurement of works and goods and is often announced as soon as the design implementation service is started. The Second type is when the purpose is to determine interested bidders who could be invited in the form of Limited Competitive Tendering. This type of GPN is used for procurement of services and is often announce after financial sources are determined. GPN covers the Employer and its financiers for its project; Description of the project with its probable or planed implementation time; type of procurement method and address where further information can be obtained.

Specific Procurement Notice (SPN) is an Invitation for Tender or a Request for Proposal when the project is ready for implementation, SPN can be sent to those interested bidders identified following GPN directly. Otherwise, it should be advertise on the bases of enlarging opportunities [26].

5. Procurement Steps: This includes Single vs Two Staged Tendering

Tender procedures will vary depending on the nature of the goods or services that are being procured, but very broadly they can be classified as either single stage or two stages [26].

Single or Two Staged Tendering: Procurement can be made using a single or two staged tendering process. They are related with whether tender packaging for submission separately and their evaluations are staged for a single or two steps when invitations are made [29]. The two staged biddings are made for the submission of technical and financial proposals separately and their evaluations one after the other, According to Ethiopian Procurement Regulations, the following shall be enforced to use Single or Two Staged Tendering: Pre or Post Qualification Tendering

6. Pre or Post Qualification Tendering; Procurement can also be based on Pre - or Post - Qualification processes

Prequalification is an internationally accepted practice in procurement management. It would normally be required for civil works contract of which its nature and cost is large and complex. So far in our country, there is no regulation on such applications but practiced based on Project Owners, Regulators and Financiers initiatives. It is a procedure in which eligible bidders are invited to provide evidence of their ability to perform the services required by the employer. Prequalification is desirable because it enables the Employer to establish the competence of companies subsequently evaluated. It is also in the interest of contractors since, if pre-qualified, they will know that they are competing against a limited number of other firms, all of whom possess the required competence and capability.

Pre - qualification can be of two types. The first is when companies are already considered qualified during their licensing requirements which entitled them for a single stage tendering process. For such types of tendering, the most important tender evaluation criteria become the low priced bid. The second is when two staged tendering is used to pre-qualify tenderers for their technical competency. Once bidders qualify for the tender, either the lowest price bidder or the lowest evaluated bidder based on the weighted average of the technical and financial score will be recommended for award.

Post - qualification is a tendering type where Financial Evaluation is carried out first and rank bidders on the basis of their offer for tender price. That is, Technical Evaluation will be done after the Financial Evaluation. However, Technical Evaluation is performed step by step starting from the lowest financially evaluated bidder until technically or cumulatively qualified

bidder is determined. The advantage of this approach is not to lose the lowest financially evaluated bidder and to save time during technical evaluations. However, post qualification approaches often cause to fix evaluators on financial results and be locked and blasted for successive technical evaluation. Post qualification tendering type is recommended for projects having high construction cost. Dams, high rising buildings and huge infrastructure are good example for post qualification tendering.

2.1.4 Role of procurement in construction industry

To properly manage risks (project construction budget, completion time and quality of work) it is important that procurement decisions are justifiable on the basis of documented facts and analysis. Soundly based decisions involve a comprehensive exploration of a range of potential delivery models and procurement methods to determine the approach best suited to each infrastructure project. By methodically exploring all available options, project owners can ensure that opportunities for achieving increased value-for-money and improved infrastructure investment outcomes are readily identified and capitalized on [5].

An appropriate procurement strategy, which is typically developed during the 'evaluation' or 'definition' phases of a project, is a key determinant of successful project delivery. To develop an effective procurement strategy, it is important to:

- fully understand the project including key drivers, constraints and risks
- assess agency and market capabilities and capacity
- strictly evaluate potential delivery models and procurement methods for suitability
- involve key stakeholders and experts as early as possible in the planning and development process
- challenge assumptions in order to better achieve desired outcomes
- use practical analytical techniques in the decision-making process.

On most projects, clients (usually through their advisers or in-house teams) will start the procurement process by devising a project strategy. With every project, the client's concerns focus on time, cost and quality (or performance) in relation to both the design and construction of the project [3].

2.1.5 History of public procurement in Ethiopia

2.1.5.1 Past development of procurement

Ethiopia historically uses procurement related laws and specific construction works related standard Tender Document prepared previously by Public works (MOC, and MoWUD) and nowadays by Financial and Economic Development (FPPAA) Authorities in order to administer Construction service and works procurements.

Until 2005, there was no comprehensive procurement law at a national level. There were only few articles in the civil code regulating the procurement procedure. In 2005, the Federal government enacted a law providing a detailed procedure of Public Procurement (providing the procedures of Public Procurement and establishing its Supervisory Agency Proclamation No. 430/2005.) This law also establishes a federal agency empowered with regulating the procurement of works, goods and services by Federal agencies [10].

The main aim was to achieve better transparency, efficiency, fairness and impartiality in public procurement and to enable the utilization of the large sum of public money spent on procurement in a manner that ensures greater economy and efficiency by addressing problems encountered in the course of implementation of the proclamation determining the procedures of public procurement of the Ethiopian Federal Government [11].

2.1.5.2 Current situation of procurement in Ethiopia

After four years of the issuance of this law, it was revised and replaced by a new law (The Ethiopian Federal Government Procurement and Property administration Proclamation No.649/2009.) This second proclamation comes with more detailed and clear procedures. It has also widened its scope by providing for the regulation of public property [10].

2.1.6 Procedure of procurement in the Ethiopian construction industry

Procurement procedures are methods used to acquire good quality without cost overrun and time overrun. It explains how to accomplish a task and it also cover all aspects of the procurement cycle. The type of procurements are documented in Chapter 2 sub sections 2.3, each type of procurement has its own procurement procedure. There are two types of procurement procedure;

2.1.6.1 Pre-construction (pre - contract) procurement

The pre-contract stage includes the following:

1. Initiation

The Project Initiation Phase is the first phase in the Project Management Life Cycle, as it involves starting up a new project. A new project is start up by defining its objectives, scope, purpose and deliverables to be produced. We also hire our project team, setup the Project Office and review the project, to gain approval to begin the next phase.

The Project Initiation Phase is the most crucial phase in the Project Life Cycle, as it's the phase in which we define our scope and hire our team.

Only with a clearly defined scope and a suitably skilled team, we can ensure success. The Project Initiation Templates will help us to do this, by giving all of the templates need to initiate new projects now.

These templates describe in depth, the steps taken to initiate a project. They also include loads of practical examples, tips and hints. Using these templates, you'll always have a head-start and you'll never have to start-from-scratch.

2. Pre-Feasibility and Feasibility study

Prefeasibility Study

Before a resource project moves into the feasibility study stage, companies will undertake what's known as a prefeasibility study. Such studies are intended to help determine whether it's even worth it to move to the feasibility phase.

More specifically, studies are designed to select the base case for developing a project. This may include factors such as output and process methods, and will be used to determine whether or not the project is "feasible" and whether it may be developed further.

Before an organization commits to putting up several million dollars to collect information and obtain the required permits, it wants to be sure its investment will pay off. Prefeasibility studies act as one of the first explorations of a potential investment, following a preliminary resource/reserve report and to creation of a model. Based on the data procured by various assessments, a prefeasibility study may occur.

In addition to information relating to geological models and environmental design, prefeasibility studies also take into account factors that may impact or interfere with the final project. This can involve community issues, geographic obstacles, permit challenges and more.

While prefeasibility studies are conceptual in nature, there are some key factors investors will want to be aware of. A comprehensive prefeasibility study should include detailed designs and

descriptions for the project, as well as cost estimates, project risks, safety issues and other important information.

There should also be multiple options included in the study for tackling different issues, as this will provide organizations with more ways to overcome potential challenges.

If a prefeasibility study results in a positive base case, the company will likely move on to the next stage: a feasibility study. If the study is negative, organizations may head back to modified or abandon their potential project altogether.

Feasibility study

The next step, a feasibility study, is intended to evaluate whether a project is possible, both technically and financially. Additionally, feasibility studies are used to help determine whether a project will be profitable.

"A thorough feasibility analysis provides a lot of information necessary for the business plan. For example, a good market analysis is necessary in order to determine the project's feasibility. This information provides the basis for the market section of the business plan."

At this point in the process, organizations already have a lot of money at stake and a drive to see their project through to completion. Therefore, feasibility studies are all about identifying and solving potential issues that may complicate a project.

Feasibility studies are also more focused on the business side of things than prefeasibility studies. For instance, a company will use a feasibility study to figure out how much money it will likely need to meet operating expenses, as well as how much revenue a project needs to bring in to make it worthwhile.

Feasibility studies cover many important issues, chief among them being the technical, economic, legal, operational and scheduling issues related to a project. Good feasibility studies should be able to answer questions regarding all these topics.

More specifically, a feasibility study should feature information about whether a project is technically possible, how much it will cost, whether it's in accordance with the law, how operations will work and when it can be completed [42].

"A feasibility study is usually conducted after producers have discussed a series of business ideas or scenarios," "The feasibility study helps to 'frame' and 'flesh-out' specific business scenarios so they can be studied in-depth. During this process the number of business alternatives under consideration is usually quickly reduced."

In the end, whether or not to continue with a project or settle on a specific business plan comes down to the judgment of the project leaders. A feasibility study is not designed to provide a clear yes or no answer. Instead, it acts as a tool that hopefully provides much detailed information as possible so that they can make intelligent and strategic decisions regarding a project. Feasibility Study Outline is provided to give you guidance on how to proceed with the study and what to include.

3. Design

The two parts of the design stage are schematic design and design development after which the Contract document (or construction document) development stage results in fully completed documents. The process is a continuum, with some overlaps and considerable similarity among the topics and tasks. We begin by describing schematic design.

Schematic design:-The design professional is responsible for producing a set of preliminary drawings as well as written report, for approval by the owner. On a building project, the architect will take the leading developing a design concept with plan, elevation and sectional views that meet the space and programmer requirements. Engineers will develop concepts of how the various systems will fit to the facility: foundation systems, cooling and heating systems and data communication systems. These preliminary drawings may be freehand sketches, but they should illustrate the project's character and emphasize such aspects as harmony with the surrounding area and any improvements, architectural style, exterior appearance, planning and zoning requirements overall structural concepts. Civil engineers will become involved in site analysis and layout, based in part on legal and topographic surveys prepared earlier, with some updating following site selection; features include topography, soil conditions, parking, access, utilities, setback requirements, water features, drainage, required easements and existing structures. Surveyors will continue their previous efforts with title searches, photogrammetry and on-site surveying and mapping. Special consultants may play a role in schematic design.

4. Tendering

Tendering is the process by which bids are invited interested body to carry out specific packages of construction work. It should adopt and observe the key values of fairness, clarity, simplicity and accountability, as well as reinforce the idea that the distribution of risk to the party best placed to assess and manage it is fundamental to the success of a project.

When organizations or individuals wish to have a new facility, or carry out renovation or maintenance of an existing facility, they will be involved in some form of procurement. There are a variety of different methods for procuring this new facility, not all of which involve construction as a solution.

The two most commonly used methods of tendering are single-stage selective tendering or two-stage selective tendering. Both involve the invitation of tenders from firms on a pre-approved, chosen because they meet certain minimum standards in general criteria such as financial standing, experience, capability and competence. The competition element of the tender is provided on the basis of price and quality.

It is worth remembering that every activity in the tendering process has a time and cost implication. It makes economic sense, therefore, not to overburden the participants with unnecessary information requirements, and to concentrate on those which are relevant to the work which is to be undertaken. Faced with competing financial pressures, most contractors will carry out their own assessment of the jobs they wish to tender for, and will be less inclined to bid for those where the procedures involved are perceived as overly complicated or difficult. Also, since preparation costs are included in their overheads, these will ultimately be passed on, in the form of higher prices. Preparation of this information will also be reflected in higher consultancy costs for the employer's team.

The principle of tendering is to ensure that true competition is achieved, as it is evaluated by applying certain criteria. These criteria may be expressed in terms of financial matters, comprising a simple assessment relating to tender sums, or more complex financial evaluation, including consideration of projected costs over the life cycle of the completed project. It could also address other non-financial factors such as time and proposed methods or levels of capability; or sometimes a mixture of both – collectively referred to as a 'quality/price balance' or 'matrix'.

European legislation describes this concept as the assessment of the most 'economically advantageous' option. In order for this to be achieved, however, each tenderer should be able to bid on an equal basis, meaning that they must receive the same information – and most importantly that this information should be sufficient in content and accuracy to allow them to properly assess the implications and bid accordingly.

It is Relevant to all projects and aimed at clients, architects, surveyors, designers, engineers, project managers, this important guide will allows adopting the key values of fairness, clarity,

simplicity and accountability. It also aligns with the principles of sustainable development which require the fair, ethical and transparent treatment of suppliers and the supply chain.

Procurement Preparation phase is meant for the formation of a Procurement Team; the preparation of Tender Documents and their approval for procurement implementations,

Procurement Team: Ethiopian Procurement Regulation states that a Procurement team consisting of a minimum of five members shall be established. As Tender Evaluation is a joint technical and commercial exercise, the project owner shall consider that the necessary experts shall be composed in the procurement team.

2.1.6.2 Construction Stage (post contract) procurement

The post-contract stage has its own project procurement. Project procurement is described as an organized method, or process and procedure for client to obtain or acquire construction products [13]. This stage includes the following:

1. Construction

Construction is the process of constructing a building or infrastructure. Construction differs from manufacturing in that manufacturing typically involves mass production of similar items without a designated purchaser, while construction typically takes place on location for a known client [34]. Construction as an industry comprises six to nine percent of the gross domestic product of developed countries. Construction starts with planning, design, and financing and continues until the project is built and ready for use [35].

Large-scale construction requires collaboration across multiple disciplines. An architect normally manages the job, and a construction manager, design engineer, construction engineer or project manager supervises it. For the successful execution of a project, effective planning is essential. Those involved with the design and execution of the infrastructure in question must consider zoning requirements, the environmental impact of the job, the successful scheduling, budgeting, construction-site safety, availability and transportation of building materials, logistics, inconvenience to the public caused by construction delays and bidding, etc. The largest construction projects are referred to as megaprojects [34].

In general, there are three sectors of construction: buildings, infrastructure and industrial. Building construction is usually further divided into residential and non-residential (commercial/institutional). Infrastructure is often called heavy/highway, heavy civil or heavy engineering. It includes large public works, dams, bridges, highways, water/wastewater and

utility distribution. Industrial includes refineries, process chemical, power generation, mills and manufacturing plants [35].

2. Commissioning and hand over

Project commissioning is the process of assuring that all systems and components of a building or road or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or build.

In practice, the commissioning process comprises the integrated application of a set of engineering techniques and procedures to check inspect and test every operational component of the project, from individual functions, such as instruments and equipment, up to complex amalgamations such as modules, subsystems and systems.

Commissioning activities, in the broader sense, are applicable to all phases of the project, from the basic and detailed design, procurement, construction and assembly, until the final handover of the unit to the owner, including sometimes an assisted operation phase.

The main objective of commissioning is to affect the safe and orderly handover of the unit from the constructor to the owner, guaranteeing its operability in terms of performance, reliability, safety and information traceability. Additionally, when executed in a planned and effective way, commissioning normally represents an essential factor for the fulfillment of schedule, costs, safety and quality requirements of the project [23].

For complex projects, the large volume and complexity of commissioning data, together with the need to guarantee adequate information traceability, normally leads to the use of powerful tools, known as commissioning management systems, to allow effective planning and monitoring of the commissioning activities.

The handover of a project to the client at the end of construction is a very important stage of the project procurement process and facility operation success. A well organized, efficient and effective transfer of information from project works to the client is essential.

The transfer of ownership of the project from contractor to client can have an effect on health and safety, reliability, standards of operation, maintenance and operational cost efficiencies to the client. The transfer/handover period can be a very stressful time for contractors' staff, and owners and occupants alike as spaces become occupied and operation of the facility starts. The

commissioning and fine tuning operations during handover can impact heavily on core business of the client if not managed in a structured manner. The project management process identifies broad activities of the project handover stage.

The handover program shall be organized by the project manager in conjunction with the head contractor and subcontractors.

Projects will require a dedicated project meeting to discuss the project handover process and to agree on requirements and outcomes. The meeting should be held no less than four weeks prior to the proposed project completion date. The meeting agenda would include: introduction and reason for the meeting, plant and equipment asset detail collection, Maintenance manuals, prescribed essential safety and health features and maintenance during the defects liability period (DLP), Understanding and process development, defects management and after-hours callouts, connection and commissioning, systems operational training planning (includes building operations), warranties and guarantees, and security systems (includes key handover process) [22].

2.1.7 Procurement Management Processes in Ethiopia Road Authority

Procurement Management process can be idealized into three major processes. These include Preparation, Tendering, and Evaluation (including Award Recommendation)

Procurement Preparation phase is meant for the formation of a Procurement Team; the preparation of Tender Documents and their approval for procurement implementations,

Procurement Team: Ethiopian Procurement Regulation states that a Procurement team consisting of a minimum of five members shall be established. As Tender Evaluation is a joint technical and commercial exercise, the project owner shall consider that the necessary experts shall be composed in the procurement team.

Tender Documents are prepared to:

- instruct bidders on the procedures for the preparation and submissions of bids,
- inform prospective bidders about the nature of things to be procured,
- inform bidders about the criteria for evaluation and selection of the successful bidder, and
- lay down the contract conditions, delivery system, procurement methods and contract types of the project.

Tender documents include:

- Form of Invitation to Tender or Request for Proposals
- Instruction to Tenderers (Standard and / or Particular information.) or Terms of References;
- Prequalification Documents if necessary Refer procurement methods based on stages
- Forms of Contract Agreement
- General and Particular Conditions of Contract
- Bill of Quantities and Drawings
- Technical Specifications & Methods of Measurement

Approval of Tender Documents: Regulatory requirements enforced for:

- Budgeting, Credit, Assistance and Grant Policies;
- Health, Safety and Environmental Requirements; and
- Professional, Ethical and Legal Requirements
- Demand checking, renewal and approvals of Tender Documents
- Check list for review is the best practice used for Tender Documents approval.

Tendering Phase includes Invitation, Clarification, Submission and Opening of tenders. Normally open tenders are floated for a period between 30 to 45 days, limited and negotiates tenders can be invited between 7 to 15 days. Invitations shall widened opportunities to the project owner by reaching all potential and eligible competitors. The invitation to tender shall clearly state:

- the owner and his desirous service or works
- how long the tender will be floated,
- eligibility requirements,
- how should the tender offer be packed, and
- place to get further information,
- when and where submission and opening of tender will take place.
- where to purchase & submit tender documents,

Clarifications can either be requested by interested bidder or carried out using a pre - tender clarification meeting. In both cases, issues clarified shall be sent (written) to all bidders participating for the intended services or works. The bidders shall submit their offer on or before the submission date and time. Late bids are automatically rejected.

Tender Opening: Bids shall be opened in public on the date, at the time and place mentioned in the invitation to tender and stipulated in the tender documents. Ethiopian practice in tender opening for public construction projects is that, two representatives from MoWUD in addition to the Project Owner, Consultant (if available), and Contractors (Who wish to attend) representatives shall attend during the tender opening ceremony.

The following will be carried out during tender opening:-

- Tender Attendee members shall take their place and be registered,
- Tender box opened and checked for faulty things,
- Check the tender is the right one,
- Bids will be opened one after the other,
- All necessary data which deem useful such as Project Name, Name of bidder, Bid Bond Amount, Tender Price, etc. will be read aloud and recorded at the opening of bids.
- Bidders representative shall sign a register to attest their presence during opening, and
- Tender committee members shall sign on the Tender documents.

Tender Evaluation Phase: is made to determine and make award recommendation for the least evaluated bidder using preliminary and detail evaluations. The recommended winner may or may not necessarily be the lowest bidder. Factors such as technical qualification, completion time commercial terms of the offer, etc are used in determining the least evaluated bidder.

Preliminary Evaluations are made Eligibility and Arithmetic Review requirements. Before commencing the actual evaluation, it is useful and recommended to complete a Basic Data Sheet for each tender to record key information and enable coding.

Eligibility Requirements: Tenders are subjected to eligibility qualifications before they enter to bid and their respective evaluations. Most often sited issues considered in eligibility requirements are:

- Valid & Up to date Trade and Professional License,
- Valid & Up to date Membership to Financier Organizations,
- Valid provision of Bid Security or Bond,
- Completeness and submittals of all required documents
- Turnover requirements fulfilled
- Appropriate invitation, packaging and submission requirements and
- Power of Attorney, signature and sealing requirements

These eligibility requirements together with basic alterations of the conditions of the tender will be considered for responsiveness or not. If the bidder offer provided weighs a major deviation from the tender condition, the tender will be considered non - responsive and could not be further considered. But if it is minor deviation, either the procurement team use their discretionary power to request clarification or the case will be recorded and taken up during negotiation if the respective winner became the least evaluated tender. When the first approach is chosen, the bidder is not allowed to change any information that can substantially affect the tender evaluation. For guideline during tender evaluation: table - outlined when a tender is considered major deviation or not.

Table 2.4 Major and minor deviations during tender evaluation

Major Deviations	Minor Deviations
Affecting the validity of the bid	Do not affect the triple constraints of the project
Rejection or Disqualifying conditions stated	Do not result in change of Bid Price
Substantial effect on the Bid Price	Non conditional tenders

Arithmetic Review: Most tenders are often submitted hastily. As a result, tenders are not arithmetic error free. If tenders are processed without arithmetic checks, on the first piece tenders are not evaluated on the bases of equal merits and if they become binding contracts being over-sighted, they will be the cause for potential disputes. Therefore, it is a formal evaluation process to review arithmetic before carrying out detail evaluations. Arithmetic review can be done if and only when financial proposal are opened.

Detail Evaluations include Technical and Financial Qualification requirements. Evaluations at this stage should first and foremost critically see the technical and commercial offers and establish system that can ensure common bases for comparison. Finally, the financial offer will be updated using Absolute Results from Commercial comparisons.

Financial Offer Comparison: After all comparisons are considered on the same bases; the Tender offer will be adjusted based on the Cost - Benefit principle which involves adding costs and benefits foregone. Besides, the preference margin will also be deducted and Least evaluated Bidder is Determined.

Besides, Financial offers per groups of trades of works are compared in order to evaluate whether tenders are front loaded or not. Front loading often cause disruption of projects or overzealous contractual negotiations.

Rejection of All Tenders though is solely the power of the employer to decide, for the sake of fairness it is recommended that such rights shall be exercised in the following cases:

- All Tenders are found non — responsive during the Preliminary evaluations
- Evidences of lack of competitions such as collusion among bidders, monopoly, etc
- Lowest responsive offer is found unreasonably high.

The following procedural Flow Chart is recommended for Tendering following the Pre-Qualification procedural flow chart.

Table 2.5 Pre-qualification procedural flow chart of ERA [26]

Procedure	Employer / Consultant	Contractors
Procurement Document Tender Document Preparation	➢ Letter of Invitation ➢ Instruction to Bidders ➢ Conditions of Contract ➢ Drawings, Bill of Quantities,	➢ Check Eligibility ➢ Check Competitive Advantage. ➢ Collect Information ➢ Decide to participate, Forms, Formats and Schedules. etc
Issuance of Tender Documents Tendering Phase	➢ Advertisement or invitation ➢ Project Scope, Location, Source of finance ➢ Issue, Submission and Opening dates of Tenders, Forms, Formats and Schedules. etc	➢ Request and Obtain Tender does.
Clarification and Site Visit Tendering Phase	➢ Arrange date and Time for Pre Bid Submission Meeting ➢ Send all clarifications to all bidders ➢ Arrange date and time for site visit ➢ Prepare and Issue Addenda for all Clarifications	➢ Request & Obtain Clarifications ➢ Request and Visit Site ➢ Acknowledge receipt of all clarifications
Submission of offer Tendering phase	➢ Receive Offers ➢ Record date and Time of Receipt ➢ Reject Late Offers	➢ Complete and Submit Offers together with relevant information.
Opening of Tender Tender Evaluation Phase	➢ Open Tender in the presence of relevant attendee ➢ Announce and Record Tenderers and all offer information	➢ Attend Tender Opening Ceremony

Evaluation of Tenders Tender Evaluation Phase	➢ Review conformity and completeness of Tender ➢ Evaluate-Alternative tenders and deviations ➢ Reject Substantially non Responsive and non-conforming Tender	➢ Provide Clarification if ➢ Requested Approval by Regulator & Financier
Selection and Award Recommendation Tender Evaluation Phase	➢ Select Least Qualified and Evaluated Bidder ➢ Propose Award Recommendations ➢ Decide if further Negotiation is required or not Approval by Regulator & Financier	

In Ethiopia the major construction is the federal government. And the most common procurement method is the low-bid procedure in which contracts are awarded to a responsive contractor who offers the least price. The prequalification and bid evaluation processes requires the development of necessary and sufficient criteria. The last two decades have witnessed a huge development in project complexity and clients need and this has led to an increasing use of alternative forms of project delivery systems. In contrast, the prequalification and bid evaluation process, quantifying and assessment of criteria are still in its original form. Prequalification provides a client with a list of contractors that are invited to tender on a regular basis. This is the approach most currently used by many countries and in which many and different types of criteria are considered to evaluate the overall suitability of contractors.

There are definite benefits and drawbacks to the low-bid award system. Promoting competition amongst contractors is a clear benefit to the process. It compels the contractors to lower their costs, usually through innovation, to ensure they win bids and maintain their profit margins. In addition, the process is beneficial specifically to the public sector because of the transparency, an important criterion of public policy (Photios, 1993). However, allowing projects to be awarded based on the least price has inherent flaws. Delays in meeting the contract duration, increment of the final project cost due to high variations, tendency to compromise quality, and adversarial relationship among contracting parties are the major drawbacks associated with responsive low-bid award procedure (Thomas, 2009). Moreover, the low-bid award system encourages unqualified bidders in the competition and in contrary it discourages qualified contractors to participate.

According to Hardy (1978), the criteria used for bid evaluation should reflect the client's objectives. These are that bids are fully responsive to the contract and bidders are sufficiently well qualified to undertake the contract. The criteria for selecting the successful bidder are then

that bid which maximizes the return on the client's investment. Thus he has proposed that bidders should submit a schedule of the payments they expect to fall due to them during the contract.

In a survey conducted in Ethiopian Road Authority; compromising quality; and escalation of the final project cost from the estimated cost and time overrun were the major problems associated with the existing approach of Procuring projects (Lemma, 2006). Poor initial funding of the project by the contractor and lack of timely resources of materials, machineries and workforces are also the major factors identified as causes of delays during the construction phase in Ethiopian construction industry (Abdo, 2006).

The construction process involves multi-organizational activity. Conflict and disputes can therefore exist at all levels in the contractual chain: between client and consultant, client and contractor, client and sub-contractor, and so on. Among many causes of disagreements in the construction project, the project delivery system selected is one of the significant elements (Abera, 2005).

2.1.8 Legal Aspects

The Federal Government of Ethiopia has statutes requiring submission of competitive bids for construction projects. This statute requires public organizations to award such contracts to the "lowest responsive bidder." The word "responsive" is inserted to require that a successful bid must also be adequately responding to the requirements of the project as specified. While it is not too difficult to determine whether a bid is responsive because responsiveness is evaluated based on the documents submitted by contractors, it takes considerable amount of time and effort to ascertain whether a bid is responsible. The bidder must also have the requisite judgment, skill, ability, and integrity to perform the contract according to its terms (Irtishad, 1993).

For two reasons application of this requirement becomes difficult. First, there is generally a narrow window of time available between a bid opening and the award of the bid. Second, although the law allows public organizations to reject any or all the bids, the rejection cannot be done arbitrarily or in bad faith. When it is the low bid which is rejected, particularly close scrutiny of the reasons given for the rejection is warranted. For these reasons, the decision to reject a low bid on the ground that the bidder was not responsible enough is dependent on the discretion of the organization. In most cases some degree of subjectivity gets involved in the process of determining whether a particular bidder is responsible. As a consequence, these

kinds of rejections frequently give rise to resentment and may end up in court. To avoid these problems, many public organizations take only responsiveness of the bid in consideration before making award decisions. Some public organs use a stringent and specific set of prequalification procedures.

2.1.9 Federal Procurement Laws

The Ethiopian Federal Government procurement and property administration proclamation no 649/2009 article 33 (1) states six methods of procurement for public goods and services, viz. open bidding, request for proposal (RFP), two stage tendering, restricted tendering, request for quotation and direct procurement.

The proclamation, however, limits public bodies to use open bidding as the preferred procedure of procurement except as otherwise provided in the proclamation to use other options (article 33(2)). Restricted tendering is allowed only when the required object of procurement is available only with limited suppliers and the cost of the procurement does not exceed the limit in the directive issued by the Ministry; or where a repeated advertisement of the invitation to bid fails to attract bidders in respect of a procurement subject to the directive to be issued by the Ministry (article 49). The total contract value of procurement made by restricted bidding is limited by the federal public procurement directive to 2 million birr for works (article 23.3).

Direct procurement is allowed when there is no competitions for technical reasons and if the required service can be supplied or provided only by one candidate. Or when there is a need of similar service or repetition of works from one supplier and when the total contract value is not exceeding the limit stipulated in the directives (article 51). The maximum contract amount allowed in the directive for direct bidding for works is similar to the restricted bidding (article 9).

The third type of procurement for public bodies is request for proposal (RFP). RFP is allowed only when the public body seeks to obtain consultancy services or contracts for which the component of consultancy services represents more than 50% of the amount of the contract (article 53).

The other two types of procurements are request for quotation and two stage bidding. Request for quotation is allowed when there are readily available goods or for procurement of works or services for which there is an established market, so long as the estimated value of the contract does not exceed an amount stated in the procurement directives issued by the Ministry (article

55). Two stages bidding on the other hand is permitted when it is not feasible for the public body to formulate detailed specifications for the goods or works such as, contract for the purpose of research, experiment, study or development etc. (article 57). The maximum contract amount provided for works in the directive to use request for quotation is 250 thousand birr (article 24.2).

In general, alternative procurement procedures other than the open bidding cannot be applicable for most public bodies' construction contracts as most public bodies' construction contracts are more than the limits specified in the maximum limit provided in the directive. In addition, the conditions set forth for the use of other alternatives are not usually fulfilled for construction work contracts except in rare cases.

Out of the six methods of procurement open bidding and restricted tendering are the only procurement methods that applicable by ERA.

As this research focuses on construction works contract for public bodies under the federal government of Ethiopia, Late us compeer examination and evaluation by Ministry of Works and Urban Development Amendment on March 2001, Public Procurement Agency (PPA) January 2006 and Public Procurement and Property Administration Agency (FPPPAA) April 2011 of bids in the open tendering procedure.

2.1.9.1 Examination and Evaluation of Bids

The proclamation defines the successful bidder as follows: the bid that is found to be responsive to the technical requirements and with the lowest evaluated price (article 43(8)). The responsiveness is determined by the technical evaluation of bidders. In order to participate in public procurement, candidates must qualify by meeting the following criteria and such other criteria, as the public body considers appropriate under the circumstances: that they possess the necessary manpower, equipment, financial and technical capabilities; that they have legal capacity to enter into the contract; that they are not insolvent; that they are registered in the suppliers list, that they are not suspended from participating in public procurement in that period; that they have renewed trade license and tax clearance; and that they have a bank account (article 28).

Any requirements required by the public body will be set forth in the bid documents or other documents for solicitation of proposals, and deemed to apply equally to all candidates. In addition, in the process of selecting the successful bidder, the public body should only consider

substantially responsive bids for further evaluation and comparison in accordance with the criteria set forth in the bidding documents (article 43(6)).

Procurement of Works for National Competitive Biddings (NCB) Public Procurement Agency (PPA) January 2006

In addition to the basic requirements defined in the proclamation article 28(1) and in accordance to ITB Sub-Clause 4.5, bidders are required to meet the minimum qualifying criteria set forth in the qualification criteria in the bid document (section 3: evaluation and qualification criteria).

Table 2.6 Qualification Criteria recommended by PPA 2006 users guide [43]

No.	Qualification Criteria	Minimum Requirements
1.	Average annual volume of construction work over the past [For major contracts, it is normally 5 years, for smaller contracts 3 years would be sufficient]	At least [Ideally the minimum value of the annual turnover of construction work should be set at not less than 2.5 times the estimated annual cash flow for the Contract. For low risk works, this minimum could be reduced to 2 times or less]
2.	Experience as a prime contractor in the construction of at least [number of similar contracts, which should be in the range of one to three, depending on the size of contract, risk of contractor default and market conditions]	Works of a nature and complexity equivalent to the Works over the last [number of years, normally in the range of five to ten. For smaller contracts, low risk works or a newly established local industry, the number of years could be reduced to 3] years (to comply with this requirement, works cited should be at least 70 percent complete).
3.	Proposal of the timely acquisition of equipment's (own, lease, hire, etc.) of the following essential equipment:	[List of equipment, For smaller contracts, the list should be limited to specialized items that are critical to the execution of the contract and that may be difficult for the successful Bidder to obtain quickly]
4.	Personnel with specific qualification and experience	[Qualifications and experience required for key personnel e.g. "a Contract Manager with five years' experience in works of an equivalent nature and volume, including no less than three years as Manager". Personnel requirements should be limited to key site management and technical personnel, who will be responsible for major components e.g. site superintendents, contract manager etc.]
5.	Liquid assets and/or credit facilities net of other contractual commitments and exclusive of any advance payments which may be made under the Contract	Of no less than [amount]. [The successful Bidder must demonstrate that it has or has access to the financial means sufficient to meet the construction cash flow requirements for the contract. The minimum liquid assets and credit

		should normally be set as the estimated payment flow over approximately 3 months at the average ("straight lined") construction rate.]

Procurement of Works for National Competitive Biddings (NCB) Public Procurement Agency (PPA) January 2006

In addition to the basic requirements, in accordance to ITB Clause 22, bidders are required to meet the minimum qualifying criteria set forth in the qualification criteria in the bid document (section 3: evaluation and qualification criteria).

