Addis Ababa University School of Commerce
Graduate Program of Project Management

PUBLIC PROCURMENT SYSTEM AND ITS EFFECT ON THE PERFORMANCE OF ROAD PROJECTS ADMINISTERED UNDER ETHIOPIAN ROADS AUTHORITY

By Yared Hadgu

Public Procurement System and Its Effect on the Performance of Road Projects
A Project Paper Submitted to School of Graduate Studies, Addis Ababa University
In partial fulfillment of the requirements for the Degree of Master of Arts in Project Management

Advisor- Solomon Markos (PhD, Ass. Prof)

June 2022

Addis Ababa

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DECLARATION

I declare that this thesis entitled PUBLIC PROCURMENT SYSTEM AND ITS EFFECT ON THE PORFORMANCE OF ROAD PROJECTS ADMINISTERED UNDER ETHIOPIAN ROADS AUTHORITY has not been presented for any other project and is not concurrently submitted in candidature of any other, and that all sources of material used for the proposal have been duly acknowledged.

Name: Yared Hadgu

Signature: _____

Place: Addis Ababa University School of Commerce

Date of Submission_____

Approved by Board of Examiners

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Examiner (External)	Signature	Date
_____	_____	_____
Examiner (Internal)	Signature	Date
_____	_____	_____
Chairperson	Signature	Date

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ABSTRACT

Over the last decade, Ethiopian road construction sector constitute the largest federal government-spending item. However, the sector is criticized by its poor performance of delivering projects within allocated time and budget. Public procurement system has irreplaceable role on the performance and successful completion of road projects. The aim of this study was to assess the impact of public procurement system on the performance of road projects administered under ERA. The study identified eight (8) indicators of procurement core processes as independent variables [Procurement Policy and View, Contract management and Procurement Plan, Procurement and Evaluation method, Solicitation and Evaluation process, Contract Pricing Structure, Project Delivery System, Conditions of Contract and Contract Administration] and three (3) project performance indicators (cost, schedule and quality), as dependent variables. A structured questionnaire was used to collect the primary data. The collected data's were analyzed using inferential statistical models to determine the correlation and regression among the variables. The study result suggests that cost, schedule and quality performances are significantly correlated to the procurement core processes in descending order. According the study, we can also draw inference from the population that cost, schedule and quality variables of the procurement system affect the cost, schedule and quality performance of road projects administered under ERA. Moreover, the study and statistical tests show, procurement policy/view, contract management process/procurement plan, procurement method and solicitation/evaluation process have positive significant correlation to the performance of road projects administered under ERA The study recommends improvements on employer's procurement policy/view, contract management process and organizational assets, along with efficient and effective contract administration. Additionally, practicing alternative mode of procurement, contracting and project delivery system adaptable to the nature of projects is essential Moreover, national public procurement policy reform based on the current pitfalls and drawbacks, that could able accommodate future market expansion and changes, is at most needed

Key words: public procurement system, performance of road projects, Ethiopia roads authority

ACRONYMS

BOQ Bill of Quantities

ERA Ethiopian Roads Authority

FDRE Federal Democratic Republic of Ethiopia

FIDIC International Federation of Consulting Engineers

ICE **T**he Institution of Civil Engineers

ICB International Competitive Bid

NCB National Competitive Bid

PBC Performance Based Contracting

PDS Project Delivery Process

PPP Public Private Partnership

PPPA: Public Procurement and Property Administration Agency

RFP Request for proposal

RFQ Request for quotation

RIBA Royal Institutions of British Architects

SBD: Standard Bid Document

SOW Statement of Work

RSDP Road Sector Development Program

CHAPTER ONE
INTRODUCTION

1.1 Background

The main aim of sound public procurement is to maximize the value of money through competitive and transparent system to attract as many suppliers as possible. Regional cooperation, trade union and standardization lead countries to have inclusive and farsighted procurement system to have competitive market in the region and in the globe

In the context of Ethiopia, road is the most important infrastructure that provides access to rural and urban areas of the country. Road infrastructure plays crucial role to the economic growth of the country. The government of Ethiopia has well recognized the limited road network coverage and poor condition of the existing road network, has been an impediment to the economic recovery and economic growth. Therefore, to address the problems, the government has launched the road sector development program (RSDP) in 1997.

Since then five phases of RSDP were implemented over a period of 1997 to 2020. The physical and financial performances of the first four RSDPs' were 86% and 115% respectively. Capacity limitation of vendors and contract management issues were reportedly the main reasons behind the underperformance of road projects. Ethiopian Roads Authority's (ERA's) institutional and policy reforms afterwards was a big leap, however, assessment of the government procurement policy in general is essential to address the root causes in align with the commercial developments and changes ahead.(ERA, 2016)

Whilst various survey reports show high rate of underperformance in public projects. The federal government of Ethiopia has continued using road projects and programs to achieve its strategy, without fundamental reform in its procurement process, while facing with complexity, uncertainty and rapid commercial changes that affect the socio economic environment and project performance.

1.2 Problem Statement

While practicing the current public procurement procedures, contract type, contract mode, bid evaluation system, standard condition of contract and contract administration in the public procurement system, ERA's nineteen (19) years assessment report shows under performance of projects According the study, capacity limitation and the public procurement issues were reported behind (ERA. 2016)

Moreover, according the recent study conducted by the Federal Construction Authority (2022), despite a significant increase in the cost of construction materials, the contract between contractors and project owners prohibited price adjustment, pushing contractors to operate at a loss while leading to a delay of public projects. Most of the projects are delayed because of price escalation, according the study.

The study conducted by the authority shows, out of seven hundred fifty nine (759) public construction projects, 98% of them have already excluded price adjustment from their contract. Even though there are projects delayed for over 15 years, the last 2 years has been, in particular challenging, because of sudden increase in the price of construction raw materials. Despite the inflationary pressure, however, contracts saw no price adjustment as most government projects have sealed contract with no price adjustment

According the study, PPPA stated that if the price escalation adjustment turns out to be more than the threshold of 15% of the whole price of the contract, the public offices were to request the authority's permission. However, PPPA also stated that the current price escalation is visible, so, in order to make the price escalation adjustment the authority has written letter to more than 150 government offices, allowing them to make price adjustment if the contract permits. PPPA has allowed all federal budgetary offices whose project contracts permit price escalation adjustments to make adjustments using given formula to calculate without requesting permission from the authority as they had previously done.

The fore seen studies show the practical implications of adopting one-sided condition of contract, the problems on administering the contract and its impact to the performance of projects

In this study, it is also worthwhile to assess the views adopted by public bodies in the selection of contract types and contract pricing structure and its implication to the performance of projects, to have all rounded perspective to the root causes of the problem

Generally, according J Rodney Turner and Stephen J Simister (2001), one of the detrimental factors for the performance of projects is the type of contractual relationship between the owner and the contractor. Theoretically, the conventional perspective in the selection of contract types is the transactional cost approach. The transactional cost approach analyzes the cost of the governance structures adopted by the client and contractor organization to manage the contractual relationship of the project. What the analysis suggests is transactional costs are not dependent on risk per se, but uncertainty in the definition of the project product. At low level of uncertainty, transactional costs associated with fixed price are low, at intermediate level, those associated with re measurement are low, and at high levels of uncertainty, those associated with cost plus are lowest, confirming perceived wisdom.

However, the role of transactional costs in determining project type is not supported by modern practices. The flaw is that if project-pricing terms are to be determined by transaction costs, then the out turn costs of the contract works must be independent of the pricing structure. However, different pricing structure motivates the contractor in different ways, so we expect out turn costs to be different under different pricing structure. These differences are greater than the differences in the transactional costs. Thus, the selection of appropriate contract pricing terms is determined by goal alignment that is having the contractor share in the client's success from the project. Therefore adopting an alternative view that the purpose of the project organization is to create a cooperative system between the client and the contractor based on shared objectives is in need to enhance the performance of projects Thus, procurement policies and procedures dictate the contract pricing structures and the terms and conditions of the contract. Thus, this is how the public procurement process has an effect on the performance of projects. Therefore, employer's project organization view in the selection of contract relations between the parties, its condition of contract and its way of administering the contract has an effect on the performance of projects

The aim of this study is then, to assess the effect of procurement core processes and public bodies project organization's view on the performance of public projects and contribute to the theory of project organization and contract selection

1.3 Research Questions

Do the public procurement process and the view on project organization have an effect on the performance of public road projects administered under ERA?

What is the correlation of contract management core processes to the performance of road projects administered under ERA?

What is the aggregate effect of the procurement system on the performance of road projects administered under ERA?

1.4 Definition

Network (2004) defined procurement system as the overall methods used by a client to arrive at a tender figure and other operation towards the selection of a competent contractor to deliver a project at an agreed time and other conditions. According to Castle (1987) competitive process is conventionally regarded as producing the proper and cheaper level of tenders because each is influenced by market pressure

A contract is a way of creating a project organization Levitt and March (1995, P 11-37). The project organization is seen as, one of transforming a conflict system in to a cooperative (rational) one. A conflict system is one in which individuals have objectives that are not jointly consistent. A cooperative system is one in which individuals act rationally in the name of a common objective. Appropriate governance structure (determined by the contractual relationships) need put in place to achieve cooperative system through goal alignment. Transactional cost analysis is an examination of comparative costs of planning, adapting and monitoring under alternative governance structures. Williamson (1996, P48 &56)

1.5 Objectives

General Objectives

1. To study the public procurement system of the FDRE
2. To study the relationship between the public procurement system and the performance of road projects administered under ERA
3. To study alternative procurement systems and best practices

Specific Objectives

1. To assess the procurement practices of the institution
2. To specify the procurement process indicators that are important to the performance of road projects
3. To analyze the magnitude of influence of the major procurement core process indicators to the performance of road projects
4. To analyze the aggregate impact of the procurement core process indicators on the performance of road projects
5. To assess the employer's view on project organization and contract management

1.6 Significance of the Study

Practical Significance

The study was intended to assess the procurement practices and its implication to the performance of projects and to inform decision makers the problem at hand

Theoretical Significance

The study was also intended to assess the employer's view on project organization and to review the alternatives to the transactional cost perspective on selection of contract types and contract pricing structures

1.7 Delimitation/ Scope of the Study

The study is limited to road projects administered under ERA procured under the federal public procurement proclamation 649/2009 performed by local contractor.

The conceptual limitation of the study was that extraneous factors (variables) which are confounded within the independent variables, shall be ignored for analysis purpose and simplicity

The methodological limitation of the study was its assumption that all local contractors share the same marked characteristics which is out of the actual reality

The geographical limitation of the study was, even though the target population was all local contractors and consultants actively participating in road projects administered under ERA. The sampling frame was limited to these contractors and consultants available at the capital (Addis Ababa) due to time and budget limitation

CHAPTER TWO

LITERATURE REVIEW

2.1. THEORETICAL LITERATURE REVIEW

2.1.1 PUBLIC PROCUREMENT SYSTEM

Public procurement is a series of processes that interrelated to each other for successful implementation of projects to achieve business objectives of the organization.

Network (2004) defined procurement system as the overall methods used by a client to arrive at a tender figure and other operation towards the selection of a competent contractor to deliver a project at an agreed time, cost and quality standards

The public procurement system includes the contract management processes required by the organization to develop and administer the contract including its procurement policy and project organization's perspective

2.2.2 PROJECT ORGANIZATION'S THEORY

The organizational theory and contract management style predicts the selection of contract type. The transactional cost approach is the conventional approach that organizations assume to select a particular contract type. According the transactional cost approach, organizations select contract type that has a minimum transactional cost. However, the transactional cost approach is not fitting with current practices. First, the difference in transactional costs among different contract types, are small compared to the difference in contract out turn cost that occurs under different motivational effect of the contract types. Second, it is assumed that the purpose behind a project contract is to create a cooperative project organization, in which all participants, employer and contractors, are motivated to achieve common objectives through goal alignment. This analysis confirms modern practices show, selection of contract type is related to the uncertainty in project deliverables and uncertainty in the process of their delivery. (Turner & Simister, 2001)

2.2.3 PROCUREMENT POLICY

The procurement policy refers to the set of purposes, principles and rules of actions that guide the procurement process of an organization.

Contract Management Guideline

The purpose of contract management guideline is to offer purchasing personnel, contract officers and other administrators, recommendations on documenting existing procurements and contracting processes and practices in connection with the procurement of goods and services

Applicable laws and Legislative Requirements

The guideline shall comply with the applicable laws and rules related to specific programs

Training for purchasing and Contracting Personnel

Organizations must train officers and employees authorized to execute contracts or to exercise discretion in awarding contracts, including training in ethics, selection of appropriate procurement method, and information resources related to purchasing technologies

Ethical Standards and Polices

Purchasing officers and employees are responsible for maintaining the high ethical standards required for stewardship for public money. All organization's officers and employees should pursue a course of conduct that does not create conflict of interest

Purchasing personnel must adhere to the highest level of professionalism, in discharging their official duties. The nature of procurement function makes it critical that everyone in the purchasing and contracting process remain independent and free the perception of impropriety. Any erosion of public trust or any shadow of impropriety is detrimental to the integrity of the purchasing process. Clear established guidelines and rules provide credibility for a purchasing program.

2.2.4 CONTRACT MANAGEMENT

Contract management is the management of all the processes needed for purchasing and acquiring goods or services from external supplier and ensuring both the employer and the contractor discharge their duties and responsibilities according the terms and conditions of the contract for the successful implementation of the project. Contract management includes planning, procurement, contract formation and contract administration.

According, UTSA (2021) contract management handbook, contract management consist the following core processes.

2.2.4.1 PROCURMNT PLANNING

The first step in contract management is planning. Planning is crucial to the successful outcome of any procurement. With proper planning programs are more likely to achieve contract objectives. Planning assist programmers in determining and documenting needs, preparing the SOW, choosing the appropriate procurement type, soliciting for response, negotiating the terms of response, drafting the contract, administering and overseeing the contract. Contract planning includes development of contract management team, determining the procurement method, developing SOW, specification, and cost estimate and communication plan and risk analysis

2.2.4.1.1 Contract Management Team

The contract team should be experienced with the proposed type and size of the contract. For purchases requiring competitive procurement, the contract team should have a reasonable understanding of the scope of the service and the specifications of the procurement contract

2.2.4.1.2 Contract Risk Management

Contact management risks are as varied to the type of contact. Risk categories common to contract management includes product risk, process risk, business continuity risk, financial risk, and schedule risk. The level of contract management risk depend on contract factors such as complexity, amount of the contract, contract pricing method, experience and expertise of staff, impact of the project and contract duration

2.2.4.1.3 Communication Plan

On competitive procurement, the purchasing office facilitates all information's transparently to the vendor community regarding the procurement opportunity through appropriate channels.

2.2.4.1.4 Determine Procurement Method

Project organization shall acquire goods/services by the method that provides the best value to the organization. Always keep best value considerations in mind when selecting the procurement method. Strategically approached procurement and employer needs leads to the appropriate procurement method. Average life span, total ownership cost, maintenance record, qualification and availability of technical services and vendor performance are some of the issues to be considered in selecting the procurement method.

