



PERFORMANCE STUDY OF LOWEST BIDDER BID AWARDING SYSTEM  
IN PUBLIC CONSTRUCTION PROJECTS

By

Laychluh Mechegiaw

A thesis submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment of the requirements for the Degree of Master of Science in Construction Technology and Management

Advisor

Abebe Dinku, Prof. (Dr.-Ing)

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School of Graduate Studies

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**Approved by Board of Examiners**

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## **ABBREVIATIONS**

ALT- Abnormally Low Tender  
EMAT- Economically Most Advantageous Tender  
ETB- Ethiopian Birr  
EU- European Union  
ITB- Instruction to Bidders  
MoW&UD- Ministry of Works & Urban Development  
NCB- Nationals Competitive Bidding  
PPA-Public Procurement Agency  
Pr- Project  
RFP- Request for Proposal  
RFQ-Request for Quotation  
SBD- Standard Bidding Document

## ABSTRACT

Ethiopian construction industry participants have long recognized that accepting the lowest price bid does not guarantee maximum value. Achieving a value-based procurement approach is a challenge, particularly for the Ethiopian public sector clients who are limited in their ability to evaluate the competitive bids based solely on the low-bid award system. In the current economic climate it is increasingly likely that construction organizations will submit abnormally low tenders to win new work. Persisting problems of inferior quality of constructed facilities, high incidence of claims and litigation, and frequent cost and schedule overruns have become the main features of Ethiopian public construction works contracts.

This research was undertaken to assess the performance of public owned construction projects awarded on a least bidder bid awarding system and to seek construction professionals' opinions about the current traditional bidding procedure and other alternative systems for evaluation of bids and awarding contracts.

An extensive literature search was carried out to identify different practices, a questionnaire survey was conducted among the different groups that make up the construction industry in Ethiopia, and projects data were collected from selected federal government clients and consultants administering public construction works.

A number of alternative bid evaluation and contract award procedures are presented and discussed in this research; some of these alternatives are in use in other countries and industries, and some are emerging. Federal government regulations are reviewed to examine the objectives and intent of the law on this issue.

The research showed that least responsive bid evaluation and contract award procedure (awarding contracts to the contractor who offers the least price) have been the main method of awarding public constructions works contract. Only in rare situations other factors, basically the contractors past record on projects owned by that particular public client, has been taken in to account in awarding contracts. Competitive low bid method has been highly criticized for its

negative impact on disputes/claims, coordination, quality control and project duration. Most of the projects have been suffering in material and equipment shortages. Manpower shortage was also encountered in many projects. On the other hand, other alternative bidding procedures included in the study were highly appreciated by respondents for their positive effects on these attributes. Particularly, the researcher shared the idea of adopting the average bid method of awarding contracts among responsive bidders which are supported by many construction professionals included in the study.

## **1. INTRODUCTION**

### **1.1 Back Ground of the Thesis**

The construction industry is one of the major sectors which involve substantial financial and human resources. Design and construction play a vital role in the national economy, including the development of residential housing, office, commercial and retail buildings, as well as industrial plants, and the replacement, maintenance, and restoration of the nation's infrastructure and other public facilities. Bid and Procurement issues are widely related to the construction industry and its participants so that striving to improve the procurement of construction by the public sector in particular is in the best interest of both the public and the construction industry.

Bid and Procurement is a substantial and integral element of Construction project management. It has been the issue of attention in the construction world. Due to time and cost overruns associated with construction projects, so many projects fail to accomplish their targets and objectives. Unmanaged or unmitigated bidding and procurement procedures are one of the fundamental causes of these overruns. These issues can be managed and controlled by influencing the current and adopting the latest procedures of bidding and procurement.

Currently, the public sector procurement of construction is largely based on the lowest bid award system. The customary practice of awarding contracts to a lowest bidder was established to ensure the lowest cost for completing a project. In public construction works, this practice is almost universally accepted since it not only ensures a low price but also provides a way to avoid fraud and corruption (Irtishad, 1993). While the low-bid procurement system has a long-standing legal precedence and has promoted open competition and a fair playing field, a long-standing concern expressed by owners and some of their industry partners is that a system based strictly on the lowest price provides contractors with an incentive to concentrate on cutting bid prices to the maximum extent possible (instead of concentrating on quality enhancing measures), even when a higher cost product would be in the owner's best interest, which makes it less likely that contracts will be awarded to the best performing contractors who will deliver the highest quality projects. As a result, the low-bid system may not result in the best value for money expended or

the best performance during and after construction. Moreover, the traditional low-bid approach tends to promote more adversarial relationships rather than cooperation or coordination among the contractor, the designer and the owner, and the owner generally faces increased exposure to contractor claims over design and constructability issues(Rizwan, 2008).

The paper aims at analyzing the current status of Bid and Procurement Strategies in the construction industry of Ethiopia. In Ethiopia, the most common method of awarding the contract is the Least Responsive Bidder or Price Based method, which has inherent flaws of high competition and minimum performance. These incompetent practices pose a serious risk and problems like:

ÉDelays in meeting project duration

ÉIncrease in total cost of the project, resulting in bankruptcy of companies.

ÉDescend in construction quality

ÉSerious question on public safety

ÉOverall project failure

Under this low-bid system, contractors submit bids based on plans and specifications prepared by the public agency or a private engineering firm hired by the agency, and, except under extraordinary circumstances, the contractor submitting the lowest responsive bid is awarded the construction contract. In all but a few cases, experience levels of the contractor, quality issues, and other criteria are not taken into consideration in awarding these contracts.

The Ethiopian Federal Government Procurement and Property Administration Proclamation, Proclamation No. 649/2009 (Federal Negarit Gazeta, 2009) states six types of methods of procurement: Open Bidding, Request for Proposals, Two stage Tendering, Restricted Tendering, Request for Quotation and Direct Procurement [*article 33 (1)*]. It also declares that public bodies should use open bidding as the preferred procedure of procurement except only where conditions for use of such other method stipulated under the proclamation are satisfied [*article 33 (2&3)*].

Although the examination and evaluation of bids require the technical qualification of bidders [*article 43 (5a)*], the successful bid will be the bid that is found to be responsive to the technical requirements and with the lowest evaluated price [*article 43 (8a)*].

In today's construction environment, public sector owners are finding themselves under increasing pressure to improve project performance, complete projects faster, and reduce the cost of administering their construction programs. In response to these pressures, the Ethiopian construction industry should come up with alternative procurement and contracting methods which incorporate factors other than just price into the selection process to improve project quality and enhance performance.

The aim of the research presented in this thesis is to assess the impact of competitive low-bid awarding system on performance of major public work projects (in terms of schedule, cost, quality and safety) in Ethiopian construction industry. The study will forward recommendations and suggestions for developing a proposal for implementing alternative bid-evaluation and contract award procedures for the construction industry of Ethiopia.

#### **1.4 Research Scope**

The scope of the study is to assess the performance of government owned construction projects which are awarded by the lowest bidders bid awarding procurement procedures in Ethiopia. It also forward suggestions and recommendations that can help to improve the bidding and procurement practices. The results of the literature search and compiled data from the data sheets and questionnaire surveys are presented in this report. Legal basis and government regulations pertaining to the issue of public construction contract-award procedures are covered in this study.

However, the research is limited to public construction projects under the federal government of Ethiopia which excludes private clients and others.

## 1.5 Research Objectives

The main objectives of this thesis are:

- To highlight the challenges and opportunities associated with the bid procurement trends in construction industry of Ethiopia, especially in Federal Government owned projects and to analyze their impact over the life cycle of construction projects.
- To propose improvements in the existing practices and new better and more useful techniques and models could be introduced to improve the project performance.
- To provide the basis to undertake more elaborate studies for actual comparison between different alternatives.
- To provide information to those who are in a position to bring changes with an objective to create a healthy construction industry in the country.