Table2.7 Qualification Criteria recommended by FPPPAA 2011 user's guide [40]

FACTOR	CRITERIA					
	Requirement	Bidder				Documentation Required
		Single Entity	Joint Venture, Consortium or Association			
			All Partners Combined	Each Partner	At Least One Partner	
1. Legal Technical of the Bidder						
1.1 Nationality	Nationality in accordance with ITB Clause 4.2.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet
1.2 Conflict of Interest	No conflict of interest as described in ITB Clause 6.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet
1.3 Registration in the FPPA's Suppliers List	Having been registered in the Public Procurement and Property Administration Agency's Suppliers List in accordance with ITB Clause 4.7.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet
1.4 Debarred by decision of the PPPA	1.1 Not having been debarred by decision of the Public Procurement Agency from participating in public procurements for breach of its obligation under previous contracts in accordance with ITB Clause 4.3.	Must meet requirement	1.2 Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet
1.5 Valid trade license or business organization registration certificate	Having been submitted valid trade license or business organization registration certificate issued by the country of establishment in accordance with ITB Clause 4.6.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet with attachments

FACTOR	CRITERIA					
	Requirement	Bidder				Documentation Required
		Single Entity	Joint Venture, Consortium or Association			
			All Partners Combined	Each Partner	At Least One Partner	
1.6 VAT registration certificate	Having been submitted VAT registration certificate issued by the tax authority (in case of contract value of Birr 100,000.00 and above) in accordance with ITB Clause 4.6.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet with attachments
1.7 Valid tax clearance certificate	Having been submitted valid tax clearance certificate issued by the tax authority (Domestic Bidders Only) in accordance with ITB Clause 4.6.	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bid Submission Sheet with attachments
1.8 Government Owned Entity	Compliance with conditions of ITB Clause 4.4	Must meet requirement	Must meet requirement	Must meet requirement	n/a	Bidder Certification of Compliance with attachments
2. Professional Qualification and capacity of the Bidder						
2.1 Number of Staff	At least staff currently work for the bidder.	Must meet requirement	Must meet requirement	n/a	n/a	Bidder Certification of Compliance
2.2 Personnel for the key position	Among the staff mentioned in sub-Clause 2.1 Bidder must demonstrate that it will have the personnel for the key position that meet the following requirement;	Must meet requirement	Must meet requirement	n/a	n/a	Technical Proposal Form PER 1 With Attachments
	<table><tr><td>No.</td><td>Position</td><td>Total Work Experience</td><td>Experience in similar Works</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>					

FACTOR	CRITERIA

	Requirement	Bidder				Documentation Required
		Single Entity	Joint Venture, Consortium or Association			
			All Partners Combined	Each Partner	At Least One Partner	
3. Technical Qualifications, Competence, and Experience of the Bidder						
3.1 General experience	The Bidder has successfully completed at least contracts with a budget of at least that of this contract in the past years	Must meet requirement	n/a	Must meet requirement	n/a	Bidder Certification of Compliance with attachments
3.2 Specific experience	The Bidder has successfully participated as contractor or subcontractor, in at least contracts within the last years, each with a value of at least, that have been successfully and substantially completed and that are similar to the proposed Works.	Must meet requirement	Must meet requirement for all characteristics	n/a	Must meet requirement for one characteristic	Bidder Certification of Compliance with attachments
3.3. History of non-performing contracts	Non-performance of a contract did not occur within the last years prior to the deadline for Bid submission, based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the bidder have been exhausted.	Must meet requirement by itself or as partner to past or existing JV	n/a	Must meet requirement by itself or as partner to past or existing JV	n/a	Bidder Certification of Compliance
3.4. Pending litigation	All pending litigation shall in total not represent more than percent of the Bidder's net worth and shall be treated as resolved against the Bidder	Must meet requirement by itself or as partner to past or existing .JV	n/a	Must meet requirement by itself or as partner to past or existing JV	n/a	Bidder Certification of Compliance

<table>
<tr><th rowspan="3">FACTOR</th><th colspan="5">CRITERIA</th></tr>
<tr><th rowspan="2">Requirement</th><th colspan="4">Bidder</th><th rowspan="2">Documentation Required</th></tr>
<tr><th rowspan="2">Single Entity</th><th colspan="3">Joint Venture, Consortium or Association</th></tr>
<tr><th>All Partners</th><th>Each Partner</th><th>At Least One</th></tr>
<tr><td>3.5. Equipment for the implementation of the contract</td><td>The Bidder must demonstrate that it will have available for the implementation of the contract the following equipment listed hereafter:</td><td>Must meet requirement</td><td>Must meet requirement</td><td>n/a</td><td>n/a</td><td>Technical Proposal with attachments</td></tr>
<tr><td></td><td colspan="5"><table><tr><td>No.</td><td>Equipment Type and Characteristics</td><td>Minimum Number Requirement</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td colspan="7">4. Financial Standing of the Bidder</td></tr>
<tr><td>4.1 Historical Financial Performance</td><td>Submission of audited balance sheets and other financial statements as required in the BDS Clause 17, for the last years to demonstrate the current soundness of the Bidder's financial position and its prospective long term profitability.</td><td>Must meet requirement</td><td>n/a</td><td>Must meet requirement</td><td>n/a</td><td>Bidder Certification of Compliance with attachments</td></tr>
<tr><td>4.2 Average Annual Turnover</td><td>The average annual turnover calculated as total certified payments received for contracts in progress or completed within the last years must exceed times the amount of the financial proposal of the Bid.</td><td>Must meet requirement</td><td>Must meet requirement</td><td>Must meet % of the requirement</td><td>Must meet % of the requirement</td><td>Bidder Certification of Compliance with attachments</td></tr>
<tr><td>4.3 Financial Resources</td><td>The Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered realassets, lines of credit, and other financial means, other than any contractual advance</td><td>Must meet requirement</td><td>Must meet requirement</td><td>Must meet % of the requirement</td><td>Must meet % of the requirement</td><td>Bidder Certification of Compliance with attachments</td></tr>
</table>

These are the major qualification criteria stipulated in the contract document. In addition, a consistent history of litigation or arbitration awards against the Applicant or any partner of a Joint Venture may result in disqualification. The detail however is determined by the nature of the construction project.

According to the proclamation article 43(3), the public body regards a bid as responsive only if it conforms to salient requirements set forth in the bidding document. And any public body should not award a contract when the bid is not responsive (article 43 (5-c)). It is also clearly stated in the PPA that The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 26 (clause 28.1).A substantially responsive Bid is one, which conforms to all the terms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one

(a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids (clause 26.2).

Prior to the detailed evaluation of bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in ITB Clause 3; (b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the bidding documents (clause 26.1).If a Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation (clause 26.3).

The employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated Bid price (clause 30.1). However, the employer reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action (clause 31.1).

2.1.9.2 Tender Evaluation and Analysis Amendment by Ministry of Works and Urban Development- March 2001

The Ministry of Works and Urban Development (MoWUD) was the authorized public body in the procurement of all works under the Federal Government of Ethiopia until 2006. However, after the establishment of Public Procurement Agency (PPA) in 2006, the procurement of all Federal Government works and services have been guided by the rules and regulations prepared by this agency.

The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001. The basis for the modification were, according to the letter from the Ministry on the 14th day of March 1993 EC, Ref. no H1-T1 240/21, to improve the procurement of public construction works by avoiding abnormally low bids. The Ministry, accompanied to the letter referred above, has tried to show the modification through the following example. For further investigation sample calculation is appended on Appendix 1.

2.1.9.3 Tender Evaluation and Analysis by Public Procurement Agency (PPA) January 2006

The evaluation and qualification on PPA 2006 is depends on section 1, Instruction to bidder and section 2, Bid Data sheet , contain all the factors, methods and criteria that the Employer shall use to evaluate and determine whether a bidder has the required qualification. No other factor, method or criteria shall be used for technical evaluation.

It is a two stage bid evaluation system the first one is technical evaluation and the second one is the financial offer. The first one is the technical evaluation, Bidders who score above 70% will be participate for farther financial evaluation. The successful bidder will be the least bidder whose offer is less than the other bidder.

2.1.9.4 Tender Evaluation and Analysis by Property Administration Agency (FPPPAA) April 2011

According to the methodology defined in the Public Procurement Proclamation and Directive the Public Body shall select the successful Bid by applying the following method:

A. Lowest Bid Evaluation

The bids shall be examined to confirm that all documentary evidence establishing the Bidders' qualifications requested. After confirming the bids comprise all mandatory documentary evidence establishing the Bidder's qualification the Public Body will rule on the

legal, technical, professional, and financial admissibility of each bid, classifying it as compliant or non-compliant with qualification requirements set forth in the Bidding Document. The Public Body will then analyze the bids' technical conformity in relation to the technical specifications, classifying them technically compliant or non-compliant. The Evaluation will continue until determined the substantial responsive with rectification of nonconformities and omissions in bids, if any.

The Public Body shall examine all Bids to ascertain whether there are any arithmetic errors in computation and summation. The Public Body shall notify Bidders on adjusted calculation errors and request bidders to confirm that they accept the correction of the calculation error within the time limit of three days from the receiving of the notification.

The final stage is awarding of the contract the Bidder who's Bid has been determined to be substantially responsive to the Bidding Documents and with the lowest price.

1. Evaluation of the Technical Proposal

All mandatory legal, professional, technical, and financial requirements have been met all technically compliant Bids shall be evaluated and scored using the two-stage bid evaluation and scoring method. In accordance with ITB Clause 38.3(f), the Public Body's evaluation of the Bid will take into account, in addition to the bid price, the following technical evaluation criteria in order of their importance and their proportional weight in the total system of evaluation.

Individual weighted scores for all technical evaluation criteria shall be weighted according to the set proportional weighting factors. The weighted result shall be calculated by multiplying the score by the proportional weighting point of the individual criterion. Bidders getting score less than [insert percent] percent in the technical evaluation shall be rejected.

2. Evaluation and Comparison of Bid Price

In the financial evaluation, the highest point shall be given to the lowest priced Bid, and conversely, the lowest point shall be given to the highest priced Bid; among technically qualified Bids. The points given to other Bidders shall be determined depending on their price offers.

From the total merit points to be given for proposals submitted by Bidders in a bid for procurement of Works, the share of Technical Proposal shall be [insert percent] percent and the remaining [insert percent] percent shall be the share of the Bid Price.

The formula for determining the financial score is the following:

$$FS = \left(\frac{LFP}{CFP}\right)100 \quad \text{……..……Eq 2.1}$$

Where: FS = The Bid Price Score;

LFP = The lowest Bid Price;

CFP = The Bid Price under consideration

The Public Body shall then add the technical score to the Bid Price score to determine the aggregated (total) Bid score and final ranking of Bids by applying the following method:

For each Technical Proposal its technical evaluation score shall be normalized according to the highest evaluated technical score that will get 100 points according to which other scores of technical criteria shall be proportionally ranked. Normalization is the transformation that is applied equally to every element in the group of data so that the group has a specific statistical characteristic.

The Public Body shall apply the following formula for the normalization of values of the technical evaluation results:

$$TSN = \left(\frac{CTP}{HTP}\right)100 \quad \text{……...……..…….Eq 2.2}$$

Where: TSN = Normalized Bid Technical Proposal Score;

CTP = The technical evaluation score for the Bid under consideration

HTP = The highest evaluated Technical Proposal score

The Public Body shall award the contract to the Bid that has the highest point in the total sum of results of the technical and Bid Price evaluation. Where two Bidders get equal merit points in the evaluation, preference shall be given to local Bidders. The Public Body may require Bidders scoring equal merit points in the evaluation to submit further Proposals on certain aspects of the Bidding Document with a view to identifying the successful Bidder. Where by reason of the Bidders scoring equal merit points not submitting final proposals they are invited to submit, or by reason of the evaluation result of the final proposals submitted by the Bidders being still equal the successful Bidder cannot be singled out, the successful Bidder shall be determined by casting lot in the presence, as far as possible, of the Bidders concerned.

2.1.10 Procurement related factor that influence project performance

Different procurement related factors that can affect project performance. Pre-construction time, control of project design and cost and client's control of construction projects are procurement related factors whose influences were found on procurement methods of Traditional, Design and Build and Management Contracting in construction industry [14].

Concentration on allocation of responsibilities, activities sequencing, process and procedure and organizational approach as procurement related factors are affect project performance. Important procurement related factors considered at the design stage as bid invitation, bid evaluation, sub contracting selection, compensation factors and performance evaluation which were termed procurement procedures were found to have effects on project performance [15].

Researchers and organizations have focused on the three project performance criteria of cost, time and quality. Recently, many studies have, however, included also other performance aspects, such as health and safety, environmental performance, customer satisfaction, and innovation [16.] Next, the six areas in which construction projects are evaluated will to brief.

1. Economic performance (Construction Budget)

This has traditionally been seen as one of the most important areas – if the economy of the project is off, the project can seldom be seen as a success. Overall project cost, i.e. the overall cost that a project incurs from inception to completion, is of major interest as it shows the resource usage in economic terms. Another important aspect regards cost predictability, that is, whether the final overall cost is in line with the initial cost estimate [17]. Cost overruns can be a source for problems for an otherwise successful project as contractors are frequently criticized for the common occurrence of cost overruns (sometimes labeled cost growth) in construction projects [18].

2. Time performance

Project duration is simply the number of days/weeks/months from start to completion of the project. Since time can be a critical issue for many clients, project duration is often of prime interest. However, schedule overruns may be an even more important issue [16].

Completing projects in a predictable manner on time (within schedule) is an important indicator of project success and the construction industry is frequently evaluated for project

delays. Schedule overruns (sometimes labeled time growth) are often very negative since they hinder the client to start using the end product as planned.

3. Quality

Satisfactory time and cost performance is of little value if the project delivers low-grade quality. The concept of quality is closely related to customer satisfaction, which has gradually been elevated in importance in the construction industry [16]. Customer satisfaction is commonly described as a comparison between the customer's pre-construction expectations and their post-construction perceptions. Hence, it involves the customer's final feelings about whether the outcome provided a satisfying or dissatisfying experience [19]. Since construction industry products are highly modified and co-created during the construction process, the concept of quality regards both the final product and the process during which is produced.

The word quality has been used for several distinct purposes. These can be grouped into the following three categories:

1. Comparative sense: as a degree of excellence, whereby, products may be ranked on a relative basis, sometimes referred to as grade [38].
2. Quantitative sense: as in manufacturing, product release and for technical evaluations, sometimes referred to as quality level [38].
3. Fit-for-purpose sense: relates the evaluation of a product or service to its ability to satisfy a given need [20].

It is evident from the above that the prime direction of quality systems is to satisfy the internal needs of the organization and its quality policies. Therefore, while these policies need to be cost-effective, they should comply with the good practice that is acceptable within construction industry [20].

4. Environmental performance

Environmental management in construction has become a critical issue in recent decades since the actors start to acknowledge that the construction industry is one of the major contributors to environmental problems. Environmental impact is affected by both the activities performed during the construction process and the material and technical solutions incorporated in the end product. Furthermore, the environmental performance depends not only of choices made but also how these choices are executed. Hence, two main aspects can

be identified within this area. First, it is in what degree the construction actors make environmentally friendly choices of material and processes, i.e. in the planning and procurement choose those material and those methods that will leave the least environmental "footprint" over the construction's life span (not only the construction period). Second, it is about how the material and processes are used during construction, i.e. environmentally friendly use of material and processes. With little concern over environmental impacts, excess loss of material and improper waste treatment are always common in the construction industry [16].

5. Work environment

Having a safe and healthy work environment for those involved in the construction process is another important indicator for a successful project performance. Construction has a poor record in this area and is still today generally a dangerous work place. However, this does not mean that a project can allow the work environment to continue to cause project participants to become ill or even die. Rather, it is the opposite. A construction project must not harm those involved, if it can be helped. A failure to succeed with this may cause long-term problems as it reduces the legitimacy of those responsible. A risk-free work environment is today seen as necessary for achieving other goals linked to cost, time and quality [21]. The most important sub-facets of work environment are health and safety. Health is concerning the physical and mental well-being of those who are involved in a construction project. Physical health issues (such as back injuries are more likely to concern those working at the construction site, while mental health issues (such as stress) are more likely to be common among off-site workers. Safety is about avoiding accidents of any kind that can cause injuries or even fatalities for those involved in the construction process. A safe project has few accidents in relation to the total man-hours worked on the specific project [18].

6. Innovation

Traditionally, the construction sector has been seen as a low technology industry, with little innovation compared to other industries. Actually, many of the problems outlined in the introduction can be seen as symptoms of a lack of new thinking and innovative action. During recent years, innovation in construction has received increasing interest in an explicit manner, both among practitioners and academics. Innovation thus seems to be a success criterion to be reckoned with. There are two aspects of innovation. First, product innovation implies innovation in the final construction, for instance in terms of innovative architecture or

innovative features in other aspects of the building. Second, process innovation, is about novel ways to work with the actual construction phase. It can comprise new ways to organize the work, new construction methods, etc...

2.1.11 Applicable Laws, Rules, Regulations and Guidelines

The following Rules, Regulations and Guidelines are useful for Procurement and Contract Management [26]:

- INCOTERMS, UNICETRAL and Other Internationally acknowledged Construction Related Laws and Regulations
- Construction related Codes of Practices such as EBCS 1 — 12 by MWUD

2.2 Procurement, Contract and Contract Management

2.2.1 Introduction

Construction Industry involves procurement and contract management systems in order to ensure fair competition and distributions of obligations and rights among stakeholders. Competition helps:

- the Project Owners' to acquire the five rights (Counterpart, Cost, Time, Quality and Quantity) s/he is entitled to, for detail information please refer sub section 2.1.2
- the Project Financiers' and Regulators' to value market principles and effective utilization of finance such that lowest qualified bids takes the project , and
- the Project Providers' to get impartial and neutral opportunity for business.

Obligations and Rights help to allocate appropriate risks among contractual parties and their remedial rights. That is, their entitlements and provisions are clearly stated and agreed upon.

Project Owners shall consider its own particular institutional and technical SWOT (Strength Weakness Opportunity and Threats (including access to financing) before selecting which procurement and contract forms to adopt for its projects. These include the design source, allocation of coordination responsibilities and the pricing methods.

Each type of contracting affects, in its own way, the allocation of responsibility & the demands on the Employer for coordination of the project. Through properly allocating these responsibilities for the project to reflect the results and recommendations SWOT's, Project Owners' can rationalize the contract price against its exposure to project risks. Project

Owners' are at liberty to use either its own in-house capacity or to allocate them to one or more other parties (Private and / or Public).

Procurement and Contract management has a strong linkage and relationship with Construction Process and Stakeholders Management. The delivery system chosen, the procurement method adopted and the contract types decided upon determine the construction process involved and the relationships and roles of stakeholders along the process.

2.2.2 Procurement & Contract Management Process

Procurement and Contract Management involves three major processes: Contract Planning, Procurement Management and Contract Management;

Contract Planning: Construction projects are components of a certain business or development demands. That is, they are formulated if and only if such businesses or development demands acknowledge their contribution and it is a must to involve them. This requirement is dealt during the basic / strategic planning phase of the overall business. This phase often pass through feasibility and financing stages of Programs or Protects. Contract is a customary tool used to implement formulated programs or projects. As a result, contract planning becomes part of this basic I strategic phase. Contract planning includes decisions on proposed Delivery Systems, Procurement Methods and Contract Types to be followed and used together with its provisions for alterations. This is because such decisions are related to regulatory requirements such as:

- Ethical (Neutrality, Formality, and Impartiality);
- Economical: (Proof of Competition, Least Qualified and Evaluated Bidder);
- Accountable: (Obligations and Rights);
- HSE (Health, Safety and Environment); and
- Transparent: (Accessibility and Notice of Advertisement).

Procurement and Contract Management processes shall be based upon the approved contract planning provisions; that is, the contract delivery system, the procurement method and contract types decided upon. The approved contract provisions can only be changed following the change process stated in the contract planning document and if only if:

- the Environment and Context considered are not correctly analyzed or changed,
- their application can remarkably affect the objective of the project, and

- procurement management process justifies change of the Contract Types.

Once the validity of the contract provisions are checked once again and taken for granted or other provisions are devised; Procurement Management followed by Contract Management can be initiated, planned, implemented, monitored and closed.

Procurement Management: is a process of selecting individuals or organizations to carry out the intended services and / or works. Procurement Management is carried out based on the provisions made during the contract planning phase of the Procurement and Contract Process. It involve the preparation of procurement documents, their invitation and submission of tender proposal and opining and evaluation of tenders, on the base of results from tender evaluations, the procurement team will recommended the lowest responsive bidder for contract management phase The following issues are necessary for a successful Procurement Management phase:

- knowing and ensuring the implementation of procurement related National and International laws, rules and regulations,
- adherence to the provisions ma e during the contract planning phase including their change processes, that is; wrt. Delivery Stems, Procurement Methods and Contract Types,
- establishment of a flexible procurement team, and
- adhering to the principles of Proof of competition, Impartiality, Neutrality, Accessibility and Formality.

Contract Management: is a process of reaching contractual agreement for implementation, its administration and finally concluding the contract. Similar to the procurement management process, it shall be based on the provisions decided during the contract planning phase. It involves negotiation based on tender evaluation recommendations and signing of contractual agreement followed by its administration for contractual implementation, progress tracking, and changes, claim and disputes administrations.

The following issues are necessary for a successful Contract Management phase:

- knowing and ensuring the implementation of contract related National and International laws, rules and regulations,

- adherence to the provisions made during the contract planning phase including their change processes, that is; wrt Delivery Systems, Procurement Methods and Contract Types,
- identifying, recognizing and involving all potential or key stakeholders to form a contract team,
- understanding, mapping and monitoring all contract conditions agreed upon, and
- ability to administer changes, claims and disputes.

2.3 Project Delivery system

2.3.1 Definition of project delivery system

Project delivery system is a system used by an agency or owner for organizing and financing design, construction, operations, and maintenance services for a structure or facility by entering into legal agreements with one or more entities or parties.

For a construction project to get off on the right foot, it is important for the owner to select the right project delivery system. There are a wide range of construction project delivery systems. These include the design-bid-build system, the design-build system, the construction management model, and other methods such as program manager and bridging. Each of these systems has its advantages and disadvantages which the owner must consider before the project begins.

2.3.2 Types of construction project delivery system

Clients usually take the initiative to have construction design and build; they are the actor who pays for the construction. The client's policies, resources, organizational structure, and preferred contractual arrangements will all need to be taken into account in choosing the right procurement method for their project [7].

Successful procurement relies on all parties involved in the project complying with their respective obligations, and identifying and dealing with risk appropriately from the outset.

There are four main Procurement (delivery) systems; they are presented as follows;

1. Traditional / General method

The design-bid-build project delivery system is the traditional method that has been used for many years in both public and private construction projects. It is the project delivery system

that is most widely used today and which is still required by some states. The design-bid-build process is a well understood delivery system in which risk is minimized through the owner's firm control of both the design and construction phases. The design-bid-build process offers checks and balances between the constructions participants

Under the design-bid-build project delivery system, the owner contracts separately for the design and construction of the project. The owner contracts directly with a design professional for the preparation of plans and specifications and assistance in the bidding stage. The design professional may also provide oversight of the project during the construction phase. The owner enters a separate contract with the general contractor for the construction of the project. Under the design-bid-build project delivery system, the owner retains responsibility for overall project management. All contracts are executed directly with the owner. The design of the project is complete before the contractor is selected and the contractor is generally selected through a competitive bid process with the assistance of the design professionals.

Some of the advantages of the design-bid-build process are that it provides checks and balances between the design and construction phase of the project, it is widely used and familiar to construction participants, and it is perceived to be a fair process in which the lowest most responsible contractor is selected for the construction of the project. Additionally, the owner is able to provide significant input into the process during the design phase. When a competent contractor commits to a lump sum price, the owner can normally rely upon the accuracy of the price and the owner is able to compare bids to obtain the best price for construction.

Some of the disadvantages of the design-bid-build process are that it is a lengthy process, it places the owner in the middle of disputes between the contractor and design professionals, the cost of construction is unknown until bids are finalized, and it intensifies the potential for change orders. The process requires a significant economic commitment by the owner at the front end of the project by requiring the owner to complete the design before bidding the construction of the project. Because the plans and specifications are completed prior to bidding the construction phase, there is a potential that bids for construction may exceed the owner's budget and hence require the owner to either redesign or abandon the project.

The contractor is usually chosen after competitive tendering on documents giving complete information. However, the contractor can be appointed earlier, either through negotiation or on the basis of partial or notional information [8].

The client only has a contact with the designer and the contractor only has a relationship with the design team. This model is only useful for simple and straightforward works.

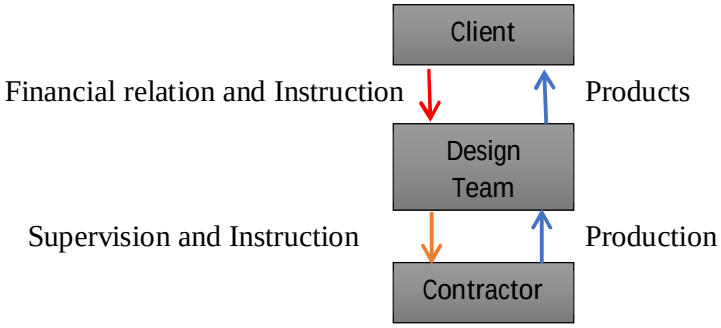


Figure 2.3 Traditional / General Method (a) [7]

Many constructions nowadays require multidisciplinary skills during the design process. The design team, often an architect needs support from specialists, like constructors and specialists in installation techniques. The design team may therefore have to procure services of advisors and subcontractors. It is often necessary to involve subcontractors in the design process, because they need to tailor their designs to the main design of the construction.

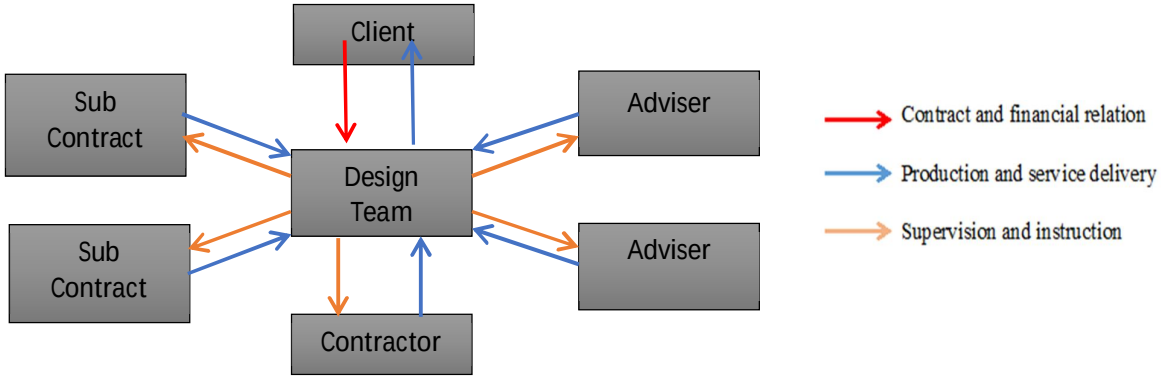


Figure 2.4 Traditional / General Method (b) [7]

The difficulty with the above-presented model is that design team needs to coordinate the inputs of the different advisors. A lack in coordination often results in mismatching design inputs and construction inputs.

In most situations, the contractor has to fill in or adjust the design provided by the design team. For example the contractor ensures that the tolerance of materials matches.

Furthermore, the contractor plans the delivery of the inputs. The procurement time of specialist equipment may take more than the entire construction process. It may be necessary to procure works from subcontractors well before the start of the construction.

The contractors also can advise the design team on practical implications of their designs. It may therefore be possible that the contractor is already engaged during or before the design phase [7].

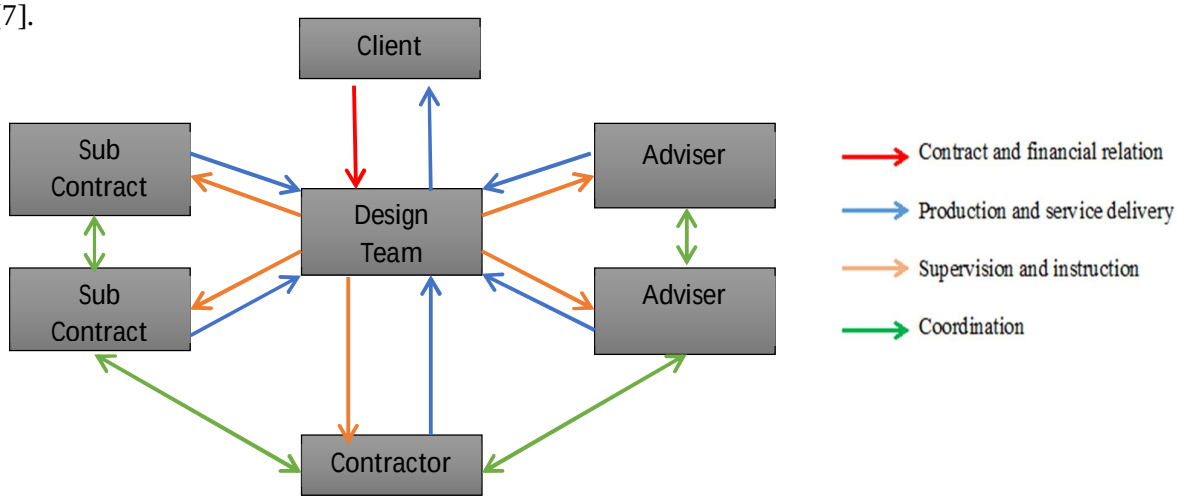


Figure 2.5 Traditional / General Method (c) [7]

2. Design and Build

Under design and built arrangement, the contractor takes on the complete responsibility for the design and construction (see figure 2.5). It places more responsibility and liability on the contractors than any other form of procurement. Unlike with general contracting the lead designer does not certify the works of the contractor.

A special form of design and build arrangement are the so called turnkey contracts. The client procures the construction like it is buying standard (mass produced) product. It's difficult for the client to influence or control the quality of works [7].

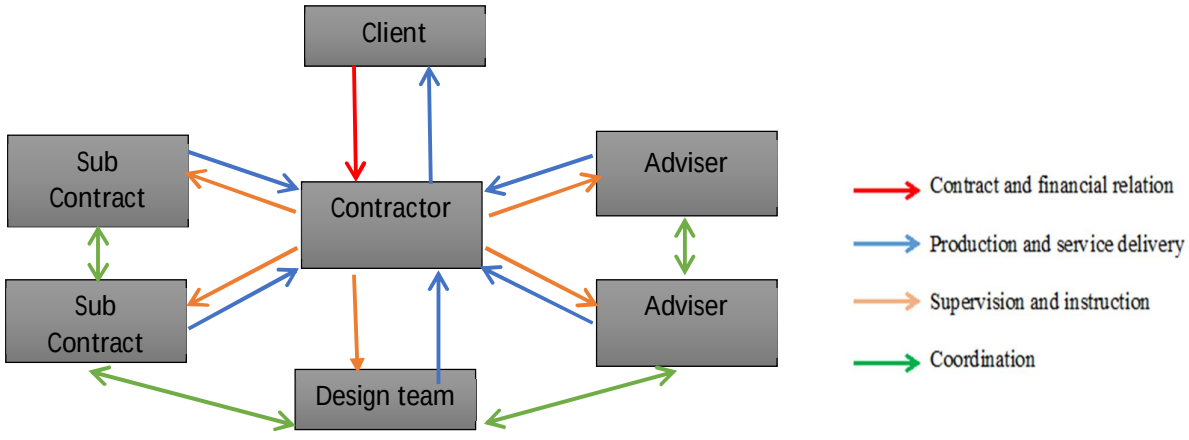


Figure 2.6 Design and build [7]

The above-presented models (Figure 2.6) are single-point models. The client has a contract with one organization. This organization insures the realization of the construction. The client delegates a large part of control to this organization.

3. Construction Management Method

The construction management project delivery system is a process by which a "construction manager" is added to the construction team to oversee some or all of the project. The construction manager can be involved in overseeing scheduling, cost control, construction, bidding, or the entire project. In many ways, the construction management process is not, by itself, a separate construction delivery system but is a resource the owner can use to assist in the construction project. The added cost of a construction manager must be weighed against the benefits this consultant brings to the project. Often, the architect can fulfill the role provided by a construction manager. However, depending upon the degree of sophistication of the owner's in-house construction staff, and depending upon the complexity of the project, a construction manager can provide an essential element to the construction project.

A construction manager is most useful on a large, complex project which requires a good deal of oversight and coordination. A construction manager is also helpful to an owner who does not have a sophisticated in-house construction team. A construction manager can help the owner control costs and avoid delays on complex projects.

The owner must weigh the relative advantages and disadvantages of each construction delivery system before beginning the project. Factors that the owner should consider are the complexity of the project, the relative importance of cost or schedule and the in-house expertise the owner has to manage the project. The model on Figure 2.7 is illustrates Construction Management delivery system

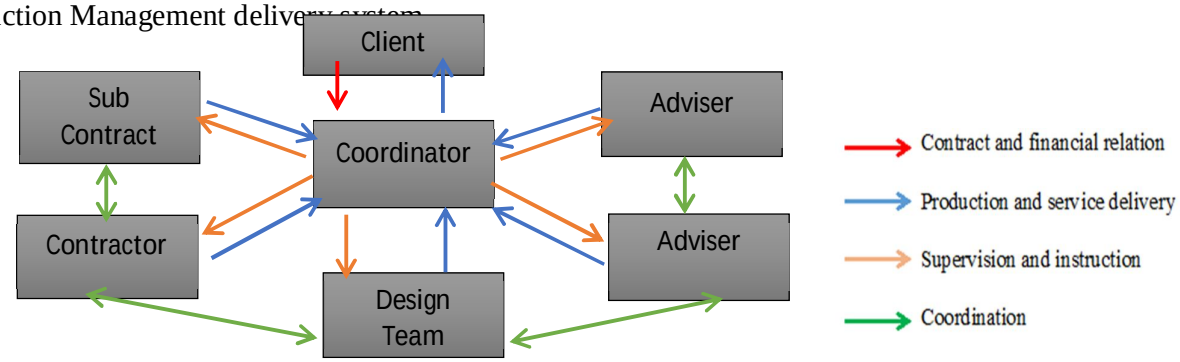


Figure 2.7 Management method [7]

The general Construction Management variations are Construction Management-at-Fee (CM at-Fee) and Construction Management-at-Risk (CM-at-Risk), and are discussed below.

In CM-at-fee method, the construction manager is responsible for project and site management, but is not involved in actual construction work. The construction manager monitors cost, time, quality and safety, but does not take responsibility for them. The construction manager is paid a fixed or time based for services provided [37].

In CM-at-risk, the construction manager, apart from providing constructability inputs at the design stage, is also responsible for construction means and methods and delivery of the completed work, including quality and performance of the asset [37]. All procurement in the project is done by the construction manager, and the contracts are between the construction manager and the subcontractors. But, still, the client retains the final decision in project delivery.

4. Client-led (Direct manager) Method

Sometime client want to be able to control the design team. Those clients often have series of contracts with their partners. The client coordinates the construction process through interlocking agreement by specifying the role of each participant. The simple schematic presentation of client-led design and built is shown on Figure 2.8 after last paragraph.

This multi-point model has also advantage with regard to contract formulation. It's easier to formulate contracts for specific production. This method also allows clients to break the construction process in orderly and manageable portions. Each portion ends with a concrete production service, detailed design, tender documents, the construction and quality control.