Formal Competitive procurement

According Laychuluh M, (2012).Generally procurement procedures are two types, competitive and negotiated. Most other procedures are either variation of or somewhere between the two extreme types. In pure competitive method, the contract is awarded to the lowest bidder, if the bidder was found to be responsive. In pure negotiated method, the price is negotiated with selected contractor(s). To minimize the shortcomings of the two extreme types, modifications have been proposed and tried in many countries The most commons are

1. Competitive low bidding (price based)
2. Competitive average bidding (price based)
3. Multi parameter bidding method (based on price and other parameters)
4. Competitive negotiated bidding
5. Noncompetitive negotiated bidding

According to Castle (1987) competitive process is conventionally regarded as producing the proper and cheaper level of tenders because each is influenced by market pressure

Best value invitations for Bids (IFB)

The best value competitive sealed bid method or open bid uses the IFB solicitation document. The IFB is generally used when the requirements for the goods and services are clearly defined, negotiations are not necessary, and price is the primary evaluation criteria for selection.

Request for Qualification (RFQ)

RFQ is generally used to procure professional services. Project organization may not select a provider of professional service or a group or association of providers or award of a contract for the professional service based on competitive bids, but must generally makes the selection and award on the basis of demonstrated competence and qualification to perform the services for a fair reasonable price

Request for Proposal (RFP)

RFP is generally used, when best value competitive sealed bid is not practicable or advantageous. RFP is used when price is not the primary evaluation criteria and other factors other than price receive significant weight. One of the main difference between IFB and RFP formal solicitation methods are negotiations are allowed under the RFP but not under IFB

2.2.4.1.5 Determine Contract Strategy

A successful project not only requires a careful analysis and an accurate estimate but also successful strategy and management. The contract strategy adopted depends on many factors, not least the resource available to the owner. Resources that are not available in house must be brought in. Tthe project management task is to coordinate the planning and execution of all these tasks within program, budget and specification.

Contract Strategy

Contract strategy deals with the division of the project into separate contracts, and the form and condition of contract most likely to encourage satisfactory completion, whilst providing controls and opportunities to the owner or contractor and rectify problems

Factors affecting in Selecting Contract Strategy

The major factors that determine contract strategies are design, conditions of contract; risk sharing, number of contractors in the Industry, available information, contract size and complexity, uncertainty of project deliverables and project delivery processes, industrial relations, government legislation and policies

2.2.4.1.6 Contract Pricing Structure

Lump Sum Contracts

These may include some or all of the design to be fit for the purpose or alternatively used to price a design prepared by employer or the consultant. Lump sum contract is most effective type for the employer to use, providing he can issue a complete specification pre contract, and confident that there will not be post contract variation. Post contract variation has to be negotiated on a single tender basis and lump sum contract don't normally provide the employer with the information he would need for a successful negotiation

Measured Contracts

Bill of quantities from design drawing should be precise statement of the unit of work to be undertaken and hence the summation of rates multiplied by its quantity amounts to lump sum price. For fast track projects, bill of quantity would be prepared on the design available; in this case, works would be priced at rates in the accepted BOQ or with the schedule of rates

Target Cost Constrict

Target cost contracts may be negotiated or competitive. Whilst target cost contracts can be successful, it should be recognized that contractors might perceive that greater profit can made by persuading the purchaser to increase his target rather than using contractor's management effort to minimize the project cost.

Cost Reimbursement Contract

Cost reimbursement contracts make the employer at least mainly responsible for the cost of inadequate design and management

Multi Contract

The employer divides the work into areas of expertise in the expectation that the economies exceed the risk. The employer may let the contract, as sufficient information is available. The main risk is that the employer must take responsibility for the failure of cone contract on another and for the effects of his failure on each contract

2.2.4.1.7 Project Delivery System

Design- Bid -Build Contracts

Traditionally, the employer has appointed an architect or engineer to undertake the design of his project. The employer usually carries the risk of design errors and delays. For conventional building and civil engineering projects, the normal practice is to produce complete detailed design of the entire works for when tender are sought

Design- Build Contracts

The design and build, or comprehensive or turnkey contract concept has becoming increasingly popular as it allows the employer to obtain competitive bids for alternative designs and to contract with a single organization for the entire project, within a budge and a program determined pre contract. The contract may be on lump sum, cost-plus, cost plus or target cost

Design Build Operate Contracts

Design, build and operate contracts extend the contractor's obligation to operating the hardware for a predetermined period during which the employer's staff may be trained, and teething troubles eliminated. It clearly gives the contractor a much greater interest in ensuring a trouble free operation and hence in quality assurance

Management Contracts

A number of major contractors now operate management-contracting divisions they seek to take the place of managing consultant. They often employ consultant as a designer, offer commercial programming, and build ability skills, most offer a flexible approach and consult the employer to the extent required

2.2.4.2 PREPARING THE SOLICITATION

After the project organization completes any required procurement planning activity, the purchase office will coordinate the preparation of the solicitation documents. Purchasing officer involved with drafting the solicitation must be aware of applicable laws and rules.

In addition, before program staffs are involved in evaluating a discretionary procurement solicitation, purchasing office will obtain signed non-closure statements and conflict of interest statements from the employees

2.2.4.2.1 Contract Term

Reasonable contract term compliant with applicable laws should be included in the solicitation.

2.2.4.2.2 Background Information

Subject to applicable laws and rules, the solicitation may need to provide potential respondents with all appropriate background information.

2.2.4.2.3 Proposal Submission Requirements

The solicitation should include a listing of all required information that respondents must submit with their proposal. Incorporating the listing of required submittal information into one section will assist respondents with confirming that all required documentation is submitted.

2.2.4.2.4 Evaluation of Proposals

Evaluation Criteria: The best value solicitation require institutions to consider the following mandatory evaluation criteria to evaluate proposals for goods/services

- Cost of goods/services
- Reputation of respondents (contractors qualification, financial capacity and experience)
- Quality of respondents goods/services
- Respondents past relationship
- Total long term cost of the respondents goods/services
- Any other relevant factors

Scoring Weight: There are several schools of thought on how much information to provide respondents regarding the evaluation criteria. At a minimum, the solicitation will identify the criteria. Organization's policy dictates the scoring weigh assigned to each criterion. When establishing the scoring weight of each criterion cost may be the most significant criterion. However, there are solicitations that skills and experience of contractor, or other factors may be more important than cost. When establishing weight for each criterion, consider the importance of each criterion to the overall project. The criterion deemed most important by the institution should be weighed higher than their other criterion.

2.2.4.2.5 Solicitation Requirement

The solicitation will notify respondents of all requirements and clearly state the consequence of failing to meet these requirements.

Contractor Qualification

The solicitation must specify any minimum qualification required by the contractor. For example, the solicitation may require that the contractor have a specified level of experience in providing the goods/services

Posting Security

The solicitation advices and stipulates the type and amount of security if respondents will be required to post security and if so, what form of security is acceptable

Monitoring

It is important to develop effective contract monitoring strategies for each contract to procure. The methods used to monitor contractor performance should be outlined in the solicitation because these methods will become important contract terms. The SOW should set specific deadline for completion of tests and a schedule for deliverables, required meeting, presentations or other activities.

Statement of Work

The statement of work is very important as it forms the basic framework for the resulting contract. The SOW is a detailed description of what is required for contractor to perform the work. The SOW should provide a clear and thorough description of the goods/services to procure. The success or failure of ac contract can often be linked to the adequacy of the planning, analysis and clarity of the SOW. The need assessment is the foundation for the SOW

Work Breakdown Structure (WBS)

One way to organize SOW is to divide each procurement objectives into logical parts, such as phases. Phases may include 1) planning, development, implementation, operation, and management 2) planning, equipment installation, testing, operation and maintenance. The specific phase should support the subject matter and purpose of the contract. Phases may further divided into smaller segments of work

Define Institutions Role

The contract, not the SOW should clearly define the role of the project organization will play in the work to be performed and the specific contributions or resources the organization will provide. The contract not the SOW should also define the role of the organization staff that will administer the contract and monitor contractor's progress

Specification Type

Specification is the primary means of communication between the project organization and vendor. A specification is a description of the goods/services an organization seeks to procure. Specification includes deliverables. Each deliverable should include the following elements: work description, performance standard, and test types, monitoring process, acceptance process, correction and measure processes

Specification controls the quality of the goods/services, the suitability of the goods/services for the business purpose and the method of evaluation used in determining best value in making contact award. Specification specifies the quantity of goods/Service, standard of goods/services and the established industry standards

Reporting

Status reporting, performance and activity reporting are terms used to describe information that a contractor must provide to show the status of the contract

Inspection and Testing

The SOW may need to provisions for inspection and testing. The project organization should include inspection and testing of goods/services purchased under the contract to ensure compliance with specification of the solicitation and contract.

Final Acceptance

The SOW would clearly define how the project organization would determine that the contract has been successfully completed. The SOW sets a standard for acceptance of the deliverable.

2.2.4.2.6 Payment Methods

There are various payment types according the contract pricing modality (fixed price, cost plus, add measure, etc.). Payment method should be consistent with the goods/services delivered. Payment should be structured to fairly compensate contractor and encourage timely complete performance of the work. As a rule, payment should approximately equal to the value of the completed work.

2.2.4.3 PUBLICATION OF THE SOLICITATION

Advertising

When marketing a competitive procurement the purchasing office will consider the types of channels for publication according the goods/services being procured. Effective advertising for goods/services may be different from effective advertisement of professional services. The purchasing office should refer to applicable laws and rules to ensure compliance

Solicitation Announcement

Announcements are efficient way to reduce mailing costs when publishing large solicitation. Announcement is a brief notification sent by the employer for potential proposers, advising of the upcoming procurement opportunity

Communication with Respondents

All communication with the potential respondents should be made only through the purchasing office the solicitation should provide the purchasing office as point of contact with acceptable form of communication. Although the purchasing staff may not be able to answer technical questions, they will obtain the responses from appropriate program staff and ensure that the information is communicated to all potential respondents. Formal communication with potential respondents include responses to written questions, pre proposal conference and written addendum

The solicitation must indicate the submission deadline (including date and time) and location for submission. The solicitation must also indicate whether the institution will hold a public opening of proposals. The institution may choose not to hold a public opening. Depending on the solicitation, a public opening may include a public reading of respondent's names or pricing tabulation prior to award of contract

2.2.4.4. EVALUATION AND AWARD

Institutions must evaluate responses in a fair and impartial manner consistent with the solicitation, applicable laws and rules. The solicitation should include a general description of the evaluation process, the evaluation criteria and at the institution's discretion the scoring weight

2.2.4.4.1. Evaluation Guide

During the planning stage for the procurement, the contract management team should develop an evaluation guide, which identifies the evaluation team, the detailed scoring matrix, the process for evaluation of responses and award of any contract, and the anticipated evaluation schedule**.**

2.2.4.4.2. Evaluation Team

The evaluation team should be comprised of individuals who are stakeholders in the goods/serves being procured or individuals who have necessary technical or program expertise. The evaluation team members are typically selected by program staff with direction fro the purchasing office and approval from the executive management

The purchasing office will coordinate with evaluation team members and facilitate the evaluation process. The evaluation team members should fully understand the requirements of the solicitation and must be able to critically read and evaluate responses and document their judgment clearly, concisely and consistently in accordance the evaluation guide.

2.2.4.4.3. Scoring Matrix

The scoring matrix is part of a well-developed evaluation guide, which is used by the evaluation team members to score the individual responses, based on the evaluation criteria defined in the solicitation. The evaluation-scoring matrix should be completed prior to publication of the solicitation because when developing the scoring matrix, it may become apparent that the solicitation needs to be supplemented or revised

2.2.4.4.4. Responsive Proposals

The purchasing office determines if the proposal submitted are responsive. At a minimum, this includes review the signed execution of offer, responses to respondent's questions or smaller documents, such as bonds and certificate of qualification are met. In addition, the purchasing office will review the proposals to ensure minimum qualifications are met. .

2.2.4.4.5. Proposal Evaluation

Ones, responses has been reviewed and found to be responsive by the purchasing office, the evaluation team leader will provide members of the evaluation team copies of the qualified responses. Some evaluation is conducted with the evaluation team at same room evaluating the responses at the same time.

2.2.4.4.6. Best and Final Offers

Selection of proposal for award is norm accomplished by formally requesting best final offers

2.2.4.4.7. Negotiation

Before negotiating with respondents, institutions should closely review the terms of the solicitation to confirm that negotiation is permitted. The IFB procurement method does not generally allow negotiation, however the RFP and RFQ methods do allow negotiation.

2.2.4.4.8. Contract Award

The institution will award a contract for the purchase of goods/services that provides the best value for the institution pursuant to the mandatory evaluation criteria required by the best value solicitation specified.

2.2.4.5. CONTRACT FORMATION

Contract is a promise or set of promises to which the law attaches legal obligation. The law regards the performance of these promises as a duty and provides a remedy for the breach of that duty. Contracts that deviate substantially from employer's requirements and specifications defined in the solicitations are subject to remedy

2.2.4.5.1. Approaches to Contract Formation

Fundamentally, the purpose of any written contract is to 1) create a legal, binding and enforceable obligation, and 2) serve as a reference document that records the terms of an agreement to prevent misunderstanding and conflict. Conflicts over contract arise primarily from ambiguity in the SOW, specification, contract period or business obligation

2.2.4.5.2. Drafting the Contract

The contract should fully describe the actual agreement of the parties. Generally, contract includes the following provisions

- Administrative provision
- Financial provision
- Risk allocation provision
- Scope of work including deliverables
- Contract terms, terminations and dispute resolution provision

2.2.4.5.3. Form of Contract

Evidence of an agreement or a contract may be documented in different format, including a formal bilateral contract, a purchase order or an exchange of correspondences. Regardless of the title, if the agreement contains the required legal elements of a contract, then it is a contract.

2.2.4.5.4. Contract Terms

Contracts include a variety of routine terms and conditions often referred as standard terms and conditions. Generally, accepted terms and conditions for use by all institutions are provided on the public procurement directives. These are the recommended terms and conditions and may be modified to meet the needs of the project organization

2.2.4.6. CONTRACT ADMINISTRATION

Contract administration is the application of tools of management to safeguard the rights and liabilities of the contracting parties by administering the agreed rules, guidelines on the components of pre and post contract activities. The basic goal of contract administration is to maximize the benefit/cost ratio in pursuance of client's objectives in terms of utility, functions, cost, time and quality

Contract administration and management includes ensuring to the extent possible that the contract requirements are satisfied, that the goods/services are delivered in a timely manner, and that the financial interests of the organizations are protected

The goal of the contract administration is to ensure contractor satisfactorily performs the contract and the responsibilities of the contract parties are properly discharged. Effective contract administration helps to minimize or eliminate problems and issues, disputes and claims. Contract administration and oversight includes the following

2.2.4.6.1. Contract Administration Planning

Statement of Work (SOW)

Planning for contract administration should be simultaneously with drafting of the SOW for the solicitation. Procedures for contract administration should be described in the solicitation. Effective contract administration begins before the solicitation is issued, with the development of a clear and concise SOW. The SOW is the road map for contract administration. At the same time, the organization should ensure appropriate resources are available for the contract administration team to perform essential contract administration processes.