As this research focuses on construction works contract for public bodies under the federal government of Ethiopia, attention will be given for the examination and evaluation of bids in the open tendering procedure.

## **2. LITERATURE REVIEW**

### **2.1 General**

The new and fast developments and needs in different aspects of human life, has lead the professionals in construction industry to use alternative forms of project delivery systems. However, the tendering and awarding systems are still largely in their original form. The insufficiency and inappropriateness of the awarded contractors has led to sub-standard work, delays, disputes, or even bankruptcy. If a client wishes to cope with these new developments and invite acceptable bidders, it is necessary to clarify and develop pre-determined selection criteria and the objective of the prequalification and bid evaluation processes (Hatush et al, 1997).

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

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

bid award procedure (Thomas, 2009). Moreover, the low-bid award system encourages unqualified bidders in the competition and in contrary it discourages qualified contractors to participate.

According to Hardy (1978), the criteria used for bid evaluation should reflect the client's objectives. These are that bids are fully responsive to the contract and bidders are sufficiently well qualified to undertake the contract. The criteria for selecting the successful bidder are then that bid which maximizes the return on the client's investment. Thus he has proposed that bidders should submit a schedule of the payments they expect to fall due to them during the contract.

In a survey conducted in the Oromiya regional state, non-existence of real competition during contractors selection; excessive time overruns; compromising quality; and escalation of the final project cost from the estimated cost were the major problems associated with the existing approach of delivering projects (Lemma, 2006). Poor initial funding of the project by the contractor and lack of timely resources of materials, machineries and workforces are also the major factors identified as causes of delays during the construction phase in Ethiopian construction industry (Abdo, 2006).

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

## **2.2 Legal Aspects**

The Federal Government of Ethiopia has statutes requiring submission of competitive bids for construction projects. This statute requires public organizations to award such contracts to the "lowest responsive bidder." The word "responsive" is inserted to require that a successful bid must also be adequately responding to the requirements of the project as specified. While it is not too difficult to determine whether a bid is responsive because responsiveness is evaluated based

on the documents submitted by contractors, it takes considerable amount of time and effort to ascertain whether a bid is responsible. "Responsible" generally refers to the apparent low bidder's quality, fitness, and capacity to perform the proposed work satisfactorily. "Responsible" means more than simply financially responsible. The bidder must also have the requisite judgment, skill, ability, and integrity to perform the contract according to its terms (Irtishad, 1993).

For two reasons application of this requirement becomes difficult. First, there is generally a narrow window of time available between a bid opening and the award of the bid. Second, although the law allows public organizations to reject any or all the bids, the rejection cannot be done arbitrarily or in bad faith. When it is the low bid which is rejected, particularly close scrutiny of the reasons given for the rejection is warranted. For these reasons, the decision to reject a low bid on the ground that the bidder was not responsible enough is dependent on the discretion of the organization. In most cases some degree of subjectivity gets involved in the process of determining whether a particular bidder is responsible. As a consequence, these kinds of rejections frequently give rise to resentment and may end up in court. To avoid these problems, many public organizations take only responsiveness of the bid in consideration before making award decisions. Some public organs use a stringent and specific set of prequalification procedures.

### **2.2.1 Federal Procurement Laws**

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

The proclamation, however, limits public bodies to use open bidding as the preferred procedure of procurement except as otherwise provided in the proclamation to use other options (article 33(2)). Restricted tendering is allowed only when the required object of procurement is available only with limited suppliers and the cost of the procurement does not exceed the limit in the

directive issued by the Ministry; or where a repeated advertisement of the invitation to bid fails to attract bidders in respect of a procurement subject to the directive to be issued by the Ministry (article 49). The total contract value of procurement made by restricted bidding is limited by the federal public procurement directive to 2 million birr for works (article 23.3).

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

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

The other two types of procurements are request for quotation and two stage bidding. Request for quotation is allowed when there are readily available goods or for procurement of works or services for which there is an established market, so long as the estimated value of the contract does not exceed an amount stated in the procurement directives issued by the Ministry (article 55). Two stages bidding on the other hand is permitted when it is not feasible for the public body to formulate detailed specifications for the goods or works such as, contract for the purpose of research, experiment, study or development etc. (article 57). The maximum contract amount provided for works in the directive to use request for quotation is 250 thousand birr (article 24.2).

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

As this research focuses on construction works contract for public bodies under the federal government of Ethiopia, attention will be given for the examination and evaluation of bids in the open tendering procedure.

### **2.2.2 Examination and Evaluation of Bids**

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

Any requirements required by the public body will be set forth in the bid documents or other documents for solicitation of proposals, and deemed to apply equally to all candidates. In addition, in the process of selecting the successful bidder, the public body should only consider substantially responsive bids for further evaluation and comparison in accordance with the criteria set forth in the bidding documents (article 43(6)).

The tender document for the procurement of works for public bodies in the federal government is *The Federal Democratic Republic Of Ethiopia Standard Bidding Document (SBD) For Procurement of Works For National Competitive Biddings (NCB) Public Procurement Agency (PPA) January 2006, Addis Ababa*. And hence, the tender document to be referred in here in the research is this document.

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

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

**Table 2.1 Qualification Criteria recommended by PPA 2006 users guide**

No.	Qualification Criteria	Minimum Requirements
1.	Average annual volume of construction work over the past [ <i>For major contracts, it is normally 5 years, for smaller contracts 3 years would be sufficient</i> ]	At least [ <i>Ideally the minimum value of the annual turnover of construction work should be set at not less than 2.5 times the estimated annual cash flow for the Contract. For low risk works, this minimum could be reduced to 2 times or less</i> ]
2.	Experience as a prime contractor in the construction of at least [ <i>number of similar contracts, which should be in the range of one to three, depending on the size of contract, risk of contractor default and market conditions</i> ]	Works of a nature and complexity equivalent to the Works over the last [ <i>number of years, normally in the range of five to ten. For smaller contracts, low risk works or a newly established local industry, the number of years could be reduced to 3</i> ] years (to comply with this requirement, works cited should be at least 70 percent complete).
3.	Proposal of the timely acquisition of equipments(own, lease, hire, etc.) of the following essential equipment:	[ <i>list of equipment, For smaller contracts, the list should be limited to specialised items that are critical to the execution of the contract and that may be difficult for the successful Bidder to obtain quickly</i> ]
4.	Personnel with specific qualification and experience	[ <i>Qualifications and experience required for key personnel e.g. “a Contract Manager with five</i>

		<i>years' experience in works of an equivalent nature and volume, including no less than three years as Manager". Personnel requirements should be limited to key site management and technical personnel, who will be responsible for major components e.g. site superintendents, contract manager etc]</i>
5.	Liquid assets and/or credit facilities net of other contractual commitments and exclusive of any advance payments which may be made under the Contract	<i>Of no less than [amount]. [The successful Bidder must demonstrate that it has or has access to the financial means sufficient to meet the construction cash flow requirements for the contract. The minimum liquid assets and credit should normally be set as the estimated payment flow over approximately 3 months at the average ("straight lined") construction rate.]</i>

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

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

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

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

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

#### **2.2.4 Tender Evaluation and Analysis Amendment by Ministry of Works and Urban Development- March 2001**

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

The tender evaluation and analysis approach were modified by the Ministry of Works and Urban Development in March 2001. The basis for the modification were, according to the letter from

the Ministry on the 14<sup>th</sup> day of March 1993 EC, Ref. no H1-T1 240/21, to improve the procurement of public construction works by avoiding abnormally low bids. The Ministry, accompanied to the letter referred above, has tried to show the modification through the following example.

### Example

#### i. Project Estimate

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

Engineer's estimate = ETB 7,500,000.00

Ministry's estimate = ETB 7,300,000.00

Project estimate = 50 % ( 7,500,000.00 + 7,300,000.00 ) = ETB 7,400,000.00

#### ii. Bidders qualified for detail evaluation

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

= 7,400,000.00 + 20% (7,400,000.00) = 8,880,000.00

= 7,400,000.00 - 20% (7,400,000.00) = 5,920,000.00

Therefore, bidders whose offer is between ETB 5,920,000.00 and 8,880,000.00 will be subjected to further evaluation. Bidders whose offers are outside the limit will be rejected.