Often clients may choose for breaking down their contractual obligations. They may first appoint a design team. The design team with assistance of specialist firms, including subcontractors may develop an integrated design meeting the specifications of the client. After the client accepted the design and finds the design feasible, it signs the contract with a contractor who builds the design. The design team is still under contract or contracted again to monitor the progress and quality of the work [8].

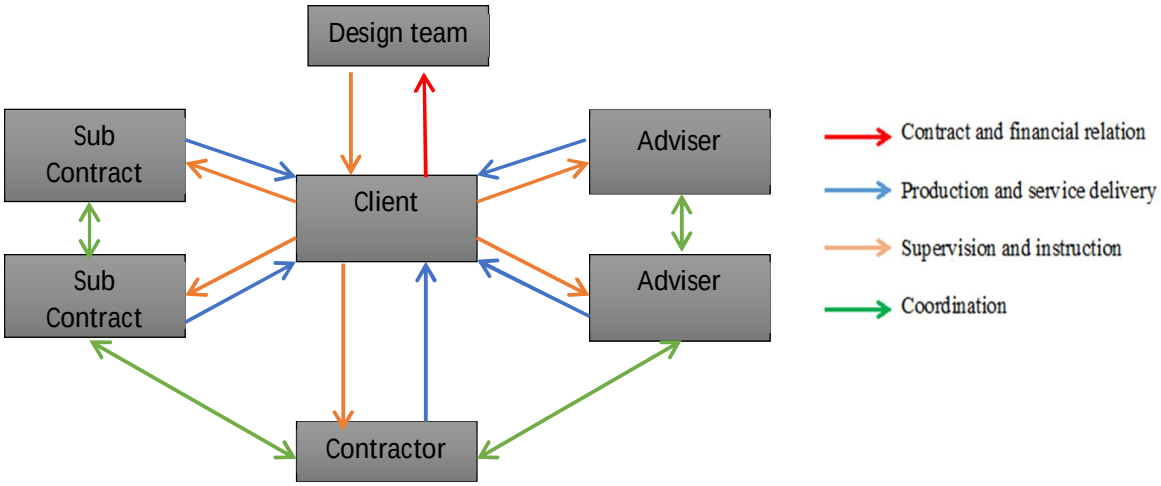


Figure 2.8 Typical structure of direct manager method [7]

5. Design-Build-Operate-Transfer (BOT) Method

In this project delivery method, a private company is responsible for the designs, construction, operation, maintenance, and financing of the project for a specified concession period [36]. The contractor assumes the risks of financing until the end of the concession period.

During this concession period, the company collects revenues from operating the project to recover its investment and to earn a profit. At the end of the concession period, ownership of the project is transferred to the client/owner.

The advantage and disadvantage of the traditional and innovative delivery methods are tabulated on table below 2.8.

Table 2.8 Delivery methods Advantage and disadvantage

Delivery Method	Advantage	Disadvantage
DBB	• Long history of acceptance • Owner flexibility • Open competition • Distinct roles • Ensures work for contractors of all size • Low tender cost • Allows the lowest contract price • Client control over project delivery method • Pre-qualification encourages better performance • Provides complete documentation allowing bill of quantity before construction • Industry capability available	• Self-serving adversarial relations • Usually cost overruns • Lack of innovation • Low bid - incentive for change orders • Owner responsibility for errors and omissions • Linear process (takes too much time) • Design suffers from lack of input from contractors • Does not encourage technological improvement or integration of systems • Lack of cost certainty • Multiple change orders • Does not promote privatization
DB	• Best-value selection • Better build ability through contractor contribution • Risk transfer • Innovation encouraged • Develops industry via cooperation • Better relationships • Encourages integration of systems • Shorten delivery process • Few change orders • Lowered administrative burden to owner	• Limited experiences with DB • Less work possibility for small and medium sized contractors • Limited competition in large projects • Client experience may be lost or diminished • Reduced flexibility • High tendering cost due to designing requirements • Lack of aesthetic consideration • Inadequate contractor quality control and assurance

CM-at- Free	• Managing and administering all phases of a project. • Treats Planning, Construction and Design, as an Integral Task. • Cost and Schedule Control • Constructability input at design stage	• No contractual relationships with trade contractors • No contractual responsibility for outcomes of a project • Client retains the risks • Additional cost for the Construction Manager
CM-at-Rick	• Good for clients with insufficient staff • Owner flexibility • Responsible for cost and time overruns • Holds and manages trade contractors • Constructability design review • Legal position as a General Contractor • Works closely as a teaming effort and encouraging trust and partnering • Phased construction (fast tracking) possible	• Lack of capable construction managers • Demanding work organization • Lack of cost certainty for each work packages • Lack of contractors who can provide both construction management and construction services • Fragmentation, as compared to DB& BOT • No exactly defined work packages (bill quantities)
BOT	• Completes projects when internal funding is not possible • Integrates the process of design, construction, operation, and maintenance. • Projects completed faster • Ownership transferred to the contractor	• Cost more in the long run • Longer tendering process • Costly tendering • Future political change may disrupt prior agreement • No capable local contractors • Contractors not interested in all works

2.3.3 Project delivery system selection criteria

Different authors have postulated different procurement selection factors that can assist clients to choose the best procurement method. Client characteristics, project requirements and external environment are the three factors that must considered during procurement selection. The use of the three factors together expansively considers client requirements to include cost related factors, time related factors and quality related factors. Several variables of client requirements were measured under cost, time and quality related factors. Project characteristics factors also include project type, size, cost, flexibility, complexity, site risk factors and degree of innovative technology. External environment factors considered are

market competitiveness, availability of materials, natural disasters, industrial actions amongst other variables. [Studies of Masterman and Gameson (1994)]

Client characteristics, project requirements and external factors are considered with general needs for investigating the procurement related factors that affect project performance. Cost related factors of capital cost of the project, maintenance cost, pre-qualification cost, financial risk amongst other variables can influence a client to select a particular procurement method that meets all these client requirements. Time related factors of planning and design time, construction time, early start of project, speed of construction and time overrun can help client to select an appropriate procurement method. Quality related factors of design reliability, aesthetic appearance of the building, workmanship amongst other variables are considered in this study. General needs factors of involvement of parties, their transparency, accountability, safety requirements and flexibility of the procurement process to client charges are also considered in the study. Project characteristics factors are project type, size, cost, degree of flexibility, complexity, time constraints, payment method, finding methods and innovative technology. Moreover, external environment factors considered also include nature of the market, government policies, government as major client, regulating feasibility, technology feasibility amongst other variables. All these above factors can influence the selection of an appropriate procurement method that can also affect project performance (Project Budget, Time and Equality).

2.4 Project Performances

2.4.1 Performance: Concept Definition

Projects (Construction as well) can be traced back to the times of oldest civilization, and so does their Performance and its Determination. Old pieces of historical documents showed that the government officials and craftsmen used to carry out construction projects. These include constructing residential houses, palaces, fortresses, roads, monumental constructions and river improvements.

These projects were also assessed for performances in the context of their historical and developmental stages. However, its concepts in the academia became relevant and have its roots during the industrial revolution. It seems, performance is a simple and straightforward notion for everyone, but this expectation is understood as a flaw and it differs as it is applied to different contexts. Generally, when we speak of performance, there is a consensus among

researchers that it represented the accomplishment of either Peoples or Materials / Equipment's / Plants or Methods / Techniques or Organizations or Products or their combinations. But, their differences lie on the issue of determining whether these accomplishments are poor or good performances. They often termed these accomplishments as failures or successes in many literatures.

Performance as a concept remained complex, multi-dimensional, and hazy. Besides, there are several terms used in connection with performance, largely based on their uses in different contexts and in a variety of ways. These terms were collected from different sources of the Glossary of Project Management for a feeling of its complexity.

Table 2.9 Project Management in Connection to Performance and Its Related Concepts

Basic Concepts	Indicators	Others
• Performance • Performance Management • Performance Assessment/Review • Performance Inspection • Performance Indicators/Criteria • Performance Measurement • Performance Reporting • Performance Control Performance • Evaluation Performance Audit • Performance Targeting	• Goal Performance • Scope Performance • Cost Performance • Schedule Performance • Quality Performance • Specification Performance • Substantial Performance • Performance Tolerance • Performance Index	• Performance Levels • Performance Period • Performance Perspectives? • Success / Failure Factors • Performance Evaluation Types • Uncertainty and changes • Performance Objectives
Sources: - IPMA, APM, AIPM, PM], OECD, and International Dictionary of Management NB: - The list is not claimed completive.		

Generally, there is a belief that the term performance was originally associated with artistic play or exhibition. After a while, the use of the term has grown considerably and during the industrial era it was highly associated with the term productivity. But, Performance is a word that everybody is using when dealing with action and function related issues.

Furthermore, Performances largely depend on their resolutions over which they can be referred in terms of their Levels or Time frames or Purposes considered. These include hierarchy with regard to:

- Objectives at the different Management levels or Geographical orientations;
- Time horizon in which performances were sought (the Past, the Present and the Future)
- The benefit or utility gained via Accountability / Control versus Learning
- Motivated approaches.
- Consequently, this study believed that performance is more vague and illusive than the concept of a project itself. Following this, a single theoretical and practical definition cannot be included in this dissertation.

2.4.2 The Two Contending Performance Demands: Successes or Failures

Analytical and Organizational factors on the one hand, and External (Contextual) and Internal (Project specific) factors on the other hand contributed to the determination of successes and failures of projects. They have also indicated that the major problem associated with such determination is how to interpret the level of performance as good or poor.

Traditionally, project managers see project success or failure as a function of the triple constraints: time, cost and quality to specifications (Figure 2.9). This however, changed its meanings overtime to reveal the problem of traditional thinking that placed time, cost and plans predictions as accurate and quality limited to satisfying specification requirements only.

Figure 2.9 showed that quality as a performance criterion is required to satisfy the stated specification. This in construction projects are well taken care of by direct supervision, tests and maintenance period after completion. That is, there is an inherent assumption that progress in terms of time and cost will be reported if and only if the quality criterion is fulfilled. This approach have assumed that needs or requirements can be well specified at the first place. Besides this should ensure that the result is in accordance with specifications, but it does not tell us anything about the quality of the specifications.

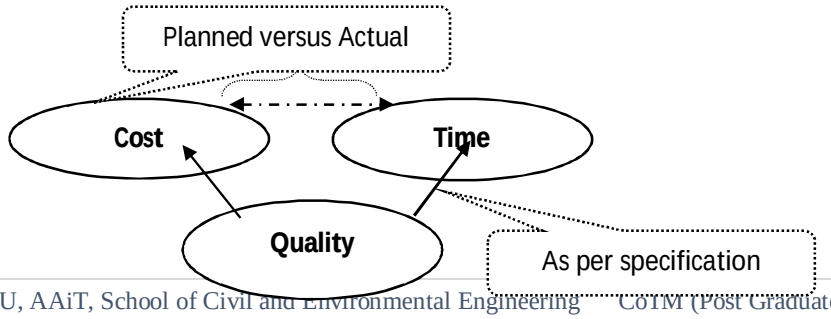


Figure 2.9 The traditional triple constraints

The drawback of this tradition is related to the amount of information available to predictors, the changes in scope and requirements of the project overtime, the attitude built up in the system whether project management was considered as planning divorced from implementation and at the same time whether too-control motivated or not, etc. However, information was believed to be less reliable at the beginning of a project, and at the same time its influence in providing good predictions and subsequent good performance is considerably high (figure 2.9).

Figure 2.9 showed the variations of information availability and its extent of influence along the three project management phases: Project Definition, Project Implementation and Project Completion Phases. These two figures (figures 2.9 and 2.10) implied that, the integration among the triple constraints was weak and quality remained to serve the quality control paradigm which has been forfeited by its two counterpart subsequent developments: Quality Assurances and Total Quality Management.

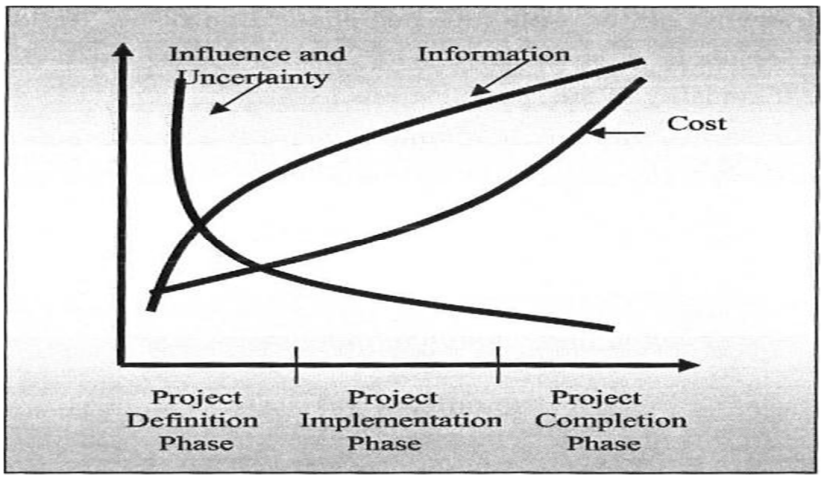


Figure 2.10 Information versus its influence along project management phases.

Scope and requirement changes are becoming facts of life. Hence, the inability to accurately specify these requirements, the case of expert-client relationships, and knowledge gap among stakeholders dictated the prevalence of uncertainty and deviations during execution. These undermined the attainment of results as predicted. The divorce between planning and implementation has also created adversarial relationships, distrust, and volatile grounds mainly due to its inherent scrutiny-oriented attitude developed between planners and implementers. As a result, performance determination suffered and one of its major purposes (Learning) is devalued considerably.

In spite of all these; planning as early as possible, learning from failures and strive for more information upfront together with a flexible approach such as:

- timely decisions adjusted to uncertainty, Isolation and Absorption of uncertainties, and Overlapping of phases; Laufer, 1997;
- integration of planning and control, and Progressing wave planning; Harrison, 1997;
- integration of planning and implementation; Mintzberg, 1994
- contract as hierarchical documents; Stinchcomb, 1985

are necessary conditions for good performances. Following these, generally, recognition was largely made such that triple constraint in its classical thoughts can only address parts of success or failure factors. Recently, the debate has moved from defining success as coherent to some general criteria to discussing which criteria must be met before we can call this specific project a success.

Both project and performance concepts were uprooted and grown for and from practical applications, or because there can be no universal theory that can guide performance determination.

Kharbanda & Pinto, 1996 in their view 'Failure as a step to success' argued that, in the event where failure considered detrimental to those who accepted it, it is often hidden (under the carpet to use their terms) and not well acknowledged. This was because, they further pointed out that failures hold moral issues what successes cannot. Hence, in project management failure can be attributed to either of these or both of their accomplishments:

As a result, failure and success can share both these characteristics, and its distinct determination is contextual and circumstantial. Most often, it is obviously difficult to label certain projects as 'failure' or 'success'. Due to these, this study preferred to use similar terms but with a different tone called 'Low Performances instead of failures and Good Performances instead of successes.

Accordingly; 'Low performance is defined as low actual accomplishment rate compared to predictions or planned values in completion time and cost measurements. This covers a possible assessment for causal relationships including questioning the realism of the predictions. To this added; stakeholder satisfaction based on performance indicators standing for assessing quality requirements in addition to specification Performances. That is,

negotiated changes using participation can be part of predictions as long as they qualify for a boundary limit.'

Hence, this definition purely indicated that predictions together with its negotiated changes, which set the 'performance criteria', are the key issue in performance determination. But, this definition do not prescribe that low performances can imply failure of projects.

2.4.3 Performance Criteria

The fact that project success or failure is ambiguously defined and a highly aggregated parameter; obliged many project managers to ascribe to simplistic formulae, i.e., the triple constraints with its traditional connotation. However, a shift to consider Customers' satisfaction as part of the performance criteria or part of quality requirements led researchers to examine this shift further for clarity in applying and understanding its relation with project successes and failures or at least determination of poor and good performances.

Poister edited by Kearney and Berman, 1999 indicated that performance indicators are developed for two purposes: for tracking projects (Progress checking and for necessary actions) and to communicate selected key indicators to external audiences (Accountability). In addition, they are expected to provide information at various levels of management for improving the successful implementation of projects.

Performance dimensions included cost of collecting information against its benefit, stakeholders involved and their objectives, consequences of answerability to those omitted, changes of performance dimensions over time, and the stages of the project along the project management processes. Consequently, choice has to be made to include the most important elements of these dimensions process.

These choices require three approaches to planning (Laufer, 1997); Systematic and Integrative planning, Timely decisions adjusted to uncertainties, and Isolation and Absorption of uncertain tasks. The first is similar to the traditional mindset and can serve as the baseline for the performance criteria.

But, the latter two are essential for coping with changes and uncertainties encountered along the management process during project executions. Hence, Performance criteria should be updated, but by no means loose sight of comparison with the original prediction for learning. This together with reduced flow of fund and its escalation, and tighter constraints resulted in

cutbacks and changes in projects will make the project planning phase more critical and continuously employed.

Knut Samset, 1998 indicated three levels of measurement of success and used five performance criteria.

1. Efficiency: Delivery in terms of cost, time and quality as per specification
2. Effectiveness: Achievement of the common goal
3. Impact: Various effects of the project
4. Relevance: Response to needs and priorities
5. Sustainability: Continuation of its relevance

These criteria along its three perspectives showed the overall integration of the project. Efficiency and Effectiveness; and Relevance was looked for contextual description. While, Efficiency is attended in terms of comparing planned and actual deviations; Effectiveness is targeted to ensure integration of objectives based on stakeholders' satisfactions.

2.4.4 Performance Measurement and Evaluation

Performance is highly related to measurement. Kelvin, emphasized the importance of measurement with his statement as: 'If something in science cannot be measured, it has little value'. Though this statement far addressed importance to objectivity and rationality over the subjective and behavioral issues, it can however be used to identify the fact that less obvious, less understanding and less use of measurement are common features in project management.

But one should not ignore that what can be measured can get attention or take more value or easily have advantages than those which could not be measured in most instances. These measures however, should make to consider not only the objective ones (if you can't count, it does not count) but also the subjective values as well.

Measurement is basic for improving performances and assists in providing accountability and learning in all business administrations. Performance measurement serves a variety of functions in project management. These include the establishment of probable targets, the tracking of performances and feedback to management. Measurements can also be used for rewarding/punishing behavior, and modeling and predicting project performances. There should also be an understanding that not all measures are good.

Besides, evaluations are generally serving two major purposes: feedback as a learning tool,

and to make operations and results transparent aimed at improving both performances and accountability (Gloria E. Grizzle, 1999). Therefore; Performance measurement and evaluation is more important in projects due to the following two reasons:

1. Projects are often executed with borrowed resources on a need bases whose loyalties lie to the least with functional departments, and
2. Project players continually changes to cause discontinuity in outlook and requirements that tend to drift according to the interpretation of the latest players.

These reasons resolve accountability leading issues to fall through cracks, under carpet and behind mirrors. Hence, inadequate level of follow-through and finger pointing when things go wrong are more or less a usual practice. Consequently, no one seems answerable for mainly bad decisions and actions. Therefore, implementing systematic, fair and rigorous performance measurement and evaluation mechanisms can reinforce and strengthen accountability in projects.

2.4.5 ERA Performance Evaluation of Contractors under Government Financed Tenders

In works contracts of government financed projects, one of the major qualification criteria is performance assessment of bidders on ongoing projects. For bidders having ongoing projects with ERA, the performance assessment will be carried out following the below indicated procedure (formula).If bidders do not have projects with ERA, the performance assessment shall be carried out following qualitative assessment of bidder's performance based on written feedback from their employers. The performance assessment is carried out every calendar month. Under each evaluation, the performance of the bidder in the immediate previous month (from the date/month of deadline for submission of the tender in reference) is used for evaluation.

1. Performance Evaluation Formula for Local Contractors

The total contract duration is divided into three equal periods in such a way that:

- At the end of the first one third period, the minimum expected progress is **9%**.
- At the end of the second one third period, the minimum expected progress is **38%**
- At the end of the last one third period or at the end of the contract period, the minimum expected progress is **70%** and

- Beyond contract period but only up to a period of one fourth of the contract period, the project is expected to be completed **100%.**
- Contractors, who fail to complete projects after elapse of one fourth period of the contract duration, will be disqualified.

For the intermediate months, the following formulae will be used:

I. For the first one third duration of contract, the formula for determination of expected minimum performance is, $\mathbf{9t_1}$

Where $\mathbf{t_1}$ = (Elapsed time in months minus mobilization time in months)/ (One third of the contract period in months minus mobilization time in months)

II. For the second one third duration of contract, , the formula for determination of expected minimum performance is, $\mathbf{9+29t_2}$

Where $\mathbf{t_2}$ = (Elapsed time in months minus One third of the contract period in months)/ (One third of the contract period in months)

III. For the last one third duration of contract , the formula for performance evaluation is, $\mathbf{38+32t_3}$

Where **t3** = (Elapsed time in months minus 2 X One third of the contract period in months)/ (One third of the contract period in months)

IV. Beyond contract period but only up to a period of one fourth of the contract period, the formula for determination of expected minimum performance is, $\mathbf{70+30t_4}$

Where $\mathbf{t_4}$ = (Elapsed time in months minus contract period in months)/ (One fourth of the contract period in months) [39].

2.5 Chain's Procurement Practices

2.5.1 Current Tendering Processes in Chain

The key steps and procedures for tendering, contract award and obtaining construction permits is tabulated as Table 2. The processes shown in Table 2 are the ones used in Nanjing City but other cities have similar processes/procedures. It is clear that the process is quite complicated and involves many government departments. The following sections describe the tendering processes in details.

2.5.2 Tender Preparation by Clients

A tender evaluation committee must be formed for every construction project with a value of more than $500,000 RMB (Chinese currency). The committee's responsibilities include call for tender, deciding eligible companies (i.e. qualification check), selecting companies for bid submission, releasing tender documents and project drawings, organizing site visits, answering questions, developing evaluation criteria, opening tenders, evaluating bid submissions, and determining which company should be awarded the contract. There are strict requirements/guidelines/rules set by the government on the formation of a tender evaluation committee:

1. The committee must have the required technical, economical and management abilities;
2. The committee should have the ability to calculate or audit the estimated project cost/price (it is called "Biao-di" price in Chinese), and to verify the contractors' qualification;
3. The committee should comprise members of: client representatives, the client's parent company's representatives, qualified economic or technical experts, and representatives from the tender management office (a department of the construction commissions);
4. The number of experts should be at least two-thirds of the total number in the committee and
5. The experts should be randomly chosen by computer from the expert database.

2.5.3 Calling for Tender and Bidder Selection

Clients implement a significant portion of the work involved in "Call for Tender":

(1) Within 30 days after receiving all necessary government approvals, clients must register their project for bidding through the electronic notice board and white board.

(2) The client calls for expressions of interest from registered contractors.

(3) The client prepares bid documents by themselves or a professional agent (i.e. a qualified quantity surveying company). The bid documents are then vetted by construction commission staff in the TCM (Tangible Construction Market) prior to actual bids being invited by the client. Interested companies expressed their interest and formally lodge an application for submitting bids.

According to technical capability, financial capacity, past performance (reputation) and company asset, every construction company is qualified as either Grade 1, Grade 2 or Grade 3 Phases by the Ministry of Construction. To be eligible to participate and submit tenders, all contractors/suppliers of construction services are required to register with the Municipal Construction Commission. Registration is a relatively straightforward process, requiring the provision of details of relevant financial data, organizational experience and expertise, as well as key staff and their past experience.

Table 2.10 Tendering Processes of Construction Projects in China (source: Nanjing Municipal Construction Commission)

Phases	Procedures	Concerned bureaus or office	Contents
Preparations before tender call	License of land	Nanjing Municipal Administrative Bureau for National Land	Check the license of land
	License of town planning	Nanjing Municipal Bureau for Town Planning	Check the license of town planning
	Auditing before commencement of construction	Nanjing Municipal Audit Bureau	Check and handle the auditing before commencement of construction
	Registration of construction project	The information division of NCPTC (Nanjing Construction Project Transaction Center)	Register and publicize information of public tender
Tendering of construction project	Tendering of construction Supervision Company and the tendering of construction equipment tendering of construction	Division 3 of NMAOT (Nanjing Municipal Administrative Office of Tender)	Handle affairs about the tendering of construction supervision and the tendering of construction equipment
		Division I of NMAOT	Countercheck the qualification of bidder and handle the project of direct contracting
		Division 2 of NMAOT	Check the tender call documents, supervise the procedures of opening and evaluation bids. countercheck the notification of tender award
		The director's office of NMAOT	Countercheck the notification of tender award
Other related procedures	Notarization of tendering	Nanjing Municipal Notarization Bureau	Notarization of the procedures on inviting and submitting tender
	Registration of local tax	Nanjing Municipal Local Tax Bureau	Registration of local tax

	Management of construction cost	Nanjing Municipal Administrative Office of Construction Cost	Countercheck the kinds of calculating construction cost
	Authenticate the contract	Nanjing Municipal Administrative Bureau for Industry and Commerce	Authenticate the contract on project construction
	Registration of construction enterprises	Nanjing Municipal Administrative Office of Construction Nanjing Municipal Administrative Office of Municipal Engineering	Registration of the construction enterprises of tender award
	Supervising quality of construction project	Nanjing Municipal Administrative Office of Supervising Quality of Construction Nanjing Municipal Administrative Office of Supervising Quality of Municipal Engineering	Draw the "Application Form of Supervising Quality of Construction Project"
	Supervising safety of construction project	Nanjing Municipal Office of Supervising Safety of Construction Nanjing Municipal Office of Supervising Safety of Municipal Engineering	Draw the "Application Form of Supervising Safety of Construction Project"
	Management of solid garbage	Nanjing Municipal Administrative Office of Solid Garbage	Handle affairs on solid garbage
Construction Permission	License of construction commencement	The construction office of the Construction Committee of Nanjing Municipality	Grant the license to the owner for according with conditions for commencement of construction

The qualification (i.e. Grade 1, 2 or 3) and past performance of each interested company is checked against the selection criteria. When too many qualified companies express interest in submitting bids, two methods may be used:

1. Random selection using a computer program or
2. By scoring -- scores are given to each company based on their past performance in terms of quality and safety, capability etc. The selected companies are notified by the committee to submit bids.

2.5.4 Tender Receipt, Open and Evaluation

The tender submissions (with company seal) are lodged in a double locked tender box. The keys are kept separately by the client and officials of the construction commission department

(or Notary Department). According to the Tendering Law of the People's Republic of China, the deadline for tender submissions and the time of opening tenders is at the same time.

The tender opening is conducted in the TCM tender opening room under the supervision of construction commission official or a person from the Notary Department, generally the day after tenders are lodged. The bidders must also be present, or their bids become invalid. All key processes are notarized by an official from the Notary Department.

The bid process is generally in two envelopes where the first envelope contains price details and company information. This envelope is opened first and information is placed on a notice board in the tender opening room to be reviewed by all present, including bidders. The second envelope, containing the information of company profile, qualification, past performance, safety accreditation, proposed project team and technical plan, subject to the non-price evaluation criteria, is then opened in the presence of the bidders and notary officers. The bidders then leave the room and independent evaluation experts are brought in to conduct their evaluation, scoring each bidder without knowing the bidder's identify. When the experts have completed their tasks, the scores are then computed, verified by the construction commission's officials and the results read out, and posted on TCM notice boards for the next two days. For most contracts, this process takes half a day, hence bidders know their status on the day tenders are opened.

2.5.5 Tender Evaluation Criteria

The selection of a best suitable company for the construction work is not based on the rule of "lowest price wins" but a multi-criteria including price, time, quality and construction plan and company's profile, past performance as well as proposed project team. A detailed tender evaluation criterion is normally specified in the tender document but in some cases prepared by the tender committee one day before the opening of the tenders. A score system, normally a 100-point system, such as the ones shown in Table 2.11 (adapted from Jiangsu Provincial Construction Commission 1999, No. 335 Document) is used. Table 2.11 means the points allocated to price components should not be less than 50 while the points for construction plan/strategies should not be more than 20. Likewise, the composition of the project team may gain up to 10 points (but no more than 10 points), and so on so forth. The total maximum points should not exceed 100. Normally, the company obtaining the highest score will be awarded the construction contract.

Two major criteria - "price" and "construction plan" are discussed in detail below since they are the most complicated and important components.

Table 2.11 Tender evaluation criteria used in Jiangsu Province, China (1999)

Component	Points Allocation
Price	≥ 50
Construction plan/strategy	≤ 20
Project learn (Project manager's qualification and performance)	≤ 10
Company past performance, financial capacity	≤ 10
Quality and time guarantee/assurance	≤ 5
Company reputation and qualification	≤ 5
Total	= 100

The price component includes both the client's own estimated project price (it is called "Biao-di" price in Chinese) and the bid prices submitted by all bidders. Each of this is validated and then combined using a weighted average and percentage methods to derive a so-called "Reasonable Price". Based on this "Reasonable Price" another price called "Optimal Price" is then derived and used as the contract award price. Detailed discussion is provided in the following sections.

Bid prices validation -- All submitted bid prices must be validated by comparing each bid price to the "Biao-di" price. A bid price is not qualified/valid if it is outside a range of 92% - I08% of the "Biao-di" price.

2.5.6 Construction Plan

The construction plans should include the main strategies that will be used for construction and this plan is worth up to 20 points. The construction plan is evaluated by the experts according to the following criteria:

- if the construction method is advanced and reasonable/logical;
- if the construction plan is scientific, reasonable/logical, and reliable;
- if the quality and safety strategies are reliable;
- if site layout and occupational measure is reasonable/logical and reliable;
- if main construction plant and equipment and labor allocation is reasonable; and
- if the project team (including management and technical personnel) is capable.

The government guidelines recommend that, unless there are major mistakes in the construction plan, the points given to each bid should not be less than 60% of pre-determined total points. The time given to the experts to evaluate all bid submissions (mainly the construction plans) is normally half to a full day.

2.5.7 Contract Award and Record Archiving

The tender selection committee combines the points for each bid and ranks the bidders according to the total points they received and hands them to the client to make a contract award decision. Normally, the bidder with the highest points will be awarded the contract. Following the conclusion of the tender evaluation process, the client is required to obtain all necessary pre-construction approvals before a contract can be executed. The contract must be signed within 30 days from the time of tender opening. Once the contract is signed, an archive file is made up, consisting of all key relevant transaction documents for the project to this stage. This goes back to copies of the registration of the project with TCM to the actual letter of acceptance. It also includes copies of all relevant approvals obtained from the various "competent" authorities that have jurisdiction over the project. Other information on the archived file includes: list of registered contractors who expressed interest; copy of client's request to the TCM to call tenders; public tender notice; report on interested registered contractors; copies of all correspondence between the client and TCM; evaluation report of the experts. The file is archived in the TCM for two years, and is then forwarded to the Municipal Archives. The file is readily accessible to MOC staff who would deal with the complaint if indeed any arise about the bidding process [45].

2.6 Literature Review Summary

Procurement is a framework in which development of project are designed, financed, constructed, used, transferred and residual disputes are resolved. It has its own process of designing, specifying, sourcing issuing, ordering and arranging of material service and equipment's within an organization. Its classified based on the thing to be procured and the way how they are procured.

In addition it's an effective and efficient use of financial resource in a competitive and transparent manner, through a sound procurement process contributes to the achievement of the operational and strategic goal of a construction project.

In the construction industry Procurement has two types of process, Pre-construction (pre-

contract) procurement and post contract (construction). Initiation, pre-feasibility and feasibility study, designing and tendering is the subsection of pre-construction and construction, commissioning and hand over are the sub-section of the second one.

To properly manage project budget, compilation time and quality of work, it is important that procurement decisions are justifiable on the bases of documented facts and analysis. Soundly base decisions involve a comprehensive exploration of a range of potential delivery models and procurement methods to determine the approach best suited to each type of infrastructures.

An appropriate procurement strategy is typically developed during the evaluation or definition phase of a project, is a key determination of successful project delivery.

As part of the procurement process selection of the right type of project delivery methods which is based on cost certainty, time certainty, insuring quality and reduction of administrative burden to the public is essential for successful completion of the project. In literature review it is found that, the different procurement method and the selection of the right type of the form of contract will have different effect on the cost, time and quality of the project.

According to the literature review different procurement selection factors can assist clients to choose the best procurement method. Client characteristics, project requirements and external environment are the factors that must considered during procurement selection. Several variables of client requirements were measured under cost, time and quality related factors. Project characteristics factors also include project type, size, cost, flexibility, complexity, site risk factors and degree of innovative technology. External environmental factors considered market competitiveness, availability of material, natural disasters; industrial actions are amongst other variables.

After selection of the best suited delivery system, the next step is preparing the procurement /tender document. Client shall prepare the tender document considering specific nature of projects and avoid ambiguities, mistakes and inconsistent in the document. This document consists of procurement and contract requirements and proposed contract documents. Procurement includes biding negotiation and purchasing required documents to communicate project information to the bidder or proposers and to facilitate the project delivery and pricing process. This document consists of both written and graphical elements and typically includes: contracting requirements, specification and contract drawings.

Likewise, Contractor selection is a critical and crucial task for any client that may help to control some of these risks and manage the complexities. Various procedures such as open tendering, selective tendering, restricted tendering, registration/ pre-qualification, post-qualification are followed for selecting contractors. In addition to the above, to select a contractor for a project it is required to develop necessary and sufficient criteria to investigate and assess the capabilities of the contractors to carry out a job if it is awarded to them.

The Ethiopian federal Government have public procurement and property administration agency (FPPPAA) standard biding document (SBD) for different procurement type. Every public body adopts this standard documents, SBDs can be adopted for any procurement system and it gives a room to the user to specify according to project nature.

Generally, from the above literature review it is concluded that procurement procedures are methods used to acquire good quality without cost overrun and time overrun.

In addition to the above paragraph I also conclude that, Procurement and project management has strong linkage and relationship with construction process and stakeholders management. The delivery system chosen, the procurement method adopted and the contract type decided upon determine the construction process involved and the relationships and the roles stakeholders along the process.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter introduces the methodological approach and the research design best suited the current research. It covers a description and justification of: the methodological approach and examines the research questions; and the data collection and analysis procedures. The chapter includes six sections on research methodology, starting from a description on the research type and approach under which this research is conducted. The second section is a discussion of the data collection approach is presented. That is, in section two, the desk study, and the questionnaire survey are developed. The Next, section describes the sampling strategy, which contains a description of the unit of analysis and unit of observation. In the fourth section, about the data collection. Section five, presents the data analysis strategy and describes the statistical assumptions, analytical techniques, and modeling strategy adopted by the current study. After this the scope and research limitation are develop. Finally, the chapter summary and Discussion and Conclusions will be going forward. The results of the investigation are presented in this chapter as well as the recommendations will going forward.

Accordingly, in this chapter, the research design and methodology followed to achieve the ultimate goal of the research which is specified at the beginning will be discussed. In a way; data and information sources, research instruments, sample size and method of analysis are presented. So that; using the design and methodology, the research draws up findings in a way to make conclusions and forward recommendations on construction procurement practices and its impacts in construction budget, completion time and performance in Ethiopian road construction.