Communication

Communication is a critical factor in successful contract administration. It is essential for the contract administrator to 1) understand the essential provisions of the contract, 2) communicate contractual obligations to appropriate relevant stakeholders, and 3) monitor contract performance over the entire term of the contract.

Risk Management

Organizations should perform preliminary risk analysis to manage risk of major contracts, 1) document the initial organization's risk perception, 2) identify specific risks, 3) determine, the level, type, and amount of management oversight and resource needed to plan and implement the contract from beginning to end, 4) identify and assign experienced personnel to assist with the contract management process

Contract Management Responsibilities

Generally, program staffs are tasked with primarily contract administration and any reporting or other necessary actions following contract formation. On contracts developed from competitive solicitation, the purchasing office must include the program staff in the development of the contract and use reasonable efforts to ensure the program staff understand the importance of their involvement in the following contract development roles. Those roles directly affect the efficiency of contract administration and can include

Developing Contract Management Team

The number of participants in the contract management process will vary in number from one person to several people depending on the dollar value, terms, level of risk and complexity of the contract. At the beginning of the solicitation development, the purchasing office should identify single point of contact from the program staff that will facilitate or approve business operation decisions and facilitate the contract administration process

Post Award Conference

For complex service contracts, the institution may desire to hold an informal or formal post award conference with contractor personnel responsible for administering the contract. A post award conference should be held as soon after the award is practical.

Performance Monitoring

Performance monitoring is a key function of proper contract administration that helps the institution to 1), confirm the contractor is performing all its duty and obligation in accordance with terms of the contract, 2) identify and address any developing problems or issues.

Monitoring Tools

The project organization should establish expectations so that employer and contractor personnel understand the contract requirement that will be monitored and the evaluation criteria for each contract requirement. Common monitoring tools include

Site Visit

Contracts that are highly complex or have a very high degree of risk may require visits to contractor's facilities. Site visit may be used to verify the contractor's performance complies with the contract schedule and other contract requirements.

Desk Review

A desk review includes a review of reports submitted by the contractor. A desk review compares the contractor's actual performance against contract requirements.

Expenditure Document Review

Expenditure document review includes analysis of contractor's invoices and payments to determine if the fee rates and expenditure items are permitted under the terms of the contract

Use of Contract Monitoring Findings

The project organization should design the monitoring program to include appropriate follow up on contract monitoring findings. Monitoring reviews, audits, and investigations should be routinely used to ensure contractor takes corrective actions, identify common problem area for training opportunities and improve future procurement. Follow up helps contractor back to compliance with contract requirements. Contract monitoring findings should also be used to improve contract requirements for future procurement. Unnecessary constraints or inadequate specifications should be noted for incorporation into future solicitation.

Monitoring by Third Parties

In some instances, the obligation of monitoring the progress of a contract is assigned to another contractor or consultant. For highly technical work, third party subject matter experts may perform monitoring services independently or in conjunction with employer's staff

2.2.4.6.2. Contract Reporting

Contract reporting obligation includes contractor reports to the employer's contract administrator. Depending on the type of contract, reporting obligation can also include employer's contract administrator reports to executive management and employer reports to other state agencies.

Status Report

Status report describes the progress of the work. The status should be compared to the contract schedule. If there are unresolved issues, those issues should be included in the report and a resolution should be requested

Activity Report

Activity report describes all activities on the project. Project activity is not the same as a work status. A project may have greater deal activities without making substantive progress. Note that activity reporting may also be a core feature of managing certain contracts.

Performance Report

Upon termination or expiry of contract, the institution should consider the benefit of filling vendor performance report. Reporting contractor's performance may facilitate resolution of contract dispute issues. Vendor performance report database, provides a resource for all state agencies when reviewing proposals submitted in connection with subsequent solicitations

2.2.4.6.3. Invoices and Payments

Invoices submitted by the contractor must comply with the contract rate schedule. Invoices should be reviewed to ensure the contractor's invoices correspond with the contractor's progress of the work.. Prior to payment invoices must be approved by program staff familiar with the work. If the program staff believes that the invoice exceeds contractor's progress, the program staff should request and receive explanation prior to the approval of the invoice for payment

Payments shall be made in accordance with the applicable laws. Mostly, payment shall be paid within 30 days after the date the correct invoice was received.

2.2.4.6.4. Change Management

During the term of the contract, it may be necessary to amend and make variations to the contract. There are two types of amendments. A bilateral amendment requires the agreement of all parties to amend the contract. Unilateral amendment requires only the agreement of one party. Terms and conditions in the original contract may specify when bilateral or unilateral amendment is required.

2.2.4.6.5. Dispute Resolution Process

Appropriate dispute resolution is essential contract management skill. Effective dispute resolution comprises identification of issues, effective communication with contractors, and providing contractors with written notice of the issue raised by the employer. The goal of dispute resolution process is to resolve contract issues through direct negotiation before the issues need third part intervention.

2.2.4.6.6. Termination

Contract termination should be the last resort and should be rare. Contract termination reflects a failure of all parties to the contract. When the contract terms permit termination, the parties are not obliged to continue performance of their duties and obligations under the contract. Depending on the specific contract terms, parties may terminate without cause (termination for convenience), with cause (termination for default) or for force majeure.

2.2.4.6.7. Contract Close Out

A contract is completed when all goods/services have been received and accepted, all reports have been delivered and accepted, all administrative actions have been accomplished, all employer furnished equipment's and material have been returned and final payment has been made to the contractor. The purpose of close out process include 1) verification that all parties have full filled their duties and responsibilities, 2) there are no remaining unperformed duties/obligations and 3) assessment of the success of the contract and lessons learned for use in future contracting.

2.2. EMPERICAL LITERATURE REVIEW

2.2.1. Background

(Griffths, 1989) Commercial scene is moving fast as technology and communication is moving faster. The creation of a single market and effective operation of a single international market involve change in economic structure, free movement of individuals, free movement of goods, common market for service, opening of public market, free movement of capital, measures to promote industrial cooperation, removal of tax boundaries, removal of market barriers. Harmonization throughout the world will make the demands on the construction industry a new contract styles that may offer the answer by providing flexibility, clarity, simplicity and an emphasis on good contract management. Hence, thorough assessment of the project procurement and contract strategy is essential

Every organization need to be prepared for change, each employer, consultant, contractor, trade association, professional body and other union must assess how it needs to respond and also to consider the effect of other's decisions on its own.

2.2.2. Public Procurement

Public procurement is estimated to be worth approximately 15% of the community GDP. Therefore, the subject is very important for both the public and the private and particularly for the project management The aim of the public procurement commission is to ensure equal access for community firms, irrespective of nationality to public contracts (Griffths. 1989)

Notwithstanding, the large investment made by the government the much needed socio economic development and industrial development has remained elusive and these according to Walker (2005) can be attributed to inadequate institutional and legal frame work, weak implementation and enforcement of contractual procedures, corruption, mismanagement

2.2.3. Procurement and Project Performance

According Pryke (2006), Projects can be treated as a network of relationships that need managing to achieve project success. In the construction sector, a number of studies have identified the importance of managing the interrelationship between parties within a project. Studies suggest cooperation, collaboration and partnering between parties of a construction project would enhance the probability of success of the project. A key issue remain is how to embed partnering relationship into the contract. The use of contract form and project delivery system to govern the relationship and resolve conflict among contracting parties have been explored by various studies, yet with no specific contractual remedy. (Clemil &Marshal, 2005)

Project performance can be measured as the extent to which project is completed in time, within budget, and demonstrates quality that satisfies the customer requirement, (Kerzner, 2009). Wide ranges of performance indicators can be employed and yet physical and financial performance indicators are dominantly employed to measure the success of the project. According the project management institute (2013), the success of the project is highly dependent on the project management and the project manager. The project management need to be full filled through matured contract management technique and cooperative and flexible contract administration.

Moreover, the performances of projects are actually affected by the tendering and evaluation procedures undertaken. According Jagboo (1989), tendering procedures are aimed at selecting a suitable contractor and obtaining from them appropriate offer which is capable of forming basis for workable agreement. However, Adams (1998) opens the wrong tendering practice is a major contributor to the construction world inefficiency and (Ogooms, 2005) added, there is obvious neglect for the due process and evaluation of contractors bid at the prequalification stage, which leads to the selection of incompetent contractor and results in low project performance and failure. Thus, the above points imply contractors selection process, therefore requires a careful assessment and any improvement in tendering practice has the potential to enhance the industries performance.

2.3. OVERVIEW OF FDRE PUBLIC PROCUREMENT SYSTEM

2.3.1 Background

Ethiopia is opening up for business. One of the main reasons is there cannot be retreat from regional and global cooperation to stay competitive in the international market

While creating Ethiopian market internationally competitive, the FDRE procurement and property administration commission should carefully consider the internal market rules to ensure the community is not unfairly exploited in the context of market open up and regional trade agreement Compliance directive to ensure effective monitoring of public procurement comes to play crucial role. Now is the time for the commission to review the procurement strategies according past performance assessments and test them against possible commercial development

Currently, Ethiopian public sector procurement is largely based on the lowest bid award system. The legal and customary practices of awarding contracts to a lower bidder were established to ensure the lowest cost for completing the project (Fitsume, 2018)

The traditional low bid approach tends to promote more adversarial relationship rather than cooperation among the contractor, the designer, and the owner. Owners generally face increased exposure to contractors claim over design and contract issues. (Rizwan, 2006)

(Laychuluh, 2012) notes that least responsive bid evaluation and award procedure has been the main method of awarding public construction works. Competitive low bid method has been highly criticized for its negative impact on dispute/claims, quality control, and project duration.

In addition to the procurement and evaluation methods, project delivery system has been affecting the performance of projects according many literatures. (Rahel, 2016) the most commonly used project delivery methods in Ethiopia context are Design – Bid – Build (DBB) and Design – Build (DB). While DBB is the traditional and frequently used project delivery system DB is now commonly practicing especially in the road construction sector. The study shows DB projects perform much better in cost and time than DBB projects. Kebede & Zhang (2021) confirms that while time overrun is often happens in both delivery systems, the magnitude of such inefficiency is much greater in public projects of DBB than DB project delivery system.

Generally, favoritism in providing influential information to bidders, inappropriate project scope definition, selecting lower bidders by avoiding technical score from further evaluation, subjective and irrelevant evaluation criterion by consultant and clients are becoming source of inappropriate selection of contractors. (Fitsume, 2018)

2.3.2 Procurement Method

The federal government of Ethiopia has statues requiring submission of competitive bids for construction projects. This statute requires public organizations to award such contracts to the lowest responsive bidder. Responsive bidder is the bidder that satisfactorily and adequately responding to the requirements of the solicitation specified

The FDRE procurement policy has six methods of procurement for public goods and services, viz. open bidding, request for proposal (RFP), two stage tendering, restricted tendering, request for quotation (RFQ) and direct procurement.

The proclamation however limits public bodies to use open bidding as preferred procedure of procurement except as otherwise provided in the proclamation to use other options

Restricted tendering is allowed only when the required object of procurement is available only with limited suppliers or where repeated of the invitation to bid fails to attract bidders.

Direct procurement is allowed when there is no competition for technical reasons and if the required service can be supplied or provided only by single supplier.

RFP is allowed only when the public body seeks to obtain consultancy services or contracts for which the component of consultancy service represents more than 50% of the contract

Request for quotation (RFQ) is allowed when there are readily available goods/services for which there is established market

Two-stage bidding is permitted when it is not feasible for the public body to formulate detailed specifications for the goods/services, such as research, experiment, study and development.

2.3.3 Standard Bid Document (SBD)

The tender document for the public bodies in the federal government is, the Federal Democratic Republic of Ethiopia Standard Bidding Document (SBD) for Procurement of Works for National Competitive Bidding (NCB) according the Public Procurement Agency (PPA) January 2006. However, international competitive bidding (ICB) may incorporate standard terms and conditions applicable in international commercial transactions

2.3.4 Tender Process

Any requirements required for public body will be set forth at the bid documents or other documents for solicitation of proposals, and deemed to apply equally to all candidates. Additionally, 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 document

2.3.5 Qualification Criteria

In addition to the solicitation submission and solicitation evaluation requirement defined in the procurement directives,, bidders are required to meet minimum qualifying criteria set forth in the qualification criteria in the bid document. The most recommended qualification criteria's are

1. Average annual volume of work for the last 5 years
2. Experience as prime contractor in the construction of similar works of the same nature
3. Proposal of timely acquisition of equipment's
4. Personnel with specific qualification and experience
5. Liquid assets and credit facilities

2.3.6 Bid Evaluation and Award

The federal procurement defines the successful bidder as, the bid that is found to be responsive to the technical requirements and with the lowest evaluated price

The responsive is determined by the technical evaluation of the bidders. In order to participate in public procurement, candidates must qualify by meeting the qualifying criteria and such other criteria, as the public body considers appropriate under the circumstances i.e. the necessary

manpower, equipment, machineries, financial and technical capabilities, legal capability, and contractor's qualification requirements. The employer will evaluate and compare only bids determined to be substantially responsive. A substantial responsive bid is, the one which confirms to all the terms, conditions of the bidding document

The employer will award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding document and who has offered the least evaluated price

Though, many studies suggest alternative procurement and bid procedures in addition to open competitive low price bid, such as engineering estimation and average method of bid award, the open bid competitive low price procurement is still at large.

2.4. SUMMAR OF LITERATURE REVIEW

Public procurement system is a series of core processes that interrelated to each other for the successful implementation of projects to achieve the business objectives of the organizations. Though is pioneer management process its maturity and level of development is tempted by the rapid trade and commercial changes. Various professional institutes and school of thoughts recommends different approaches for the success of contract management. However, according many literatures the right contract management should tailored to fit according the organizational culture of the institution in particular and the socio economic development and the policy of the of the contrary in general

Project organization can be conflicting or cooperative system. Conflicting system can arise through bounded rationality or opportunism. A cooperative system is one in which individuals act rationally in the name of common objective. The type of contractual relationship developed between parties is a manifestation of the organization's project organization views

According the literatures reviewed contract management core processes, organization's polices, and project organization perspectives are seemingly affecting the performance of projects. Hence, due process assessment and evaluation might need to figure out the impact of public procurement processes on the performance of projects

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This analytical study is to investigate the effect of public procurement system on the performance of road projects administered under ERA. Hence, the aim of this explanatory research is to identify any correlations between the variables that pertain to the research problem.

Quantitative research approach inquires about the relationships among variables that the investigator seeks to know. Quantitative hypothesis on the other hand are predictions the researcher makes about the expected relationships among variables. Since these quantitative approaches are numeric estimate of the correlations between variables and/or aggregate effect of independent variable on dependent variables, they are suitable for the study's subject matter.