#### iii. Detail Evaluation

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

**Table 2.2 Summary of Bidders Offer**

<b>Bidder</b>	<b>Offer (ETB)</b>	<b>Remark</b>
A	6,140,000.00	6,140,000.00
B	5,790,000.00	Rejected
C	7,100,000.00	7,100,000.00
D	7,500,000.00	7,500,000.00
E	8,140,000.00	8,140,000.00
F	7,930,000.00	7,930,000.00
G	9,120,000.00	Rejected
		<b>36,810,000.00</b>

Bidders B and G are non-responsive because their offer is not within plus or minus 20% of the project estimate.

Average offer from contractors =  $36,810,000.00/5 = 7,362,000.00$

Adjusted project estimate =  $25\% (7,400,000.00) + 75\% (7,362,000.00) = 7,371,500.00$

The minimum acceptable bid offer =  $7,371,500.00 \pm 15\% (7,371,500.00) = 6,265,775.00$

Therefore, the winner of this bid will be the least bidder whose offer is greater than ETB 6,265,775.00. In this particular example, bidder C whose offer is ETB 7,100,000.00 (Seven million one hundred thousand birr) will be awarded.

## **2.3 Alternatives, Issues And Concerns**

### **2.3.1 Contract-Award Procedures in Construction**

Bidding procedures are basically of two types: competitive and negotiated. Most of the other procedures are either variation of, or somewhere between these two extreme types. In pure competitive method, the contract is awarded to the lowest-bidder, if the bidder is found to be responsive. In pure negotiated method the price is negotiated with a selected contractor. To minimize the shortcomings of these two extreme types, modifications have been proposed and tried in many countries. For the purpose of this research, the following contract-award procedures are considered:

- 1) Competitive Low Bidding (Price-based)
- 2) Competitive Average Bidding (Price-based)
- 3) Multi Parameter Bidding Method (Based on price and other factors)
- 4) Competitive Negotiated Bidding
- 5) Non-Competitive Negotiated Bidding

#### **2.3.1.1 Competitive Low Bidding (Price-based)**

Competitive bidding is the most widely used method of obtaining and selecting contractors for construction projects. In general, the purpose of price-based competitive bidding is to obtain the lowest possible price. Competitive bidding believes to give everyone an equal chance to bid, eliminates collusion, and saves taxpayers money. It fosters honest competition in order to obtain the best work and supplies at the lowest possible price. It is also necessary to guard against favoritism, imprudence, extravagance, fraud and corruption (Sweet, 1989).

For this procedure to work it is essential to have a set of well-defined criteria to help the officials determine that the bids are responsive and the bidders are responsible. Under the competitive low-bid method, the qualified (responsive) bidder who submits the lowest bid that meets the specifications must be awarded the contract. As stated earlier, pursuant to article 33(2),

proclamation no. 649/2009, this method of competitive bidding is the standard method for awarding federal owned construction contracts in Ethiopia.

### **2.3.1.2 Competitive Average Bidding (Price-based)**

A variation of the competitive low bid method of awarding contracts is based on the principle that the best bid is the bid which is closest to the average of all bids, and not the bid which is highest or lowest. Bids which fall too far below the mean are considered to be unrealistically underbid. Bids which are much higher than the average are considered to be unrealistically overpriced. Methods based on this principle are very common and known, in general, as European Methods (Irtishad, 1993).

In general, the winner based on the average-bid method is the contractor whose bid satisfies a certain relationship with the average of all bid prices. Different average-bid method use different procedures for calculating the average, or use different criteria for determining the winning bid. For example, some use an arithmetic average or a weighted average, while others use the average of the remaining bids after all bids that differ more than a certain percentage from the average of all other bids are eliminated. Similarly, the winner might be the contractor whose price is closest to the average, or the contractor whose bid is closest to, but less than the average. The former, for example, is used in Taiwan while the latter is used in Italy (Photios, 1993).

A formula to decide a reasonable offer from several competitive bids was developed in Europe, known as "Danish" system, wherein the lowest and highest offers are rejected out right away and the rest of the offers are only considered (Irtishad, 1993). This formula stands as:

$$NA = (NL + 4A + NH)/6 \quad [Eq. 2.1]$$

Where,

NA = new average;

NL = new low;

NH = new high; and

A = average of all offers.

The bid which is first above this new average is then treated as realistic and acceptable. The major shortcoming of this method is that it is not effective unless the number of submitted bids is eight or more.

The basic philosophy behind the average bidding procedure is that the best bid is the one closest to some average, not the lowest, not the highest. These competitive price-based average bidding methods are used mainly to ensure that the contractor is responsible, to avoid contractor-failure, and to reduce disputes and claims.

The underlying principle is that the contractors should get a reasonable and realistic price for their work. It is assumed that with a fair price they would conform to quality requirements of the project, would complete on time, and would not have adversarial relationships with the consultant of the employer.

### **2.3.1.3 Multi-Parameter Bidding Method (Based on price and “other” factors)**

A model of competitive bidding that is based not only on cost but also on other parameters was proposed by Herbs man and Ellis; they named it the multi-parameter bidding procedure(Herbs man et al, 1992). They suggest that the major parameters should be cost, time and quality. Given that the amount of time a contractor proposes to take to complete the project may have a major impact on costs. For instance, a contractor who can complete a building 4 months prior to his closest competitor may save the employer additional rent monies, by factoring this cost saving into the bid process, a more accurate reflection of total costs can be calculated. Similarly the impact of quality can also be included in the award-decision. The long-term costs of maintenance and repair are directly related to the quality of the constructed facility being built. In the Multi-Parameter Bid Method, estimates of quality may be measured by the type of materials proposed to be used, the previous experience/past performance of the general contractor and the proposed subcontractors.

Under the Multi-Parameter Bid Method, time and quality concerns are each assigned a maximum attainable number of points. The bids are then reviewed and ranked based upon these factors, as well as upon the contract cost.

Other parameters can also be added in this model as desired by the user. Biddersø proposed project-duration and past performance (quality of finished projects, safety records, etc.) can be factored into come up with a òtotal combined costö in this method (Tarricon, 1993). The total combined costs of all the bidders are then compared to select the best bid.

#### **2.3.1.4 Competitive Negotiated Bidding**

Sometimes it may become necessary to obtain bids from a select group of contractors known to have the technical, financial and managerial capability to complete a complex project. In such cases competitive price-based bidding may not be appropriate.

Pure sole-source negotiation, on the other hand, is very difficult to practice in public sector since this process may easily lead to allegation of favoritism and corruption. To avoid these inherent problems with pure sole-source negotiated bidding many agencies and owners have using variations that have in effect, features of both competitive and negotiated procedures.

The most common modification of the pure negotiated procedure is to increase the number of firms to negotiate with, thus increasing the options to select from. In some cases, certain firms which are known to be competent to complete a project, based on previous experience or reference, are contacted by the owner or client (Irtishad, 1993). The public body shall negotiate a contract with the most qualified firm for professional services at compensation which the organization determines are fair, competitive, and reasonable. In making such determination, the public body shall conduct a detailed analysis of the cost of the professional services required in addition to considering their scope and complexity.

The Ethiopian Federal procurement law allows restricted tendering provided that the required object of procurement is available only with limited suppliers and the cost of the procurement does not exceed the limit in the directive issued by the Ministry; or where a repeated

advertisement of the invitation to bid fails to attract bidders in respect of a procurement subject to the directive to be issued by the Ministry (article 49). The total contract value of procurement made by restricted bidding is limited by the Federal public procurement directive to 2 million birr for works (article 23.3).