Therefore, it is necessary to identify the variables and methods based on occurrences, in order to rank their overall effects on the practice. This helps to prioritize the factors and, hence to determine the mitigation actions to be taken.

Generally, this research part is expected to be an important stepping stone for examining the various aspects of the problem under consideration, understanding and formulating guiding principles to govern the research procedure and developing and/or testing the enhancement of the existing situation, state or process.

3.2 Research Type and Approach

The research started as two staged study. Problem identification has been done through a preliminary unstructured literature review and discussion with colleagues and professionals in the sector. As an output of this initial phase, examine and analyze different procurement practices in the Ethiopian road construction and its impact in project budget, completion time and quality of work is identified as a proposed problem to be studied; where the research questions were developed in view of investigating this problem.

Contextual and conceptual literature reviews have been done once the problem is identified to have an in depth understanding on the research topic. The review includes books, journal articles, internet sources and archival document such as issues related to prolongation procurement practice in Ethiopia road construction projects. The document search was mainly intended to collect how different construction procurement is implemented practically and to check their compliance as provided in the contract provisions.

Once the specific question was determined, a suitable research design and methodology was considered. Afterwards, the variables and research questions were used. This study is therefore adopted only qualitative research method.

A qualitative research is a "subjective" assessment of a problem and takes the form of an opinion, view, perception or attitude towards objects (that are referred to as an attribute, variable, factor or question).

This survey-based research design has been selected as it is useful in demonstrating the prevalence of the problem. Once the distribution of the problem has been determined and major variables identified, it may be possible to get hints on how to prevent the challenges

and problems. It also helps to identify differences among groups and to recommend possible remedies to be taken by respective stakeholders.

To this effect, a questionnaire was designed following an in-depth contextual and conceptual literature review, and distributed to selected stakeholders including contractors, consultants and employers actively participating in Ethiopian road construction industry. To supplement the questionnaire, a desk study was conducted. Checking, sorting and coding of gathered data has been done for the selected method of analysis. Consequently; analysis of the data obtained from questionnaires and Desk study have processed which involves simple statistical approach, examining, tabulating and categorizing based on the chosen measurement scale. After the collected data is analyzed, the findings and results are discussed. Finally, the researcher has given his conclusion and recommendation, based on the analysis and discussion.

3.3 Research Instrument

Tadesse, 2009) grouped the methodology of data collections under four headings, namely opinion research, empirical research, archival research and analytical research. According to Brukley; each method has its own strength and limitation, none of the above methods is superior that of the other. The choice which one to use is decided based on the research/survey objective, the nature of the information and resources available (Jobber cited in Tadesse, 2009).

The data collection approach adopted for conducting this research includes both primary and secondary sources. Questionnaire and desk study provide the primary data for this thesis while the secondary data sources include renowned civil engineering journals those especially in project and construction management, internet sources, as well as reviewing related archival documents on contractual issues of road construction works. These different methods of data collection have been used in order that the data or information obtained from one can be supplemented by the others whereby the collected data will give multiple evidences.

3.1.1 Questionnaire

Questionnaire provides first-hand information for the subject matter of a research as it is focused on issues which further serves as a survey to understand the main concerns and attitudes of respondents towards the problems (Kasiem, 2008). In this thesis, questionnaire

was administered to some selected stakeholders of the construction industry such as domestic and foreign contractors, consultants and Client. The questionnaire which consists of both open and close ended question was distributed among these professionals.

They were also asked regarding the administration practice of the parties in handling the effects of procurement in time, cost and quality based on their experience and rate the potential variables provided regarding frequency of occurrence.

Finally, open and closed ended questions which were intended for the assessment of the estimation methods and practices were directed to respondents; this is aimed to evaluate whether the estimation process itself contribute to the problem.

3.1.2 Desk Study

In addition to books, journals and internet sources, archival document and claim documents have been reviewed to understand the background of contract provisions, back up data and practices in procurement in the Ethiopian road construction sector. These secondary sources provide a general understanding of the subject area by presenting a wide range of ideas in the field which help to supplement other specific information obtained from the primary data sources.

In addition; desk studies on procurement practice in road construction were used in this research to support or supplement responses and arguments found by questionnaire through in-depth analysis of some cases of a project. Of course, as the nature of the cases focuses on one aspect of a problem or practice, the conclusion drawn may not be generalized, but rather related to one particular event (Naoum cited in Kasiem, 2008). For this reason, desk studies under this research are used to supplement the findings obtained through questionnaire in a way to bridge the gulf.

3.4 Sample Size Distributions

Professional	Number of professionals
Contractor	107
Consultant	76
Client	1

Source: Contractor: Ministry of urban Development and construction construction industry development and regulatory bureau and Ethiopian Road Authority

Consultant: Addis Ababa city Administration and Ethiopian Road Authority

To determine the minimum sample size, Kumasi Metropolis, Kish (1965) formula which gives a procedure for the calculating minimum sample size.

$$n = \frac{K}{1+\frac{K}{N}} \quad \text{……..……..Eq 3.1}$$

Where: n = Sample Size, N = Population Size

S = Maximum standard deviation in the population element (total error = 0.1at a confidence level of 95%)

$$K = \frac{S^2}{V^2} \text{……...……..…….E.q 3.2}$$

V = Standard error of sampling distribution = 0.05

P = the population elements.

$S^2 = P(1-P) = 0.5(1-0.5) = 0.25$ ……..…… ……..Eq 3.3

Therefore, in determining the minimum sample size of Contractor, given Contractor that N = 107, the population number of contractor that works with ERA for the past 10 years (collected from ERA). But out of these contractors only 26 of them have license for GC-1 and RC-1. For this study N=26

$$K = \frac{S^2}{V^2} = \frac{0.25}{0.05^2} = 100$$

$$n = \frac{k}{1+\frac{k}{N}}$$

$$n = \frac{100}{1+\frac{100}{26}}.$$

$$n = 20.63$$

n = 20.63 means that, the minimum sample size of contractor to be used for the study is approximately 21. The 21 contractor will help in establishing the actual sample size for the study. Saunders et al (2007) however put forward a formula for calculating the actual sample size. This formula according to Saunders et al (2007) considers irregularities such as refusal to respond to questionnaires, ineligibility to respond to questionnaires, inability to locate respondent which occur during distribution and collection of data. The formula is:

$$n^a = \frac{n*100}{re\%} \quad \text{.....Eq 3.3}$$

Where n^a is the actual sample size required, n is the minimum sample size, re% is the estimated response rate expressed as a percentage.

Oladapo (2005) and other researchers such as Newman and Idrus (2002), Ellhag and Boussabaine (1999) and others, have indicated that a response rate of 3% is good enough in construction studies. Thus given that n=21, re%=35, n^a will computed as:

$$n^a = \frac{21*100}{35}$$

n^a =60 is the actual sample size for the contactor.

Sample Size for the consultant

To calculating minimum sample size

$$n = \frac{K}{1+\frac{K}{N}}$$

Where: n = Sample Size, N = Population Size

S = Maximum standard deviation in the population element (total error = 0.1 at a confidence level of 95%)

$$K = \frac{X2}{V}$$

V = Standard error of sampling distribution = 0.05

P = the population elements.

$S^2 = P(1-P) = 0.5(1-0.5) = 0.25$

Therefore in determining the minimum sample size of consultant, given that N = 76 the population number of Consultant collected from ERA, consultant that works with ERA for the past 10 years. But out of these consultant only 13 of them are works with ERA for the last Ten years. For this study N=13

$$K = \frac{S^2}{V^2} = \frac{0.25}{0.05^2} = 100$$

$$n = \frac{K}{1+\frac{K}{N}}$$

$$n = \frac{100}{1+\frac{100}{13}}.$$

n=11.504is the minimum sample size

To calculate the actual sample size of the consultant

$n^a = \frac{n*100}{re\%}$ Thus given that n=12, re%=35, n^a will computed as:

$$n^a = \frac{12*100}{35}$$

n^a = 35 is the actual sample size for the consultant

3.5 Data Collection

The study has used the data sources to produce the following basic documents: respondents' documents and archival documents. The respondents' documents were collected using questionnaire from client, contractors and consultants. Archival documents were mostly from completed projects, in which contract documents, project reports, correspondence letters and

payment certificates were investigated thoroughly which were very important in identifying the recurrent problems related to Procurement practice and its effects on completion time, project cost and performance in the Ethiopian road construction projects.

According to Ethiopian Road Authority data, two hundred seventeen different roads are constructed (Access Road, Main Roads, Junction Roads and etc...) Out of those roads 12 recent road construction projects in Ethiopia were selected and investigated. Some of the selected road projects are not completed. These projects discussed information regarding the estimated time and actual completion date as well as estimated amount and actual amount.

3.6 Data Analysis

The questioner and desk study were analyzed in relation to the theoretical propositions. This method of analysis helps to analyze the responses in actual numbers. Accordingly, Frequency distribution was used to distribute the data into categories and determine the number of individual or cases belonging to each category, presented in the form of table

3.7 Scope and Limitation

Construction procurement cover a wide range in the construction industry beginning from the pre- tendering to the post tendering activity. Therefore, this thesis work attempts to assess the current Procurement practice and the tender evaluation system and also to examine alternative approaches that could improve the overall productivity of the road construction industry in Ethiopia's. Every attempt has been made to seek information from relevant stakeholders, and to review different standard literatures.

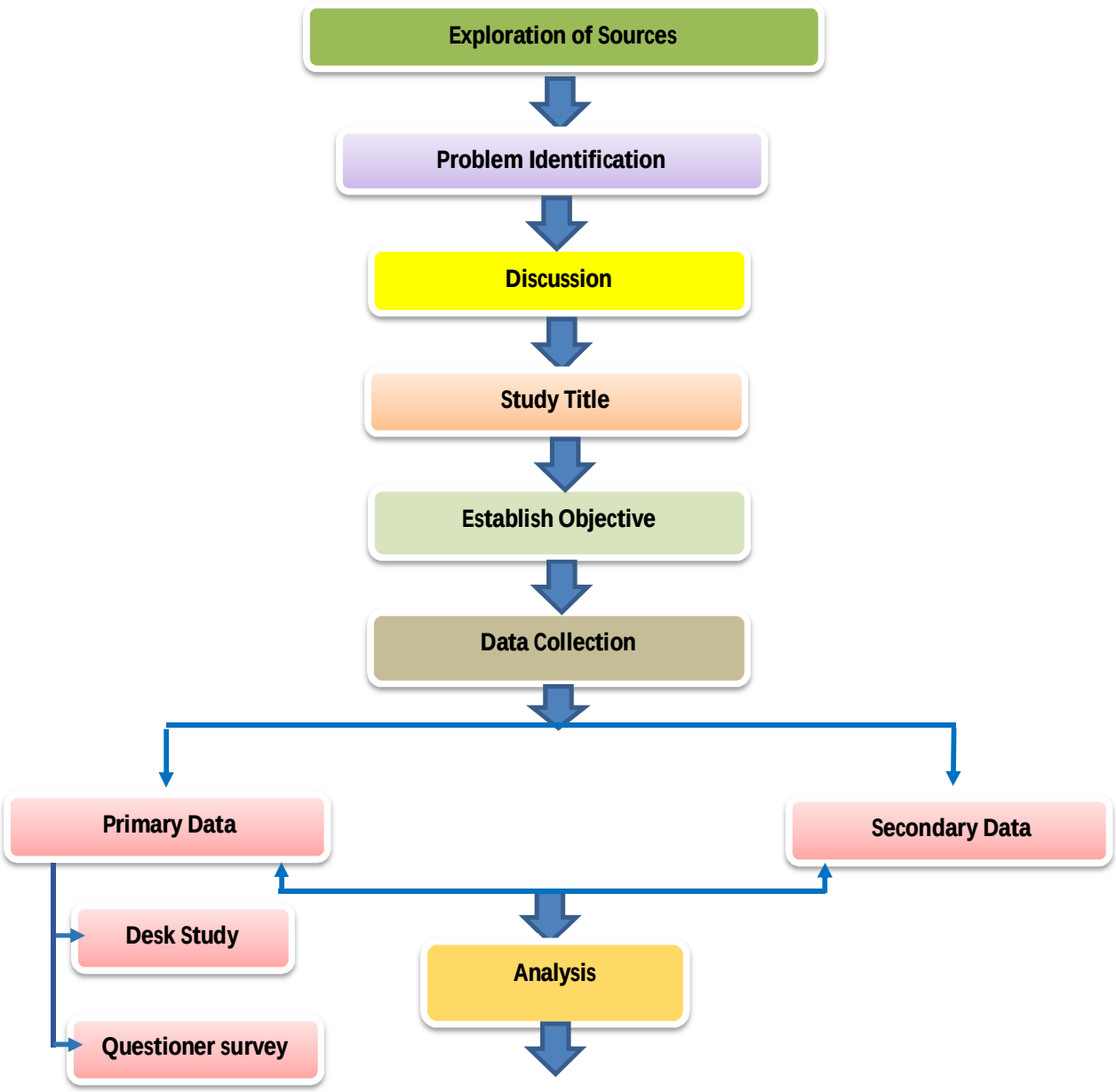
However, the thesis work is limited by several factors. Due to shortage of time and budget allocated for the research work, it has not been possible to visit actual sites of the projects used for the study.

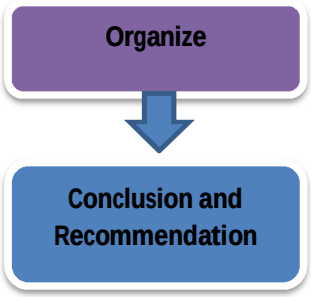
It is also worth mentioning that in the absence of the problems cited above, it could be possible to assess many sample projects so that the entire analysis of the study would be more informative, exhaustive, and reliable. Hence, some of the findings of the study are based on twelve sample projects.

The other important limitation of the study was the lack of willingness of professionals to complete and return the questionnaire by consulting firms and contractors. A series of

briefings on the questionnaire was conducted to motivate respondents in completing the questionnaire as its findings are for academic purpose. In addition, it is found difficult to access documents related to procurement practice.

The methodology that will be followed to prepare this research is shown below in simple chart.





CHAPTER FOUR

ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter describes the Analysis and discussion of the data gathered from the desk study and questionnaire survey. It includes construction procurement practices and its effect on construction budget, compilation time and performance in Ethiopian Road Construction.

4.2 Results of Questionnaire

The Questioner surveys focus only on the Construction procurement practices and its impacts in construction budget, completion time and performance in Ethiopian road construction. Questionnaires were distributed to different organizations involved in the construction. The organizations were selected randomly. The output depends on the respondents' general knowledge on the construction. Construction professionals from different organizations in the construction industry were asked through questionnaires.

4.2.1 Respondent characteristics

This part mainly designed to provide general information about the respondents in terms of the respondent's organization, position, education status, field of specialization and work experience.

4.1.1.1 Type of respondent's organization

In this study, 67.7 % (40) contractors, 100 % (1) owners, 50.00 % (15) consultants participated in the questionnaire. The general response rate for contractors, owners and consultants was 60.44 % and the total number of respondents for the three parties was 56 out 91 respondents.

The response rate of contractors was 67.7 % (40 out of 60 respondents), for the owner 100 % (1 out of 1 respondents) and 50.00 % (15 out of 30 respondents) for consultants.

Table 4.1 Type of respondents` organization

No. of respondents	Questionnaire distributed	Questionnaire Returned	Response Rate
Contractor	60	40	66.67%
Consultant	30	15	50.00%
Client	1	1	100.00%
Total	91	56	61.54%

4.1.1.2 Respondent Education Status

As can be seen in the next table (Table 4.1), 65% and 35% of the contractor respondents hold a first degree and second degree respectively. Out of the 35% respondents 64% specialized in Construction Technology and Management, 21% specialized in Highway Engineering and 14% specialized in Geotechnical Engineer. On the Consultant side 47% of the respondent hold first degree and the remaining 53% of the respondents hold second degree. From the 53% second degree holder 75% specialized in Construction technology and Management, 13% specialized in Highway Engineering and 18% specialized on Geotechnical Engineering.

Table 4.2 Respondent Education Status

Education Status	Contractor	Consultant	Client
Bsc	26	7	1
Msc	14	8	
Total	40	15	1

Education Status	Contractor	Consultant	Client
Bsc	65%	47%	100%
Msc	35%	53%	
Total	100%	100%	100%

Table 4.3 Respondent Field of Specialization

Field of specialization	Contractor	In %	Consultant	In %
Construction Technology and Management	3	21%	1	13%
Highway Engineering	9	64%	6	75%
Geotechnical Engineering	2	14%	1	13%
Total	14	100%	8	100%

4.1.1.3 Respondents' designation

Table 4.4 shows that 23.08% (9) of contracting companies respondents were Manager / Planning, monitoring and supervisor Engineer, 23.08 % (9) were Contract Administration Engineer, 41.03 % (16) were office engineers, 10.26 % (4) were civil engineers and 2.56 % (1) was Senior Construction Engineer. It has been found that 100.00 % (1) of client respondent was Contract engineers. It has been founded that 53.33 % (8) of the consultants companies respondents were resident engineers, 20.00 % (3) were office engineers, 6.67 % (1) was highway engineer and 20.00% were project follow-up engineer. Totally out of 91 respondents from the three parties' contract administration engineer and office engineer takes the higher place.

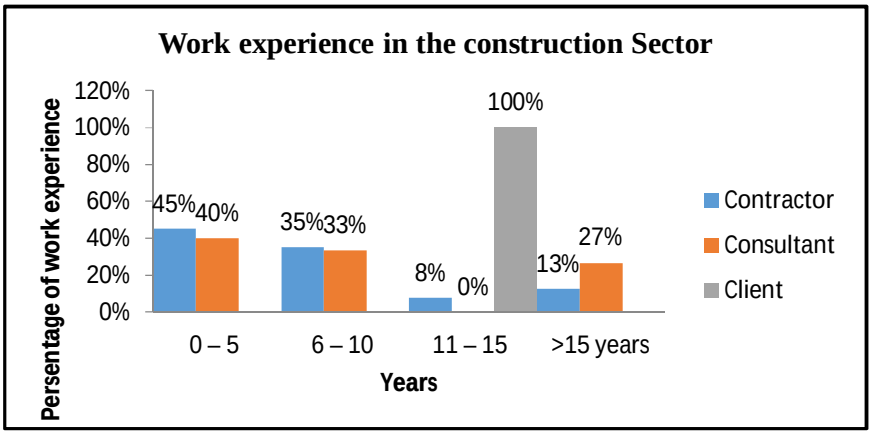
Table 4.4 Respondents Designation

Respondents Designation	Contractor	Contractor Respondents Rate	Consultant	Consultant Respondents Rate	Client	Client Respondents Rate
Contract Administration Engineer	9	23.08%	8	53.33%		
Office engineer	16	41.03%	3	20.00%		
Civil Engineer	4	10.26%			1	100%

Senior Construction Engineer / Highway Engineer	2	2.56%	1	6.67%		
Project Follow-up Engineer			3	20.00%		
Manager / Planning, monitoring and supervisor Engineer	9	23.08%				
Total	40		15		1	

4.1.1.4 Experience of respondents

Overall work experience of the contractor, consultant and client is indicated on the next bar chart (Figure 4.1), From the contractor respondents 45% of them have 0-5 years of construction experience, 35% of them have 6-10 years of construction experience, 8% in between 11-15 years and 13% of them have more than 15 years of experience. From the consultant side, 40% of the respondents have 0-5 years' experience, 33% of the respondents have 6-10 years of work experience while the remaining 27% respondents have greater than 15 years of experience. From the client 100% of the respondent have 11-15 years of experience. On the whole, most of the respondents had a first degree with work experience of 0-5 years and 6-10 years. These distributions provided that information collected from respondent were based on a wider academic knowledge area and the respondents have overall work experience at different position.



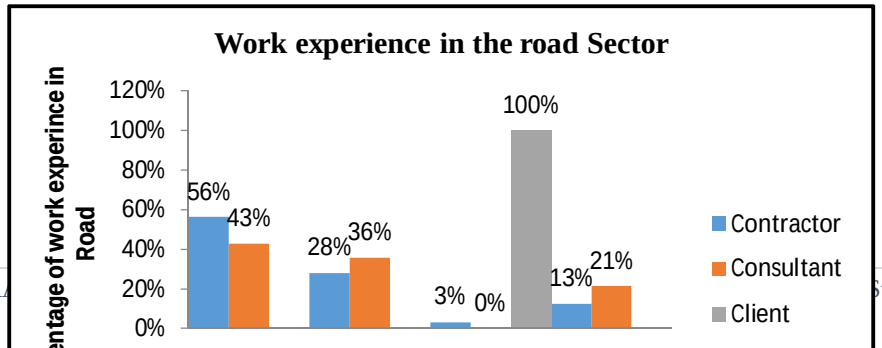


Figure 4.1 Experience of respondents (years)

4.2.2 Contractor Respondent's View

4.2.2.1 Comparison of Project Delivery System in Road Construction

All of the professionals reflect similar view that the Ethiopian Road construction industry is better to shift in to the innovative project delivery methods and latest construction technologies. Most of the respondents argue that something has to be done to improve the situation. Many of the respondents specially who are actively participating in DB contract state that the traditional project delivery method (DBB) undermines the possibility of contracting firms providing broader and better services.

In this regard, the questionnaire of this study attempted to ask the delivery method that effectively for the road construction. Accordingly, (Figure 4.2), majority of the informants responded that (46%) DB project delivery method was effective for the road construction. The second highest score (28%) was given to the DBB. The third highest score was to the BOT method (21%). The fourth was given to the CM-at-Risk method (5%). And no one gave vote for the CM-at-Fee delivery method (5%).

Even if DB project delivery system recommended as effective for the road construction, but it has it on disadvantage and limitation; limited experiences with DB, less work possibility for small and medium sized contractors, limited competition in large projects, client experience may be lost or diminished, reduced flexibility, high tendering cost due to designing requirements, lack of aesthetic consideration, inadequate contractor quality control and assurance and higher overall cost are some of the limitation and disadvantage of DB project delivery system.

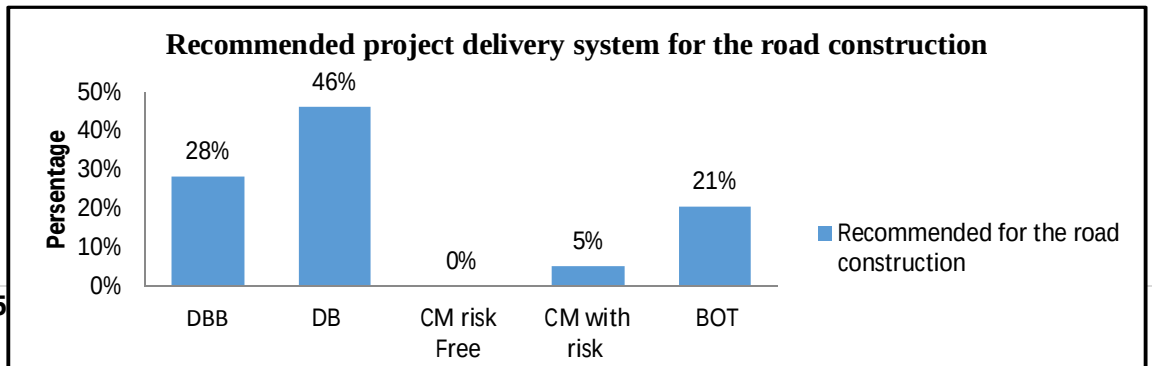


Figure 4.2 Recommended project delivery methods for road construction

In this regard, the questionnaire of this study attempted to ask the delivery method that effective to meet project cost and execute the work on time for road construction. Accordingly, the respondents responded that (41%) and (62%) DB method is effective to execute the work on time and meet project cost respectively, because the contractor assumes all project responsibilities, from design stage up to the concession period for project transfer, it intentionally reduces the time schedules required to process the activities and project cost too. The second score (18%) was given to the DBB method by meeting the project cost and according to them, (28%) was given to BOT method meeting the estimated project duration. Accordingly, equally 5% was given for CM risk Free and CM with Risk project delivery method for the effectiveness to meet project cost and equally 8% for the effectiveness to complete the work on time.

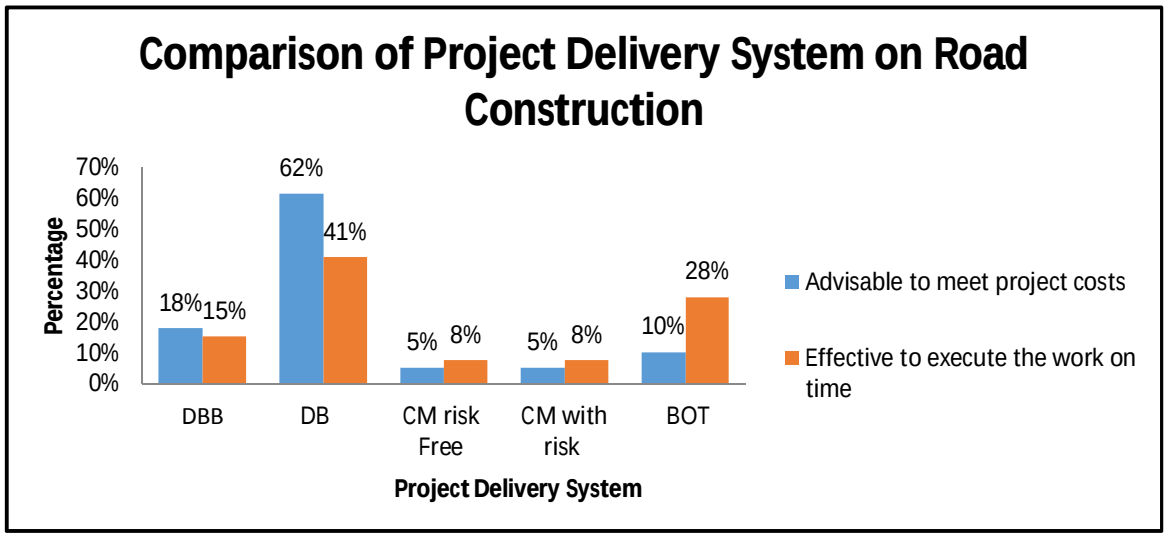


Figure 4.3 Respondents' perception on the method that meets project Cost and work on time

In addition to this respondent also asked project delivery method that ensures a quality project (both functional and aesthetic), (33%) DBB and BOT (Figure 4.4) got equal value by ensuring quality project both in function and aesthetic. The reason is, as noted, this method creates checks and balances between the design team and the contractor(s) so that the defects of one party are not concealed. The respondents thought that the BOT method ensures a quality project better than the DB.

A significant number of respondents (28%) replied that the DB method is also effective in ensuring a quality project (both functional and esthetic). This is because, as the respondents mentioned, highly experienced construction management professionals are involved who can give material quality, skilled labor, and cost control inputs both at the design and actual construction stages. Moreover, Construction Manager at Risk and Construction Manager at Free got equal vote as shown in the following figure.

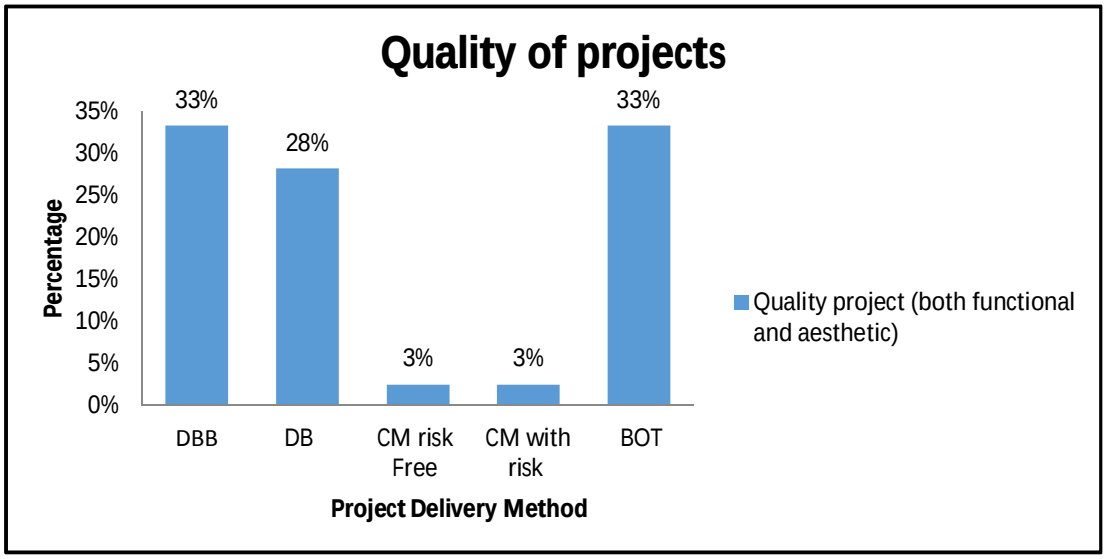


Figure 4.4 Respondents' perception on Quality of projects

Respondents were also asked to express their opinion concerning the need for reduction of administrative burden to the owner when choosing among the delivery methods. Accordingly, it was reported by 41% of the respondents that they consider DB for reduction of administrative burden to the owner. The second highest score (36%) was given to the BOT for reduction of administrative burden to the owner. The third highest score was to the CM risk free method (10%). The fourth was given to the CM-at-Risk method (8%). And their final choice was the DBB method (5%).

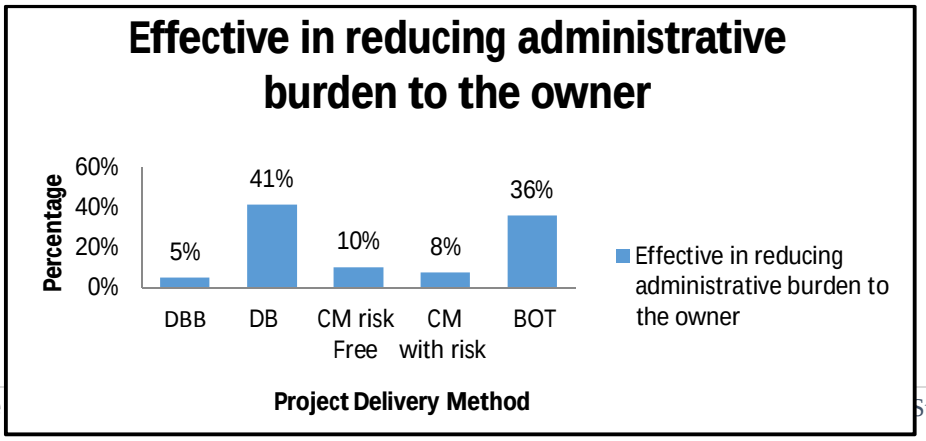


Figure 4.5 Respondents' perception on effective in reducing administrative burden to the owner

The final question from the first section was the project delivery method that exposed to time extension claim, to cost claim and to quality/performance claim. As per the respondent DBB takes the highest place (67%) that exposed to time extension claim, (72%) to cost claim and (45%) to quality/performance claim.

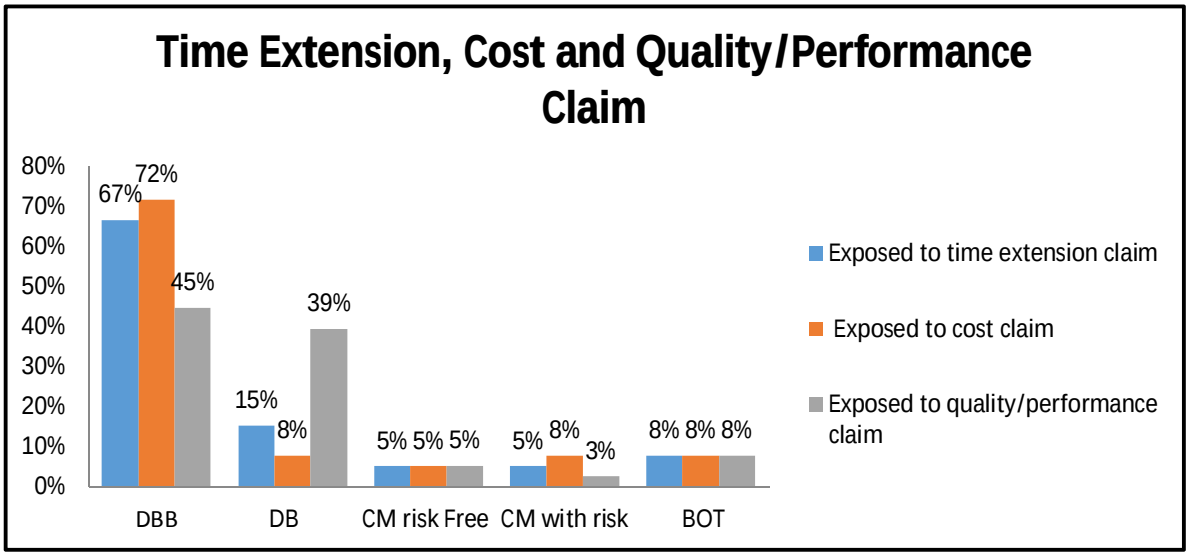


Figure 4.6 Time Extension, Cost and Quality/Performance Claim

4.2.3 Consultant Respondent's View

4.2.3.1 Project delivery methods used by Consultant

Next to the general information, the first question of the consultant respondents was to select the project delivery method that used by the organization to procure at list one construction projects. In this regard, the respondents' response as presented on figure 4.7, (60%) they had never used any of the innovative methods to deliver at least one construction project so far. Hence, it has been noted that these offices have been using the traditional, DBB, method, even if it's not timesaving and is a costly method. And the remaining (40%) consultant has exposer on innovative project delivery method. Accordingly out of the 40% consultant (67%) use DB widely than the other innovative method. The second score were given for both CM-risk-free and CM-at-Risk method (13%). And the final one was the BOT method (7%).