The use of variables in research question or hypothesis is typically limited to the following basic approaches one is where groups of independent variable are compared to see its impact on a dependent variable and the other relates one or more independent variables to one or more dependent variables. In this study the impact of collected independent variables to three dependent variables shall also be assessed and analyzed

Survey Design

A survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of the population. From the sample result, the researcher generalizes or makes claim about the population. The purpose of survey is to generalize from sample to population so that inference can be made about some characteristic (Bablee, 1990). Survey design was selected for this study because opinion of road project practitioners and vendor stakeholder can certainly expresses the inference of the public procurement system to the performance of road projects within their reach and experience. Moreover, survey design was economical, rapid for data collection, convenient for the respondents and simple to administer The survey study was cross sectional with data collected at one point in time. The form of data collection is self-administered survey questionnaires, which involved on person delivery of questionnaires and collection of responses

3.2 Data Type, Source and Method of Data Collection

Primary Data

Well-structured questionnaires were employed to collect date from construction practitioners and vendor stakeholders to answer the research question. In addition, desk review of contracts was conducted to assess the procurement modalities and conditions of the contract.

Secondary Data

FDRE procurement and property administration proclamation 649/2009 and its directive, the Standard Bid Document (SBD), FDRE Contract and Commercial Laws, nineteen (19) years ERA's Assessment Report (2016) and study by the Federal Construction Authority were the main secondary data sources on top of other literatures and references

Research Instrument

Survey instrument i.e., questionnaires were developed to the study for data collection, that addresses the relationship of the variables under consideration. The questionnaires were modified forms from previous studies on related topics by Laychuluh (2012), Mekonnen (2013) and Rahel (2016)

Study Variables

Independent Variables Indicators of public procurement core processes were independent variables

1. Procurement Policies and Views
2. Contract management process and procurement plan
3. Procurement and evaluation method
4. Solicitation and evaluation process
5. Contract Pricing Structure
6. Project Delivery System
7. Conditions of Contract
8. Contract Administration

Dependent Variable In this study, the main performance indicators of road projects were dependent variables

1. Cost performance
2. Schedule performance
3. Quality Performance

Extraneous /Confounded Variables: infinite number of extraneous variables exists that might affect a given relationship. Most of them must assumed or excluded from the study. When the dependent variable is not free from the influence of extraneous variables, the relationship between the dependent and independent variables is said to be confounded by an extraneous variables. The most visible extraneous variables in this study were site factors and force majors. In the study, similar site conditions were assumed and force majors were excluded from analysis

Validity and Reliability

Test for validity and reliability has been carried out before effective use of the instrument for data collection. Validity and reliability of the result have been checked and improved through triangulations and other appropriate methods

Validity

The collected data are valid due to the following main points

1. The respondents are subject matter professionals from respective categories, which involves directly in procurement, contract administration and project management. Relevant and equivalent representatives from each category has participated to avoid biasness and conflict of interest
2. Descriptive and inferential statistics have been employed for analysis. The results found from the two analysis were coherent and expresses each other
3. The responses of most participants in reversed instrument were consistent with their response in the constructs of the instrument

Reliability

The coherence and repeatability of the descriptive and inferential analysis results showed, the instrument was reliable. Moreover, Cronbach's Alpha was used to determine the internal reliability of the questionnaire used in this study.

Reliability Score

Reliability refers to the consistency of a measure. There are three known types of consistency: over time (test-retest reliability), across items (internal consistency), and across different researchers (inter-rater reliability).

Internal consistency is the consistency of people's responses across the items on a multiple-item measure. Perhaps the most common measure of internal consistency used by researchers is called Cronbach's α (alpha). Cronbach's Alpha Coefficient was computed using SPSS, which shows values ranging between 0 and 1.0. A value of 1.0 indicates perfect reliability while a reliability of at least 0.7 indicates the instrument or questionnaire is acceptable or reliable.

Table 3 1 Reliability Score

Variables	N of Items	Cronbach's Alpha (α)
All Dependent and Independent Variables	27	.936
Dependent Cost Performance Variable	1	.949
Dependent Schedule Performance Variable	1	.930
Dependent Quality Performance Variable	1	.957
All Independent Cost Variables	8	776
All Independent Schedule Variables	8	.869
All Independent Quality Variables	8	.820

The reliability score of all the variables (27 items) is above 9.0. Moreover, the reliability score of individual dependent variables and the whole dependent variables (3 items each) is above 9.00. Thus, the result indicates that the questionnaire used in this study has a very high level of reliability.

The reliability score of all independent cost variables (8 items) is above 7.0. Thus, the result indicates that the questionnaire used in this study has acceptable level of reliability.

The reliability score of all independent schedule variables (8 items) is 8.0. Thus, the result indicates that the questionnaire used in this study has good level of reliability.

The reliability score of all independent quality variables (8 items) is above 8.0. Thus, the result indicates that the questionnaire used in this study has good level of reliability.

Method of Data Collection

Collection of data through questionnaires has been carried out from the target population on person. Survey questionnaires have been distributed and responses were collected on person for the convenience of the respondents

3.3 Population and Sample Design

Target Population and Sampling Frame

The population group encompasses construction industry practitioners in the road projects administered under ERA. The population group consists of procurement and program staff and SME's of the Engineering Procurement Directorate of ERA and project management team members' of local contractors and consultants who are actively engaged in current road contracts under ERA

1. **Employer:** ERA's Engineering Procurement Directorate
   The engineering procurement directorate of the employer encompasses 40 individuals (purchasers, program staff and SME's)
2. **Contractors :** Local Contractor that are actively performing road project under ERA
   45 local contractors are actively performing road projects administered under ERA
3. **Consultants:** Local Consultant that are actively consulting road project under ERA
   Even though there are 75 local consultants that are giving consulting service to road projects administered under ERA, however, we took only 45 consultants that are consulting local contractor's projects

Population Size and Census Survey

Due to the small size of members of the target population, Census Survey was optimum to get enough representatives and to enhance reliability and accuracy. A Census Survey enumerates all items in the target population Therefore all members in our field of inquiry have constituted our population size.

Table 3 2: Population Size

ID	Category	Target Population
1	Client	40
2	Contractor	45
3	Consultant	45
	Total	**130**

3.4 Data Analysis and Presentation

Quantitative Method

Quantitative statistical methods have been be used to analyze the data collected. Descriptive statistics such as percentage, mean, standard deviation, etc and inferential statistics such as correlation and regression have been employed. The analysis result mainly comprised the assessment of the correlation of different variables and regression effect of procurement core processes to the performance of road projects

3.5 Ethical Consideration

Right to choose: Everyone had the right to determine whether to participate in the study or not

Right to safety: The respondents for the study have been protected from any physical and physiological harm raised due to the study

Right to be informed: Respondents had the right to be informed all aspects of the research

Right to privacy: All respondents had the right to undisclosed relevant personal identification factors to preserve their privacy

Confidentiality: Confidentiality issues and concerns had been observed along the study process

3.6 Organization of the Study

The study has been organized in to five chapters that discuss various aspects of the public procurement processes. Chapter One explained the background of the research and what the research was intending to achieve. It has followed by Chapter Two, literature reviews on procurement and contract management, the different views on contract management, and contract strategies, the main core processes of project procurement, factors that affects the selection of appropriate contract pricing structure.

Chapter Three has discussed the methodologies employed for data collection and analysis. Chapter Four was dedicated to the analysis and discussion of the findings. The last chapter has drawn conclusion of the study and has provided some recommendation for improvement.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1. General Information about Questionnaire

The questionnaires were designed to give respondents their perception on the performance of projects administered under ERA. The instrument has been also designed to get the perception of participants on the attribute of procurement core processes on cost, schedule and quality performance.

Participants were asked the employer's view on project organization, procurement guideline and ethical standards, procurement and contingency plan and to evaluate the organizational culture and readiness for standardized procurement

The participants were also asked their level of satisfaction on the employer's procurement policy, procurement plan, procurement methods, evaluation methods, terms and conditions of contract, contract pricing structure, contract administration and project delivery system

The instrument then tried to caliper the magnitude impact of the procurement core processes on the performance of projects by rating the impact of procurement processes indicators and their frequency of occurrence

Participants were also asked to rate the impact of procurement and evaluation method, contract-pricing structure and project delivery system on contractor and employer's attributes Moreover, risks and uncertainties associated with project deliverables and project delivery process were asked to assess the risk level associated with each procurement and contract management core processes

Participants were also asked to rate the employer's procurement and contract management processes in respect to best practice parameters to evaluate the employer's contract management processes maturity

The impact of alternative procurement methods, contract pricing structure, and project delivery system on performance of projects were also asked to assess participant's comparative view and perception on alternative modalities.

Finally, reversed questions were asked to validate the instrument and sort bad data's and participants were given open-ended questions to get their unguided reflection public procurement system.

4.2. Data Preparation and Transformation

Missed value

Missed data's from the responses were replaced by the appropriate imputation method than discarding the whole observation. The average mean of the population was used to replace missed data

Data Transformation

Measurement scale of some responses of the questionnaire needed to be reversed for appropriate interpretation and construct similarity

4.3. General Information of Respondents

Regardless of the sample, size abundant questionnaires have been distributed on the target population. This approach enables to have contingent substitution for excessive non-respondent and to replace bad and missed data's. The following table shows the distribution of questionnaires among the population categories and their response rating

Table 4 1: Population Distribution

ID	Category	Population	Distributed Questionnaires	Respondent's	None Respondent's	Rate
1	Client	40	38	32	6	84.2%
2	Contractor	45	40	35	5	87.5%
3	Consultant	45	39	34	5	87.2%
	Total	**130**	**117**	**101**	**16**	**86.3%**

According the requirement of census survey, questionnaires are distributed to all available population members though the address found from the employer database. Out of the 130 target population members, we could able reach 117 of them and 13 of the population members could not able accessed due to geography, field visit and other private issues of the respondents.

From the distributed 117 questionnaires, 86.3 %, which is 101 successful responses has been collected. Out of the collected 101 response data's, 5 bad data's from contractor and consultant's categories has been rejected from analysis. Therefore, 32 response data's from each category (client, contractor and consultant) has been prepared for data analysis

Table 4 2: Participant Distribution

Category Name		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Client	32	33.3	33.3	33.3
	Contractor	32	33.3	33.3	66.7
	Consultant	32	33.3	33.3	100.0
	Total	96	100.0	100.0	

4.4. Analysis Result

4.4.1. Descriptive Statistics

Procurement Core Process (Independent Variables)

To classify the attributes of the procurement processes on cost, schedule and quality, respondents has rated the cause of delay, cost overrun and quality problem on road projects. The respondent's rating is tabulated below

Table 4 3: Cost Variables

No	Description	Frequency	Percent (%)
1	Procurement and Evaluation Method	4	4
2	Contract Pricing and Delivery	28	28
3	Condition of Contract	4	4
4	Bid and Evaluation Requirement	6	6
5	Bid and Evaluation Process	2	2
6	Procurement process and process assets	2	2
7	Contract Administration	24	24
8	All the above Variables	30	30

From the above table we can see that all the variables are rated high as a cause for cost overrun Therefore, all procurement core processes are considered as cost variables in our analysis

Table 4 4: Schedule Variable

No	Description	Frequency	Percent (%)
1	Procurement and Evaluation Method	4	4
2	Contract Pricing and Delivery	8	8
3	Condition of Contract	4	4
4	Bid and Evaluation Requirement	14	15
5	Bid and Evaluation Process	12	13
6	Procurement process and process assets	4	4
7	Contract Administration	22	23
8	All the above variables	28	29

From the above table we can see that all the variables are rated high as a cause for delay. Therefore, all procurement core processes are considered as schedule variables in our analysis

Table 4 5: Quality Variable

No	Description	Frequency	Percent (%)
1	Procurement and Evaluation Method	4	4
2	Contract Pricing and Delivery	12	11
3	Condition of Contract	4	4
4	Bid and Evaluation Requirement	10	9
5	Bid and Evaluation Process	4	4
6	Procurement process and process assets	4	4
7	Contract Administration	32	30
8	All the above Variables	38	35

From the above table, all the variables are rated high as a cause for quality problems. Therefore, all procurement core processes are considered as quality variables in our analysis Moreover, participants has also rated their level of satisfaction on the employer's procurement core processes as the following tables summarizes

Table 4 6: Procurement Core Process Level of Satisfaction

No	Description	Level of Satisfaction											
		5		4		3		2		1	RANK		
		f	%	f	%	f	%	f	%	f	%	Mean	SD
1	Contract Pricing Structure	4	4	40	42	28	29	10	10	14	11	3.14	1.11
2	Procurement Policy/View	14	15	36	38	26	27	14	15	6	15	3.40	1.11
3	Solicitation and Evaluation Process	14	15	36	38	26	27	14	15	6	15	3.40	1.11
4	Conditions of Contract	12	13	52	54	22	23	4	4	6	4	3.63	.97
5	Procurement and Evaluation Method	10	10	44	46	20	21	14	15	6	15	3.40	1.10
6	Contract Management Process	22	23	30	31	22	23	12	13	10	13	3.46	1.23
7	Contract Administration	10	10	48	50	20	21	10	10	8	11	3.48	1.03
8	Project Delivery System	4	4	40	42	28	29	10	10	14	11	3.10	1.12

From the above table we can see that highly rated (mode) level of satisfaction of the participants on all employer's procurement core processes is 4.0. However, the mean value is between 3.0 and 4.0 with standared deviation near 1.0 for all procurement core processess. The distribution for all procurement core processes is normal and their N curve is smooth and hence 95% of the distribution lies between between 1.0 and 5.0

Employer's Contract Management Practice

Participants have also asked the frequently used procurement method, contract pricing structure and project delivery system in the employer organization. The following table summarizes the employer's contract management practice

Table 4 7: Procurement Method

No	Procurement Method	Frequency	Percent (%)
1	Competitive Low Price	18	18
2	Responsive and Competitive Low Price	42	41
3	Responsive and Competitive Average Price	8	8
4	Responsive and Competitive Engineering Estimation	10	10
5	Negotiated	8	8
6	RFP/RFQ	16	16
7	Subjective Rating	0	0

According the above table the most usual procurement method is responsive competitive low price. In addition some direct and restrictive procurements has also observed

Table 4 8: Contract Pricing Structure

No	Contract Type	Frequency	Percent (%)
1	Lump Sum	36	38
2	cost Plus	10	10
3	Re measure	46	48
4	Target Cost	4	4

According the above table the most usual contract pricing structure of the employer is re measurement, however lump sum is becoming common and frequent in DB projects

Table 4 9: Project Delivery System

No	Contract Mode	Frequency	Percent (%)
1	Design, Bid and Build (DBB)	54	56
2	Design and Build (DB	24	25
3	Construction Management	18	19
4	Alliance	0	0

According the above table the most usual project delivery mode is the traditional design, bid and build. In addition, DB projects are becoming familiar in very expensive projects

Employer's Project Organization View

Table 4 10: Project Organization View

No	Description	Frequency	Percent (%)
1	Conflicting and Adversarial	24	25.00
2	Cooperative and Rational	60	62.50
3	Partnering and Alliance	12	12.5

According the respondents the employer's project organization perception and view is 62.5% collaborative and rational, 25% adversarial and conflicting and 12.5% partnering and alliance.