#### **2.3.1.5 Non-Competitive Negotiated Bidding**

The non-competitive negotiated procedure is essentially the process of negotiating a bid with a single source, usually a preselected contractor. For this reason it is also known as sole-source negotiation. The price to be paid, and the goods and services to be received by the owner are usually the items of negotiation. The firm, that is known to have qualification and expertise, can be chosen without any advertisement or notification. This saves time but increases the possibility of corruption and nepotism.

Direct procurement is allowed when there is no competitions for technical reasons and if the required service can be supplied or provided only by one supplier. Or when there is need of similar service or repetition of works from one supplier and when the total contract value is not exceeding the limit stipulated in the directives (article 51). Direct procurement is usually common in the form of variations in the construction industry. The directive from Ministry of Finance and Economic Development limits the volume of the additional requirements of works to procure directly to a maximum of 25% of the initial contract volume (article 25.2). This method is not uncommon to procure new construction projects in the private sector. However, it is almost nonexistent in the public sector construction.

#### **2.3.2 Issues and Concerns about Different Bidding Procedures and their Consequences**

*a) Competitive low bidding (Price-Based):* Although it is generally accepted that competitive low bid method saves taxpayers money and thus protects public interest, this traditional method has recently been criticized lately for promoting inferior quality, causing too many change orders, furthering adversarial relationships, time overrun, and increasing overall cost of the project.

The competitive bidding process for awarding construction contracts in Ethiopia is typically based on the low-bid method. According to this method, the construction firm who is responsive and submitting the lowest bid receives the right to the construction contract. Its main advantage is that it forces contractors to continuously try to lower costs by adopting cost-saving technological and managerial innovations (Photois, 1993). These savings are then passed to the owner through the competitive process.

If a contractor submits a bid that is significantly lower than the client's estimate and the other bidders, it is difficult to understand how that contractor could complete the job profitably. The European Union defines those bids as *Abnormally Low Tenders* (Thomas, 2009). An Abnormally low tender is a tender whose price is considered significantly lower than most of or the average of all tenders in the same procurement procedure. The EU introduced legislation to allow public sector clients the option of awarding a construction project using either the traditional low bid or the Economically Most Advantageous Tender (EMAT). The legislation allowed public sector clients to reduce their exposure to some of the adverse effects of abnormally low tenders (ALT), including: Unsatisfactory quality through the need to reduce construction costs (Winch); and Predatory pricing and unfair competition that distorts the market, negatively affecting the other bidders (Alexanderson et al, 2006).

European Commission's Europe report on "Prevention, Detection and Elimination of ALT in the European Construction Industry" states that a tender is assumed to be abnormally low if in the light of the client's estimate and of all the tenders submitted, it appears to be abnormally low by not providing a margin for normally levels of profit, and the low tender cannot be explained by economy of the selected construction method, the technical solution chosen, exceptionally favorable conditions available to the tender, or the originality of the work proposed (Thomas, 2009).

The underlying assumptions upon which competitive low bidding system is based are discussed in the following.

First, competitive low bidding assumes that goods or services can be objectively evaluated or compared before award decisions are made. This is not an easy task. To circumvent the inherent problems with this assumption, it is usually stated in the bid invitation that for consideration, bids should be responsive and the bidders should be responsible.

Second, it assumes that there are free bids and true competition. If there is collusion among the bidders to take turns or submit fictitious bids, antitrust laws are violated and competitive bidding cannot accomplish its objective of obtaining the lowest price.

Thus the success of competitive low bidding system depends largely on the integrity and ability of the contractor, which are often difficult to measure since the tendency is to look solely at price.

Another criticism of competitive bidding is the difficulty of involving the contractor in the design process. Rigid specifications may also make competitive bidding process ineffective because it does not give contractors the chance to come up with different options. If product specifications do not provide for alternative products and a viable method for substitutes, competitive pricing may be unduly restricted.

Other problems associated with the competitive low bid method is that when the number of bidders is as large as is the case in a slow economy, an owner runs a significant risk of selecting a contractor that has either accidentally or deliberately submitted an unrealistically low price (Photois, 1993). A contractor cannot adhere to such a low price and at the same time expect to complete the project according to plans and specifications, and also make a reasonable profit. This often results in excessive claims and disputes during construction that lead to schedule delays, compromises in quality, and increased costs.

Although competitive low bid process is supposed to foster innovation by forcing contractors to continuously try to lower costs by adopting cost-saving technological and managerial innovations, it has been criticized for discouraging innovation (Irtishad, 1993). Nicolson asserts, low bids provide little margin for a contractor to implement new techniques or upgrade the

quality of his current product. It has been criticized for not providing any incentive for the construction of high quality project at a reasonable price.

The other most concerning reason is the practice of a contractor intentionally submitting an artificially low bid in anticipation of making their profit through change orders and claims (Thomas, 2009). Some bidders carefully review the bid documents searching for mistakes and ambiguity in areas that could lead to change orders and claims during the project (Dowle et al, 1990). These bidders can then use this knowledge to submit a lower bid with the expectation of recouping the money later. In all cases the abnormally low bid is not reflective of the final contract cost or the hidden costs incurred by the client when dealing with numerous change orders and claims.

Competitive low bid method has also been criticized to cause abuse of the change order procedure. It is alleged that change orders become too numerous and too expensive under this method. Thus according to its critics, the low bidder method does not guarantee the lowest cost because delays and cost-increases are very likely to occur with the procedure.

Despite all these criticisms there are strong arguments in favor of using the traditional competitive low bidder system.

The public sector seems to be more comfortable with this process because the bid evaluation is not complicated. The checks-and-balance system, and integral part of this competitive process, fosters confidence with the taxpayers. Its objectivity is ensured because price is the only criterion for evaluating bids. Its vulnerability to different sorts of political and social pressure is much less than other procedures that are based on some degree of subjectivity.

**b) *Competitive average bidding (Price-based):*** In competitive average bidding procedures, as described in the previous section, all the features of open competitive system are retained. The only difference is that the selected contractor is the one whose bid is near the average of all the bids submitted.

The major drawbacks of the low-bid method is the possibility of awarding a construction contract to a contractor that submits, either accidentally or deliberately, an unrealistically low bid price. Often, such an occurrence works to the owner's and contractor's detriment by promoting disputes, increased costs, and schedule delays. To address this problem, other countries have adopted the average-bid method and award the contract to the contractor whose price is closest to the average-bid method and explores its merits relative to the low-bid method (Photois, 1993).

The main advantage is that it safeguards an owner against signing a construction contract for an unrealistically low bid price that almost certainly will lead to adversarial relationships during construction (Ioannou et al, 1993). It was also pointed out that, under this method, contractors are protected from having to honor a bid containing a gross mistake or oversight.

The basic drawback of the average-bid method is that it does not necessarily promote price competition that leads to lower costs for the owner. A technological or managerial breakthrough that results in major cost savings will not necessarily be passed on to the owner in the form of lower prices, unless this breakthrough is known to be available to all bidders. Although it has been argued that average bidding method results in significantly higher profits for the contractors in projects won (Irtishad, 1993). When such high profits are available throughout the industry, bid prices should be expected to gradually fall and the savings will eventually be passed to the owner. It has been claimed that the average bid method would increase contractor profitability and it has the potential to improve relationships between the owner and the contractor.

It is apparent from the above discussion that most of the perceived benefits of average bid method may only be realized in the long run. Moreover, some of these benefits are of intangible nature. The success of this procedure also depends on the requirement that general contractors select their subcontractors on the average-bidding principle. Given the way bidding is practiced, accepting sub-bids till the last moment, this would be very difficult to enforce. In addition, currently the law does not require general contractors to submit and retain a preselected group of subcontractors.

Some major pitfalls associated with the competitive low bid method can also be prevalent with the average bid procedure. As is the case with the low bid method, collusion among the bidders and the absence of prequalification can negate its intent and produce undesirable results (Ioannou et al, 1993).