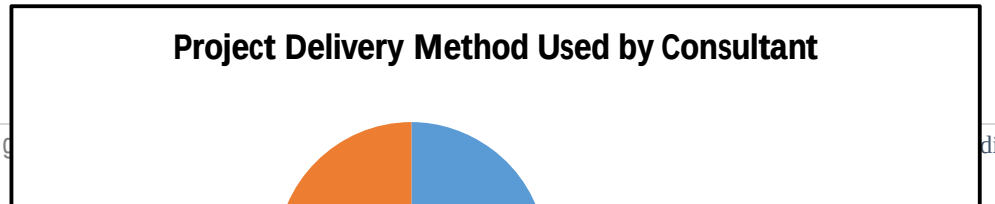


Figure 4.7 Project delivery method used by consultant

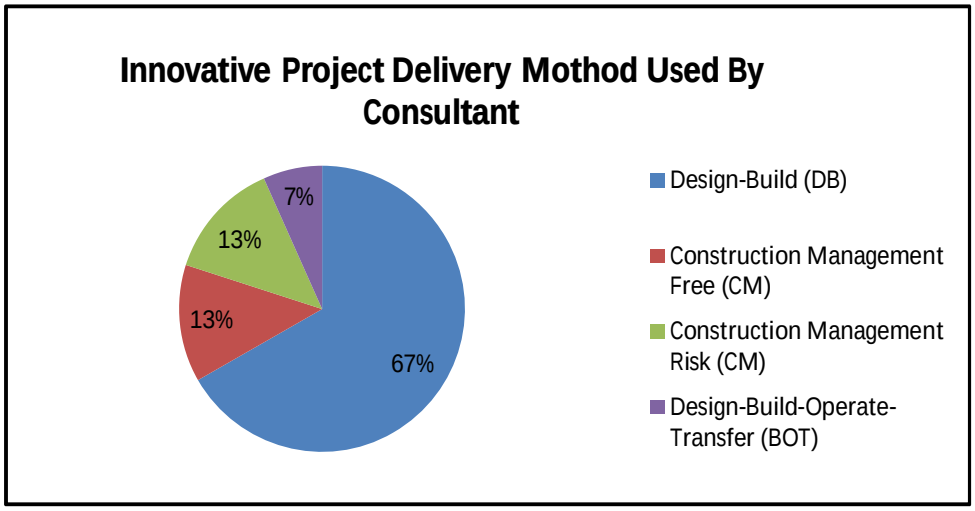


Figure 4.8 Innovative project delivery methods used by Consultants

4.2.3.2 Willingness to Shift from the Traditional to the Innovative Method(s)

Asked if they intend to shift from the traditional method of project delivery to the innovative ones, 67% of the respondents preferred to sift to innovative method. However, the respondents also mentioned problems like absence of timely project completion, cost overruns and poor quality of the finished products as the main problems of the traditional project delivery method. On the other hand 33% of the respondents prefer to stay in the traditional method, as they quote lack of capable local contractors in the country, and absence of local standard conditions of contract for the use of the innovative methods they chose to stay in the traditional. It's presented as shown in the figure below.

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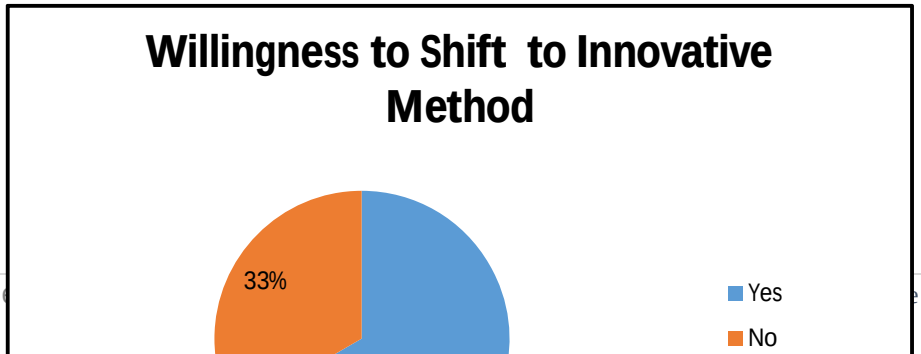


Figure 4.9 Willingness to Shift from the Traditional to the Innovative Method(s)

4.2.3.3 Priority rank of the Innovative project delivery method

The next questionnaire survey asked the respondents to rank the innovative project delivery method that they plan to shift; based on the figure 4.17 below the respondents only rank DB project delivery method and it got the first priority (60%).

The reasons that respondents cited for their mixed feelings were:

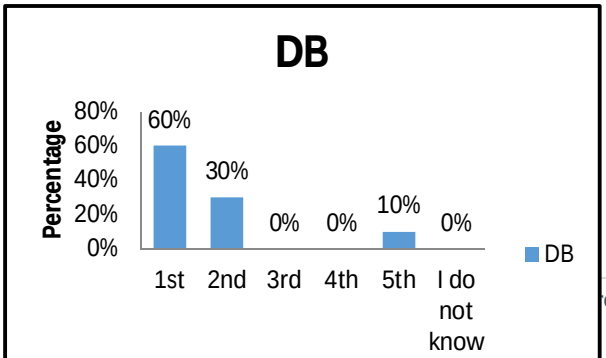
i. Lack of capable local contractors, and

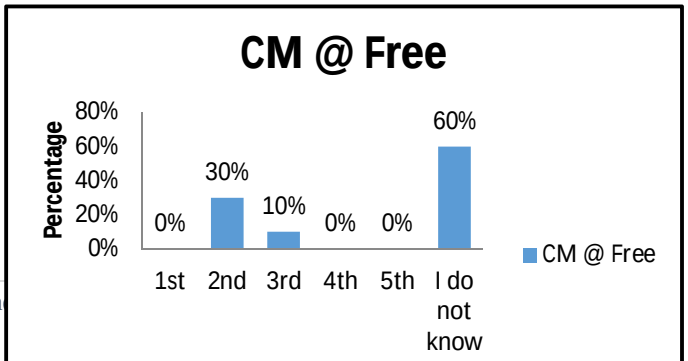
ii. Lack of local law allowing the use of these innovative methods.

Hence, for the sake of the reasons mentioned, the respondents' perception that the local construction industry lacks capable local contractors for adoption of innovative project delivery methods could not be firm ground for not introducing or applying the innovative methods.

Respondents also mention construction law in Ethiopia excludes other methods than DBB method. It is worth noting that the selection or use of specific project delivery methods may be mandated for some owners. However, the local situation appears to be a bit relaxed in this regards. Hence, the Standard Public Works Procurement Guideline for Competitive Bidding, issued in January 2006, allows the application of the innovative methods. In this regard, it recommends the adoption of the FIDIC Conditions of Contract.

The respondent chose 'I do not know' section for CM at Free, CM at Risk and BOT project delivery system, the percent ranges from 60%-80%. It is logically true when we compare to the real practices to the Ethiopian road construction.





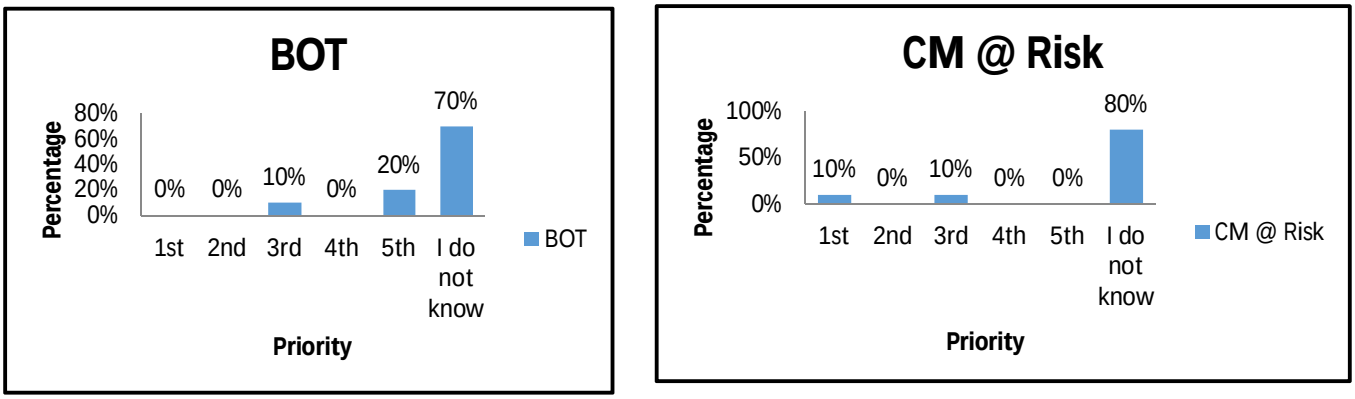


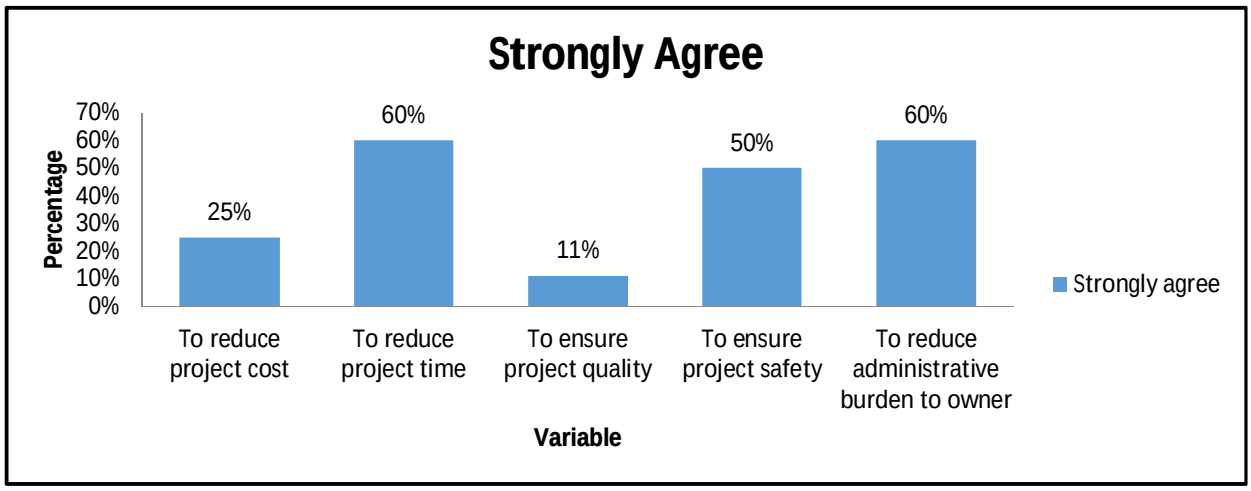
Figure 4.10 Priority Ranks of the Innovative Method(s)

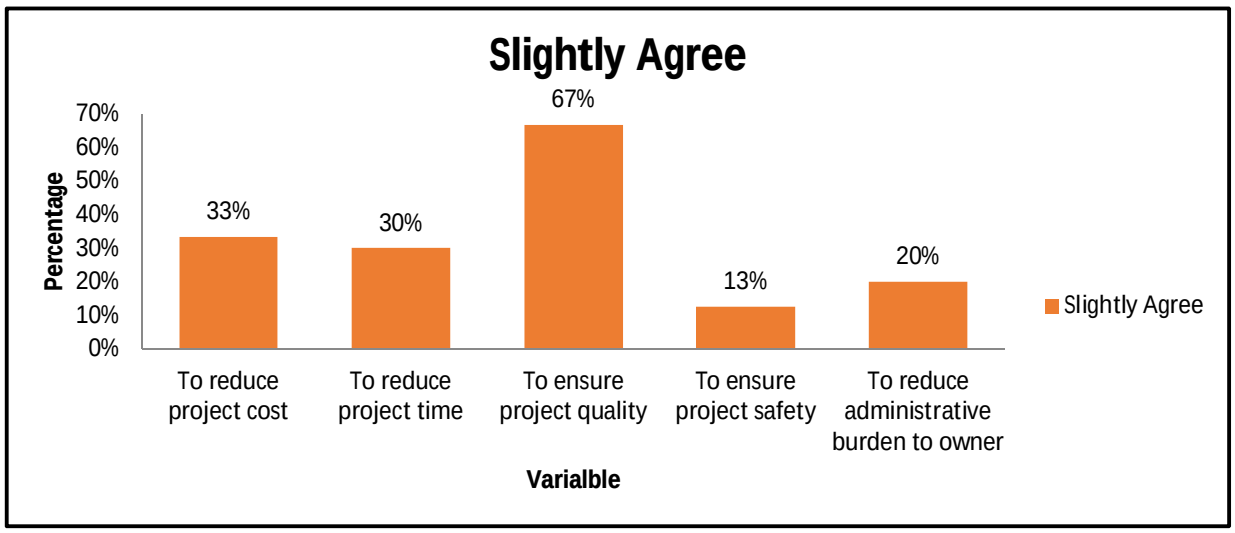
4.2.3.4 Respondents' reason to shift to Innovative project delivery method

Farther question also asked for the consultants who intended to shift to innovative project delivery system, "what was/were the reasons behind their decisions to shift to innovative method?" As presented in the figure below 4.11 all the respondents only select DB delivery system and rank based on redaction project cost, redaction project time, ensure project quality, ensure project safety and to reduce administrative burden to owner.

First critical criterion they consider to select DB among the project delivery methods is to maintain or, if possible, to reduce the project duration. As reported below 60% of the respondents strongly agree DB reduce project duration and respondents were also asked to express their opinion concerning the need for reduction of administrative burden to the owner when choosing among the delivery methods, 60% of the respondents similarly strongly agree it reduce administrative burden to the client.

Ensuring Project quality is given the second slightly agreeing priority (60%) in delivery method. In Addition the need for cost reduction is considered as the third pressing (Neutral) criteria (25%) for selecting among the delivery methods.





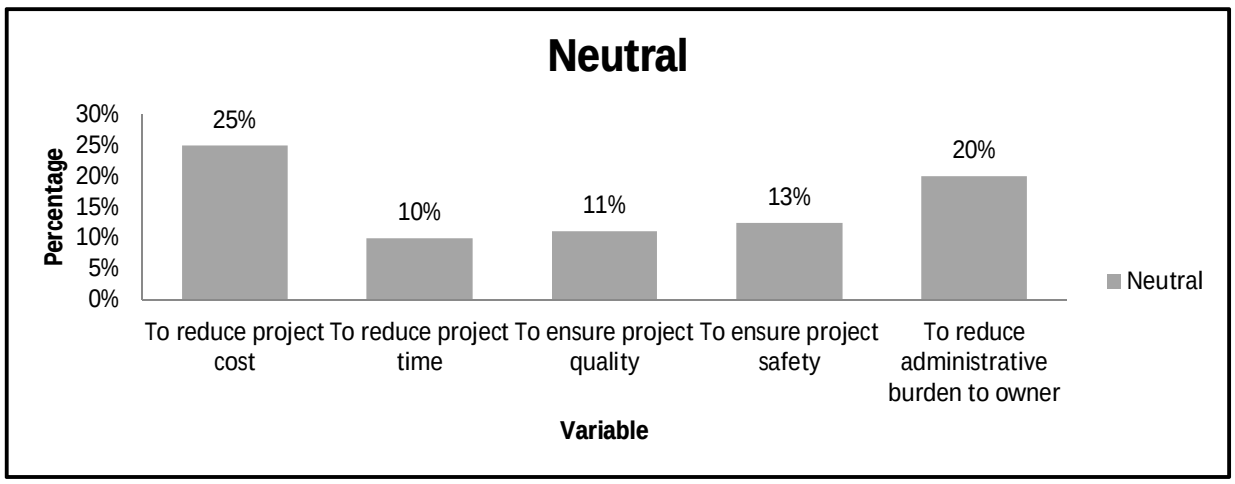


Figure 4.11 Respondents' reason to shift to Innovative project delivery method

Lastly, under this part of the questionnaire, the procurement related factor that affecting project performance were asked. All feedback from respondent tabulated and tries to find out critical

factors which severely affect performance of construction. Accordingly, the respondents responded that (54%) process and procedure of the construction organization is the prime factor that affects project performance.

Up next control of project design (20%) takes the second highest rank that affects project performance.

In addition Pre-construction and client interest got equal vote (13%) on procurement related factor that affects project performance.

One of the respondent point out "The most important factors agreed by the owners, contractors, and engineers as the main factors affecting the performance of construction projects: improper planning, improper designing, site management, decision making, construction methods, shortage of labor and technical personnel, quality and shortage of materials, construction mistakes and defective work, productivity.

The owners and technical factors are more important than the operational ones. Development of human resources in the construction industry through proper and continuous training programs for construction performance enhancement. These programs can update participants' knowledge and can assist them to be more familiar with project management techniques and processes.

Engineers should perform their activities properly to improve productivity which helps improvisation of construction projects. Contractors should not increase the number of projects that cannot be performed successfully. Proper motivation and safety systems should be established for improving the productivity performance of construction projects. Contractors are counseled to minimize waste rates through project implementation for improving cost. They should be more interested in conformance to project specification to overcome disputes, time, and cost performance problems. Quality materials should be of a greater interest for contractors in order to improve cost, time, and quality performance. This can be done by applying quality training and meetings that are necessary for performing an improvement. Contractors are urged to be more interested in sequencing of work according to schedule. In addition, contractors should have a cost engineer in their projects to successfully control costs and improving in performance of construction."

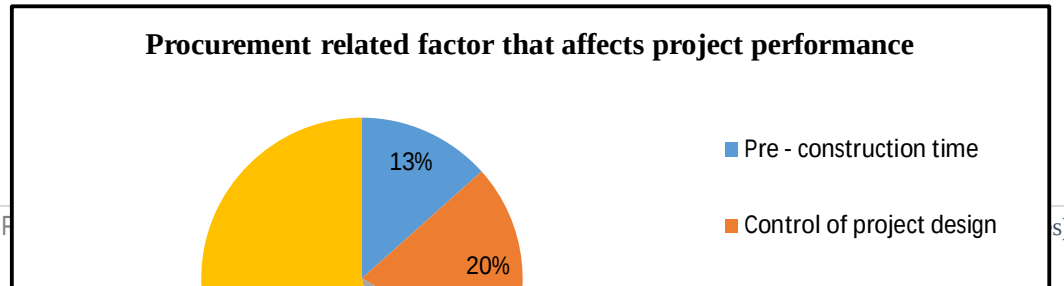


Figure 4.12 Procurement related factor that affects project performance

4.2.4 Contractor and Consultant Respondent's View (Common Questioner Survey)

4.2.4.1 Respondent's view regarding the essential procurement stage for road construction for better performance

In this regard, the questionnaire of this study attempted to ask the essential procurement stage for road construction for better performance (Figure 4.13). Accordingly, (72%) of the contractor and (93%) of the consultant respondents responded that pre-construction stage is essential for better performance than the construction stage.

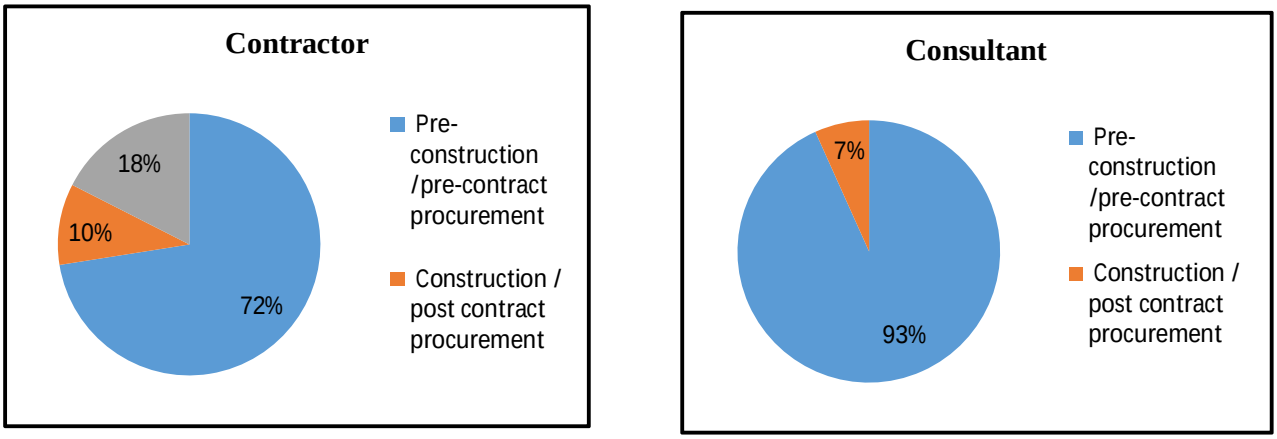


Figure 4.13 Contractor and Consultant view regarding the essential procurement stage

It was observed that 72% of the contractor respondents indicated the pre-construction stage is essential procurement stage for road construction for better performance (Figure 13). According to these respondents select the subdivision of pre-construction procurement stage like these, 76% select pre-feasibility and feasibility study as very high, 14% select Design as Very High and 10% select as tendering as Very High subdivision of pre-construction procurement stage. Out of the 93% of the consultant respondent select the subdivision of pre-construction procurement stage like

these, 67% pre-feasibility and feasibility study as very high, 20% select Design as High and 13% select tendering as Very High .

Figure 4.13a Contractor view regarding subdivision of pre-construction procurement stage

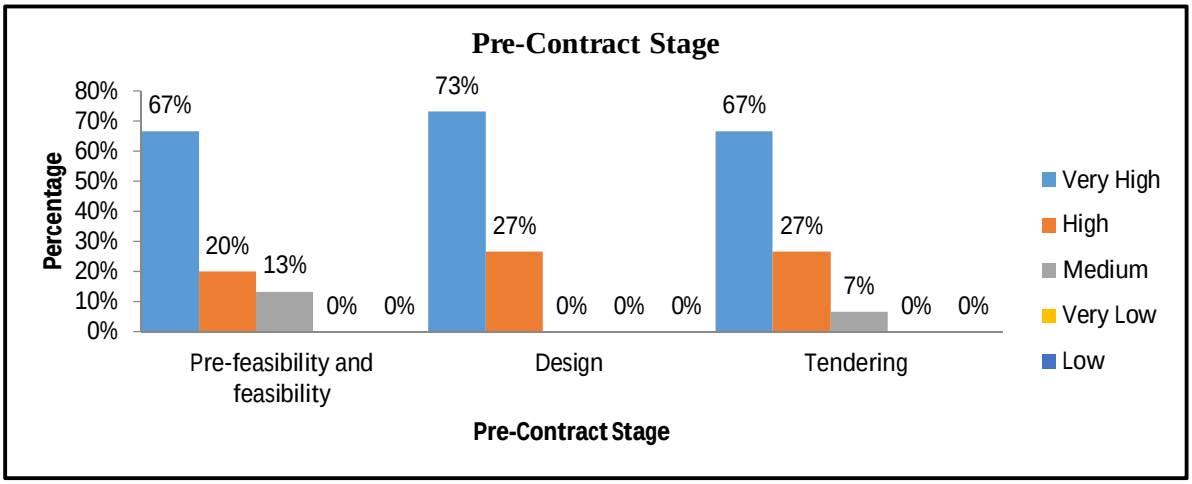


Figure 4.13b Consultant view regarding subdivision of pre-construction procurement stage

4.2.4.2 Contractor Respondents View on advantageous SBD for tender evaluation for road construction

As shown on Figure below, Contractor Respondents asked which SBD is advantageous for tender Evaluation and Analysis for the road construction, 32% of respondent select PPA 2006, 25% of the respondent select MoWUD, 28% of the respondent select FPPPAA 2011 and 15% of them did not select any of the SBD for Road construction.

It can be seen that (Figure 4.14) the majority of the Contractor respondents support least bidder system (PPA 2006 Standard Biding Document) for tender evaluation system. PPA 2006 SBD evaluation method is a two stage bid evaluation system the first one is technical evaluation and the second one is the financial offer. The first evaluation is a technical evaluation, Bidders who

Advantageous SBD for tender evaluation for the road

score above 70% in the technical evaluation will participate for further financial evaluation. The successful bidder will be the least bidder whose offer is less than the other bidder.

Figure 4.14 Contractors view on tender evaluation system

4.2.4.3 Consultant Respondent View on advantageous SBD for tender evaluation for road construction

As shown on Figure below, Consultant Respondents asked which SBD is advantageous for tender Evaluation and Analysis for the road construction, 47% of respondent select FPPPAA 2011, 33% of the respondent select MoWUD, 28% of the respondent select PPA 2006 and 13% of them did not select any of the SBD for Road construction.

On the other hand most of the consultant respondents support FPPPAA 2011 Standard Biding Document for tender evaluation system. The aggregate of technical and financial offers have 70% and 30% value respectively at the end of evaluation. The Technical Proposal evaluation score shall be normalized according to the highest evaluated technical score that will get 100 points according to which other scores of technical criteria shall be proportionally ranked. Normalization is the transformation that is applied equally to every element in the group of data so that the group has a specific statistical characteristic. The same is true for the financial offer. The winner of this bid will be the highest point in the total sum of results of the technical and Bid Price evaluation.

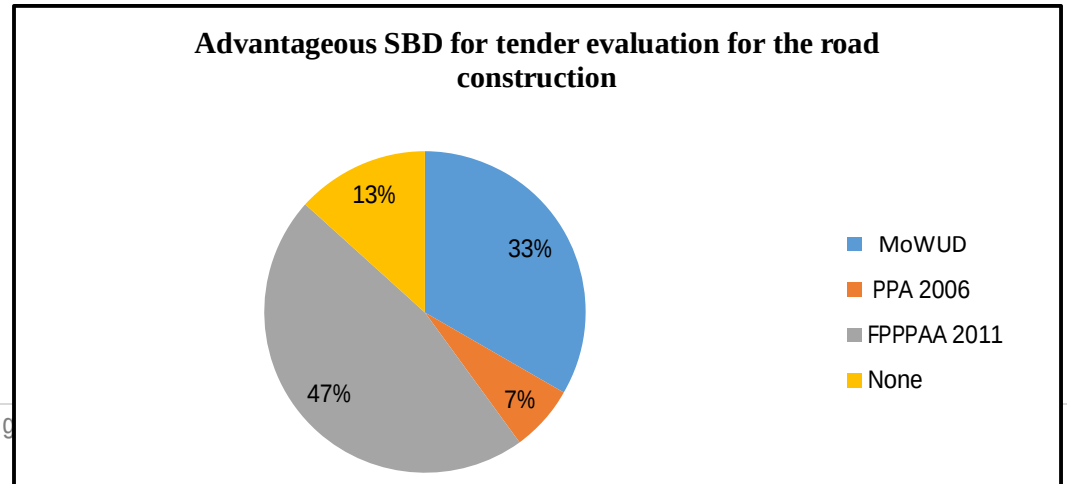


Figure 4.15 Consultant View on tender Evaluation System

4.2.4.4 Contractor Respondent View on Tender Evaluation and Analysis of different Standard Bid Document

In this regard, the questionnaire of this study attempted to ask the impression about MoWUD, (The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001), PPA 2006 and FPPPAA 2011 tender evaluation and analysis approaches for road construction. According to respondent (Figure 4.16 a, b & c) as illustrates below that 30% of the respondents gave very good to PPA 2006 tender evaluation and analysis for road, 45% of the respondent gave Good for MoWUD evaluation system and 28% Fair for FPPPAA 2011 tender evaluation and analysis approaches for road construction.

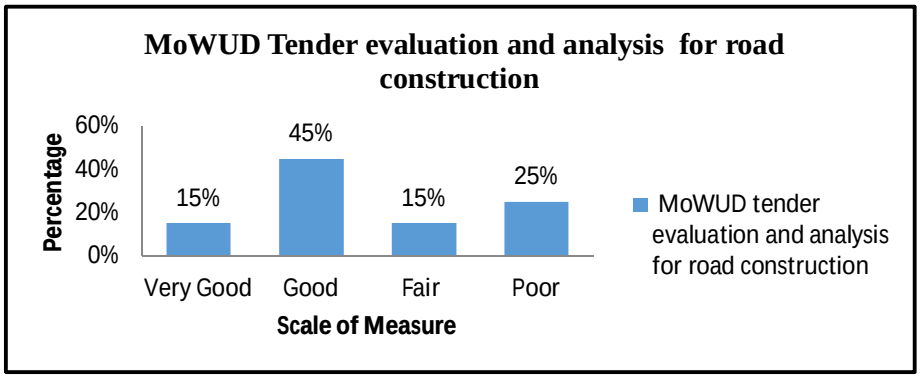


Figure 4.16a Contractor Respondent View on MoWUD Tender evaluation for road construction

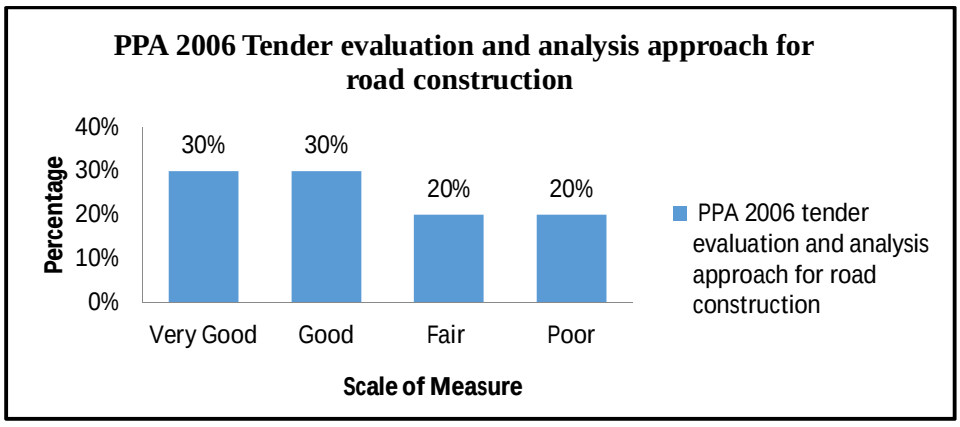


Figure 4.16b Contractor Respondent View on PPA 2006 Tender evaluation for road construction

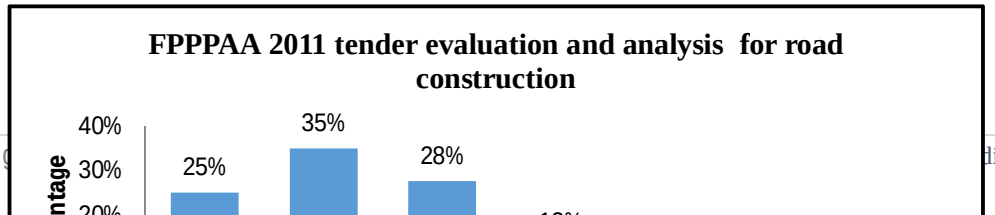


Figure 4.16c Contractor Respondent View on FPPPAA 2011 Tender evaluation for road construction

4.2.4.5 Consultant Respondent perception on Tender Evaluation and Analysis of different Standard Bid Document

It was observed that 33% of the consultant respondents indicated MoWUD and FPPPAA 2011 as a very good tender evaluation for road construction. Next PPA 2006 and FPPPA 2011 (40%) take the second scale of measure as good tender evaluation for road construction. And 33% fair for MoWUD tender evaluation for road construction as shown in the following figure 4.17a, b and c.

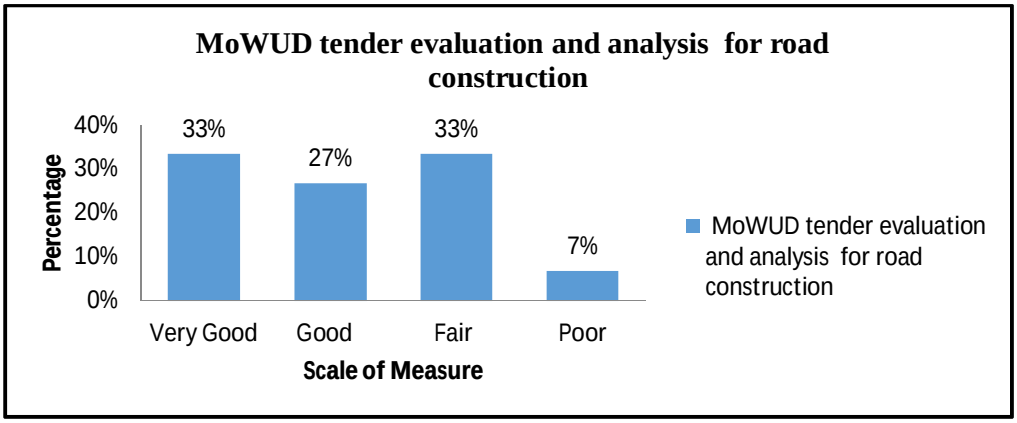


Figure 4.17a Consultant Respondent View on MoWUD Tender evaluation for road construction

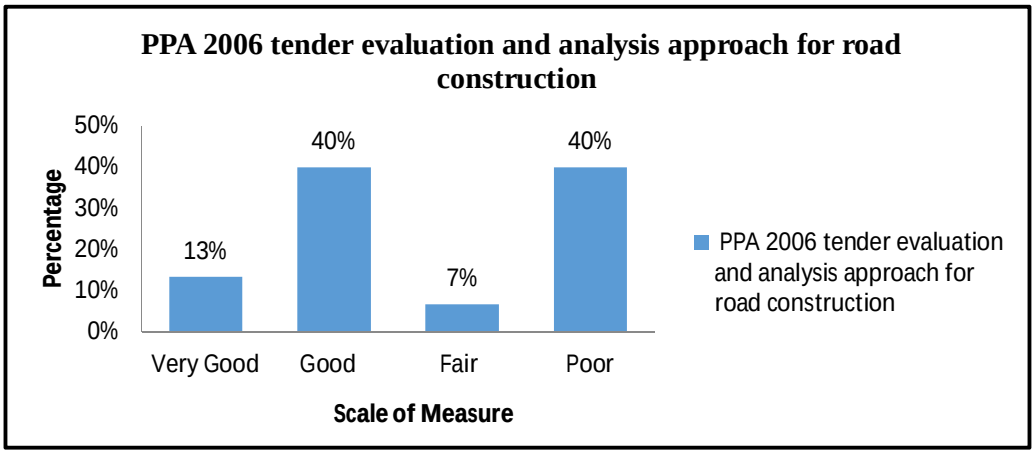


Figure 4.17b Consultant Respondent View on PPA 2006 Tender evaluation for road construction

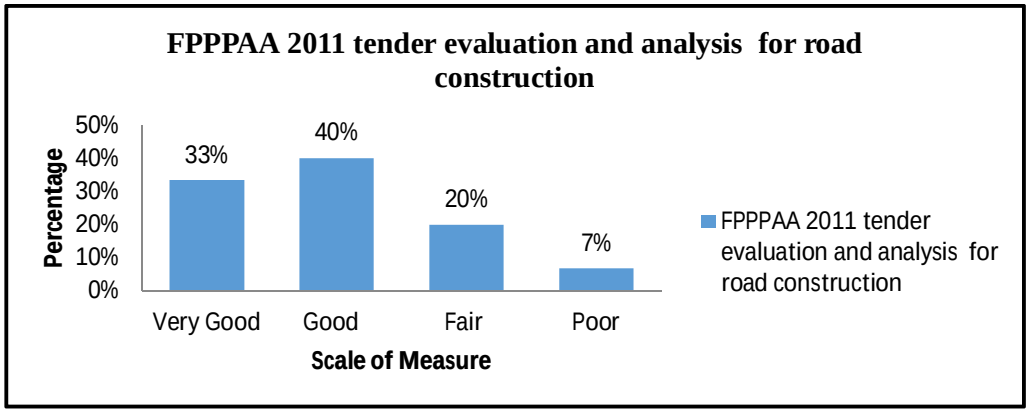


Figure 4.17c Consultant Respondent View on FPPPAA 2011 Tender evaluation for road construction

4.2.4.6 Contractors Respondent Perception on Performance Evaluation used in Construction Projects

Here also another question arises, about performance: "which performance evaluation is used for construction projects?" The respondent answer is presented in Figure 4.18 from the surveyed contractors; it was found that 70% of them select Economical performance evaluation used most frequently. Other 60% of the respondents said time performance evaluation is occurs rather than Quality, Environmental performance and working Environment performance. And the rest 33% said Quality performance used frequently and least frequently. Their final choice was for environment performance and working environment performance (38% and 45%) No occurrence and least frequently respectively.