Employer's Project Uncertainty and Risk

Table 4 11: Project Certainty

No	Description		5	4	3	2	1	Mean	SD
			Very High	High	Moderate	Low	Not		
1	Certainty of Project Deliverables	f	6	18	38	28	6		
		%	6.25%	18.75%	39.58%	29.17%	6.25%	2.896	.99
2	Certainty of Project Delivery Process	f	6	8	54	22	6		
		%	6.25%	8.33%	56.25%	22.9%	6.25%	2.854	.89

According the above table the most respondents (39.58%) has rated the certainty of the employer's project deliverables is moderate (3.0) that means the uncertainty and risk associated with employer's project deliverables is (6-3) = 3, is moderate too.

In addition, according the above table the most respondents (56.25%) has rated the certainty of the employer's project delivery process as moderate (3.0) that means the uncertainty and risk associated with employer's project delivery process is (6-3) = 3, is moderate too

Performance of Projects (Dependent variables)

The descriptive analysis of the performance of projects is tabulated in the following table

Table 4 12: Performance of Projects

		Cost Performance	Schedule Performance	Quality Performance
N	Valid	96	96	96
	Missing	0	0	0
Mean		2.78	2.89	2.97
Std. Deviation		.743	.749	.766

Cost Performance

According the descriptive analysis taken the performance of road projects administered under ERA and in accordance, the five-scale interval measurement the mean of the cost performance is 2.8 and the standard deviation is 0.74

Table 4 13: Cost Performance of Projects

Cost Performance		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	6	6.3	6.3	6.3
	2	16	16.7	16.7	22.9
	2	16	16.7	16.7	39.6
	3	10	10.4	10.4	50.0
	3	27	28.1	28.1	78.1
	3	12	12.5	12.5	90.6
	4	2	2.1	2.1	92.7
	4	2	2.1	2.1	94.8
	5	3	3.1	3.1	97.9
	5	2	2.1	2.1	100.0
	Total	96	100.0	100.0	

While the mean of the schedule performance of projects is 2.8, the above frequency table shows the most rated (mode) cost performance is 3.0.In addition, the above distribution is normal and its N- curve is smooth. Hence, 95% of the observation is between two standard deviations of the mean value (2.8) Therefore, 95% of the observation is between 1.0 and 4.0 performance values

Schedule Performance (Dependent Variable)

According the five-scale interval measurement taken the descriptive analysis shows the mean schedule performance of road projects is 2.9 and the standard deviation is 0.74

Table 4 14: Schedule Performance of Projects

Schedule Performance		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	2.1	2.1	2.1
	2	16	16.7	16.7	18.8
	2	12	12.5	12.5	31.3
	3	17	17.7	17.7	49.0
	3	18	18.8	18.8	67.7
	3	18	18.8	18.8	86.5
	4	4	4.2	4.2	90.6
	4	2	2.1	2.1	92.7
	4	2	2.1	2.1	94.8
	5	3	3.1	3.1	97.9
	5	2	2.1	2.1	100.0
	Total	96	100.0	100.0	

While the mean of the schedule performance of projects is 2.9, the above frequency table shows the most rated (mode) schedule performance is 3.0. In addition, the above distribution is normal and its N- curve is smooth. Hence, 95% of the observation is between two standard deviations of the mean value (2.9) Therefore, 95% of the observation is between 1.0 and 4.0 performance values

Quality Performance (Dependent variable)

According the five-scale interval measurement taken the descriptive analysis shows the mean quality performance of road projects is 3.0 and the standard deviation is 0.76. Moreover, the following table shows the frequency distribution of quality performance

Table 4 15: Quality performance Frequency Distribution

Quality Performance		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	2.1	2.1	2.1
	2	16	16.7	16.7	18.8
	2	8	8.3	8.3	27.1
	3	14	14.6	14.6	41.7
	3	22	22.9	22.9	64.6
	3	15	15.6	15.6	80.2
	4	8	8.3	8.3	88.5
	4	4	4.2	4.2	92.7
	4	2	2.1	2.1	94.8
	5	3	3.1	3.1	97.9
	5	2	2.1	2.1	100.0
	Total	96	100.0	100.0	

While the mean of the quality performance of projects is 3.0, the above frequency table shows the most rated (mode) quality performance is also 3.0. The above distribution is normal and its N- curve is smooth. Hence, 95% of the observation is between two standard deviations of the mean value (3.0) Therefore, 95% of the observation is between 1.0 and 4.0 performance values

4.4.2. Correlation of Variables

Table 4 16: Cost variable Correlations

		Cost performance of projects	Procurement Policy cost variable	Contract Management cost variable	Procurement Method cost variable	Contract Pricing cost variable	Project Delivery cost variable	Solicitation and Evaluation cost variable	Condition of Contract cost variable	Contract Administration cost variable
Cost Performance of projects	Pearson Correlation	1	.310**	.347**	.256*	.137	.020	.169	.037	.020
	Sig. (2-tailed)		.003	.001	.012	.183	.845	.100	.718	.847
	N	96	90	96	96	96	96	96	96	96
Procurement Policy cost variable	Pearson Correlation	.310**	1	-.013	.582**	.219*	.203	.456**	.227*	.625**
	Sig. (2-tailed)	.003		.902	.000	.038	.055	.000	.031	.000
	N	90	90	90	90	90	90	90	90	90
Contract Management cost variable	Pearson Correlation	.347**	-.013	1	.000	-.031	-.034	-.191	.098	-.083
	Sig. (2-tailed)	.001	.902		.997	.763	.739	.062	.342	.423
	N	96	90	96	96	96	96	96	96	96
Procurement Method cost variable	Pearson Correlation	.256*	.582**	.000	1	.353**	.304**	.771**	.471**	.437**
	Sig. (2-tailed)	.012	.000	.997		.000	.003	.000	.000	.000
	N	96	90	96	96	96	96	96	96	96
Contract Pricing cost variable	Pearson Correlation	.137	.219*	-.031	.353**	1	.941**	.241*	.432**	.264**
	Sig. (2-tailed)	.183	.038	.763	.000		.000	.018	.000	.009
	N	96	90	96	96	96	96	96	96	96
Project Delivery cost variable	Pearson Correlation	.020	.203	-.034	.304**	.941**	1	.176	.426**	.229*
	Sig. (2-tailed)	.845	.055	.739	.003	.000		.086	.000	.025
	N	96	90	96	96	96	96	96	96	96
Solicitation and Evaluation cost variable	Pearson Correlation	.169	.456**	-.191	.771**	.241*	.176	1	.427**	.472**
	Sig. (2-tailed)	.100	.000	.062	.000	.018	.086		.000	.000
	N	96	90	96	96	96	96	96	96	96
Condition of Contract cost variable	Pearson Correlation	.037	.227*	.098	.471**	.432**	.426**	.427**	1	.176
	Sig. (2-tailed)	.718	.031	.342	.000	.000	.000	.000		.086
	N	96	90	96	96	96	96	96	96	96
Contract Administration cost variable	Pearson Correlation	.020	.625**	-.083	.437**	.264**	.229*	.472**	.176	1
	Sig. (2-tailed)	.847	.000	.423	.000	.009	.025	.000	.086	
	N	96	90	96	96	96	96	96	96	96

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

From the above correlation table we can see that procurement policy/view, contract management processes and procurement method is significantlly correlated to the cost performance of projecs.

Table 4 17: Schedule Variable Correlations

		Schedule performance of projects	Procurement Policy schedule variable	Contract Management schedule variable	Contract Pricing cost variable	Procurement Method schedule variable	Project Delivery cost variable	Condition of Contract schedule variable	Solicitation and Evaluation schedule variable	Contract Administration schedule variable
Schedule Performance of projects	Pearson Correlation	1	.273**	.304**	.088	.181	.119	.047	.208*	-.024
	Sig. (2-tailed)		.007	.003	.391	.077	.249	.647	.042	.817
	N	96	96	96	96	96	96	96	96	96
Procurement Policy schedule variable	Pearson Correlation	.273**	1	.103	.578**	.544**	.587**	.130	.370**	.564**
	Sig. (2-tailed)	.007		.319	.000	.000	.000	.206	.000	.000
	N	96	96	96	96	96	96	96	96	96
Contract Management schedule variable	Pearson Correlation	.304**	.103	1	.139	.209*	.149	.103	.242*	.341**
	Sig. (2-tailed)	.003	.319		.175	.041	.148	.319	.018	.001
	N	96	96	96	96	96	96	96	96	96
Contract Pricing cost variable	Pearson Correlation	.088	.578**	.139	1	.924**	.985**	.515**	.546**	.436**
	Sig. (2-tailed)	.391	.000	.175		.000	.000	.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Procurement Method schedule variable	Pearson Correlation	.181	.544**	.209*	.924**	1	.944**	.545**	.673**	.478**
	Sig. (2-tailed)	.077	.000	.041	.000		.000	.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Project Delivery cost variable	Pearson Correlation	.119	.587**	.149	.985**	.944**	1	.499**	.596**	.432**
	Sig. (2-tailed)	.249	.000	.148	.000	.000		.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Condition of Contract schedule variable	Pearson Correlation	.047	.130	.103	.515**	.545**	.499**	1	.428**	.173
	Sig. (2-tailed)	.647	.206	.319	.000	.000	.000		.000	.091
	N	96	96	96	96	96	96	96	96	96
Solicitation and Evaluation schedule variable	Pearson Correlation	.208*	.370**	.242*	.546**	.673**	.596**	.428**	1	.475**
	Sig. (2-tailed)	.042	.000	.018	.000	.000	.000	.000		.000
	N	96	96	96	96	96	96	96	96	96
Contract Administration schedule variable	Pearson Correlation	-.024	.564**	.341**	.436**	.478**	.432**	.173	.475**	1
	Sig. (2-tailed)	.817	.000	.001	.000	.000	.000	.091	.000	
	N	96	96	96	96	96	96	96	96	96

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

From the above Pearson's correlation table we can see that procurement policy/view, contract management process and solicitation and evaluation process are significantly correlated to rhe schedule performance of projects.

Table 4 18: Correlations (Quality Variables)

		Quality performance of Projects	Procurement Policy quality variable	Contract Management quality variable	Procurement Method quality Variable	Contract Pricing quality variable	Project Delivery quality variable	Condition of Contract quality variable	Solicitation & Evaluation quality var.	Contract Administration quality variable
Quality Performance of projects	Pearson Correlation	1	.147	.254*	.077	-.028	-.025	.096	.266**	.062
	Sig. (2-tailed)		.152	.013	.459	.787	.812	.352	.009	.551
	N	96	96	96	96	96	96	96	96	96
Procurement Policy quality variable	Pearson Correlation	.147	1	-.045	.015	.281**	.030	-.100	.137	.251*
	Sig. (2-tailed)	.152		.667	.885	.006	.769	.331	.184	.014
	N	96	96	96	96	96	96	96	96	96
Contract Management quality variable	Pearson Correlation	.254*	-.045	1	.219*	.161	.204*	.100	.163	.341**
	Sig. (2-tailed)	.013	.667		.032	.116	.046	.331	.113	.001
	N	96	96	96	96	96	96	96	96	96
Procurement Method quality variable	Pearson Correlation	.077	.015	.219*	1	.889**	.959**	.605**	.627**	.416**
	Sig. (2-tailed)	.459	.885	.032		.000	.000	.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Contract Pricing quality variable	Pearson Correlation	-.028	.281**	.161	.889**	1	.954**	.562**	.455**	.368**
	Sig. (2-tailed)	.787	.006	.116	.000		.000	.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Project Delivery quality variable	Pearson Correlation	-.025	.030	.204*	.959**	.954**	1	.619**	.487**	.399**
	Sig. (2-tailed)	.812	.769	.046	.000	.000		.000	.000	.000
	N	96	96	96	96	96	96	96	96	96
Condition of Contract quality variable	Pearson Correlation	.096	-.100	.100	.605**	.562**	.619**	1	.405**	.172
	Sig. (2-tailed)	.352	.331	.331	.000	.000	.000		.000	.095
	N	96	96	96	96	96	96	96	96	96
Solicitation and Evaluation quality variable	Pearson Correlation	.266**	.137	.163	.627**	.455**	.487**	.405**	1	.471**
	Sig. (2-tailed)	.009	.184	.113	.000	.000	.000	.000		.000
	N	96	96	96	96	96	96	96	96	96
Contract Administration quality variable	Pearson Correlation	.062	.251*	.341**	.416**	.368**	.399**	.172	.471**	1
	Sig. (2-tailed)	.551	.014	.001	.000	.000	.000	.095	.000	
	N	96	96	96	96	96	96	96	96	96

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

From the above correlation table we can see that contract management process and solicitation and evaluation process are significantly correlated to the quality performance of projects.

4.4.3. Regression of Variables

Regression of Cost Variables

Regression analysis is under taken for the sample population by SPSS 26 Statistical Program to test the significance, correlation between the response cost performance, and the input cost variables

Table 4 19: Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.628[a]	.395	.339	.60374

a. Predictors: (Constant), contract administration cost variable, contract management cost variable, condition of contract cost variable, project delivery cost variable, Procurement method cost variable, procurement policy cost variable, solicitation and evaluation cost variable, contract pricing cost variable

b Dependent Variable: Cost performance of projects

Table 4 20: ANOVA (a)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.675	8	2.584	7.090	.000[b]
	Residual	31.712	87	.365		
	Total	52.387	95			

a.. Dependent Variable: Cost performance of projects

b. Predictors: (Constant), contract administration cost variable, contract management cost variable, condition of contract cost variable, project delivery cost variable, Procurement method cost variable, procurement policy cost variable, solicitation and evaluation cost variable, contract pricing cost variable

Testing Hypothesis

Significance Test

Hypothesis Test of Ho: β=0

An important hypothesis to consider regarding the simple regression model Y= **α+βc+e** is the hypothesis that β=0 its importance drives from the fact that it is equivalent to stating that the mean response does not depend on the input, or equivalently, that there is no regression on the input variable. Now the claim being made is that the regression coefficient b is equal to 0.0. To see if the data are strong enough to refute this claim, we need to see if it leads to rejection of the null hypothesis when testing, Ho*:* β=0 verses Ho: $\beta \neq 0$, *P-value=0.05*

A significance level **γ** test *Ho,* can be performed by first computing the value of the test statistics, call its value **u** and then rejecting *Ho* if the desired significance level is at least as large as P value i.e. *P- value* > ***u***

According the analysis the significance level **γ** test value *(0.000)* is less than the desired significance level, *P = 0.05.* Hence we have enough evidence to disprove the null hypothesis that, procurement system don't have an impact on the cost performance of projects and accept the alternative hypothesis that the procurement system has a significant impact on the cost performance of projects with 95% confidence interval

F Test

F statistics is a value you get when you run ANOVA or regression analysis to find out if the means between variables are significantly different. It is similar to T statistics from T test. A t test will tell you if a single variable is statistically significant and F test tells if groups of variables are jointly significant. If the F value of the statistical test is greater than the critical F value at a desired significance level and degree of freedom, the data is statistically significant to reject the null hypothesis

According the statistical analysis under taken, the F value is (7.09) and the critical F value for significance level P value =0.05 and degree of freedom $8 \leq$ df ≤ 87 is 2.05

The F value (7.09) is greater than the critical F value (2.05) and hence we can reject the null hypothesis with 95% confidence that the variance between the variables is not due to random chance. Hence, the independent cost variables are jointly significant and positively correlated to the cost performance of projects

The above two tests enables to reject the null hypothesis that the procurement system does not affect the cost performance of projects and accept the alternative hypothesis that the procurement system has an impact on the cost performance of projects with 95% of confidence level

Regression between Cost Variables and Cost Performance

The desired significance level for 95% confidence interval is *P=0.05* and cost variables whose significance value less than 0.05 have significant effect on the cost performance of projects.