Whether contractor profitability is higher and relationships between the owner and the contractor are better in the countries that practice average bid method cannot be ascertained. There is not enough evidence to conclude that incidence of claims are less in European countries (that practice average bid method) (Irtishad, 1993).

**c) *Other Competitive Bidding Methods (Based on price and “other” factors):*** Under this method factors other than price are considered before award decisions are made. This is done in a more rigorous fashion than the customary practice of prequalification procedure. Technical merit, and time and quality-related factors in a bid proposal are being given more emphasis. Some people assert that the innovative methods are needed for the sake of time and quality, to get better value for the government money, to reduce life-cycle costs for the public body, to encourage quality and innovations, while maintaining a fair profit for the contractor.

For many years the time element was not the most important element in construction projects in many countries. The element of cost was the most important one, and therefore the procurement systems were mainly for materials and equipment. In the last few years, the construction industry of Ethiopia has involved in both building of new roads and construction of existing facilities. These reconstruction projects are mainly in urban areas and cause substantial problems to the public. The economic cost of these delays is also enormous. In U.S.A for instance, a few innovative procurement systems for “buying time” were introduced in order to minimize those delays (Zohar et al). The common denominator of all those procurement system is the ability of the contractor to procure the time for completion of the project.

**d) *Competitive Negotiated Bidding:*** Request for proposals and/or request for qualification for a particular project are examples of typical competitive negotiated method. Proposals from more than one contractor are scrutinized for factors such as technical capability,

project schedule as well as cost. These methods are usually employed when the project is planned to be built under a design/build contract. Proponents of competitive negotiated bidding methods claim that these methods save time, improve quality and reduce number of claims.

The main points against this method are that the cost and time spent by the contractor for preparing a proposal is higher; the system lends itself to a situation where the contractor is reserved to propose any new or innovative ideas because they may not fit the experience of preconceived ideas of the evaluators; contractors are required to disclose confidential commercial and financial information that should not be released outside the company; the owner may try to get cost-saving ideas from the competing contractors during the interviews and yet may choose not to award the project to the contractor whose ideas would later be utilized; and the processes of evaluation turns out to be subjective rather than objective (Kelley, 1991).

#### **2.4 Summary of Literature Review**

Professionals in the construction industry have agreed the importance of the method of bid evaluation and contract award procedure chosen for the successful accomplishment of construction contracts. Many countries have also revised their construction procurement of construction contracts based on their own experiences and research findings.

Least bidder bid awarding procedure has been widely accepted in many countries for decades. The customary practice of awarding contracts to a lowest bidder was established to ensure the lowest cost for completing a project. In public construction works, this practice is almost universally accepted since it not only ensures a low price but also provides a way to avoid fraud and corruption (Irtishad, 1993). However, allowing projects to be awarded based on the least price has become one of the major sources of construction projects failures. Delays in meeting the contract duration, increment of the final project cost due to high variations, tendency to compromise quality, and adversarial relationship among contracting parties are the major drawbacks associated with responsive low-bid award procedure (Thomas, 2009). Moreover, the low-bid award system encourages unqualified bidders in the competition and in contrary it discourages qualified contractors to participate.

Consequently, many countries based on their previous experiences and research findings have developed modified procedures to address these problems. Competitive Average Bidding, Multi Parameter Bidding, Competitive Negotiated Bidding and None-Competitive Negotiated Bidding methods are the most frequently used procedures in many countries. Competitive Average Bidding method has become the most favorite of many European countries. The EU introduced legislation to allow public sector clients the option of awarding a construction project using either the traditional low bid or the Economically Most Advantageous Tender (EMAT). The legislation allowed public sector clients to reduce their exposure to some of the adverse effects of abnormally low tenders (ALT), including: Unsatisfactory quality through the need to reduce construction costs (Winch, 2000); and Predatory pricing and unfair competition that distorts the market, negatively affecting the other bidders (Alexanderson et al, 2006).

Competitive Average Bid procedure has become more popular because all the features of open competitive system are retained on one hand. On the other hand, the possibility of awarding a construction contract to a contractor that submits, either accidentally or deliberately, an unrealistically low bid price will be reduced. The competition provides a way to avoid fraud and corruption, which are the major drawbacks of other negotiation based alternatives. The averaging will safeguard an owner against signing a construction contract for an unrealistically low bid price that almost certainly will lead to adversarial relationships during construction (Ioannou et al, 1993).

### **3. RESEARCH METHODOLOGY**

#### **3.1 Questionnaires Survey**

The research was started with literature reviews. Based on the information acquired from literature reviews and input from various local experts, questionnaires were developed for survey exercise. Two types of questionnaires were developed for two diverse groups, construction organizations and public organizations. General contractors, Building contractors, Special contractors/Sub contractors, Consultants and Architects/Engineers are included in the first group. The second group was comprised of public agencies and organizations.

After the development of questionnaire and before finalizing the draft, pilot surveys were conducted. Based on the suggestions questionnaires were improved. The questionnaires were then dropped in person. Interviews also were held along the questionnaires survey to cross- check the information and obtain any extra knowledge.

A separate data sheet was also developed to collect information from public organization clients and from consultants who are administering public owned construction projects.

The responses obtained from questionnaire survey and through data sheets were analyzed to identify the trends and practices in bid and procurement in Ethiopian Federal Government owned construction projects. Questionnaires were analyzed separately and then collectively sections as well as questionnaire wise. Based on the data obtained conclusions are drawn and recommendations are forwarded.

#### **3.2 Questions Raised**

The questionnaire designed for the construction organizations contained four main types of questions. From question 1 to 3 nature of the organizations were asked and general profiles of the companies were obtained. Question 4 was about the frequency of respondents' business obtained under different project delivery and bid-award methods. Question 5 of the questionnaire was asked to respondents to give their rating of the different bid-evaluation and contract award

procedures based on some attributes or criteria. In the final type of question, question 6, respondents were asked to indicate their agreement or disagreement at different degree to 12 statements listed in the questionnaire with respect to different bidding practices. In addition to these four groups of questions, respondents were given the chance to reflect any additional comments.

The questionnaire prepared for public agencies and organizations were similar in the last three groups of the questions included in the questionnaire developed for construction organizations. However, questions 1 to 3 were designed suitably to public organizations.

### **3.3 Data Sheet**

Information from public organization clients and from consultants who are administering public owned construction projects were collected through data sheets. Four types of information were collected. The first one is about the summary of the financial bid evaluation of bidders. Statuses of the projects awarded on the responsive least bidder awarding system were obtained through the second question under different parameters. In the third category, major difficulties encountered during the construction process were identified. Finally, evaluation of contractor performance in respect to quality of works, quality of materials and their progress as per the schedule were determined. In addition to these four groups of questions, respondents were given free space for any additional comments.

## 4. ANALYSIS AND DISCUSSION

### 4.1 General

Questionnaires were distributed to different organizations involved in the construction business and public agencies and organizations at the federal level. The organizations were selected on a random basis for private sectors. However, public organizations and agencies were selected based on their contribution in the construction industry. Public agencies including Public Procurement Agency and Ministry of Works and Urban Development were comprised in the study. Construction Design Share Company and Ethiopian Road Authority were also among the major shareholders in the Ethiopian construction industry included in the survey.

Information regarding federal owned construction projects was also collected through data sheets from public clients and consultants administering public projects.

### 4.2 Questionnaires Response Rate

A total of 83 questionnaires, 48 to construction organizations (contractors and consultants) and 35 to public organizations were distributed out of which 49 are collected from volunteer respondents. Table 4.1 shows the summary of number of rate of responses by major stockholders.