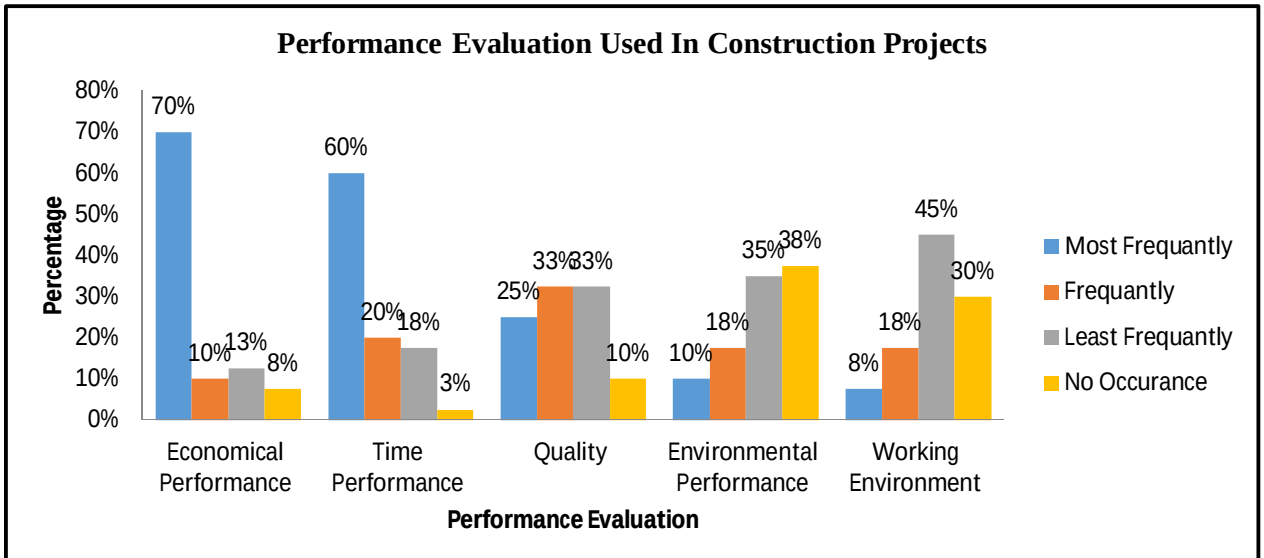


Figure 4.18 Performance Evaluation used for construction projects

4.2.4.7 Consultant Respondent perception on Performance Evaluation used in construction projects

Here also same question asked for the consultant, "Which performance evaluation is used for construction projects?" The respondents replied their answer as presented in Figure 4.19 it was found that 60% of them select Time performance evaluation used most frequently. Other 60% of the respondents said Economical performance evaluation is occurs rather than Quality, Environmental performance and working Environment performance.

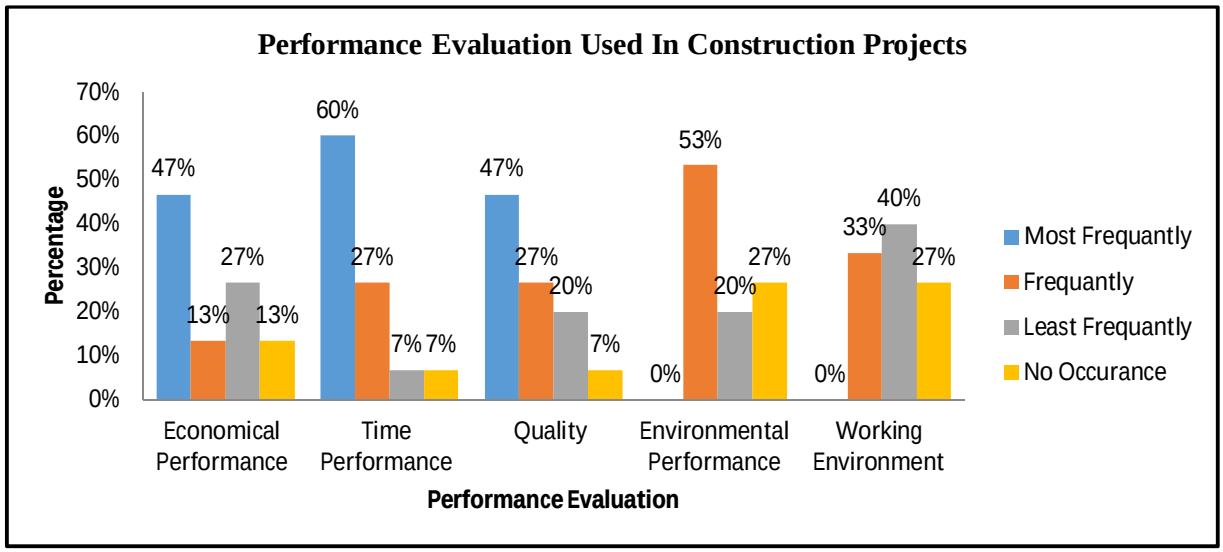


Figure 4.19 Performance Evaluation used for construction projects

4.2.4.8 Satisfaction of Contractor on Ethiopian construction procurement practice

Lastly, under this part of the questionnaire, Satisfaction of Contractor on Ethiopian construction procurement practice. As illustrated under the following (Figure 4.20) 42%, 38%, 15% and 5% Medium, Low, very low and high respectively. Owner wants to award to low bid, over qualification criteria, corruption, lack of information regarding the project and lack of local low allowing the use of innovative methods are the reason that responded suggested.

Figure 4.20 Satisfaction of Contractor on Ethiopian construction procurement practice

4.2.4.9 Satisfaction of Consultant on Ethiopian construction procurement practice

The same is true for consultant, lastly they asked there degree of satisfaction on Ethiopian construction procurement practice. As described on the Figure 4.21 below 40% select Very Low degree of satisfaction, 33% Vote for Medium, 27% Vote for Low degree of satisfaction, and no one select high degree of satisfaction.

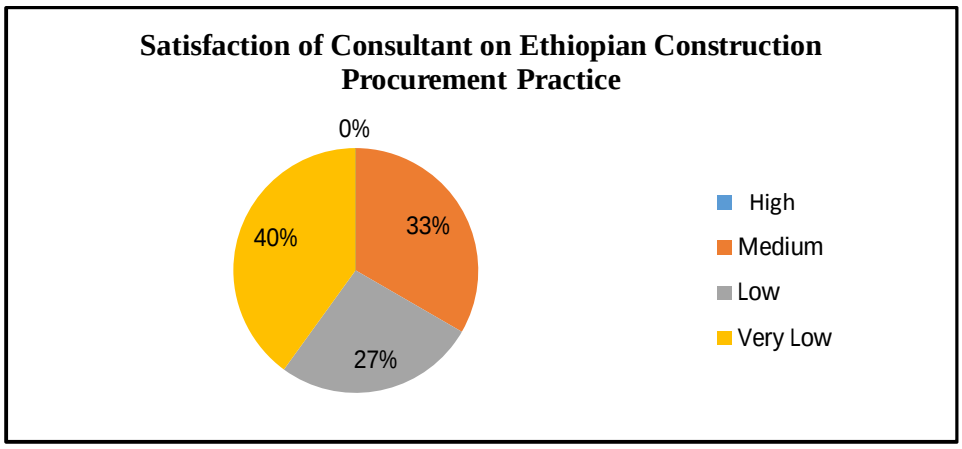


Figure 4.21 Satisfaction of Contractor on Ethiopian construction procurement practice

4.2.5 Client View

The General Information of the client is presented on the first section with the contactor and consultant. From the distributed questionnaire to the client the first question asked was, client requirements to select project delivery system. According to the respondent they use project requirements and project plan (Project type, Size, cost, Flexibility, complexity and site risk) to select project delivery but they company do not have specialized staff member who is responsible to select type of project delivery system for new construction project.

The Ethiopian roads authority has experience with the DB innovative methods of project delivery system in the road construction in addition to the traditional project delivery method. However, owner's primary goal in choosing a delivery method to ensure that the method to meet

the project objectives and at the same time allow the project to be delivered on time and within budget with better quality. ERA always use traditional delivery system and usually innovative delivery system.

For the question raised about the project delivery method that is generally recommended for the road construction, clients prefer DBB.

Even if clients in general consider DBB as an advantageous project delivery method they also comment DBB exposed to time and cost claim in road construction. They also comment DB project delivery system is effective to meet project costs and execute the work on time for the road construction but it exposed to quality/performance claim. They also mention BOT project delivery system ensures a quality project (both functional and aesthetic) and effective in reducing administrative burden to the owner in the road construction.

The clients were also asked to explain their criteria to select the type of construction contract document (construction contract document like MoWUD, PPA 2006, and FPPPAA2011), according to their explanation the interest of the client takes the first priority, in addition to this the project size, complexity and type of the project takes the second priority. But ERA use World Bank standard biding document for projects greater than Ten Million US Dollar and PPA for projects less than Ten Million US Dollar. As well, they select FPPPAA 2011 SBD as advantageous tender evaluation for the road construction.

The clients select pre-construction Procurement stage to ensure good quality without cost overrun and time overrun. And they also rank the sub title of the pre-construction, 50% for the design, 25% for pre-feasibility and feasibility and 25% for tendering.

In this regard, the questionnaire of this study attempted to ask the impression about tender evaluation system, the respondent satisfying is presented here below as table 4.5;

Table 4.5 Client's View on Tender Evaluation

SBD	Priority		
	Very good	Good	Fair
MoWUD			✓
PPA 2006		✓	
FPPPAA2011		✓	

The other question arises was about performance; "which procurement related factor is affecting project performance?" The respondent lists the factor that affects the performance as;

- Pre - construction time
- Control of project design
- Clients interest and
- Process and procedure of construction organizational

As next which performance evaluation is used for construction projects from respondent is tabulated below (Table 4.6)

Table 4.6 Frequency of Performance Evaluation used for construction projects

Performance Evaluation	Most Frequently	Frequently	Least Frequent	No Occurrence
Economic Performance		√		
Time Performance			√	
Quality	√			
Environmental Performance			√	
Working Environment			√	

Lastly, under this part of the questionnaire, degree of satisfaction of the client on the Ethiopian construction procurement practice was asked. The respondents mention as Low degree of satisfaction.

4.3 Case Study on Ethiopian Road projects

In Ethiopia, the key parties involved in road projects implementations are the Government of Ethiopia represented by the Ethiopian Roads Authority, Contractors and Consultants. The Ethiopian Roads Authority (ERA) is charged with the duties and responsibilities of providing adequate road infrastructure to support the socio-economic development of the country. The task involves improving the condition of existing roads and expanding the network. ERA was established in 1951 as Imperial Highway Authority and was responsible for the design and implementation of road projects for about 60 years from its establishment by making use of in house design and own force unit for construction. Later, recognizing the importance of the road transport in supporting social and economic growth and its role as a catalyst to meet poverty reduction targets, the Government of Ethiopia has placed increased emphasis on improvement of the quality and extent of road infrastructure in the country. To address constraints in the road sector, related to restricted road network coverage and poor condition, the Government formulated the Road Sector Development Program in 1997

Currently, the Contractors taking part in road projects implementations are National and International companies. Most of the local Contractors are of limited capacity and rarely do

meet the requirements to participate in donor financed projects. Hence, international Contractors, who meet the requirements, have been participating in donor financed projects. The contracting company after winning the contract will take the responsibility to complete construction of the project in accordance with the contract document. Consultants, like Contractors, will take the responsibility for the design and/or supervision services they render in accordance with the contract document. International Consultants' have also been participating in donor financed projects.

The tender document for the procurement of works in ERA is World Bank standard biding document for projects greater than Ten Million US Dollar and PPA for projects less than Ten Million US Dollar. For this research six projects were selected for the case study to assess the procurement practices in ERA. The research intention was to investigate construction project that procured under World Bank standard biding document so that all the selected projects are procured under the World Bank standard bid document.

The project delivery method widely practiced by ERA is the traditional design-bid-build approach. Now days ERA adapt the innovative project delivery system Design Built for few projects. The DBB approach has three separate phases. First, the feasibility and/or design of a project are undertaken by a Consultant, then a bid is floated to procure a Contractor, and finally the selected Contractor completes the construction. But the DB approach has only two stages, the first one is bid floated and them contractor selection.

For this research three DBB and three DB Ethiopian Federal Road Projects were selected for the procurement practices study in the road sector. Due to shortage of time and budget allocated for the research work, it has not been possible investigate additional project. In addition to these project construction budget greater than 10 Million US dollar, Different project delivery system, road length greater than 35km, and not terminated road projects are the criteria for the selection.

During the desk study the Qualification Requirements, bidder who participate in the bidding process, bid evaluation system, contract amount, contract time during signing of the contract, actual cost and actual time at completion, Nature and complexity of the project were investigated. These help to know whether the Construction procurement practice has impacts in construction budget, completion time and performance in the Ethiopian construction industry.

The procurement of services and works were made on international competitive bidding, and the projects were delivered with design-bid-build and Design build project delivery method. The list of these projects is described hereunder;

Case Study One

4.3.1 Construction Procurement Practice

4.3.1.1 Design-Bid-Build Project Delivery Method

A. Sodo Tercha Road upgrading Project (Lot 2:Omo River-Tercha 83.4Km)
B. Sodo-Tercha Road Upgrading project (Lot 1: Sodo-Omo River 75.72)
C. Felegebirhan-Bahirdar Road Project (Contract-2: Zema River Bridg-Felegebrihan)

A. Sodo Tercha Road upgrading Project (Lot 2: Omo River-Tercha (83.4Km)

The works under this contract consist of the upgrading of the existing gravel surface road which begins at the town of Tercha and ends at about Omo River at Km 139+000. The road shall be upgraded to DS4 road class (ERA's Geometric design Manual -2002). The upgrading road shall have a cross section width of 7.0m outside town (with 1.5m shoulder on each side) and 19 m width (including 3.5 parking lane and 2.50m pedestrian walkway) within town section. The formation of the road is 20cm base course/wearing gravel, 27.5cm sub base and 30cm capping layer for widening.

The road traverses abundantly through mountainous terrain and has necessitated the installment/rehabilitation of 138 minor/major drainages – RC pipes, box/slab culverts and bridges, requiring new construction and provision of additional cells/rehabilitation as detailed and presented in the engineering report of this contract. The provision of new construction includes two bridges with span: 1*20 RCDG and 1*10 RCSS, Three slab/box culverts at km 58+284,108+780 &113+052 and Thirty nine pipe culverts.

The road will be constructed to an Asphalt Concrete Standard. The works under this contract consists of the construction of 83.4 Km road to DS-4 standard with 7.0 m carriageway width. The works also includes construction of several minor and major drainage structures. The general summary of the project is tabulated below.

Table 4.7 General Information Summary of Sodo Tercha Road upgrading Project Lot 2

No.	General Information	Descriptions
1.	Project Location	Southern Region
2.	Length (km)	83.4
3.	Road standard	DS-4
4.	Width of Road	7.0m outside town (with 1.5m shoulder on each side) and 19 m width (including 3.5 parking lane and 2.50m pedestrian walkway) within town section
5.	Type of Surface	Asphalt Concrete surface
6.	Existing Road	upgrading of the existing gravel surface
7.	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting (Contract Delivery Strategy)	Design-Build Contract

The Specific Procurement Notice for Invitation to bids for the subject Project was published on the Ethiopian Herald on July 27 & 29, 2014. Pursuant to the notice of invitation, sixteen bidders have purchase the tender documents before the deadline for submission of bids.

A pre-bid meeting of the tender was scheduled to be held on August 19, 2014 at 10:30AM at ERA conference room.

Later some queries have been received from bidders in written forms and Addenda & clarification to Queries were issued to all the bidders who have purchased the bidding document.

Among the listed below sixteen prospective bidders who have bought the tender documents from ERA, Eight of them have submitted their qualification applications and financial offers in separate sealed envelopes before/on October 28, 2014 at 2:40 PM which is the latest date for submission of bid. The table blow shows the list of bidder who have purchase and submitted their application for post qualification and financial offers.

Table 4.8 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

No	Name of Applicants	Country of	Submitted

		Registration	
1.	Alemayehu Ketema General Contractor	Ethiopia	No
2.	China First Highway Engineering Co.,Ltd (CFHEC)	China	No
3.	China Jiangxi Corporation for International Economic and Technical Cooperation	China	No
4.	China Railway No.3 Engineering Group Co., Ltd	China	No
5.	China Seventh Group Co.	China	Yes
6.	Defence Construction Enterprise	Ethiopia	Yes
7.	DMC Construction Plc	Ethiopia	Yes
8.	Enyi General Business Plc, Enyi Construction	Ethiopia	Yes
9.	Ethio General Contractor	Ethiopia	No
10.	Gemshu Beyene General Contractor	Ethiopia	Yes
11.	SATCON Construction Plc	Ethiopia	No
12.	SBI International Holdings AG	Switzerland	Yes
13.	Sinohydro Corporation	Ethiopia	No
14	SUR Construction Plc	Ethiopia	Yes
15	Yencomad Construction Plc	Ethiopia	Yes
16	Zhongmei Engineering	China	No
Total		**16**	**8**

The evaluation of the bids is a two stage procedure; namely, Post Qualification and financial Evaluation. First the qualification information shall thoroughly be checked whether it complies with the criteria set out in the qualification document. Then the financial bids of bidders will be opened only for those bidders whose post qualification information is found to be responsive.

The qualification criteria set by the employer; Legal Requirement, History of Non-performing contracts, Historical Financial Performance, construction experience, construction turnover, manpower requirements, proposed construction methodology and work program are itemized below.

Table 4.9 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants

1.	Legal Requirement	Must be GC-1	All Pass
2.	History of Non-Performing Contracts	Non-performance of a contract did not occur within the last Two (2) years	All Pass
3.	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass
4.	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
5.	Cash Flow	115 Million Birr for local bidder and 150 Million Birr for foreign	All Pass
6.	Annual Construction Turnover	320 Million Birr for local bidder and 910 Million Birr for foreign	All Pass
7.	General Construction Experience	Five Years Required	All Pass
8.	Specific Construction Experience	One project with min. Project amount of 610 million Birr or equivalent AC projects	1 fail /7 pass
9.	Specific Construction Experience in Key Activities	Quantitative requirement for earth work previous execution.	1 fail /7 pass
10.	Personnel Capabilities	As required in execution of the project	All Pass
11.	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

All are passed the post qualification criteria except one contractor, rejected due to failure to fulfill the specific construction experience and specific construction experience in key activities and found be non-responsive and rejection form further evaluation as listed above. The other all contractor fully qualified and attended the financial offer opening.

The evaluation criteria is as stated in the above table, bidders qualified the post-qualification evaluation criteria requested for financial bid evaluation. It's a lowest evaluated bid price, out of seven contractors' one international contactor win the tender with an amount of 1,674,383,031.77 ETB including contingency specified provisional sum and VAT.

On 14th of April, 2015, ERA has signed a construction agreement with the Contractor for the construction works of the road. The original cost of the civil works contract is ETB 1,674,383,031.77 inclusive of VAT 15%.

B. Sodo-Tercha Road Upgrading project (Lot 1: Sodo-Omo River)

The work under this contract is located in the southern part of the country in the Southern Nations, Nationalities and Peoples (SNNP) Regional States. The work consists of the upgrading of the existing gravel surface road which begins at the town of Sodo and ends at town of Tercha. The roads shall be upgraded to DS4 road class (ERA's Geometric design Manual -2002 having 75.72 km with asphalt Concrete Standard. The upgrading roads shall have a cross section width of 7.0m outside town (with 1.5m shoulder on each side) and 19 m width (including 3.5 parking lane and 2.50m pedestrian walkway) within town section. The formation of the road is 20cm base course/wearing gravel, 27.5 sub base and 30cm capping layer for widening.

The road traverses abundantly through mountainous terrain and has necessitated the installment/rehabilitation of 155 minor/major drainages, RC pipes, box/slab culverts and construction of 1 and 21 box and pipe culverts, respectively requiring provision of additional cells/rehabilitation of 3bridges, 22slab/box culverts and 108pipe culverts. The general summary of the project is tabulated below.

Table 4.10 General Information Summary of Sodo-Tercha Road Upgrading project Lot 1

No.	General Information	Descriptions
1.	Project Location	Southern Region
2.	Length (km)	75.72
3.	Road standard	DS-4
4.	Width of Road	7.0m outside town (with 1.5m

		shoulder on each side) and 19 m width (including 3.5 parking lane and 2.50m pedestrian walkway) within town section
5.	Type of Surface	Asphalt Concrete surface
6.	Existing Road	upgrading of the existing gravel surface
7.	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting (Contract Delivery Strategy)	Design-Build Contract

The Specific Procurement Notice for Invitation to bids for the subject Project was published on the Ethiopian Herald and ERA's websites on July 27 & 29, 2014. Pursuant to the notice of invitation, sixteen bidders have purchase the tender documents before the deadline for submission of bids.

A pre-bid meeting of the tender was scheduled to be held on August 19, 2014 at 10:30AM at ERA conference room.

Later some queries have been received from bidders in written forms and Addenda & clarification to Queries were issued to all the bidders who have purchased the bidding document.

Among the listed below Eighteen prospective bidders who have bought the tender documents from ERA, Seven of them have submitted their qualification applications and financial offers in separate sealed envelopes before/on October 28, 2014 at 2:40 PM which is the latest date for submission of bid. The table blow shows the list of bidder who have purchase and submitted their application for post qualification and financial offers.

Table 4.11 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

No	Name of Applicants	Country of Registration	Submitted
1.	Alemayehu Ketema General Contractor	Ethiopia	No
2.	ASER construction	Ethiopia	No
3.	China First Highway Engineering Co.,Ltd (CFHEC)	China	No
4.	China Jiangxi Corporation for International	China	No

	Economic and Technical Cooperation		
5.	China Railway No.3 Engineering Group Co., Ltd	China	No
6.	China Seventh Group Co.	China	No
7.	Defence Construction Enterprise	Ethiopia	Yes
8.	DMC Construction Plc	Ethiopia	Yes
9.	Enyi General Business Plc, Enyi Construction	Ethiopia	Yes
10.	Ethio General Contractor	Ethiopia	No
11.	Gemshu Beyene General Contractor	Ethiopia	No
12.	HUNAN HUANDA road and bridge corporation	China	Yes
13.	SATCON Construction Plc	Ethiopia	No
14	SBI International Holdings AG	Switzerland	Yes
15.	SINOHYDRO Corporation	Ethiopia	No
16.	SUR Construction Plc	Ethiopia	Yes
17.	Yencomad Construction Plc	Ethiopia	No
18.	Zhongmei Engineering	China	Yes
Total		**18**	**7**

The evaluation of the bids is a two stage procedure; it is similar with (case study I) project. The qualification criteria set by the employer; Legal Requirement, History of Non-performing contracts, Historical Financial Performance, construction experience, construction turnover, manpower requirements, proposed construction methodology and work program are summarized below.

Table 4.12 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants
1.	Legal Requirement	Must be GC-1	All Pass
2.	History of Non-Performing Contracts	Non-performance of a contract did not occur within the last Two (2)	All Pass

		years	
3.	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass
4.	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
5.	Cash Flow	95 Million Birr for local bidder and 125 Million Birr for foreign	All Pass
6.	Annual Construction Turnover	260 Million Birr for local bidder and 750 Million Birr for foreign	All Pass
7.	General Construction Experience	Three years for local contractor and Five for foreign	All Pass
8.	Specific Construction Experience	One project with min. Project amount of 660 million Birr and least 57Km length for local bidder and two projects 1.1Billion each and least 75Km length for foreign	1 fail /6 pass
9.	Specific Construction Experience in Key Activities	Quantitative requirement for earth work previous execution.	1 fail /6 pass
10.	Personnel Capabilities	As required in execution of the project	All Pass
11.	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

All are passed the post qualification criteria except one contractor, rejected due to failure to fulfill the specific construction experience and specific construction experience in key activities and found be non-responsive and rejection form further evaluation as listed above. The other all contractor fully qualified and attended the financial offer opening.

The evaluation criteria is as stated in the above table, bidders qualified the post-qualification evaluation criteria requested for financial bid evaluation. It is lowest evaluated bid price, out of seven contractors' one international contactor win the tender with an amount of 1,328,412,050.02 ETB including contingency specified provisional sum and VAT.

C. Felegebirhan-Bahirdar Road Project (Contract-2: Zema River Bridg-Felegebrihan)

The project road is located in the North West part of Ethiopia, Amhara Regional state. The works under this contract consists of the construction of 83km of the Felegebrihan - bahirdar road project contract-II. The project road starts from Abaya River Bridge, which is located at a distance of 395 Km North West of Addis Ababa and stretches to south east direction and ends at Felegebrihan town.

The road shall be construction to DS4 road class (ERA's Geometric Design Manual-2002) with an Asphalt concrete carriageway of thickness 50mm and it shall have a cross section of 10m (7m AC carriageway and 1.5m gravel shoulder on each side) or as per the drawings. The work also includes the construction of minor and major drainage structures. The general summary of the project is tabulated below.

Table 4.13 General Information Summary of Felegebirhan-Bahirdar Road Project

No.	General Information	Descriptions
1.	Project Location	North West
2.	Length (km)	83
3.	Road standard	DS-4
4.	Width of Road	7.0m outside town (with 1.5m shoulder on each side)
5.	Type of Surface	Asphalt Concrete surface
6.	Existing Road	New construction
7.	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting (Contract Delivery Strategy)	Design-Build Contract

The Specific Procurement Notice for Invitation to bids for the subject Project was published on the Ethiopian Herald newspaper on February 08 & 09, 2014. Pursuant to the notice of invitation, Nineteen applicants have collected the tender documents before the deadline for submission of bids.

A pre-bid meeting of the tender was scheduled to be held on March 19, 2014 at 10:30AM at ERA conference room.

Later some queries have been received from bidders in written forms and Addenda & clarification to Queries were issued to all the bidders who have purchased the bidding document.

Among the listed below Nineteen prospective bidders who have bought the tender documents from ERA, Seven of them have submitted their qualification applications and financial offers in separate sealed envelopes before/on July 08, 2014 at 2:30 PM which is the latest date for submission of bid. The table blow shows the list of bidder who have purchase and submitted their application for post qualification and financial offers.

Table 4.14 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

No	Name of Applicants	Country of Registration	Submitted
1.	China First Highway Engineering Co.,Ltd (CFHEC)	China	No
2.	Chaina Railway 18th Bureau Group Co.,Ltd.	China	No
3.	China Railway No.3 Engineering Group Co., Ltd	China	No
4.	China Railway Seventh Group Co.,LTD (CRSG)	China	Yes
5.	China Tiesiju Civil Engineering Group Co.,Ltd.,	China	No
6.	Diriba Defersha General contarctor	Ethiopia	No
7.	DMC Construction Plc	Ethiopia	No
8.	Emenete Endeshaw General Constractor	Ethiopia	No
9.	Ethiopian Road Construction Cooperation (ERCC)	Ethiopia	Yes
10.	Fermanoglu Construction Tourism Trade Industry Limited Company JV with STY construction Tourism Trade Industry Limited Company	Turkey	Yes
11.	G/ Hiwot E/ Mariam General Contractor	Ethiopia	No
12.	Hunan Huanda road and bridge corporation	China	No
13.	Simplex Infrastructures LTD	India	Yes
14.	Sinohydro Corporation Limited	China	Yes
15.	SUR Construction Plc	Ethiopia	Yes
16.	Yemane Girmay General Contarctor	Ethiopia	No
17.	Yencomad Construction Plc	Ethiopia	Yes
18.	Yotek Consttruction Plc	Ethiopia	No

19.	Yuksel INSSAT A.S.	Turkey	No
Total		**19**	**7**

The evaluation of the bids is a two stage procedure; it is similar with (case study I and II) project. The qualification criteria set by the employer; Legal Requirement, History of Non-performing contracts, Historical Financial Performance, construction experience, construction turnover, manpower requirements, proposed construction methodology and work program are summarized below.

Table 4.15 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants
1	Legal Requirement	Must be GC-1	All Pass
2	History of Non-Performing Contracts	Non-performance of a contract did not occur within the last Two (2) years	All Pass
2	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass
3	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
4	Cash Flow	120 Million Birr for local bidder and 155 Million Birr for foreign	All Pass
5	Annual Construction Turnover	330 Million Birr for local bidder and 950 Million Birr for foreign	All Pass
6	General Construction Experience	Three years for local contractor and Five for foreign	All Pass
7	Specific Construction Experience	One project with min. Project amount of 820 million Birr and least 68Km length for local bidder and two projects 1.4 Billion each and least 85Km length for foreign	All pass
8	Specific Construction Experience in Key Activities	Quantitative requirement for earth work previous execution.	All pass
9	Personnel Capabilities	As required in execution of the project	All Pass

10	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

All are passed the post qualification criteria except Three contractor, rejected due to failure to submit acceptable bid security, performance record on ongoing ERA's and other client projects. The other all contractor fully qualified and attended the financial offer opening.

The evaluation criteria is as stated in the above table, bidders qualified the post-qualification evaluation criteria requested for financial bid evaluation. It is lowest evaluated bid price, out of four contractors' one international contactor win the tender with an amount of 1,126,931,063.88ETB including contingency specified provisional sum and VAT.

On 13th June 2013, ERA has signed a construction agreement with the Contractor, for the construction works of Felegebirhan-Bahirdar Road Project (Contract-2: Zema River Bridg-Felegebrihan road project. The original cost of the civil works contract is ETB 1,126,931,063.88 inclusive of VAT 15%.

4.3.1.2 Design-Build Project Delivery Method

A. Design and construction works of werabe-Bojecber Road project
B. Design and construction of Efson(Ataye)-Mehamed Road project
C. Morocho–Dimtu–Bitena–Sodo Design and Build Road Project: Contract I:Moricho-Dimtu-Bitena (60.8km)

A. Design and construction works of werabe-Bojecber Road project

The project road is located in the central part of Ethiopia, Southern Nation Nationality and People Regional State (SNSPR). It is the design construction of approximately 38.5Km road with design class of DC-5 Double Bituminous Surface Treatment (DBST) Standard. The work includes demolishing and removal of substandard structures, and construction of new culverts and bridges if required. The road will have a carriageway width of 7m (two lanes of DBST each 3.5m with). In rural section, shoulder width of 1.5m in flat and rolling terrains, and 0.5m in mountainous and escarpment terrains will be provided in both side; whereas, in town section of zonal seats, 3.5m parking lanes and 2.5m footway (both side) and 2.5m median will be provided. For the town/village section travers by the road, the regional, zone, woreda and kebeke seat typical cross sections shall be used according to the administrative setup of the town/village. The existing werabe – Bojeber road is a gravel surface except the last 6Km road segment between terega and Bozhober village which is recently constructed to DBST standard.

The period of completion is 36 months for design and construction including 120 calendar days of mobilization. The general summary of the project is tabulated below.

Table 4.16 General information summary of design and construction works of Werabe-Bojecber Road project

No.	General Information	Descriptions
1.	Project Location	Southern Nation Nationality and People Regional State
2.	Length (km)	38.5
3.	Road standard	DC-5
4.	Width of Road	7.0m outside town (with 1.5m shoulder on each side)
5.	Type of Surface	DBST
6.	Existing Road	Upgrading except last 6km
7..	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting *(*Contract Delivery Strategy)	Design-Build Contract

The notice for Invitation for bid was published on the Ethiopian Herald Newspaper and ERA website on May 15, 2015. Pursuant to the notice of invitation, Thirty Five applicants have collected the tender documents before the deadline for submission of bids.

Among the listed below Thirty Five potential bidders who have bought the tender documents from ERA, Sixteen of them have submitted their qualification applications and financial offers in separate sealed envelopes before/on November 19, 2015 at 2:30 PM which is the latest date for submission of bid. The table blow shows the list of bidder who have purchase and submitted their application for post qualification and financial offers.

Table 4.17 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

No	Name of Applicants	Country of Registration	Submitted
1.	Afro Tsion Construction Plc	Ethiopia	No
2.	Alemayehu Ketema General Contractor	Ethiopia	No
3.	Aster Mengistu GC	Ethiopia	No

4.	Awash Welday General Contractor	Ethiopia	Yes
5.	CCECC Ethiopia Construction PLC	P.R. China	No
6.	China communications Construction Company Ltd.	P.R. China	No
7.	China Wu Yl Co.Ltd	P.R. China	No
8.	Cross-Land Construction	Ethiopia	Yes
9.	Defense Construction Enterprise	Ethiopia	Yes
10.	Diriba Defersha General Construction	Ethiopia	Yes
11.	DMC Construction Plc	Ethiopia	Yes
12.	Eshetu Lema Construction	Ethiopia	Yes
13.	Ethio General Contractor	Ethiopia	No
14.	Ethio-Canadian Business Group Plc (Construction)	Ethiopia	Yes
15.	FAL General Contacor	Ethiopia	Yes
16.	G/Hiwot E/Mariam General Contractor	Ethiopia	No
17.	Gemshu Beyene Construction Plc	Ethiopia	No
18.	HAWK International Finance and Construction Co.Ltd.	Yemen	No
19.	Henok and Family General Business Plc.	Ethiopia	Yes
20.	Homa Construction	Ethiopia	No
21.	Macro General Contarctor and Trading Plc	Ethiopia	No
22.	Markan Trading Plc	Ethiopia	Yes
23.	Melcon Construction Plc	Ethiopia	No
24.	Orchid Business Group Plc	Ethiopia	No
25.	Powercon Plc	Ethiopia	Yes
26.	Queiroz Galvao		No
27.	Rama Construction Plc	Ethiopia	Yes
28.	Samson Chernet GC	Ethiopia	No
29.	Shed General Contractor Plc	Ethiopia	Yes

30.	Sunshine Construction Plc	Ethiopia	No
31.	SUR Construction Plc	Ethiopia	Yes
32.	Tekleberhan Ambaye Construction Plc	Ethiopia	No
33.	Yemane Girmay General Contractor	Ethiopia	Yes
34.	Yencomad Construction Plc	Ethiopia	No
35.	Yotek Construction Plc	Ethiopia	Yes
Total		**35**	**16**

The evaluation of the bids is a two stage procedure; it is similar with the DBB projects. The qualification criteria set by the employer; Legal Requirement, History of Non-performing contracts, Historical Financial Performance, construction experience, construction turnover, manpower requirements, proposed construction methodology and work program are summarized below.