According the analysis procurement policy, contract management process/procurement plan and contract-pricing structure cost variables have significant positive effect on the cost performance of road projects, while procurement method, conditions of contract and solicitation/evaluation methods do not have significant effect on the cost performance of projects. However, project delivery system and contract administration have significant negative effect to the cost performance of road projects.

Regression Coefficients

The regression result shows how the input variables affect the dependent variable. According the analysis result the dependent variable schedule performance is related to the independent schedule variables by the following regression formula

CP=1.464+0.326PP+0.5CM+0.008PM+1.041CPS-0.783PDS-0.275CC+0.208SEP-0.407CA

Where CP = cost performance, PP = procurement policy, CM= contract management, PM=procurement method, CPS=contract pricing structure, PDS= project delivery system, CC= condition of contract, SEP=Solicitation and evaluation processes, CA= contract administration

Table 4 21: Coefficients (a)

Procurement Cost Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.464	.399		3.674	.000
	procurement Policy cost variable	.326	.094	.411	3.453	.001
	Contract Management cost variable	.500	.117	.381	4.266	.000
	Procurement Method cost variable	.008	.103	.012	.081	.936
	Contract Pricing cost variable	1.041	.270	.982	3.856	.000
	Project Delivery cost variable	-.783	.231	-.860	-3.397	.001
	Condition of Contract cost variable	-.275	.159	-.181	-1.730	.087
	Solicitation and Evaluation cost variable	.208	.157	.195	1.319	.191
	Contract Administration cost variable	-.407	.139	-.330	-2.930	.004

a. Dependent Variable: Cost performance of projects

Coefficient of Determination

Suppose we wanted to measure the amount of variation in the set of response values $y_1 \ldots y_n$ Corresponding to the set of input values $x_1 \ldots . x_n$. A standard measure in statistics of the amount of variation in a set of values $y_1 \ldots \ldots . y_n$

$$S_{yy} = \sum_i^n (y_i - Y)^2$$

For instance if all the values of y_i are equal and thus are all equal to Y then y_1 would equal to 0

The variation in the value of y_i arises from two factors. First, because the input values x_i are different, the response variable y_i will have different mean values, which will result in some variation in their values. Second, the variation also arise from the fact that even when the difference in the input values are taken in to account, each of the response variable y_i has variance (δ^2) and thus will not exactly equal to the predicated value at its input x_i

The question is how much of the variation in the values are of the response variable is due to the different input values, and how much is due to other factors and the inherent variance of the response even when the input values are taken into account. To answer this question, note that the quantity

$SSR_R = \sum_i^n (y_i - A - Bx_i)^2$, measure the remaining amount of variation in the response value after different input value are taken into account. Thus

$S_{yy} - S_{yy}$, represents the amount of variation in the response variables that is explained by the different input values and so the quantity R^2 is defined by

$$R^2 = \frac{S_{yy} - SS_R}{S_{yy}}, \qquad R^2 = 1 - \frac{SS_R}{S_{yy}}$$

R^2 , thus represents proportion of the variation in the response variable that is explained by the different input values, R^2 is called the coefficient of determination

The coefficient of determination will have a value between 0.0 and 1.0. A value of R^2 near 1.0 indicates that the amount of the variation of the response data is explained by the different input values, where as a value of R^2 near 0 indicates that little of the variation is explained by the different input values

Thus, according the statistical analysis under taken the value of R^2 is 0.395 which means 39.5% of the variation in response cost performance is caused due to the inputs in cost variables and the 60.5% of the variation is caused due to other factors and the variance, (δ^2) of the response cost performance and explained by the standard error of the analysis

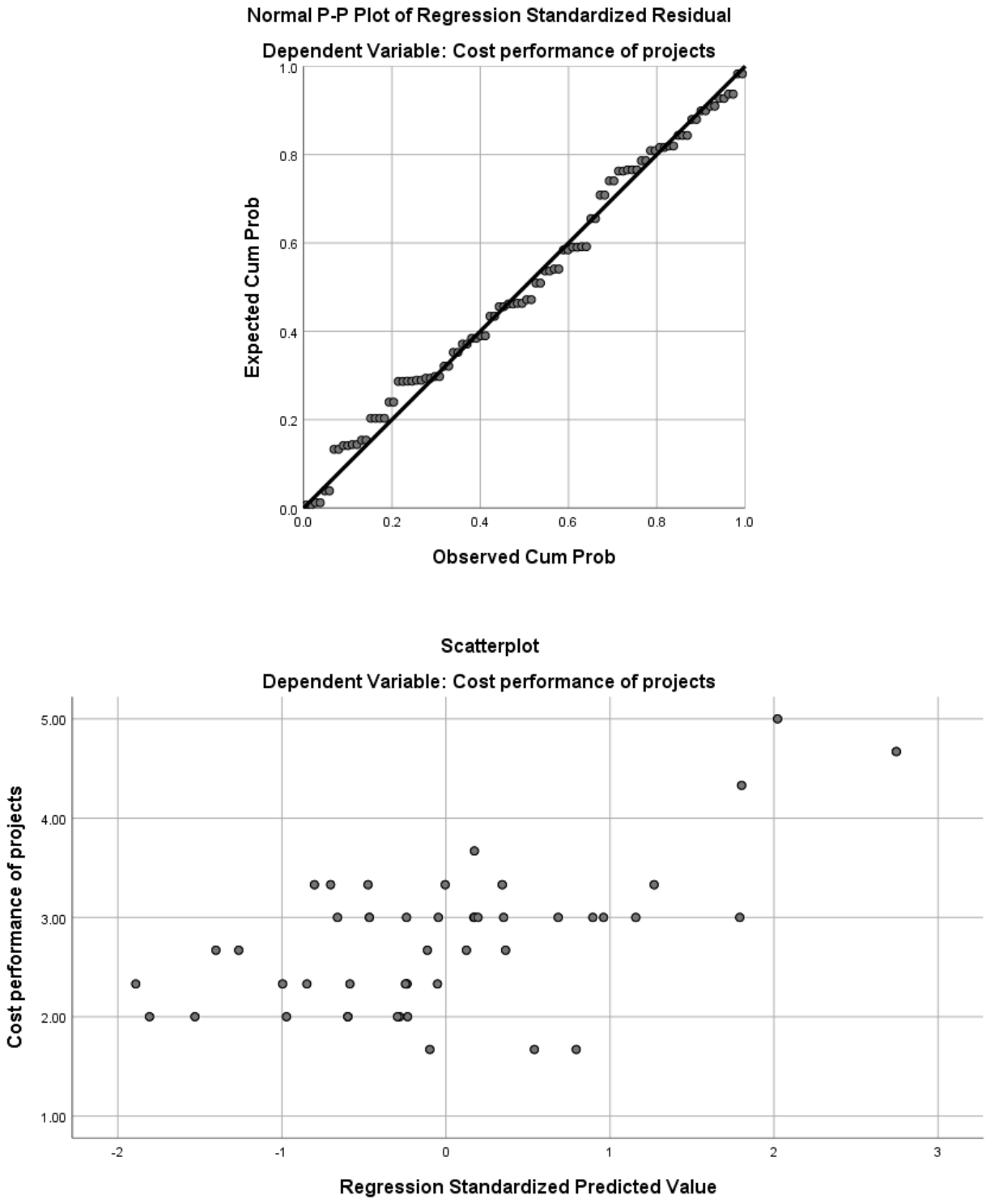

Figure 4.1: Cost Performance Scatter Diagram

Regression Schedule Variables

Regression analysis is under taken for the sample population by SPSS 26 Statistical Program to test the significance and correlation between the response quality performance and the quality variables

Table 4 22: Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.585[a]	.343	.282	.63454

a. Predictors: (Constant), contract administration schedule variable, condition of contract schedule variable, contract management schedule variable, procurement policy schedule variable, solicitation and evaluation schedule variable, contract pricing cost variable, Procurement method schedule variable, project delivery cost variable

b. Dependent Variable: Schedule performance of projects

Table 4 23: Model Summary (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.254	8	2.282	5.667	.000[b]
	Residual	35.030	87	.403		
	Total	53.284	95			

a. Dependent Variable: Schedule performance of projects

b. Predictors: (Constant), contract administration schedule variable, condition of contract schedule variable, contract management schedule variable, procurement policy schedule variable, solicitation and evaluation schedule variable, contract pricing cost variable, Procurement method schedule variable, project delivery cost variable

Testing Hypothesis

Significance Test

Hypothesis Test of Ho: β=0

An important hypothesis to consider regarding the simple regression model Y= **α+βc+e** is the hypothesis that β=0 its importance drives from the fact that it is equivalent to stating that the mean response does not depend on the input, or equivalently, that there is no regression on the input variable. Now the claim being made is that the regression coefficient b is equal to 0. To see if the data are strong enough to refute this claim, we need to see if it leads to rejection of the null hypothesis when testing

Ho: β=0 verses Ho: β ≠ 0 , *P-value=0.05*

A significance level **γ** test *Ho,* can be performed by first computing the value of the test statistics, call its value **u** and then rejecting *Ho* if the desired significance level is at least as large as P value i.e. *P- value* > ***u***

According the analysis the significance level **γ** test value *(0.000*) is less than the desired significance level, *p=0.05*, of the test. Hence we have enough evidence to disprove the null hypothesis that procurement system has don't have an impact on the schedule performance of projects and accept the alternative hypothesis that the procurement system has a significant impact on the schedule performance of projects with 95% confidence interval

F Test

According the statistical analysis under taken, the F value is (5.667) and the critical F value for significance level P value =0.05 and degree of freedom $8 \leq df \leq 87$ is 2.05.

The F value (5.667) is greater than the critical F value (2.05) and hence we can reject the null hypothesis with 95% confidence that the variance between the variables is not due to random chance. Hence, the independent schedule variables are jointly significant and positively correlated to the schedule performance of projects

The above two tests enables to reject the null hypothesis that the procurement system does not affect the schedule performance of projects and accept the alternative hypothesis that the procurement system has an impact on the schedule performance of projects with 95% of confidence level

Regression between Schedule Variables and Schedule Performance

The desired significance level for 95% confidence interval is P =0.05 and therefore schedule variables whose significance value less than 0.05 are significantly correlated to the schedule performance of projects.

According the analysis procurement policy/view and contract management process/procurement plan schedule variables have significant positive effect on the schedule performance of projects. While procurement method, contract-pricing structure, project delivery system, conditions of contract and solicitation/evaluation process do not have significant effect on the schedule performance of projects. However, contract administration schedule variable has a significant negative effect on the schedule performance of road projects

Regression Coefficients

The regression result shows how the input schedule variables affect the dependent schedule performance variable. According the analysis result the dependent schedule performance is related to the independent schedule variables by the following regression formula

SP = 1.29+0.42PP+0.624CM+0.793CM-0.353CPS-0.487PDS-0.0326CC+0.204SEP-0.642CA

Where CP = cost performance, PP = procurement policy, CM= contract management, PM=procurement method, CPS=contract pricing structure, PDS= project delivery system, CC= condition of contract, SEP=Solicitation and evaluation processes, CA= contract administration

Table 4 24: Coefficients (a)

Procurement Schedule Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.219	.492		2.475	.015
	procurement Policy schedule variable	.417	.094	.547	4.429	.000
	Contract Management schedule variable	.624	.163	.360	3.819	.000
	Procurement Method schedule variable	.793	.381	.628	2.080	.040
	Contract Pricing schedule variable	-.353	.630	-.315	-.560	.577
	Project Delivery schedule variable	-.487	.778	-.401	-.626	.533
	Condition of Contract schedule variable	-.032	.170	-.021	-.188	.851
	Solicitation and Evaluation schedule variable	.204	.166	.162	1.227	.223
	Contract Administration schedule variable	-.642	.151	-.518	-4.265	.000

a. Dependent Variable: Schedule performance of projects

Coefficient of Determination

Considering the statistical measurement to account the variations caused in response variable due to the input variables $R^2 = \frac{S_{yy} - SS_R}{S_{yy}}$, $R^2 = 1 - \frac{SS_R}{S_{yy}}$

The statistical analysis under taken shows, the value of R^2 is 0.343, which means 34.3% of the variation in response schedule performance is caused due to the inputs in cost variables and the 63.45% of the variation is caused due to other factors and the variance (δ^2) of the response cost performance and explained by the standard error of the analysis

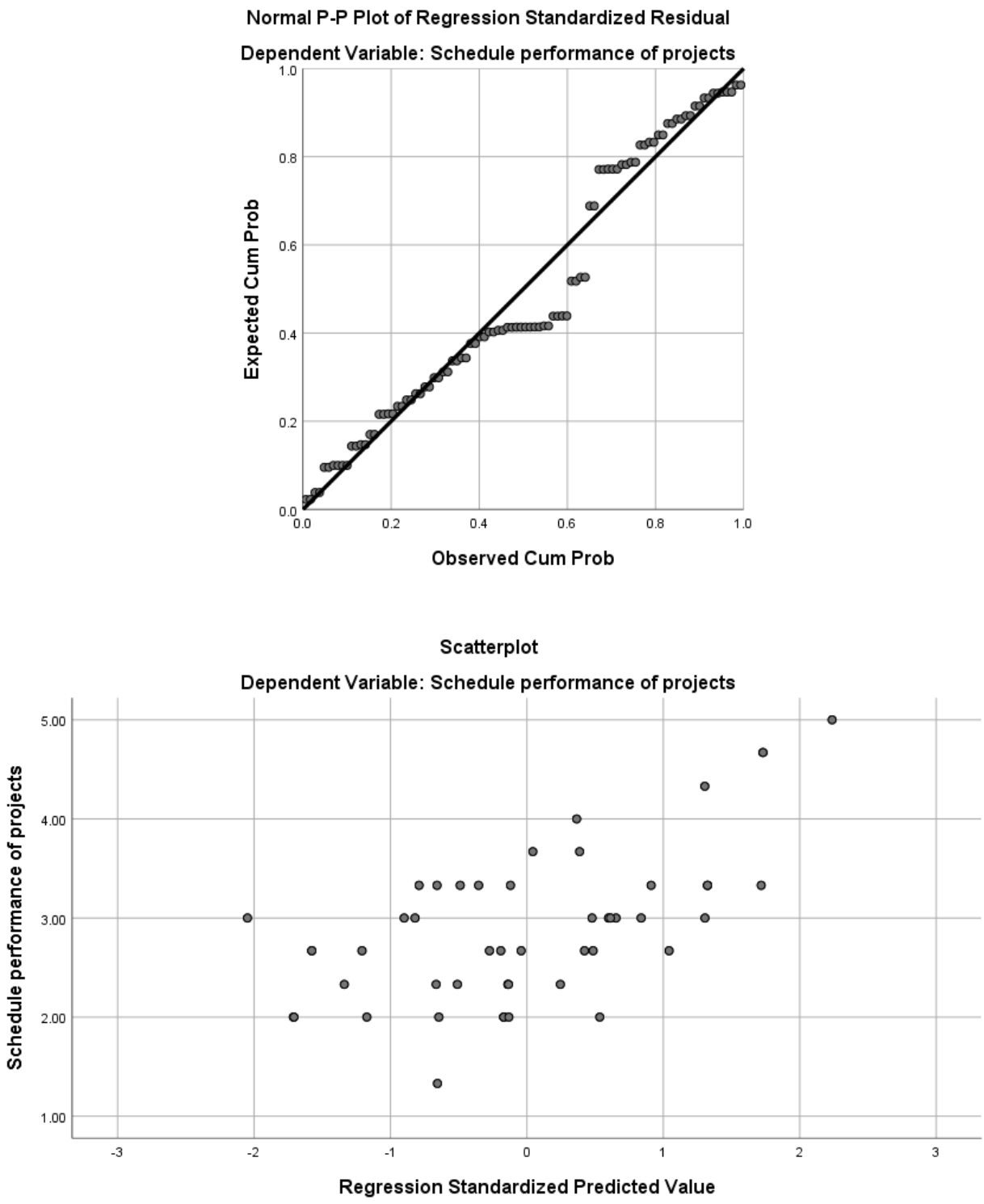

Figure 4.2: Schedule Performance Scatter Diagrams

Regression Quality Variables

Regression analysis is under taken for the sample population by SPSS 26 Statistical software program to test the significance and correlation between the response quality performance and the quality variables