**Table 4.1 Summary of number and response rate by participants.**

<b>No.</b>	<b>Participants</b>	<b>Distributed in Number</b>	<b>Returned in Number</b>	<b>Response Rate in %</b>
1.	Contractors	24	11	45.83
2.	Consultants	24	16	66.67
3.	Public organizations	35	22	62.86
	<b>Total</b>	<b>83</b>	<b>49</b>	<b>59.04</b>

In addition to the questionnaires, information was collected through 22 data sheets. Data were obtained from public clients (10 projects) and consultants administering public owned construction projects (12 projects).

### 4.3 Survey Results.

#### 4.3.1 Survey Results Obtained Through the Data Sheet

Twenty two public owned construction projects awarded on a least bidder bid awarding system were investigated. The data was obtained from public clients (10 projects) and consultants administering public owned construction projects (12 projects).

##### 4.3.1.1 Financial Evaluation of Bidders

In the researcher's effort to collect the summary of financial evaluation of bidders, it was possible to obtain the financial evaluation document for all of the projects from the public clients (10 projects) and 8 from consultants administering public projects out of 12 projects under the survey. The number of bidders in the survey is summarized in Table 4.2 below.

**Table 4.2 Summary of number of bidders**

No. of bidders	Data obtained from		
	Public clients	Consultants	Total
1 to 4	7	6	13
5 to 9	3	2	5
10 and above	0	0	0
Unknown	0	4	4
<b>Total</b>	<b>10</b>	<b>12</b>	<b>22</b>

For most of the projects the number of bidders which are responsive and subjected to financial evaluation was less than five (more than 59%). All projects are awarded for the bidder who

offers the least price. The average of bidders' offer, engineer's estimate and the winner's offer is summarized in Table 4.3 below.

**Table 4.3 Summary of financial offers**

<b>Projects</b>	<b>Average of bidders' offer (A)</b>	<b>Engineer's estimate (B)</b>	<b>Winner's offer (C)</b>	<b>C/A (%)</b>	<b>C/B (%)</b>
Pr-1	578,955,819.50	557,859,141.43	541,718,515.00	93.57	97.11
Pr-2	560,045,576.00	612,018,837.12	537,524,143.00	95.98	87.83
Pr-3	158,558,236.00	121,311,616.51	136,120,676.00	85.85	112.21
Pr-4	401,717,221.75	335,735,213.47	372,420,036.00	92.71	110.93
Pr-5	694,344,982.00	529,457,990.25	617,731,977.00	88.97	116.67
Pr-6	802,977,822.33	525,512,890.96	545,262,748.00	67.91	103.76
Pr-7	319,475,425.00	240,769,907.69	309,755,259.00	96.96	128.65
Pr-8	645,285,964.20	623,598,090.96	546,964,937.00	84.76	87.71
Pr-9	537,451,403.80	478,633,246.35	502,877,507.00	93.57	105.07
Pr-10	579,256,642.25	698,333,424.59	453,990,619.00	78.37	65.01
Pr-11	9,864,289.75	Unknown	7,478,718.00	75.82	
Pr-12	18,989,253.50	Unknown	18,915,903.00	99.61	
Pr-13	3,374,055.75	Unknown	2,938,827.00	87.1	
Pr-14	8,276,067.00	Unknown	5,382,798.00	65.04	
Pr-15	88,474,895.67	Unknown	73,470,443.00	83.04	
Pr-16	22,211,877.25	Unknown	18,938,435.00	85.26	
Pr-17	51,589,099.00	Unknown	41,732,546.00	80.89	
Pr-18	65,087,310.20	Unknown	54,024,082.00	83	
Pr-19	33,185,996.00	Unknown	33,185,996.00	100	
Pr-20	16,047,961.00	Unknown	16,047,961.00	100	
Pr-21	11,689,464.95	Unknown	11,689,464.95	100	
Pr-22	11,431,397.64	Unknown	11,431,397.64	100	

From the eighteen projects that the researcher can find their financial evaluation reports, about 55.6% (10 projects) were awarded for the least bidders whose offers were between 85% and 100% of the average of all bidders offer. 33.3% (6 projects) were awarded to bidders whose offers were within the range of 70% to 85% of the average of all bidders offer. Only 11.1% (2 projects) were given to contractors whose prices were 65% to 70% of the average.

For the first ten projects with engineers estimate, the least offered prices for three projects were in the range of 85% to 100% of the estimate. Only one project was awarded for a contractor whose offer was 65.01% of the engineers estimate. On the other hand, six projects were given for least responsive bidders whose offers were more than 100% of the engineers estimate with the highest of 128.65%.

In all projects except two for the first ten projects with the engineers estimate, the average of all bidders offer is greater than the engineers estimate.

#### **4.3.1.2 Status of Projects**

Major contract data including contract value and extension of time given were collected for all projects under the survey. Moreover, status of the project in relation to the planned schedule and the actual progress were recorded and summarized in Table 4.4.

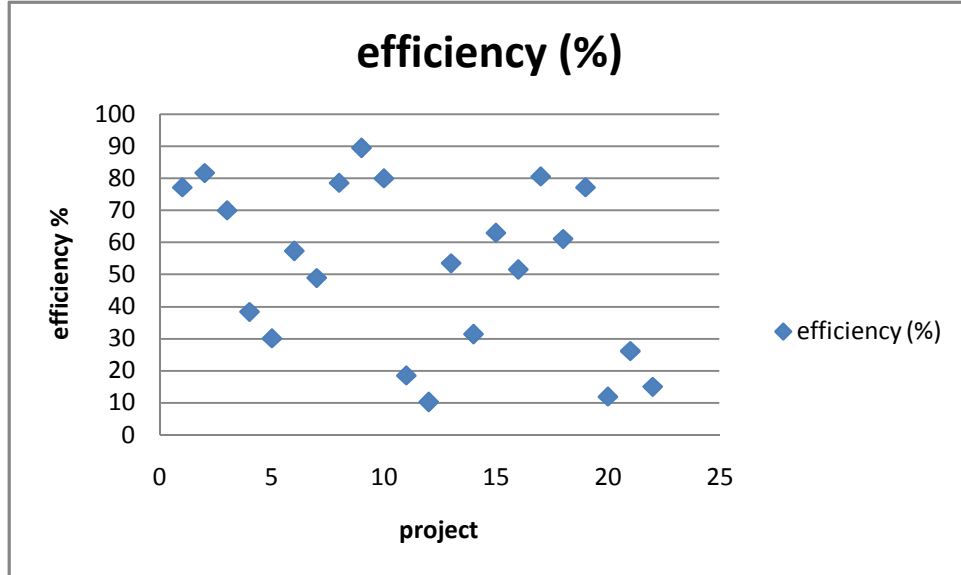
The efficiency of projects under the study, with respect to their progress compared to the schedule/time elapsed, ranges from 10.18% to 89.53%. Only 18.18% (4 projects) under the survey have efficiency greater than 80%. Most projects, 40.91% (9 projects) have achieved only 50% to 80% of their schedule. 22.72% (5 projects) have found attaining about 20% to 50% of the approved schedule. The remaining 18.18% (4 projects) have the poorest progress from their schedule, achieved less than 20% as low as 10.18%. The summary of efficiency of projects is shown in *Figure 4.1*.