Table 4.18 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants
1	Legal Requirement	Must be GC-1	2 fail / 14 All Pass
2	History of Non-Performing Contracts	Non-performance of a contract did not occur within the last Five (5) years	All Pass
2	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass

3	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
4	Cash Flow	46 Million Birr for local bidder and 62 Million Birr for foreign	All Pass
5	Annual Construction Turnover	94 Million Birr for local bidder and 281 Million Birr for foreign	2 Fail / 14 Pass
6	General Construction Experience	Two years for local contractor and Five years for foreign	All Pass
7	Specific Construction Experience	One project with min. Project amount of 141 million Birr and least 19Km length for local bidder and two projects 500 Million each and least 38.5 Km length for foreign	All pass
8	Specific Construction Experience in Key Activities	Quantitative requirement for earth work previous execution.	All pass
9	Personnel Capabilities	As required in execution of the project	All Pass
10	Equipment Capabilities	As required in execution of the project	All Pass
11	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

Nine contractors passed the post qualification criteria except, Three of the contractor rejected due to failure to submit acceptable bid security, the other two of the contractor reject due to failure to meet the eligible requirements and the other two of the contractor reject due to failure to meet the average annual construction turn over.

Bidders qualified the post-qualification evaluation criteria were requested for financial bid evaluation. It is lowest evaluated bid price, out of the Nine contractors' one National Competitive bidder win the tender with an amount of 458,445,650.00ETB including contingency specified provisional sum and VAT.

On 20th May, 2016, ERA has signed a construction agreement with the Contractor for the construction of Design and construction works of werabe - Bojeber Road project. The original cost of the civil works contract is ETB 458,445,650.00 inclusive of VAT 15%.

B. Design and construction of Efson (Ataye)-Mehamed Road project

The Efeson (Ataye) – Mehal Meda road project is found in the Amhara National Regional state, northern part of Shewa and Southern Wollo provinces which traverses Efratana Gidim and Lala Midirna Woreda. The project road starts on the Junction on Tarmaber- kombolcha trunk road at Efeson town which is about 262 km far from the capital of the county, Addis Ababa, and traverses to west and the project end up at Mehal Meda town. The Efeson- Mehal Meda road project is approximately 60km.

Table 4.19 General Project Information Summery for Efeson (Ataye) – Mehal Meda road project

No.	General Information	Descriptions
1.	Project Location	Amhara National Regional State
2.	Length (km)	60 km
3.	Road standard	DS-5
4.	Width of Road	10 m (7m DBST and 1.5m gravel shoulder on each side)
5.	Type of Surface	Double Surface Treatment (DBST)
6.	Existing Road	N/A
7.	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting (Contract Delivery Strategy)	Design-Build Contract
9.	Type of Contract (Based on Payment Modality)	Lump Sum Contract

The project involves identifying the best route alignment based on technical, economic, social environmental and administrative reasons, designing and constructing of the road to DS5 with Double Surface Treatment. The work includes demolishing and removal of substandard structure such as fords, pipes, bridges and vented causeways if any and construction of new culverts and bridges as required and supported by the detail design analysis and submittals.

The road connects the two towns, Mehal Meda and Efeson (Ataye), as well as villages and large rural settlement areas in between these towns. It provides unique accesses to markets, hospitals, schools and other infrastructures including important administrative centers.

Tendering was conducted following an open tender procedure. Specific Procurement notice for Invitation to bids for the subject project was published on the Ethiopian Herald on March 01 and 02, 2014 and the same was posted on ERA web site. Pursuant to the notice of invitation,

Twenty One have collected the tender documents before the deadline for submission of applications as shown in table below.

Table 4.20 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

S.No	Name of Applicants	Country of Registration	Submitted
1.	AL ASAB General Transport & Contracting Establishment	UAE	Yes
2.	China Gezhouba Group Compnay Limited Ethiopian Branch	China	No
3.	China First Highway Engineering Co.Ltd	China	No
4.	GIBB Africa Consulting Design Management	Kenya	No
5.	FAL Trading General Contractor	Ethiopia	No
6.	China State Construction Engineering Corp. Ltd	China	No
7.	China Railway No. 3 Engineering Group Co. Ltd.	China	No
8.	Hawk International Finance & Construction Co. Ltd.	Yemen	No
9.	Fermanoglu Construction Tourism Trade industry	Turkey	No
10.	Hunan Huanda Road & Bridge Corporation	China	Yes
11.	MACRO General Contractor & Trading Plc	Ethiopia	Yes
12.	Emnete Endeshaw General Contractor	Ethiopia	No
13.	Sunshine Construction plc	Ethiopia	Yes
14.	Sur Construction Plc	Ethiopia	No
15.	YENCOMAD Construction Plc	Ethiopia	Yes
16.	Yemane Girmay General Contractor	Ethiopia	No
17	Raubex Construction (pty) ltd	Ethiopia	No
18	Rotation International Trading Plc	Ethiopia	No
19	DMC Construction Plc	Ethiopia	No
20	PAKSOY INS. TUR.SAN.VE TIC.AS.	Ethiopia	No

21	Tekleberhan Ambaye Construction Plc	Ethiopia	Yes
Total		**21**	**6**

As indicted in above table a total of twenty one bidders respond to invitation but only six bidders submit.

ERA specifies qualification criteria for Efeson (Ataye) – Mehal Meda road project tender process participants must fulfil including; legal requirements, historical non-performing contracts, historical financial performance, general and specific experience etc. Qualification requirement for participate in Efeson (Ataye) – Mehal Meda road project tender process summarized in table below.

Table 4.21 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants
1	Legal Requirement	Must be GC-1	All Pass
2	History of Non-Performing Contracts	Nonperformance of a contract did not occur within the last Two (2) years	All Pass
3	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass
4	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
5	Cash Flow	105 Million Birr for local bidder and 140 Million Birr for foreign	All Pass
6	Annual Construction Turnover	209 Million Birr for local bidder and 426 Million Birr for foreign (peak)	1 Fail/5 Pass
7	General Construction Experience	Two years for local bidder and Five Years Required for foreign bidders	All Pass
8	Specific Construction Experience	For local bidders ETB 314 Million or project of length 66km for foreign bidders ETB 1.004 Billion or project of length 88 km each	2 fail /4 pass
9	Specific Construction	Quantitative requirement for earth work	2 fail /4 pass

	Experience in Key Activities	previous execution.	
10	Personnel Capabilities	As required in execution of the project	All Pass
11	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

From total of six bidders only four found to be responsive for qualification criteria set by ERA and pass this stage and proceed to next stage, the other two considered non responsive and rejected from further evaluation. Out of the four contractors' one National Competitive bidder win the tender with an amount of 1,352,642,535.82 ETB including contingency specified provisional sum and VAT.

On 24th January 2015, ERA has signed a construction agreement with the Contractor, for the construction works of Efeson (Ataye) – Mehal Meda road project. The original cost of the civil works contract is ETB 1,352,642,535.82 inclusive of VAT 15%.

C. Morocho–Dimtu–Bitena–Sodo Design and Build Road Project: Contract I:Moricho-Dimtu-Bitena (60.8km)

The project work is the design and construction of road surfaced with Asphalt Concrete, located in Southern part of the country within the bounds of Southern Nations, Nationalities and Peoples Regional State (SNNPRS). The road will have a carriageway width of 7 m (two lanes of Asphalt Concrete each 3.5m width) and an approximate length of 60.8km.In Zonal, Woreda and Kebele Seats, the respective typical road cross sections and pavement layers as indicated in the drawings will be applied.

Bridges and culverts shall be maintained or Rehabilitated or constructed as new as necessary with reinforced concrete. Culverts shall have Inlet and out let structures together with erosion protection as recommended on appropriate sections.

The sub-base course shall be natural, screened or crushed material or an approved blend of these materials that meet the requirements of the Specifications. The base course layer shall be constructed from crushed aggregate which should meet the specification requirements. The riding surface shall be an Asphalt Concrete meeting the requirements of the specifications. The general summary of the project is tabulated below.

Table 4.22 General Project Information Summery for Morocho–Dimtu–Bitena–Sodo Design and Build Road Project: Contract I road projec

No.	General Information	Descriptions
1.	Project Location	Southern Nations, Nationalities and Peoples Regional State
2.	Length (km)	60.8 km
3.	Road standard	DS-3
4.	Width of Road	10 m (7m DBST and 1.5m gravel shoulder on each side)
5.	Type of Surface	Double Surface Treatment (DBST)
6.	Existing Road	N/A
7.	Source of Finance for Construction	Government of Ethiopia
8.	Type of Contracting *(Contract Delivery Strategy)*	Design-Build Contract
9.	Type of Contract (Based on Payment Modality)	Lump Sum Contract

Tendering was conducted following an open tender procedure. Specific Procurement notice for Invitation to bids for the subject project was published on the Ethiopian Herald on September 5, 2013. Pursuant to the notice of invitation, Sixteen contractors have collected the tender documents before the deadline for submission of applications as shown in table below.

Table 4.23 List of applicants who have collected bidding document and submitted their application for post qualification and financial offer.

S.No	Name of Applicants	Country of Registration	Submitted
1.	AL ASAB General Transport & Contracting Establishment	UAE	Yes
2.	China Civil Engineering Construction Corporation	China	Yes

3.	China First Highway Engineering Co.Ltd	China	No
4.	China Railway No.3 Engineer Group Co.Ltd	China	No
5.	China Railway Seventh Group Co.LTD (CRSG)	China	No
6.	China Tiesiju Civil Engineering Group Co.Ltd	China	No
7.	ETHIO General Contractor	Ethiopia	No
8.	Defence Construction Enterpries	Ethiopia	Yes
9.	Fermanoglu Construction Tourism trade industry	Turkey	Yes
10.	Hunan Huanda Road and bridge corporation	China	No
11.	MACRO General Contractor & Trading Plc	Ethiopia	No
12.	SINOHYDRO Corporation Ltd	China	No
13.	Sunshine Construction plc	Ethiopia	Yes
14.	Sur Construction Plc	Ethiopia	Yes
15.	YENCOMAD Construction Plc	Ethiopia	Yes
16.	Yemane Girmay General Contractor	Ethiopia	No
Total		**16**	**7**

Among the above listed prospective bidders who have bought the tender documents seven of them submitted their qualification application and financial offers.

ERA specifies qualification criteria for Morocho-Dimtu-Bitena-Sodo Design and Build road project tender process participants must fulfill including; legal requirements, historical non-performing contracts, historical financial performance, general and specific experience etc. Qualification requirement particularly for Morocho-Dimtu-Bitena-Sodo road project tender process is summarized in table below.

Table 4.24 Qualification Criteria and Applicant Evaluation

S.No	Specified Criteria	Required Qualification	Assessment of Applicants
1	Legal Requirement	Must be GC-1	All Pass
2	History of Non-Performing Contracts	Nonperformance of a contract did not occur within the last Two (2) years	All Pass

3	Pending litigation	All pending litigation shall in total not represent more than 30% of the Applicant's net worth	All Pass
4	Historical Financial Performance	Audited balance sheets for the last five years	All Pass
5	Cash Flow	91 Million Birr for local bidder and 121 Million Birr for foreign	All Pass
6	Annual Construction Turnover	255 Million Birr for local bidder and 546 Million Birr for foreign	All Pass
7	General Construction Experience	Three years for local bidder and Five Years Required for foreign bidders	All Pass
8	Specific Construction Experience	One project with min. Project amount of 455 million Birr and least 36Km length for local bidder and two projects 728 Million each and least 48 Km length for foreign	All Pass
9	Specific Construction Experience in Key Activities	Quantitative requirement for earth work previous execution.	All Pass
10	Personnel Capabilities	As required in execution of the project	All Pass
11	Equipment Capabilities	As required in execution of the project	All Pass
12	Proposal of work methods and program	To present Proposal of work methods and program	All Pass

From total of Seven bidders Six of them found to be responsive for qualification criteria set by ERA and pass this stage and proceed to next stage, One contractor considered non responsive and rejected from further evaluation. Out of the Six contractors' one National Competitive bidder win the tender with an amount of 995,018,921.34 ETB including contingency specified provisional sum and VAT.

The agreement was signed between ERA and the contractor on 22 of December, 2014 for the construction works of Contract I: Morocho–Dimtu–Bitena–Sodo Design and Build Road Project (60.8km) road project. The original cost of the civil works contract is ETB 995,018,921.34 inclusive of VAT 15%.

4.3.1.3 Summary of findings (case study 1)

The qualification criteria's are similar for both DB and DBB projects. The criteria for all selected case study projects are according to World Bank standard biding document.

There is qualification criteria set by ERA, it's tabulated as table 25 some of the requirements are difficult to quantify but construction turnover, cash flow requirement and general experience are based on the formula given in Table 4.25

The History of non-Performing contracts, pending litigation, historical financial performance, personnel requirement, equipment requirement, Proposal of work methods and work program of the case study projects are also based on Table 4.25

As discussed on literature review section 2.1.6 (construction procurement procedure) ERA use all the Procurement Management process, includes Preparation, Tendering, and Evaluation (Including Award Recommendation)

The preparation of Tender Documents include:

- Form of Invitation to Tender
- Instruction to Tenderers or Terms of References;
- Prequalification Documents
- Forms of Contract Agreement
- General and Particular Conditions of Contract
- Bill of Quantities and Drawings
- Technical Specifications & Methods of Measurement

Tendering Phase: includes Invitation (Invitation to bidder are posted in Ethiopian Herald Newspaper and ERA Website), Clarification, Submission and Opening of tenders. Normally open tenders are floated for a period between 30 to 45 days.

Clarifications can either be requested by interested bidder or carried out using a pre - tender clarification meeting. In both cases, issues clarified sent (written) to all bidders participating for the intended services or works. The bidders were submitting their offer on or before the submission date and time. Late bids are automatically rejected.

Tender Opening: Bidding documents opened in public on the date, at the time and place mentioned in the invitation to tender and stipulated in the tender documents. In addition to the

Project Owner, Consultant (if available), and Contractors representatives attend during the tender opening.

The following criteria's are carried out during tender opening by the client (ERA):-

- Tender Attendee members shall take their place and be registered,
- Tender box opened and checked for faulty things,
- Check the tender is the right one,
- Bids will be opened one after the other,
- All necessary data which deem useful such as Project Name, Name of bidder, Bid Bond Amount, Tender Price, etc. read aloud and recorded at the opening of bids.
- Bidders representative sign a register to attest their presence during opening, and
- Tender committee members also sign on the Tender documents.

Tender Evaluation Phase: As stated in the above case study project, evaluations include both Technical and Financial Qualification. Technical Evaluation take the first place, it includes the evaluation of construction turnover, cash flow requirement, general and specific experience, history of non-performing contracts, pending litigation, historical financial performance, personnel requirement, equipment requirement and proposal of work methods. Each of the Qualification requirements has its own value for the technical evaluation.

Finally, Financial Evaluation is take place, to determine and make award it must necessarily be the lowest bidder. Preliminary Evaluations are made Arithmetic Review requirements. Most tenders are often submitted hastily. As a result, tenders are not arithmetic error free. Almost all the projects listed above on the case study have arithmetic error. Arithmetic review can be done only for bidders who qualify the post qualification criteria.

After all comparisons are considered on the same bases; the Tender offer will be adjusted based on the Cost - Benefit principle which involves adding costs and benefits foregone.

Besides, the preference margin will also be deducted and Least evaluated Bidder is Determined.

Table 4.25 Qualification Criteria of ERA and World Bank [41 & 44]

Qualification Criteria	Tender Type	Qualification Requirements		
		World Bank's SBD	ERA's Bidding Documents	
			For locals	For foreign
Annual construction turnover (ACT)	ICB	ACT= $\frac{EE \times F}{Yrs}$ Where EE = Engineer's Estimate Yrs = Contract period in Years The multiplier F=2 may be reduced for very large projects but shouldn't be less than 1.5.	AT(Average)=$\frac{EE^* F}{yrs}$ F=0.7	AT(Average)=$\frac{EE^* F}{Yrs}$ F= 2.5 to 1.5.
	NCB		As above but F=0.5	As above but F=1.5
Liquid asset/cash flow requirement (CF)	ICB/ NCB	CF= $\frac{EE^* F}{Months}$ Months=Construction period in months Factor F should not be more than 4 months.	CF= $\frac{EE^* F}{Months}$ Months=Construction period in months Factor F = 3	CF= $\frac{EE *F}{Months}$ Month= Construction period in months Factor F = 4
General Construction	ICB	5 or more years may be reduced to 3 years in agreement with the Bank.	Three years' experience	5 to 10 years of general experience in construction.

experience	NCB		The firmsexperience could be reduced to two years to support the participation of the newly established/ infant local construction industry.	5 years of general experience in construction
Qualification	**Tender Type**		**Qualification Requirements**	
Specific construction projects experience i) Number of projects ii) Value of the project iii) Nature, Complexity & Similarity of Projects	ICB	i) 1 to 3 contracts normally 2 depending on the size and complexity of the subject contract, the exposure of the Employer to risk of contractor default, and country conditions. ii) 80% of the estimated value of the subject contract. iii) Similar to the proposed works. The similarity shall be based on the physical size, complexity, methods/ technology.	i) 1 Project ii) 50%of the estimated Value of the intended contract or 75% of the length of the intended project. iii) Similarity of the project could be one standard work below.	i) 1-3 projects ii) 80%of the estimated Value of the intended contract or equal length to the subject project. iii) works of a nature and complexity equivalent

		World Bank's SBD	ERA's Bidding Documents	
Specific construction experience i) number of projects ii) value of the projects iii) nature, Complexity & Similarity of projects	NCB		i) 1 project ii) 25% of the valueof the intended project or half of the length of the intended project. iii) As exceptional,for less complex and less risk projects this requirement could be relaxed to 15% iv) One level below the standard of the intended project or higher level.	i) 2 projects ii) Value of the project 80%of the intended contracts or length to the subject project. iii) Similarity of the project could be of similar sizeand complexity.
Specific construction experience in key activities	ICB	80% of the estimated monthly or annual production rate of key activities.	60% of the estimated monthly or annual production rate of key activities	80% of the estimated monthly or annual production rate of key activities
	NCB	80% of the estimated monthly or annual production rate of key activities.	40% of the estimated monthly or annual production rate of key Activities.	80% of the estimated monthly or annual production rate of key Activities.

Historical contract non – performing records	ICB & NCB	i) Non-performance of a contract did not occur within the last two (2) years prior to the deadlinefor Qualification submission based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the Bidder have been exhausted. ii) If the Employer, based on full documentary evidence, establishes continued poor performance by any Bidder engaged in similar works in Africa and other developing countries, on any contracts carried out over the last 2 years, the Employer may use this information in the assessment of the Bidder. The documentary evidence to support the assessment and final decision by the Employer will be fully disclosed to the applicant	In addition to the World Bank's guideline special attention shall be paid for this criterion as contract non-performing is CRITICAL in the current Ethiopian situation. Therefore: i. Record of progress shall be kept accurate; ii. Evaluationof contractors performance contractors performance shall be conducted monthly; iii. Any contractor's performance shall be evaluated based on the ERA's contractor's performance assessment framework and rated accordingly. The minimum acceptable performance on ongoing contract shall be revised to reflect the actual situations. The minimum acceptable performance on ongoing contracts is set time to time by ERA board	Inadditionto the World Bank's guideline special attention shall be paidfor this Criterion as contract non-performingis CRITICAL in the current Ethiopian situation. Therefore: i) Recordof progress shall be kept accurate; ii) Evaluation of contractors performance shall be Conducted monthly; iii) Any contractor's performance shall be evaluated based on the ERA's contractor's performance assessment framework and rated accordingly.

Other criteria:				
o Legal Status	ICB & NCB	Is required	Is required	Is required according to the respective financiers' guide
o Major Equipment	ICB & NCB	Is required	Is required	Is required according to the respective financiers' guide
o Key Personnel	ICB & NCB	Is required	Is required	Is required according to the respective
o Proposal for Sub-Contracting	ICB & NCB	Is required	Is required	financiers' guide Is required according to the respective
o Proposal of work methods and programs	ICB & NCB	Is required	Is required	Financiers' is required
o Pending Litigation	ICB & NCB	Is required	Is required	Is required according to the respective
o Historical Financial Performance	ICB & NCB	Is required	Is required	Is required according financiers guide to the respective financiers' guide
o Current Contract Commitments	ICB & NCB	Is required	Is required	Is required according to the respective financiers' guide
o Declaration of Site Visit and Understanding of the Work	ICB & NCB	Is required	Is required	Is required according to the respective financiers' guide

Case Study -2

4.3.2 Construction procurement impacts in construction budget, completion time and performance in Ethiopian road construction (DB and DBB project Delivery Method)

To conduct the Construction procurement impacts in construction budget, completion time and performance in Ethiopian road construction, the researcher considers 3 of ongoing DB projects and 3 DBB highway projects. A total of 6 projects were selected. All the 6 (3 DBB and 3 DB) projects are currently ongoing highway projects being built in Federal Democratic Republic of Ethiopia and all of them are 90% and completed.

Projects that executed greater than 90% or completed, construction budget greater than Ten Million US dollar and different project delivery system are the selection criteria's for the case study – 2.

4.3.2.1 Design-Bid-Build Road Projects

The projects were delivered with DBB project delivery method in the Federal road projects of Ethiopia. All of the three selected projects are 100% completed. Sample projects of DBB projects are presented, as given in Table 4.26 to assess the status of the construction road projects implemented in the federal road construction projects. The table has been used to show the associated time and cost overruns, as per the sampled projects.

Table 4.26 Original and Revised Contract Price and Contract Period of Sampled DBB Contracts

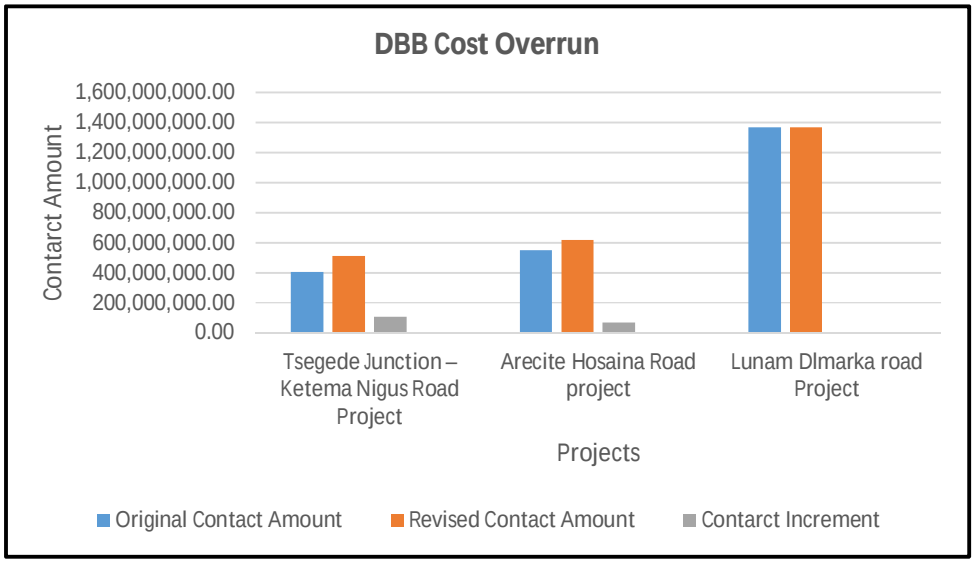
No	Project Name	Data of Contact		Contact Amount		Contract Time	
		Contract Signing Date	Contact Commence-ment Date	Original	Revised	Original	Revised
1	Tsegede Junction – Ketema Nigus Road Project	06/Sep/12	05/Dec/12	408,300,125.60	516,442,158.68	5/Dec/2015	6/Jun/2016
2	Arecite Hosaina Road project	27/Jun/2011	7/Oct/2011	549,471,508.44	618,998,415.32	06/Apr/2014	09/Jul/2015
3	Lunam Dlmarka	30/Aug/2013	24/Sep/2013	1,369,965,425.79	1,369,965,425.79	30/Jun/2015	4/Jan/2016

The total percentage of contract amount increment of the above DBB projects have been collected and arranged in the table below to show the significance of the contract amount cost overrun whose mean value is 13%. The Contract price cost increment and its respective percentages are presented in Table 4.27.

No	Project Name	Contact Amount		Increase in Contract Price	Percentage Increment in Contract Price
		Original	Revised		
1	Tsegede Junction – Ketema Nigus Road Project	408,300,125.60	516,442,158.68	108,142,033.08	26%
2	Arecite Hosaina Road project	549,471,508.44	618,998,415.32	69,526,906.88	13%
3	Lunam Dlmarka road Project	1,369,965,425.79	1,369,965,425.79	0	0%
Mean					13%

Table 4.27 Increment in Contract Price of Sampled DBB Contracts

From the desktop study data the contract price overrun that has been experienced in the DBB projects can be presented for better visualization in figure 4.22 below to show the comparison easily. As it is indicated on the figure, though the mean value of the percentage increment in contract price is only 13%, the individual percentage of the revised contract price increment is also presented.



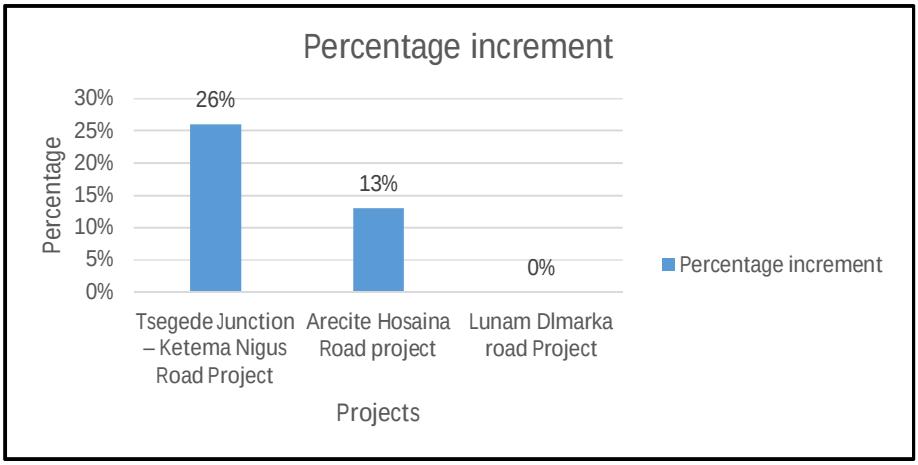


Figure 4.22 Percentage increment as well as original and revised contract price of sampled DBB projects

The increasing days of the total contract period and its percentage of increment of the DBB projects is shown in table 4.5 below to show the significance of the contract period overrun. The Contract period or schedule overrun and its respective percentages are presented in Table 4.28.

Table 4.28 Increment in Contract Period and Original and Revised Contact Period of Sampled DBB Contracts

No	Project Name	Original Contract Period	Revised Contract Period (days)	Increased Contract Period (days)	Percentage Increment in Contract Period (%)
1	Tsegede Junction – Ketema Nigus Road Project	730	1313	583	79.86%
2	Arecite Hosaina Road project	1095	1554	459	41.90%
3	Lunam Dlmarka road Project	730	918	188	25.75%
Mean					49.17%

The above Tables signifies that the budget and time overruns range from 13 % to 26 % of the initial costs with mean value of 13% and from 25.75 % to 79.86 % with mean value of 49.17% of the initially estimated time respectively.

From tables Table 4.27 and Table 4.28 it can be seen that, on average, there is about 13 % cost increment beyond the initially estimated budget and about 49.17 % time overrun. From the

above tables one can conclude that the construction work on the federal road projects have not been running as per the durations and the budgets estimated before the commencement of the actual construction in ERA.

Among the sampled projects the minimum status of completion is Lunam Dlmarka road Project which is 97.84%and the maximum is Tsegede Junction – Ketema Nigus Road Project which is 79.86%.

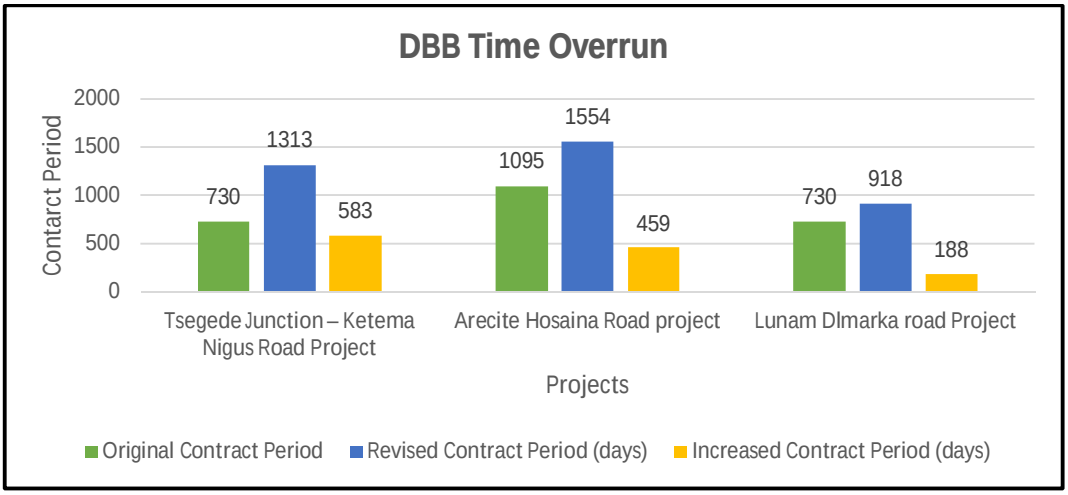


Figure 4.23 Percentage increment as well as original and revised contract price of sampled DBB projects

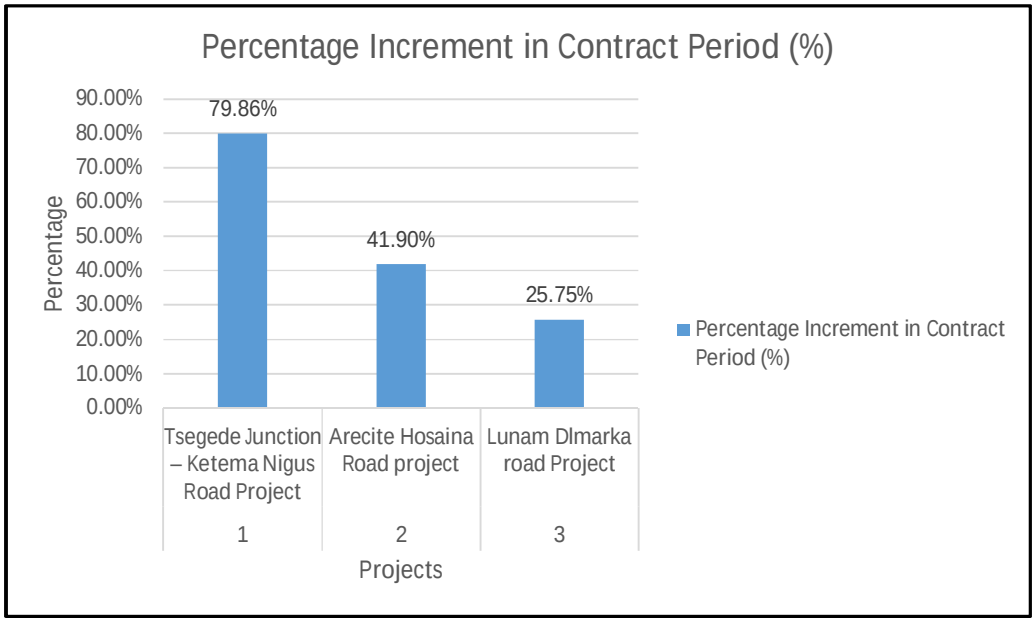


Figure 4.24 Percentage of time over run of sampled DBB projects

Consideration given to the time and cost analysis of the above three projects based on the actual time elapsed against accomplishment indicates that the, overall time extension ranges from 25.75 % to 79.86 % with an average value of 49.17 %.

4.3.2.2 Design-Build Road Projects

Sample projects of DB projects are presented, as given in Table 4.29 to assess the status of the currently under construction road projects implemented in the federal road construction projects.

No	Project Name	Data of Contact		Contact Amount		Contract Time	
		Contract Signing Date	Contact Commence-ment Date	Original	Revised	Original	Revised
1	F2-F1-Hana (F3-F1-Hana)	2/Oct/2013	14/Nov/2013	651,111,224	651,111,224	15/Nov/2015	28/May/2016
2	F2-F3(F3-F4)	19/Dec/2013	15/Jan/2014	459,460,272	459,460,272	15/Jul/2016	9/Sep/2016
3	Fiyel Weha – Abi Adi Road project Contact 2-Tekeze River-Abi Adi (Km34+980-Abi Adi)	22/May/14	25/Jun/2014	2,146,302,500	2,146,302,500	24/Jun/2017	Not Revised

Table 4.29 Original and Revised Contract Price and Contract Period of DB Contracts

Sampled data from the selected DB projects have been collected and arranged in the tables below to show the significance of these problems. The percentage of time and cost overruns are presented in Table 4.30 and Table 4.31.

No	Project Name	Contact Amount		Increase in Contract Price	Percentage Increment in Contract Price
		Original	Revised		
1	F2-F1-Hana (F3-F1-Hana)	651,111,224	651,111,224	0	0%
2	F2-F3(F3-F4)	459,460,272	459,460,272	0	0%
3	Fiyel Weha – Abi Adi Road project Contact 2-Tekeze River-Abi Adi (Km34+980-Abi Adi)	2,146,302,500	2,146,302,500	0	0%

Mean	0%

Table 4.30 Original and Revised Contract Price in percent

As per the survey data gathered for those 3 DB projects the results of the research indicated that projects delivered using the DB project delivery system approach performed less increment in the contract price than those delivered through the DBB delivery systems. As it is indicated in the figure 4.30 below the percentage of the increment in the contract price is 0% which is perfect when it is compared against the previously described DBB project delivery system.