Table 4 25: Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.523[a]	.274	.207	.68180

a. Predictors: (Constant), contract administration quality variable, condition of contract quality variable, procurement policy quality variable, contract management quality variable, solicitation and evaluation quality variable, contract pricing quality variable, Procurement method quality variable, project delivery quality variable

b. Dependent Variable: Quality performance of projects

Table 4 26: ANOVA (a)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.265	8	1.908	4.105	.000[b]
	Residual	40.442	87	.465		
	Total	55.707	95			

a. Dependent Variable: Quality performance of projects

b. Predictors: (Constant), contract administration quality variable, condition of contract quality variable, procurement policy quality variable, contract management quality variable, solicitation and evaluation quality variable, contract pricing quality variable, Procurement method quality variable, project delivery quality variable

Testing Hypothesis

Significance Test

Hypothesis Test of Ho: β=0

An important hypothesis to consider regarding the simple regression model Y= **α+βc+e** is the hypothesis that β=0 its importance drives from the fact that it is equivalent to stating that the mean response does not depend on the input, or equivalently, that there is no regression on the input variable. Now the claim being made is that the regression coefficient b is equal to 0.0. To see if the data are strong enough to refute this claim, we need to see if it leads to rejection of the null hypothesis when testing

Ho: β=0 verses Ho: β ≠ 0 , *P-value=0.05*

A significance level **γ** test *Ho,* can be performed by first computing the value of the test statistics, call its value **u** and then rejecting *Ho* if the desired significance level is at least as large as P value i.e. *P- value* > ***u***

The significance level value of the test *(0.000)* is less than the significance level of the test, *P=0.05.* Hence, we have enough evidence to reject the null hypothesis that procurement system do not have an impact on the quality performance of projects and accept the alternative hypothesis that the procurement system has a significant impact on the quality performance of projects with 95% confidence

F Test

According the statistical analysis under taken, the F value is (4.105) and the critical F value for significance level P value =0.05 and degree of freedom $8 \leq df \leq 87$ is 2.05

The F value (4.105) is greater than the critical F value (2.05) and hence we have enough evidence to reject the null hypothesis with 95% confidence that the variance between the variables is not due to random chance. Hence, the independent quality variables are jointly significant and positively correlated to the quality performance of projects

The above two tests enables to reject the null hypothesis that the procurement system does not affect the quality performance of projects and accept the alternative hypothesis that the procurement system has an impact on the quality performance of projects with 95% of confidence level

Regression between Quality Variables and Quality Performance

The desired significance level for 95% confidence interval is *P-value =0.05* and therefore quality variables whose significance value less than 0.05 are significantly correlated to the quality performance of projects

According the analysis procurement policy/view and contract management process/procurement plan quality variables have significant positive effect on the quality performance of projects. While procurement method, contract-pricing structure, project delivery, solicitation/evaluation process, conditions of contract and contract administration quality variables do not have significant effect on the quality performance of road projects.

Regression Coefficients

The regression result shows how the input quality variables affect the dependent quality performance. According the analysis result the dependent schedule performance is related to the independent schedule variables by the following regression formula

QP=1.028+0.27PP+0.535CM+0.684PM-1.423CPS+0.508PDS+0.259CC+0.208SEP-0.319CA

Where CP = cost performance, PP = procurement policy, CM= contract management, PM=procurement method, CPS=contract pricing structure, PDS= project delivery system, CC= condition of contract, SEP=Solicitation and evaluation processes, CA= contract administration

Table 4 27: Coefficients (a)

Procurement Quality Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.028	.516		1.994	.049
	Procurement Policy quality variable	.270	.109	.546	2.478	.015
	Contract Management quality variable	.535	.175	.302	3.052	.003
	Procurement Method quality variable	.684	.626	.552	1.093	.278
	Contract Pricing quality variable	-1.423	.845	-1.262	-1.683	.096
	Project Delivery quality variable	.508	1.121	.475	.453	.652
	Condition of Contract quality variable	.259	.187	.169	1.388	.169
	Solicitation and Evaluation quality variable	.208	.173	.189	1.204	.232
	Contract Administration quality variable	-.319	.174	-.252	-1.836	.070

a. Dependent Variable: Quality performance of projects

Coefficient of Determination

Considering the statistical measurement to account the variations caused in response variable due to the input variables $R^2 = \frac{S_{yy} - SS_R}{S_{yy}}$, $R^2 = 1 - \frac{SS_R}{S_{yy}}$

The statistical analysis under taken shows the value of R^2 is 0.274, which means 27.4% of the variation in response quality performance is caused due to the inputs in quality variables and the 62.6% of the variation is caused due to other factors and the variance (δ^2) of the response quality performance and explained by the standard error of the analysis

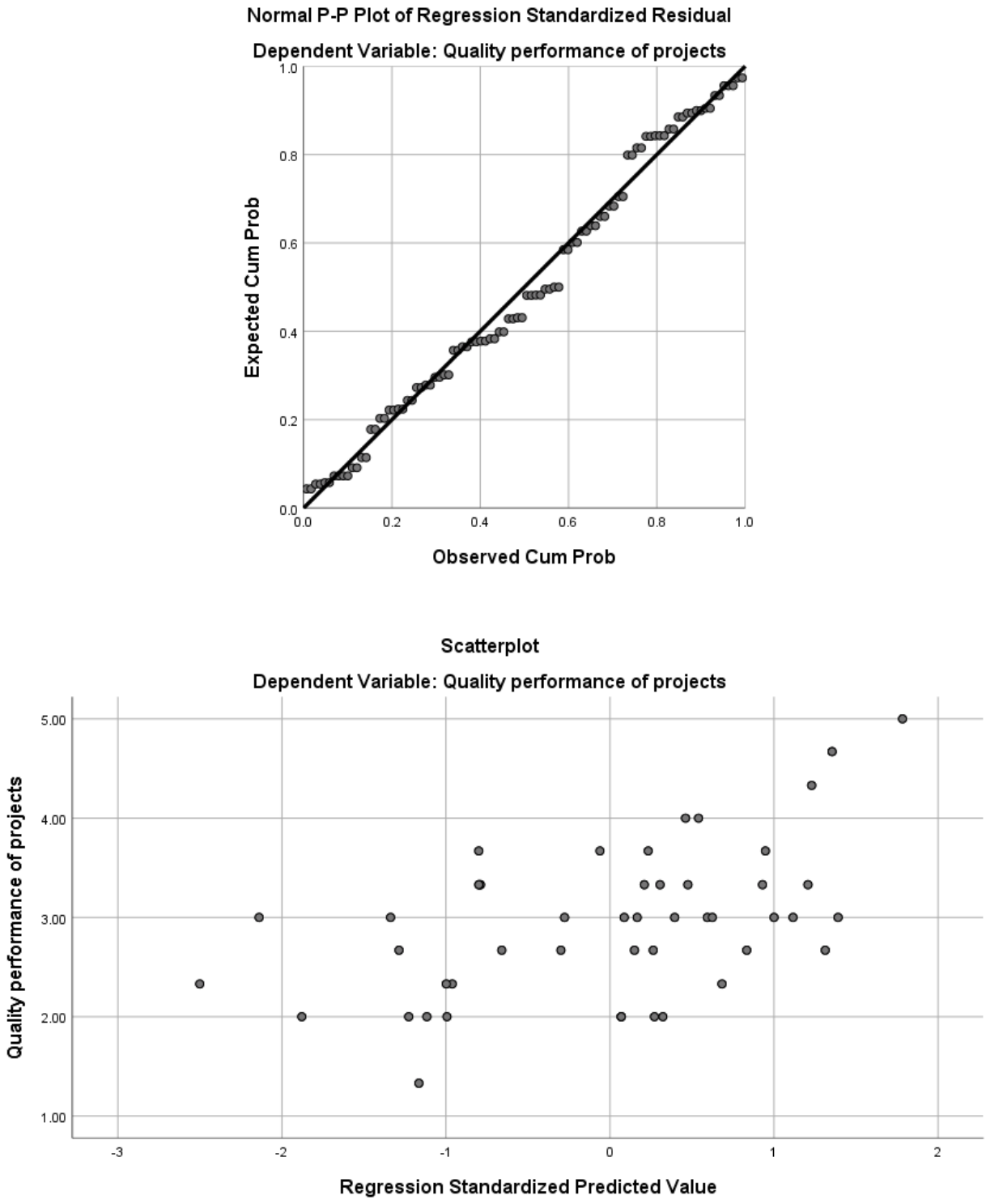

Figure 4.3: Quality Performance Scatter Diagram

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary

This study on public procurement system and its effect on the performance of road projects administered under Ethiopian Roads Authority (ERA), has mainly considered perspectives and views of major stakeholders (employer, contractors and consultants).

To collect valuable data for the study, questionnaires were prepared and distributed to professionals and SME's working at Engineering Procurement Directorate of the employer (ERA) and project management team members' of contractors and consultants, who are actively participating in road projects under the employer.

The questionnaires were structured with inquires regarding the public procurement system and contract management core processes and their effects on the performance of road projects. The study has identified eight (8) indicators of procurement core processes [Procurement Policy and Views, Contract management and Procurement plan, Procurement and Evaluation Method, Solicitation and Evaluation Process, Contract Pricing Structure, Project Delivery System, Conditions of Contract, Contract Administration] and three (3) main performance indicators of road projects as dependent variables (Cost Performance, Schedule Performance and Quality Performance)

The population of the study was one hundred thirty (130), which consist of client, contractors and consultants. One hundred seventeen (117) questionnaires were sent out to the various respondents working at Engineering Procurement Directorate of the client (ERA), contractors and consultants. One hundred one (101) questionnaires were retrieved from the respondents and ninety six (96) response data's were used for the data analysis. The collected data was computed using SPSS 26 Statistics Program

The study instrument has tried to capture the procurement and contract management core processes and their effect on the cost, schedule and quality performance of road projects. Moreover, respondent's perception on the current employer's contract management process and contract administration practices, were analyzed. The effect of contract pricing and project delivery system on employer's and contractor's attributes were employed to assess their impact

According the five-scale interval measurement taken the average cost performance of road projects is 2.8 and the most rated cost performance is 3.0, the average schedule performance of road projects is 2.9 and the most rated schedule performance is 3.0 and the average quality performance of road projects is 3.0 and the most rated quality performance is 3.0.

According Pearson's r-correlation (two-tail) test, procurement policy/view, contract management process/procurement plan and procurement method is significantlly correlated to the cost performance of projects.

According Pearson's r-correlation (two-tail) test, procurement policy/view, contract management process/procurement plan and solicitation/evaluation process are significantly correlated to the schedule performance of projects

According Pearson's r-correlation (two-tail) test contract management process/procurement plan and solicitation/evaluation process are significantly correlated to the quality performance of projects

According the one way ANOVA t-test (one-tail) analysis result, procurement policy/view, contract management process/procurement plan, contract-pricing structure, project delivery system and contract administration cost variables have significant effect on the cost performance of road projects

According the one-way ANOVA t-test (one-tail), analysis result, procurement policy/view, contract management process/procurement plan and contract administration schedule variables have significant effect on the schedule performance of road projects

According one-way ANOVA t-test (one-tail) analysis result, procurement policies/view, contract management process/procurement plan quality variables have significant effect on the quality performance of road projects

According the regression analysis result the joint effect of all the procurement core processes on cost, schedule and quality performance of road projects is positive and significant

Frequently used procurement and evaluation method by the employer is open and responsive competitive low price. Even though, many studies suggested the need of practicing alternative procurement and bid evaluation methods, such as engineering estimation and average method of bid evaluation, the open competitive low price procurement is still dominant.

Thus, out of two hundred fourteen (214) active civil works and consultancy service contracts of ERA, one hundred ninety two (192) are open responsive competitive low price bid, twenty one (21) are direct procurement and one (1) is restricted procurement contracts

Moreover, according most respondents, frequently used contract pricing structure by the employer is re measure; however, lump sum contract pricing is common for design and build road projects. In addition, according most respondents, frequently used project delivery system by the employer is design, bid and build, however currently .design and build project delivery system is well being introduced and practiced. Additionally, some pilot project on performance based contracting (PBC) is currently undergoing

According the analysis result the respondent's level of satisfaction on most public procurement core processes is moderate. Moreover, the employer's risk and contingency plan is moderate in line with the uncertainty of project deliverables and delivery process, which is also moderate.

According the respondents the employer's project organization perception and view is 62.5% collaborative and rational, 25% adversarial and conflicting and 12.5% partnering and alliance.

5.2. Conclusion

Public procurement system has irreplaceable role to the progress and successful completion of projects The study has aimed to assess the impact of public procurement system on the performance of road projects administered under Ethiopian Roads Authority (ERA). Thus, in addition to the survey questionnaires from subject matter professional, the study has also reviewed the legislative and administrative requirements of the public procurement procedures.