**Table 4.4 Summary of work progress**

<b>Projects</b>	<b>Planned/time elapsed (%)<sup>[1]</sup></b>	<b>Work done (%)</b>	<b>Efficiency (%)</b>
Pr-1	100.27	77.42	77.21
Pr-2	69.26	56.57	81.68
Pr-3	103.22	72.25	70
Pr-4	98.78	37.85	38.32
Pr-5	86.37	25.93	30.02
Pr-6	99.33	56.98	57.36
Pr-7	59.89	29.3	48.92
Pr-8	69.62	54.7	78.57
Pr-9	82.20	73.59	89.53
Pr-10	0.5	0.4	80
Pr-11	150	27.68	18.45
Pr-12	988	100.58	10.18
Pr-13	200	107	53.5
Pr-14	318.67	100	31.38
Pr-15	3	1.89	63
Pr-16	101.66	52.42	51.56
Pr-17	45.59	36.74	80.59
Pr-18	34.14	20.85	61.07
Pr-19	138.23	106.75	77.23
Pr-20	392	46.38	11.83
Pr-21	380	99.02	26.06
Pr-22	443.33	66	14.89

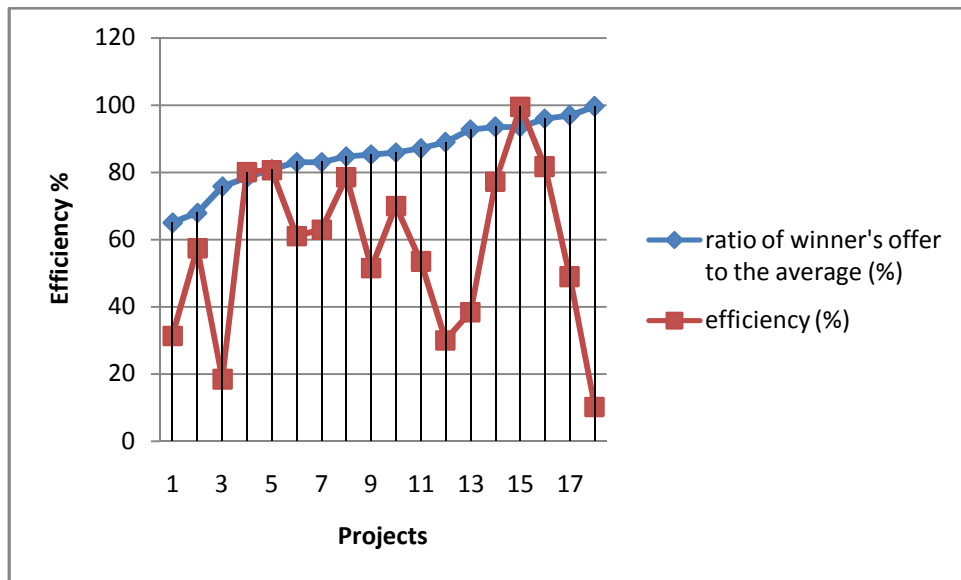
[1]when the percentage of time elapsed is greater than 100%, percentage of time elapsed is taken as percentage of work planned.

Where; 
$$\text{Efficiency (\%)} = \text{Progress (\%)} \times \frac{\text{Planned (\%)}}{\text{Time Elapsed (\%)}} \quad [\text{Eq. 4-1}]$$



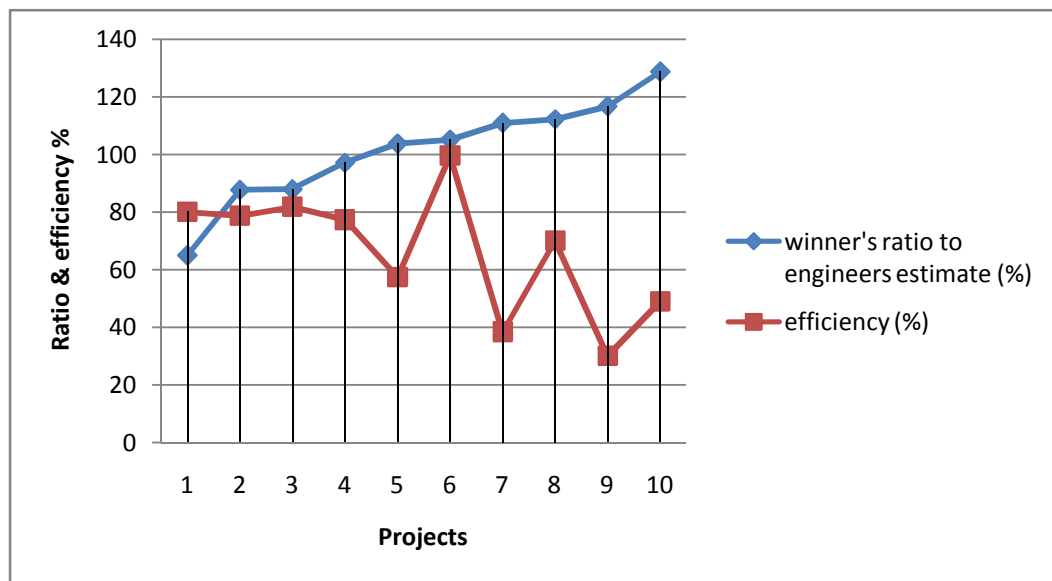
**Fig. 4.1 Efficiency of projects (progress/schedule)**

There seems no distinct relationship between the contractors' progress and the ratio of their bid price to the average offers and the engineers estimate. *Figures 4.2 and 4.3* below show the relationships.



**Fig. 4.2 Relationship between progress and ratio of winner's bid to the average offer**

Although it is difficult to reach on a definite relationship between the progress of works and the ratio of winner's bid to the engineers estimate, there is a tendency of decrement of the efficiency as the ratio increases. The basic reason, from my observation and through discussion with construction professionals, is due to the unreliable engineer's estimate of projects. In many organizations, engineer's estimates are made in the absence of up-to-date market prices of materials, equipment and manpower. None existence of standard market prices in different levels in the country and poor data base of private consultants and public clients have significantly affected the accuracy of the engineer's estimate. In addition, the unanticipated inflation in the country has also affected the contractor's performance. Projects which are subjected to price escalation are found performed better than projects where there is no provision for price escalation.



**Fig. 4.3 Relationship between progress and ratio of winner's bid to the engineers estimate**

#### **4.3.1.3 Major Difficulties Encountered During the Construction Process**

Projects under the survey were also assessed in respect of the major difficulties encountered during the construction process. Material shortage, equipment shortage, cash shortage, man power shortage, employer interference, design/drawing related and supervision related problems

were short listed by the researcher. Other prominent factors such as unexpected weather condition and security related problems were also discovered through the survey. Table 4.5 below summarizes the major difficulties encountered.

Material shortage (11 projects) and equipment shortage (10 projects) are the major problems encountered. Manpower shortage (7 projects) and cash shortage (6 projects) are the second most serious problems while design/drawing interference (3 projects) and supervision related (1 project) are less frequent problems while employer interference has no problem at all. Other factors mainly unexpected adverse weather condition and security related problems are also reflected in six of the projects under the survey.