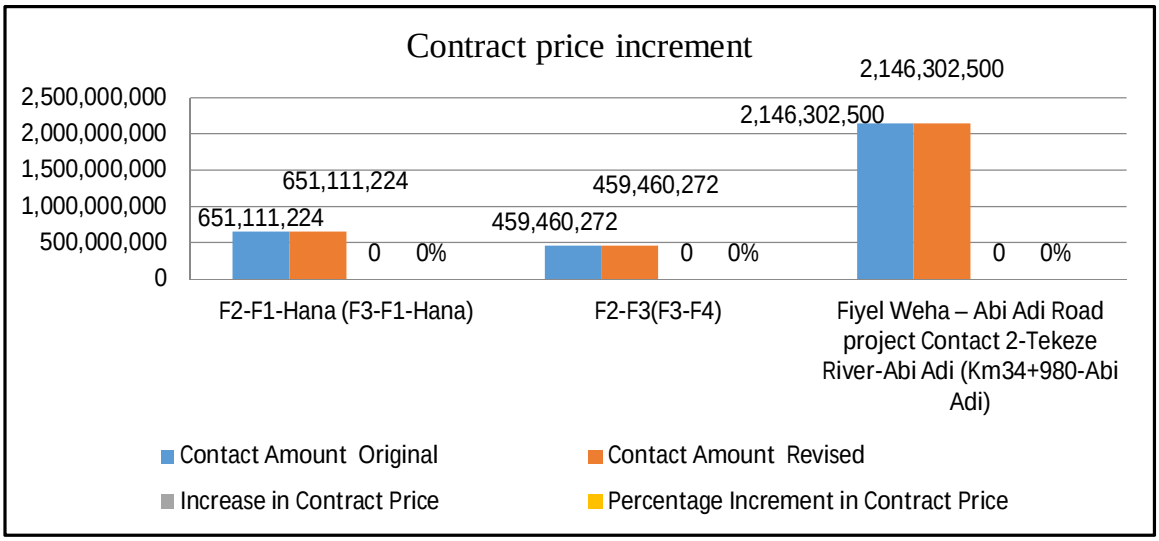


Figure 4.25 Contract price increment of sampled DB projects

The survey highlights that significant numbers of the sampled DB projects were associated with shorter overall project time than conventional system. It is also calculated that the reduction of the overall project period is attributed to the system's ability to overlap the design and construction phases.

It is observed also that cost and completion time is firmer under the Design and Build procurement method. This means the client knows his total financial commitment in the early stage of the project; the contractor does not introduce any changes throughout the project. Because there is no provision for bill of quantities, adequate arrangements for evaluating any changes on the price or on cost basis can be carried out earlier by including in the contract.

As it is seen in Table 4.30 and Table 4.31, in most of DB procurement form, the final cost does not exceed the project budget, because as it is the fixed fee the calculate risks and the cost variations are absorbed by the contractor. In this respect, Design and Build certainly presents a

better chance of the client obtaining his completed building within budget, because as it is fixed fee the cost variation is absorbed by the contractor.

Table 4.31 Original and Revised Contract Duration

No	Project Name	Contact Time		Increase in Contract Time	Percentage Increment in Contract time
		Original	Revised		
1	F2-F1-Hana (F3-F1-Hana)	15-Nov-15	28-May-16	74	10%
2	F2-F3(F3-F4)	15-Jul-16	09-Sep-16	56	7%
3	Fiyel Weha – Abi Adi Road project Contact 2-Tekeze River-Abi Adi (Km34+980-Abi Adi)	24-Jul-17	Not revised	0	0%
Mean					8.5%

The above Tables signifies that the budget and time overruns range from 0.0 % to 0.0 % of the initial costs with mean value of 0.0 % and from 0.0 % to 10 % of the initially estimated time with mean value of 8.5 % respectively.

Cost savings may also result in time saving. The overall effects is reduction in the employer's financing charges, lesser effect of inflation and faster construction operation, which, in a commercial context, produces an earlier return on the capital, invested. From the above two tables it can be seen that, on average, there is no cost increment beyond the initially estimated cost and about 8.5 % time overrun.

The results of the research indicated that projects delivered using the DB project delivery system approach performed less increment in the contract price than those delivered through the DBB delivery systems. As it is indicated in the figure 4.26 below the percentage of the increment in the contract price is from 0% which is very small when it is compared against the previously described DBB project delivery system.

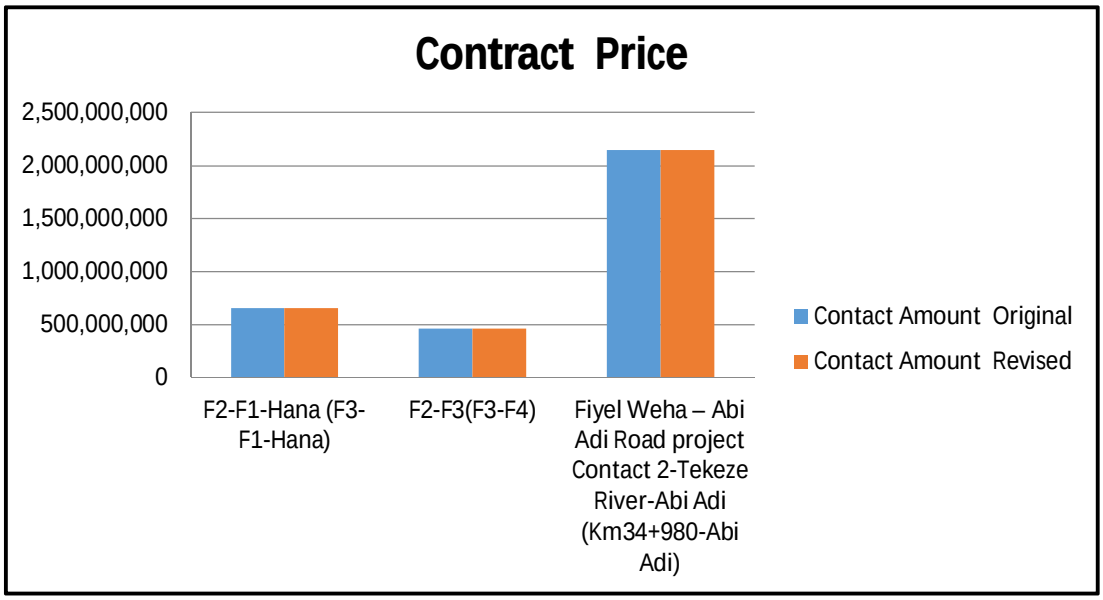


Figure 4.26 Original and Revised Contract Duration

Consideration given to the time and cost analysis of the three DB projects based on the actual time elapsed against accomplishment as shown in figure 4.26 indicates that the overall time overrun 0 %.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter includes the conclusions and recommendations of this research. The main objective of this study was to examine and analyze different procurement practices in the Ethiopian road construction industry and its impact in project budget, completion time and quality of work. The following conclusions and recommendations are, therefore, presented in line with the specific objectives designed to meet the main objective.

Questionnaire survey was used to examine Construction procurement practices and the factors that affecting construction procurement and causes of time overrun, cost overrun and performance. Desk study was also used to identify the existence and extent of time and cost overrun on road construction projects in Ethiopia.

5.2 Conclusion

- The practice of procurement by Ethiopian Road Authority is good. This question is aimed to look at the views of the respondents with respect to whether ERA prepares procurement plan considering the project scope and limitation, the procurement process, procurement resources, procurement risks and opportunities, and capability and capacity of the client. However, the construction procurement is the fundamental baseline for execution of the project which sets acquisition strategy and helps guide program execution across the entire project lifecycle which investigates the projects requirements, market conditions, project risks, contract awarding processes and construction phase. Hence, problem on the procurement will affect the overall performance of the project.
- The Ethiopian Road Authority does not, currently, seem ready to practice the innovative project delivery system except DB. ERA broadly uses DBB project delivery system compared to DB project delivery system. In relation to the general evaluation, the DB project delivery system is evaluated to be more effective for the Federal Road Construction Projects due to the following reasons:

I. The increment of Construction Budget is lower in DB projects than in DBB in Ethiopian Federal Road Construction Projects. But the overall cost of DB project delivery system is higher than DBB Delivery system.
II. The Total Time Extension is lower in DB projects than in DBB projects for Ethiopian Federal Road Construction Projects.
III. DB project delivery system reduce administrative burden than DBB in Ethiopian Federal Road Construction projects
IV. DB project delivery is recommended for the road project than DBB for Ethiopian Federal Road Construction Projects by ERA.
V. The traditional procurement system also provides a high degree of quality certainty and functional standards. It is also a system that provides an opportunity for the owner to combine the best design, management and construction expertise between consultants and contractor. It also provide more time for client and consultants to review and fully develop the design and specification thus allowing better documentation preparation. However, this system does not provide opportunities for contractor to contribute his construction technology and management expertise because they only come into the scene after the design has been fully developed and approved.
VI. Generally, escalation of the final project cost from the estimated cost and time overrun were the major problems associated with the existing approach of delivering projects.

- Client, Contactor and Consultant are main players in the construction industry, that's why this specific objective choice only on clients, contractor and consultants to investigate extent of satisfaction in construction procurement practice in Ethiopian construction industry. Based on the questioner collected degree of satisfaction of respondents on average is low degree of satisfaction.

- The use of the various project procurement systems shows that the construction industry is now trying to meet the clients' needs. This is because the different procurement method will have different effect on the cost, time and quality of the project. Each project procurement system has its own peculiarity in term of the pretender and post tender activities and processes, division of risks between client and contractors, and the effectiveness of project monitoring and control. It is very important at the very outset of the project to carefully consider all factors when selecting the most appropriate procurement approach for a construction project. This is because each system has its own feature and peculiarity that will have effect on the cost, time and quality of the project i.e. the project performance.

- Awarding the project to the least bidder and unnecessary requirement. In addition to the above factors improper planning, designing, communication, site management, decision making, construction methods, shortage of labor and technical personnel, quality and shortage of materials, construction mistakes and defective work, productivity, construction methods complexity of project, quality assurance, availability of equipment's & failure, unforeseen site condition, weather condition, finance & payment of completed work, major disputes & negotiation, productivity, construction mistakes & defective work, client's satisfaction are factors that affects process of procurement in Ethiopian federal road construction.
- In ERA projects, awarding construction contracts is typically based on the low bid method where the construction firm who fulfils the required qualification criterion and submitting the lowest bid. However, as part of the evaluation process it is found that the performance assessment of contractors in their ongoing projects is strong. The performance assessment is made only based financial progress and duration of projects disregarding quality and overall management of projects and formula used for calculation of the expected performance of contractors is not in line with the actual expected cash flow progress. In addition, the performance assessment is made in monthly basis and may results contractors to focus in fulfilling a performance requirement of a specific month based on the intention to participate specific tender and non-uniform disqualification of contractors. The study also identifies that qualification criterion of local contractors is exceptionally relaxed and no strong mechanism to control the workload contractors' in relation to their capacity. Moreover, the technical and financial capacity of contractors is not properly evaluated like the financial standing of the contractor, the capacity of the contractor in terms of equipment and technical staffed on the study, it is found that the existing evaluation and qualification criteria will result in selection of unqualified contractor who do not have the capability, capacity and good performance. This affects the overall performance and results in delays, cost overruns and poor quality of projects. In addition, incapable contractors as compared to the project scope might not have the capacity to study the projects in detail before submitting their bids come up with unnecessarily very low offer which results projects delays and poor quality.

5.3 Recommendation

Based on the findings of the study, the following recommendations are put forward for improvement of the current practices in Ethiopian road construction projects.

- Development of human resources in the construction industry through proper and continuous training programs for construction performance enhancement. These programs can update participants' knowledge and can assist them to be more familiar with project management techniques and processes. Engineers should perform their activities properly to improve productivity which helps improvisation of construction projects. Contractors should not increase the number of projects that cannot be performed successfully. Proper motivation and safety systems should be established for improving the productivity performance of construction projects. Contractors are counseled to minimize waste rates through project implementation for improving cost. They should be more interested in conformance to project specification to overcome disputes, time, and cost performance problems. Quality materials should be of a greater interest for contractors in order to improve cost, time, and quality performance. This can be done by applying quality training and meetings that are necessary for performing an improvement. Contractors are urged to be more interested in sequencing of work according to schedule. In addition, contractors should have a cost engineer in their projects to successfully control costs and improving in performance of construction."
- It is very important at the very outset of the project to carefully consider all factors, client's policies, resources, organizational structure, and preferred contractual arrangements, when selecting the most appropriate procurement approach for a construction project. This is because each system has its own feature and peculiarity that will have effect on the cost, time and quality of the project.
- ERA should provide training, seminars, workshop with regard to innovative project delivery system, BD project delivery system, to executing the projects within construction budget, time and good quality. Moreover, senior staffs who have past experience in executing innovative project delivery projects should be able to educate others, share knowledge and keep communication to their junior about the innovative project delivery system.
- ERA is expected to establish other tender evaluation system other than low bid method to improve the cost overrun, time overrun and quality of the construction projects.
- Copy or modifying other country method may not be work full for our county condition to that finding of the problem and fixing this issue will be solution and it will be applicable for better construction procurement.

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Appendix - 1

Sample Calculation

Project Estimate

Project estimate means 50% engineer's estimate and 50% estimate of the Ministry. The project estimate shall be indicated in the bid document.

Engineer's estimate = ETB 152,000,000.00

Ministry's estimate = ETB 150,000,000.00

Project estimate = 50 %(152,000,000.00 + 150,000,000.00) = ETB 151,000,000.00

Bidders qualified for detail evaluation

Bidder's who are submitted the required bid security and whose offer is within plus or minus 20% of the project estimate will be subjected to detail evaluation. This criterion shall be clearly indicated in the bid document.

= 151,000,000.00+20% (151,000,000.00) = 181,200,000.00

= 151,000,000.00-20% (151,000,000.00) = 120,800,000.00

Therefore, bidders whose offer is between ETB 181,200,000.00 and 120,800,000.00 will be subjected to further evaluation. Bidders whose offers are outside the limit will be rejected.

iii. Detail Evaluation

The winning bidder will be the least bidder whose offer is within -15% of the adjusted project estimate. The adjusted project estimate is 25% of the project estimate and 75% from the average of the offer from the bidders who are subjected to detail evaluation.

Table 2.5 Summary of Bidders Offer

Bidder	Offer (ETB)	Remark
A	176,000,000.00	176,000,000.00
B	143,000,000.00	143,000,000.00
C	124,000,000.00	124,000,000.00
D	192,000,000.00	Rejected
E	118,000,000.00	Rejected
F	165,000,000.00	165,000,000.00
G	130,000,000.00	130,000,000.00
H	183,000,000.00	Rejected
		738,000,000.00

Bidders D, E and H are non-responsive because their offer is not within plus or minus 20% of the project estimate.

Average offer from contractors = 738,000,000/5 = 147,600,000.00

Adjusted project estimate =25 %(151,000,000.00) +75 %(147,600,000.00) =148,450,000.00

The minimum acceptable bid offer =148,450,000.00-15 %(148,450,000.00) =126,182,500.00

Therefore, the winner of this bid will be the least bidder whose offer is greater than ETB 126,182,500.00. In this particular example, bidder C whose offer is ETB130, 000,000.00 (Seven million one hundred thousand birr) will be awarded.

Appendix – 2

Questionnaire survey

QUESTIONNAIRE FOR RESEARCH THESIS

Introduction

This questionnaire is prepared to obtain information from key informants with semi- structured questions. The information is required for the academic research entitled "Construction procurement practices and its impacts in construction budget, completion time and performance in Ethiopian road construction", which is being conducted as partial fulfillment of MSc in construction technology and management.

The questionnaire consists of three sections. Section 1 General Profile of the Respondent, Section 2 General Question Related to Project Delivery System and at the end there is a space that left for general comments regarding the research topic at Section 3.

Your response, in this regard, is highly valuable and contributory to the outcome of the research. All feedback will be kept strictly confidential, and utilized for this academic research only.

Thank you,

Bilen Abera

Post graduate student, Construction technology and management

Addis Ababa Institute of Technology, School of Civil and Environmental Engineering

Department

Addis Ababa

Ethiopia

Supervised by **Prof. (Dr. –Ing) Abebe Dinku**

Questionnaire for the Client
(Code A)

Section 1: General profile of the Respondent

1.1 Name: _____ (optional)

1.2 Position: _____

1.3 Organization/Working Place_____

1.4 Address: _____ (optional)

a) Mobile:_____

b) E-mail: _____

1.5 Educational status? If your answer is MSC, please choice your field of specialization at 1.6.

☐ BSc ☐ MSc

Others; please specify_____

1.6 What is your field of specialization?

☐ Construction Technology and Management ☐ Transportation engineering

☐ Highway engineering ☐ Geotechnical engineering

Others, please specify_____

1.7 Work experience

a. In the construction Sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

b. In the road sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

Section 2: General Question Related to procurement and tender evaluation

DBB=Design Bid Built, DB=Design Built, CM at Free = Construction Management at free, CM at risk = Construction management at risk, BOT = Design Built Operate Transfer

Traditional delivery system is a design-bid-build project delivery method, the Owner first contracts with a Design Professional who provides the design. After the design the bidding system is take place. Finally the owner enters a separate contract with the general contractor for the construction of the project.

Innovative project delivery methods are Design-Build, Construction Management (CM), and Design-Build-Operate-Transfer. **Design-Build**: - the design-build team is works under a single contract with the project owner to provide design and construction services. One entity, one contract, one unified flow of work from initial concept through completion. **Construction Management (CM):-** The construction management project delivery system is a process by which a "construction manager" is added to the construction team to oversee some or all of the project. The construction manager can be involved in overseeing scheduling, cost control, construction, bidding, or the entire project. **Design-Build-Operate-Transfer: -** a private company is responsible for the designs, construction, operation, maintenance, and financing of the project for a specified concession period.

2.1 What are client requirements to select project delivery system?

a) Client characteristics (Cost, Time and Quality related factors)
b) External Environment (Market competitiveness, Availability of material, and Natural Disaster)

c) Project requirement (Project type, Size, cost, Flexibility, complexity and site risk)

d) Other

_____

2.2 Do you have specialized staff member who is responsible to select type of project delivery system for new construction project?

a) Yes b) No

2.3 Which type of tendering is better for projects to complete the work with in estimated Construction time, budget and quality for road construction project?

a) Open tendering b. select tendering c. multi-stage tendering d. Invitation tendering

2.4 Indicate the project delivery methods used by your organization to procure at least one construction projects.

Project delivery method	Yes	No	Do not know
Traditional			
Innovative			

2.5 If your organization has ever used the innovative methods, indicate them.

Innovative project delivery methods		Yes	No	Do not know
Design-Build (DB)				
Construction Management (CM)	Fee			
	Risk			
Design-Build-Operate-Transfer (BOT)				

	Priority

2.6 How often has your organization used the traditional or the innovative methods?

Delivery method	Always	Usually	Some times	Rarely	Not used
Traditional					
Innovation					

2.7 If you have been always employing the traditional method so far, do you intend (i.e. plan) to shift to the innovative project delivery methods?

2.7 A) If your answer is Yes, please rank them.

a) Yes b) No c) Mixed feeling

		1st	2nd	3rd	4th	5th	I do not know
DBB							
DB							
CM	Free						
	Risk						
BOT							

2.7 B) If yes, what is\are the reason\s behind your decisions? Order your reasons.

Please indicate the significance of each factor by ticking the appropriate boxes.

Add any remarks relating to each factor on the other raw.

St.A = Strongly agree (1) Sl.D = Slightly disagree (4)

Sl.A = Slightly agree (2) St.D = Strongly disagree (5)

N = Neutral (3)

Method	Reasons	Priority					
		1st	2nd	3rd	4th	5th	I do not know
DBB	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
DB	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
CM At free	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
	To reduce project cost						
	To reduce project time						

CM At Risk	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
BOT	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						

2.8 How do you choose any of the method (traditional or innovative)?

a) After considering the merits and demerits of each.

b) Because it is the customarily used method.

c) Others (indicate).

2.9 Which method do you think is particularly recommended for the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.10 Which method do you think is specifically advisable to meet project costs for the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.11 Which project delivery method ensures a quality project (both functional and aesthetic) for the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.12 Which project delivery method is effective in reducing administrative burden to the owner for the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.13 Which project delivery method is exposed to time extension claim on the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.14 Which project delivery method is exposed to cost claim on the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.15 Which project delivery method is exposed to quality/performance claim on road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.16 Which project delivery method is effective to execute the work on time on the road construction?

a) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.17 What criteria are clients use to select the type of construction contract document (construction contract document like MoWUD , PPA 2006, FPPPAA2011)

_____

_____

_____.

2.18 Which procurement stage is essential for road construction for better performance?

a) Pre-construction /pre-contract procurement
b) Construction / post contract procurement

Other _____

If your answer is "a" please rank table 5.1 by ticking the appropriate boxes and if your answer is "b" please rank table 5.2 by ticking the appropriate boxes.

V.H = Very High = 1 M = Medium = 3 L = Low = 5

H = High = 2 V.L = Very Low = 4

Pre contract Stage	Rank				
	1 (V.H)	2 (H)	3 (M)	4 (V.L)	5 (L)
Pre-feasibility and feasibility					
Design					
Tendering					

Table 5.1

Post contract Stage	Rank				
	1 (V.H)	2 (H)	3 (M)	4 (V.L)	5 (L)
Construction					
Commissioning					
Handover					

Table 5.2

2.19 Which construction standard bid document is advantageous for tender evaluation system than the other for the road construction?

a. MoWUD b. PPA 2006 c. FPPPAA 2011

d) other _____

2.20 What is your impression about MoWUD tender evaluation and analysis approach for road construction?

(The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001. Bidder's offer must be within plus or minus 20% of the project estimate will be subjected to detail evaluation. Project estimate means 50% engineer's estimate and 50% estimate of the Ministry. Bidders whose offer is within 20% and least price will be the winner.)

a. Very good b. Good c. Fair d. Poor

2.21 What is your suggestion about PPA 2006 tender evaluation and analysis approach for road construction?

(It is a two stage bid evaluation system the first one is technical evaluation and the second one is the financial offer. The first one is the technical evaluation, Bidders who score above 70% will participate for further financial evaluation. The successful bidder will be the least bidder whose offer is less than the other bidder.)

a. Very good b. Good c. Fair d. Poor

2.22 What is your opinion about FPPPAA 2011 tender evaluation and analysis approach for road construction?

(The aggregate of technical and financial offers have 70% and 30% value respectively at the end of evaluation. The Technical Proposal evaluation score shall be normalized according to the highest evaluated technical score that will get 100 points according to which other scores of technical criteria shall be proportionally ranked. Normalization is the transformation that is applied equally to every element in the group of data so that the group has a specific statistical characteristic. The same is true for the financial offer. The winner of this bid will be the highest point in the total sum of results of the technical and Bid Price evaluation.)

a. Very good b. Good c. Fair d. Poor

2.23 Which procurement related factor is affecting project performance?

a. Pre - construction time
b. Control of project design
c. clients interest
d. Process and procedure of construction organizational
e. Others

_____

2.24 Which performance evaluation is used for construction projects

M.F = Most frequently = 1 LF = Least Frequent =3
F = Frequently = 2 N.O = No occurrence = 4

Performance Evaluation	1 (M.F)	2 (F)	3 (L.F)	4 (N.O)
Economical Performance				
Time Performance				
Quality				
Environmental Performance				
Working Environment				

2.4 Your degree of satisfaction on the Ethiopian construction procurement practice?

a) High b) Medium c) Low d) Very low

e) other _____

2.25 In your opinion, what are the criteria that affects the process of construction procurement?

_____

_____.

Section 3: General Comments Regarding the Research

I am interested in any other comment you might have concerning procurement practices in Ethiopian construction project industry? Please use the space provide below for any of your comment.

_____

_____

_____

_____

_____.

Questionnaire for Consultant

(Code B)

Section 1: General profile of the Respondent

1.1 Name: _____ (optional)

1.2 Position: _____

1.3 Organization/Working Place_____

1.4 Address: _____ (optional)

c) Mobile:_____

d) E-mail: _____

1.5 Educational status? If your answer is MSC, please choice your field of specialization at 1.6.

☐ BSc ☐ MSc

Others; please specify_____

1.6 What is your field of specialization?

☐ Construction Technology and Management ☐ Transportation engineering

☐ Highway engineering ☐ Geotechnical engineering

Others, please specify_____

1.7 Work experience

c. In the construction Sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

d. In the road sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

Section 2: General Question Related to procurement and tender evaluation

DBB=Design Bid Built, DB=Design Built, CM at Free = Construction Management at free, CM at risk = Construction management at risk, BOT = Design Built Operate Transfer

Traditional delivery system is a design-bid-build project delivery method, the Owner first contracts with a Design Professional who provides the design. After the design the bidding system is take place. Finally the owner enters a separate contract with the general contractor for the construction of the project.

Innovative project delivery methods are Design-Build, Construction Management (CM), and Design-Build-Operate-Transfer. **Design-Build**: - the design-build team is works under a single contract with the project owner to provide design and construction services. One entity, one contract, one unified flow of work from initial concept through completion. **Construction Management (CM):-** The construction management project delivery system is a process by which a "construction manager" is added to the construction team to oversee some or all of the project. The construction manager can be involved in overseeing scheduling, cost control, construction, bidding, or the entire project. **Design-Build-Operate-Transfer:-** a private company is responsible for the designs, construction, operation, maintenance, and financing of the project for a specified concession period.

2.8 Indicate the project delivery methods used by your organization to procure at least one construction projects.

Innovative project delivery methods		Yes	No	Do not know
Design-Build (DB)				
Construction Management (CM)	Fee			
	Risk			
Design-Build-Operate-Transfer (BOT)				

Method	Priority					
	1st	2nd	3rd	4th	5th	I do not know
DBB						
DB						

Delivery method	Always	Usually	Some times	Rarely	Not used
Traditional					
Innovation					

2.9 If your organization has ever used the innovative methods, indicate them.

2.10 How often has your organization used the traditional or the innovative methods?

Project delivery method	Yes	No	Do not know
Traditional			
Innovative			

2.11 If you have been always employing the traditional method so far, do you intend (i.e. plan) to shift to the innovative project delivery methods?

CM	Free						
	Risk						
BOT							

2.4 A) If your answer is Yes, please rank them.

a) Yes b) No c) Mixed feeling

Table 2.4 a

2.5 B) If yes, what is\are the reason\s behind your decisions? Order your reasons.

Please indicate the significance of each factor by ticking the appropriate boxes.

Add any remarks relating to each factor on the other raw.

St.A = Strongly agree (1) Sl.D = Slightly disagree (4)

Sl.A = Slightly agree (2) St.D = Strongly disagree (5)

N = Neutral (3)

Method	Reasons	Priority					
		1st	2nd	3rd	4th	5th	I do not know
DBB	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
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	To ensure project quality						
	To ensure project safety						
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	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
	To reduce project cost						

CM At Risk	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						
BOT	To reduce project cost						
	To reduce project time						
	To ensure project quality						
	To ensure project safety						
	To reduce administrative burden to owner						
	Others						

Table 2.4 b

2.6 How do you choose any of the method (traditional or innovative)?

e) After considering the merits and demerits of each.

f) Because it is the customarily used method.

g) Others (indicate).

2.7 Which method do you think is particularly recommended for the road construction?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.8 Which method do you think is specifically advisable to meet project costs?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

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2.10 Which project delivery method is effective in reducing administrative burden to the owner?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.11 Which project delivery method is exposed to time extension claim?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.12 Which project delivery method is exposed to cost claim?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.13 Which project delivery method is exposed to quality/performance claim?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.14 Which project delivery method is effective to execute the work on time?

b) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.15 Do you have specialized staff member to assist clients on select the project delivery system for new construction project?

b) Yes b) No

2.16 Which type of tendering is better for projects to complete the work with in estimated Construction time, budget and quality for road construction project?

a) Open tendering b) select tendering c) multi-stage tendering d) Invitation tendering

2.17 Which procurement stage is essential for road construction for better performance?

c) Pre-construction /pre-contract procurement

d) construction / post contract procurement

Other _____

If your answer is "a" please rank table 5.1 by ticking the appropriate boxes and if your answer is "b" please rank table 5.2 by ticking the appropriate boxes.

V.H = Very High = 1 M = Medium = 3 L = Low = 5

H = High = 2 V.L = Very Low = 4

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Design					
Tendering					

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Post contract Stage	Rank				
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Commissioning					
Handover					

Table 5.2

2.18 Which construction standard bid document is advantageous for tender evaluation system than the other for the road construction?

a) MoWUD b) PPA 2006 c) FPPPAA 2011 d) None

2.19 What is your impression about MoWUD tender evaluation and analysis approach for road construction?

(The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001. Bidder's offer must be within plus or minus 20% of the project estimate will be subjected to detail evaluation. Project estimate means 50% engineer's estimate and 50% estimate of the Ministry. Bidders whose offer is within 20% and least price will be the winner.)

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2.20 What is your suggestion about PPA 2006 tender evaluation and analysis approach for road construction?

(It is a two stage bid evaluation system the first one is technical evaluation and the second one is the financial offer. The first one is the technical evaluation, Bidders who score above 70% will participate for further financial evaluation. The successful bidder will be the least bidder whose offer is less than the other bidder.)

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a) Very good b) Good c) Fair d) Poor

2.22 Which procurement related factor is affecting project performance?

f. Pre - construction time
g. Control of project design
h. clients interest

i. Process and procedure of construction organizational

j. Others_____

2.23 Which performance evaluation is used for construction projects

M.F = Most frequently = 1 L.F = Least Frequent =3

F = Frequently = 2 N.O = No occurrence = 4

Performance Evaluation	1 (M.F)	2 (F)	3 (L.F)	4 (N.O)
Economical Performance				
Time Performance				
Quality				
Environmental Performance				
Working Environment				

2.24 Your degree of satisfaction on the Ethiopian construction procurement practice?

b) High b) Medium c) Low d) Very low

e) other _____

2.25 In your opinion, what are the criteria that affects the process of construction procurement?

_____

_____.

Section 3: General Comments Regarding the Research

I am interested in any other comment you might have concerning procurement practices in Ethiopian construction project industry? Please use the space provide below for any of your comment.

_____

_____

_____

_____

.

Questionnaire for contractors

(Code C)

Section 1: General Profile of the Respondent

1.1 Name: _____ (optional)

1.2 Position: _____

1.3 Organization/Working Place_____

1.4 Address: _____ (optional)

e) Mobile:_____

f) E-mail: _____

1.5 Educational status? If your answer is MSC, please choice your field of specialization at 1.

☐ BSc ☐ MSc

Others; please specify_____

1.6 What is your field of specialization?

☐ Construction Technology and Management ☐ Transportation engineering

☐ Highway engineering ☐ Geotechnical engineering

Others, please specify_____

1.7 Work experience

e. In the construction Sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

f. In the road sector

☐ 0 – 5 years ☐ 6 – 10 years ☐ 11 – 15 years ☐ More than 15 years

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contract with the project owner to provide design and construction services. One entity, one contract, one unified flow of work from initial concept through completion. **Construction Management (CM):-** The construction management project delivery system is a process by which a "construction manager" is added to the construction team to oversee some or all of the project. The construction manager can be involved in overseeing scheduling, cost control, construction, bidding, or the entire project. **Design-Build-Operate-Transfer: -** a private company is responsible for the designs, construction, operation, maintenance, and financing of the project for a specified concession period.

2.12 Indicate the project delivery methods used by your organization to procure at least one construction projects.

Project delivery method	Yes	No	Do not know
Traditional			
Innovative			

Innovative project delivery methods		Yes	No	Do not know
Design-Build (DB)				
Construction Management (CM)	Fee			
	Risk			
Design-Build-Operate-Transfer (BOT)				

2.13 If your organization has ever used the innovative methods, indicate them.

2.14 How often has your organization used the traditional or the innovative methods?

Delivery method	Always	Usually	Some times	Rarely	Not used
Traditional					
Innovation					

2.26 How do you choose any of the method (traditional or innovative)?

h) After considering the merits and demerits of each.

i) Because it is the customarily used method.

j) Others (indicate).

2.27 Which method do you think is particularly recommended for the road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.28 Which method do you think is specifically advisable to meet project costs at road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.29 Which project delivery method ensures a quality project (both functional and aesthetic) for road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.30 Which project delivery method is effective in reducing administrative burden to the owner on the road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.31 Which project delivery method is exposed to time extension claim on road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.32 Which project delivery method is exposed to cost claim on road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.33 Which project delivery method is exposed to quality/performance claim on road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.34 Which project delivery method is effective to execute the work on time at road construction?

c) DBB b) DB c) CM risk Free d) CM with risk e) BOT f) Other

2.35 Which procurement stage is essential for road construction for better performance?

e) Pre-construction /pre-contract procurement
f) Construction / post contract procurement

Other _____

If your answer is "a" please rank table 5.1 by ticking the appropriate boxes and if your answer is "b" please rank table 5.2 by ticking the appropriate boxes.

V.H = Very High = 1 M = Medium = 3 L = Low = 5

H = High = 2 V.L = Very Low = 4

Pre contract Stage	Rank				
	1 (V.H)	2 (H)	3 (M)	4 (V.L)	5 (L)
Pre-feasibility and feasibility					
Design					
Tendering					

Table 5.1

Post contract Stage	Rank				
	1 (V.H)	2 (H)	3 (M)	4 (V.L)	5 (L)
Construction					
Commissioning					
Handover					

Table 5.2

2.36 Which construction standard bid document is advantageous for tender evaluation system than the other for the road construction?

b. MoWUD b. PPA 2006 c. FPPPAA 2011 d. None

2.37 What is your impression about MoWUD tender evaluation and analysis approach for road construction?

(The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001. Bidder's offer must be within plus or minus 20% of the project estimate will be subjected to detail evaluation. Project estimate means 50% engineer's estimate and 50% estimate of the Ministry. Bidders whose offer is within 20% and least price will be the winner.)

b. Very good b. Good c. Fair d. Poor

2.38 What is your suggestion about PPA 2006 tender evaluation and analysis approach for road construction?

(It is a two stage bid evaluation system the first one is technical evaluation and the second one is the financial offer. The first one is the technical evaluation, Bidders who score above 70% will participate for further financial evaluation. The successful bidder will be the least bidder whose offer is less than the other bidder.)

b. Very good b. Good c. Fair d. Poor

2.39 What is your opinion about FPPPAA 2011 tender evaluation and analysis approach for road construction?

(The aggregate of technical and financial offers have 70% and 30% value respectively at the end of evaluation. The Technical Proposal evaluation score shall be normalized according to the highest evaluated technical score that will get 100 points according to which other scores of technical criteria shall be proportionally ranked. Normalization is the transformation that is applied equally to every element in the group of data so that the group has a specific statistical characteristic. The same is true for the financial offer. The winner of this bid will be the highest point in the total sum of results of the technical and bid price evaluation.)

b. Very good b. Good c. Fair d. Poor

2.40 Which type of tendering is better for projects to complete the work with in estimated Construction time, budget and quality for road construction project?

a. Open tendering b. select tendering c. multi-stage tendering d. Invitation tendering

2.41 Which performance evaluation is used for construction projects

M.F = Most frequently = 1 LF = Least Frequent =3

F = Frequently = 2 N.O = No occurrence = 4

Performance Evaluation	1 (M.F)	2 (F)	3 (L.F)	4 (N.O)
Economical Performance				
Time Performance				
Quality				
Environmental Performance				
Working Environment				

2.42 Your degree of satisfaction on the Ethiopian construction procurement practice?

c) High b) Medium c) Low d) Very low

e) other _____

2.43 In your opinion, what are the criteria that affects the process of construction procurement?

_____

_____.

Section 3: General Comments Regarding the Research

I am interested in any other comment you might have concerning procurement practices in Ethiopian construction project industry? Please use the space provide below for any of your comment.

_____

_____

_____

_____.