The study results suggested that the cost, schedule and quality performance of road projects are positively correlated to the procurement and contract management core processes. Hence, we can draw inference from the population that cost, schedule and quality variables of the procurement system affect the performance of road project administered under ERA

According Pearson's r-correlation, procurement policy/view, contract management process/procurement plan and procurement method cost variables are significantly correlated to the cost performance of road project. According Pearson's r-correlation, procurement policy/view, contract management process/procurement plan and solicitation/evaluation process schedule variables are significantly correlated to the schedule performance of road projects. According Pearson's r-correlation contract management process/procurement plan and solicitation/evaluation process quality variables are significantly correlated to the quality performance of road projects

According the regression analysis result, procurement policy/view, contract management process/procurement plan, contract-pricing structure, project delivery system and contract administration cost variables have a significant effect on the cost performance of projects. According the regression analysis result, procurement policy/view, contract management process/ procurement plan, procurement method and contract administration schedule variables have significant effect on the schedule performance of projects. According the regression analysis result, procurement policy/view and contract management process/procurement plan quality variables have significant effect on the quality performance of road projects

Generally, the study shows the procurement policy and employer's view on project organization and contract management process and procurement plan have a positive significant correlation and effect in all cost, schedule and quality performance of road projects administered under ERA

5.3. Recommendations

- Public procurement policy reform on current public procurement practice pitfalls and drawbacks that also accommodates future market expansion and changes
- Clear definition on best value criterion and their valuation and estimation matrix for each specific project
- Adopt procurement method that enhances the best value for public projects
- Developing private public partnership (PPP) and alliance is essential by public institutions, along their collaborative and rational perception on project organization
- Complete and practical procurement plan based on past performance and adaptable for future changes, such as earlier stakeholder issue management on right of way, service utilities, etc.
- Comprehensive risk and contingency plan compatible to the level of uncertainty on project deliverables and delivery process, shall be enrolled
- Adopting alternative mode of procurement and evaluation method adaptable to the nature of project's complexity and uncertainty
- Adopting alternative mode of project delivery system depending on the uncertainty of project deliverables and delivery process, such as performance based contracting (PBC), public private partnership (PPP), and other alliance types, etc.
- Adopting flexible and accommodating terms and conditions of contract, such as securities and guaranties i.e. bonds, insurance, bank guarantee, etc.
- Incentivized and rewarding contract modality proportional to the risk taken by party to promote innovation
- Practicing efficient and effective contract administration with predefined performance matrix and alternative modalities, such as, alternate dispute resolution mechanism (ADR) and pre contract stakeholder's issue clearance on right off way and service utilities.
- Initiatives on alternative payment modalities for contractor's due payment, such as promissory note check payment from employer to contractors for their due payments which will be paid by financial institutions at discounted rate
- Post project evaluation and assessment for continuous improvement through the lessons learned and best practice sharing
- Contract management core process enhancement and capacity building and best practice sharing on the following organization's contract management process assets:

A. Process:

Contracting process standardized institutional wide using standard templates

Contract management guideline serves as road map to guide the contracting process

Active collection of the lessons learned and integration for continuous improvement

Active, formal business planning process and proactive compliance enforcement

B. Organization:

Project team possess technical and program expertise and knowledge

Active involvement of the end user as SME's during solicitation requirement gathering

Contracting decision involves all relevant parties

C. Technology:

Contract automation system that allows automated reporting of contract

Independent and formal mechanisms in place to track compliance

D. Performance Matrix:

Deliverables/ SOW are developed collectively with impute from SMEs

Clear distinction of well-developed deliverables and performance matrix

Compliance and performance measured consistently (at least monthly)

E. Vendor Relations:

Properly routed communication with vendors during solicitation

Frequent communication by contract administrator to vendors in all aspects of contract

Dispute resolution or contract issue procedures clearly defined

F. Fiscal:

Contract administrator approves invoices, budget changes/fiscal amendments

Contract administrator routinely communicates with account payable office regarding all fiscal contract matters, disputes, and non-payment

G. Legal:

All terms and conditions by applicable laws are included in the contract and regularly reviewed and updated by regular staff

H. **Training:**

Contract administrator are trained as required by the contract management guideline

- Similar studies and works on alternative procurement methods and contracting shall be encouraged to come up with optimized solution to our public procurement system

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APPENDIX

PROCUREMENT SYSTEM IN PUBLIC ROAD PROJECTS

Dear Respondents

As part of my Master of Art in Project Management in Addis Ababa University, I am undertaking a research on the title “Procurement System and its Effect on the Performance of Road Projects Administered under Ethiopian Road Authority”

I have developed this questionnaires to collect views of professionals working for the employer, contractors and consultants who specifically involved on procurement, contract administration and project management, which I believe will help to get reliable and credible information from exposed professionals for completeness of my research

It is my believe that the research, in addition to its academic significance, will have a practical significance for enhancement of public procurement system

Your response in this regard is highly valuable and contributory to the outcome of the research. All feedbacks will be kept strictly confidential and utilizes for this research only. If you have any question concerning the research study, please contact me through the address below

Thank you in advance for your kind contribution

Best Regards

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QUESTIONARIES

PROCUREMENT SYSTEM IN PUBLIC ROAD PROJECTS

Public Body/Contractor/Consultant:

1. Does the employer organization have complete procurement plan and budget?
   ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
2. Does the employer have procurement guideline and standards synergetic to public policy?
   ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
3. Are you satisfied with the procurement guideline and ethical standard of the organization?
   ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
4. Does the employer organization have risk management and contingency plan?
   ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
5. Employer organization's project organization & contract management view advocates
   ☐ Conflicting and adversarial ☐ Cooperative and rational ☐ Partnering &alliance
6. Employer's contract management view has an impact on performance of projects
   ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
7. Frequently used procurement and evaluation method in the organization
   ☐ Competitive low price
   ☐ Responsive and Competitive low price
   ☐ Responsive and competitive average price
   ☐ Responsive and competitive engineer's estimation
   ☐ Negotiated ☐ Subjective Rating
   ☐ RFP/RFQ ☐ Other (please specify)
8. Frequently used contract pricing structure in employer organization
   ☐ Lump Sum ☐ Cost plus ☐ Re measure ☐ Target Cost
9. Frequently used project delivery system in employer organization
   ☐ DBB ☐ DB ☐ Construction Management ☐ Alliance
10. Are you satisfied by the organization's procurement and evaluation methods?
    ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea
11. Contractors selected for the current road projects are incapable to meet schedule
    ☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

12. Contractors selected for the current road projects are incapable to meet standard

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

13. Projects selected for the current road projects are incapable to maintain budget

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

14. Are you satisfied with the contract pricing and project delivery system of the organization?

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

15. Are you satisfied with the organization's current bidding and evaluation requirements?

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

16. Are you satisfied with the organization's current bidding and evaluation processes?

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

17. Are you satisfied with the organization's terms, conditions and requirements of the contract?

☐ Yes, always ☐ Most of the time ☐ Usually ☐ Rarely ☐ No ☐ No idea

18. Certainty of most the organization's project deliverables

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Not at all ☐ No idea

19. Certainty of most the organization's project delivery process

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Not at all ☐ No idea

20. Please describe the main employer's cause of delay in most projects

☐ Procurement and evaluation method ☐ Contract pricing and delivery system

☐ Terms and conditions of the contract ☐ Bid and evaluation requirement

☐ Bid and evaluation process ☐ Contract management/procurement plan

☐ Contract administration and performance matrix ☐ All ☐ other (please specify)

21. Please describe the main employer's cause of cost overrun in most projects

☐ Procurement and evaluation method ☐ Contract pricing and delivery system

☐ Terms and conditions of the contract ☐ Bid and evaluation requirement

☐ Bid and evaluation process ☐ Contract management/procurement plan

☐ Contract administration and performance matrix ☐ All ☐ Other (please specify)

22. Please describe the main employer's cause of quality problems in most projects

☐ Procurement and evaluation method ☐ Contract pricing and delivery system

☐ Terms and conditions of the contract ☐ Bid and evaluation requirement

☐ Bid and evaluation process ☐ Contract management/procurement plan

☐ Contract administration and performance matrix ☐ All ☐ Other (please specify)

23. Use the following grading scale to indicate your rating of each employer's procurement core processes on the basis of the attributes listed (Table 1 to Table 3)

a. Will always have a positive effect b. May sometimes have a positive effect

c. Will have no effect d. May sometimes have a negative effect

e. Will always have a negative effect f. No idea

Table 1

Employer's Procurement Method							
Procurement Method	**Employer's Risk**	**Employer's Cost**	**Dispute/ Claims**	**Cooperation/ Partnering**	**Quality Control**	**Project Duration**	**Other/ Specify**
Competitive Low Price							
Competitive Average Price							
Competitive Engineering Estimation							
RFP/RFQ							
Negotiated							
Subjective Rating							
Alliance							

Table 2

Employer's Contract Pricing Structure							
Contract Type	**Employer's Risk**	**Employer's Cost**	**Dispute/ Claim**	**Cooperation/ Partnering**	**Quality Control**	**Project Duration**	**Other/ Specify**
Lump Sum							
Cost plus							
Re measure							
Target Cost							
Other							

Table 3

Employer's Project Delivery System							
Contract Mode	**Employer's Risk**	**Employer's Cost**	**Dispute/ Claim**	**Cooperation/ Partnering**	**Quality Control**	**Project Duration**	**Other/ Specify**
DBB							
DB							
Construction Management							
Alliance							

24. When the employer's project deliverables or products are uncertain, rate the effect of the following contract combination modality (Table 4)

a. Always positive effect b. Sometimes-positive effect c. No effect

d. Sometimes negative effect e. Always negative effect f. No idea

Project Delivery System	Contract Pricing Structure				
	Lump Sum	Cost plus	Re measure	Target Cost	
DBB					Table 4
DB					
Construction Management					
Alliance					

25. When the employer's project delivery processes are uncertain, rate the effect of the following contract combination modality (Table 5)

a. Always positive effect b. Sometimes-positive effect c. No effect
d. Sometimes-negative effect e. Always negative effect f. No idea

Project Delivery System	Contract Pricing Structure				
	Lump Sum	Cost plus	Re measure	Target Cost	
DBB					Table 5
DB					
Construction Management					
Alliance					

26. When both the employer's project deliverables and the project delivery processes are uncertain, rate the effect of the following contract combination modality (Table 6)

a. Always positive effect b. Sometimes-positive effect c. No effect
d. Sometimes-negative effect e. Always negative effect f. No idea

Project Delivery System	Contract Pricing Structure				
	Lump Sum	Cost plus	Re measure	Target Cost	
DBB					Table 6
DB					
Construction Management					
Alliance					

27. Use the indicated scale (√) to evaluate the following terms and conditions of contract

Terms and Conditions of Contract and Employer's Requirement	Degree of Impact on performance					Frequency of Occurrence				
	Very High	High	Moderate	Low	None	Very High	High	Moderate	Low	None
Irrational and inflexible bonds and guarantees										
Subjective and unrelated qualification criteria										
Illogical and less feasible contract period										
Time taking and costly dispute resolution mechanisms										
One-sided and non incentivized contract conditions										
Poor scope definition and specification										
Subjective and less specified acceptance criteria										
Un application/restrictive price escalation adjustment										
Inaccurate or incomplete design and BOQ										
Employer's Bid and Evaluation Process										
Unclear and vague bid document and ITB										
Favoritism in providing crucial information										
Collusive practice of participants										
Conflict of interest on tendering										
Insufficient time for bid process and evaluation										
Inappropriate media and time usage for bid publication										
Subjective bid submission and evaluation requirements										
Subjective prequalification and evaluation score matrix										
Non transparent bid and evaluation process										

Note: Leave each boxes open for "No Idea"

Table 7

28. Use the indicated scale (√) to evaluate the contract management and administration processes

Employer's Contract Administration Process	Degree of Impact on performance					Frequency of Occurrence				
	Very High	High	Moderate	Low	None	Very High	High	Moderate	Low	None
Frequent change order and valuation problems										
Poor claim management and determination										
Excessive delay on due payments to contractors										
Poorly defined SOW and performance matrix										
Prolonged contact close out										
Poor stakeholder issue management										
Poor communication and documentation										
Timely ineffective price escalation adjustment										
Employer's Contract Management Processes										
One sided and non-incentivized contracts										
Poor planning, budgeting and risk management										
Premature organization and process assets										
Substandard procurement guidelines/ templates and ethical standards										
Non performance on capacity building and best practice sharing										

Note: Leave each boxes open for "No Idea"

Table 8

29. Rate the contract management practice of the employer organization according the best practice indicators

5= Excellent, 4=Very good, 3= Good, 2=Fair, 1=Poor, 0 = No idea

Contract Management Best Practice Indicators	Rank
Processes: Contracting process standardized institutional wide using standard templates Contract management guideline serves as road map to guide the contracting process Active collection of the lessons learned and integration for continuous improvement Active, formal business planning process and proactive compliance enforcement	
Organization: Project team possess technical and program expertise and knowledge Active involvement of the end user as SME's during the solicitation requirement gathering Contracting decision involves all relevant parties	
Technology: Contract automation system that allows automated reporting of contract Independent and formal mechanisms in place to track compliance	
Performance Matrix: Deliverables/ SOW are developed collectively with impute from SMEs Clear distinction of well-developed deliverables and performance matrix Compliance and performance measured consistently (at least monthly)	
Vendor Relations: Properly routed communication with vendors during the solicitation Frequent communication by contract administrator to vendors in all aspects of the contract Dispute resolution or contract issue procedures clearly defined	
Fiscal: Contract administrator approves all invoices, budget changes or fiscal amendments Contract administrator routinely communicates with account payable office regarding all fiscal contract matters, disputes, non-payment	
Legal: All terms and conditions by applicable laws are included in the contract and regularly reviewed and updated by regular staff	
Training: Contract administrator are trained as required by the contract management guideline	

Table 9

30. With respect to the current bid and evaluation practice rate the degree of your agreement
5= strongly agree, 4= agree, 3= neutral, 2= disagree, 1=strongly disagree, 0=no idea

No	Description	Rank
1	Competitive low bid has worked well in the past and will work well in the future	
2	Competitive bid awards to lowest bidder closest bidder's average should be adopted	
3	Competitive bid to awards contract to bidder closest to the average of all bidders and the engineering estimation should be adopted	
4	Competitive system with provision to award contract to lowest bidder which is within some predefined range of the engineering estimation should be adopted	
5	A combination of competitive and negotiated procedures should be used	
6	Competitive low bid is appropriate for design, bid and build mode of contract	
7	Negotiated bid procedure is appropriate for design and build mode of contract	
8	Competitive low bid encourages contractors to be innovative	
9	Competitive low bid procedure guarantees lowest cost project	
10	The prequalification criteria are objective, rational and free of biases	
11	Employer's requirement and conditions of the contract are rational and objective	
12	Bid requirements and processes are objective and transparent	
13	The bid evaluation method ensures the best value for the employer	
14	Bid and evaluation requirements and their score matrix are rational and appropriate	
15	Favoritism and corruption can't be avoided in negotiated bid procedure	
16	Favoritism and corruption are avoided in competitive lower bid	
17	Contract management process assets are standardized companywide and matured	
18	Professionalism and ethics of purchasing and evaluation team are satisfactory	
19	Training and capacity building to comply with policies and standards are satisfactory	
20	There is always strict follow up & measures on policy, standard and ethics compliance	

Table 10

Open Ended Questions

31. What do you think about the contract pricing and project delivery system of the employer organization related to achieving its objective?

32. Are the contract pricing and project delivery system frequently adopted by the employer organization one-sided adversarial contracts or incentivized cooperative contracts?

33. Do the contract pricing and project delivery system frequently adopted by the employer organization, advocate partnership and cooperation or adversarial and disputed?

34. In your opinion, what kind of contracts shall prevails in achieving project objectives, one sided adversarial contracts or incentivized cooperative contracts?

    In addition, what other alternatives do you suggest?

35. Any other comments

THANK YOU FOR YOUR COOPERATION