**Table 4.5 Summary of major difficulties encountered**

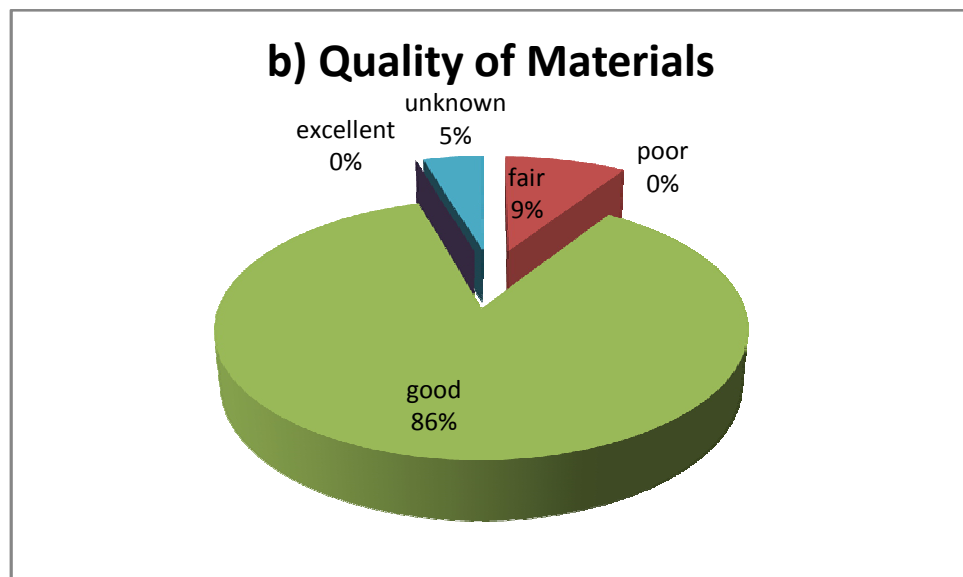
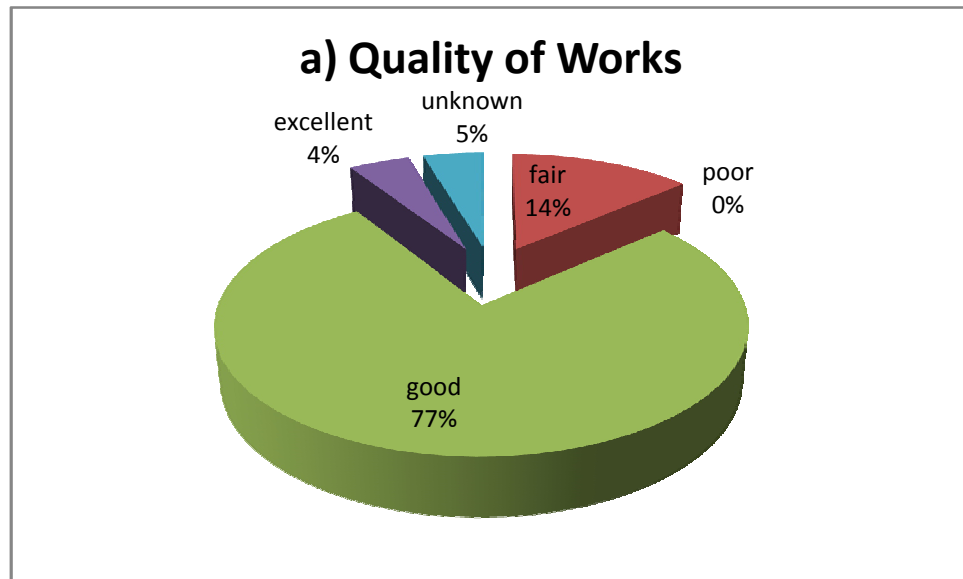
Major difficulties by type	Response rates		
	Yes	No	Unknown
Material shortage	11	9	2
Equipment shortage	10	8	4
Cash shortage	6	6	10
Manpower shortage	7	13	2
Employer interference	0	14	8
Design/drawing related	3	11	8
Supervision related	1	17	4
Otherø	6	1	15

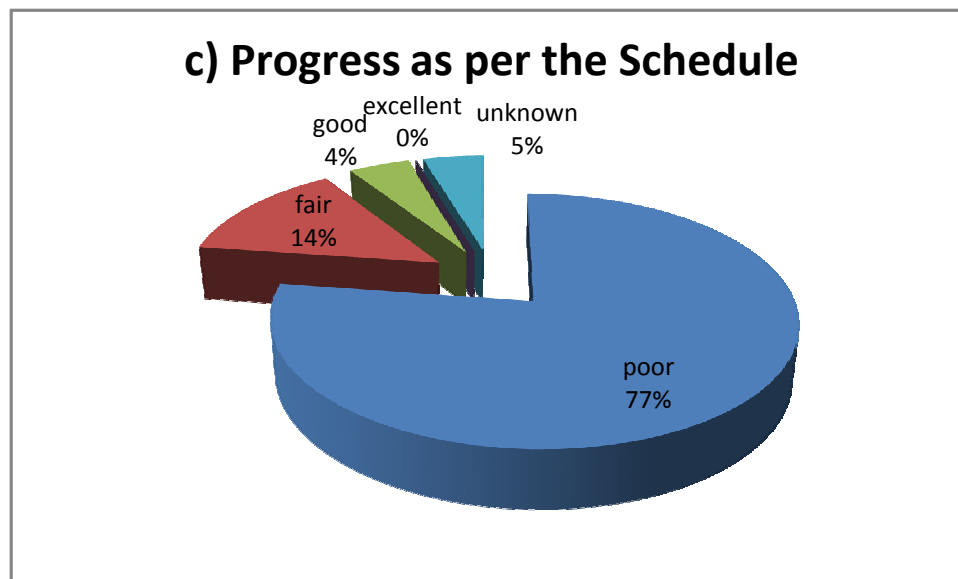
#### **4.3.1.4 Evaluation of Contractors Performance**

Contractorø performance in respect to quality of works, quality of materials and progress as per the schedule were identified for the projects under the study. The results show that the quality of works for most projects (77%) is good. Similarly the quality of materials is also good for most projects (86%). In contrast, the progress of most projects (77%) is discovered poor. These

performance evaluations of contractors are obtained solely from consultants administering Federal Government projects. The summary of evaluation of contractor's performance is summarized in *Figures 4.4a to c*.

**Fig.4.4 Performance evaluation of contractors**





#### **4.3.2 Survey Results Obtained Through Questionnaires**

Construction professionals from different organizations in the construction industry and from public organizations were asked through questionnaires. 55.1% of the respondents were from private organizations while the rest 44.9% are from public agencies and organizations.

Among the 27 respondents from private sector only three were from firms which have 26-50 employees, all other respondents were from an organization which has more than 50 employees. 30% of the private firms have been established in the last 5 to 10 years while the other 70% of the companies included in the survey has more than 10 years old in the business. From the public sector on the other hand, experts from Public Procurement Agency, Ministry of Works and Urban Development and Ethiopian Roads Authority were included in the study.

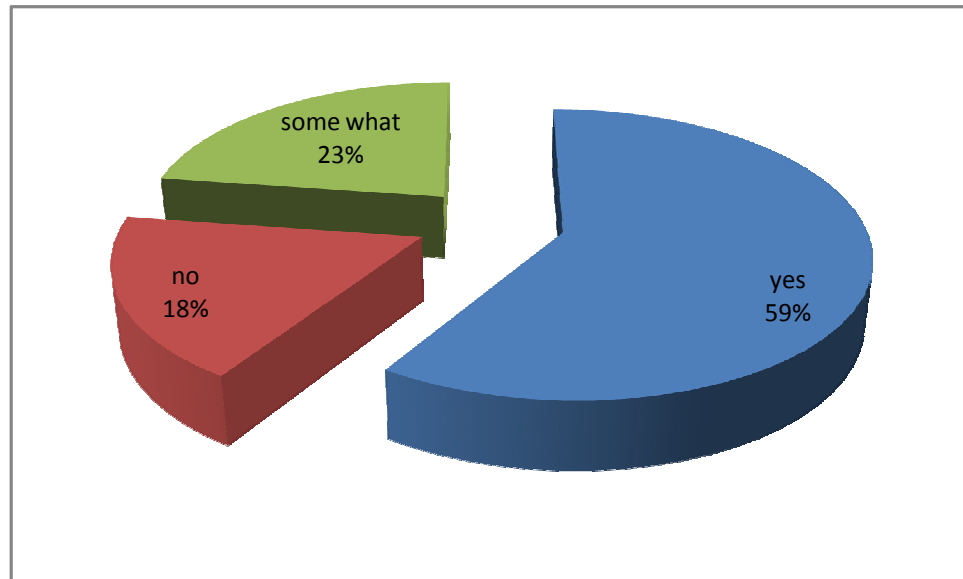
##### **4.3.2.1 Public Organizations Bid Evaluation Procedures**

Respondents were asked to describe their organization bid evaluation procedure. Alternatives were given in the questionnaire: Based on bid price only, Based on bid price and responsiveness & Based on bid price, responsiveness and other factors.

Only 23% of them replied that their organization bid evaluation procedure is based on bid price, responsiveness and other factors. All the other 77% respondents said their bid evaluation procedure is based on bid price and responsiveness. Respondents in the first group said that performance of contractors in their previous contract with that particular public organization would also be considered in the qualification criteria.

One of the five respondents where their organization's bid evaluation procedure is based on bid price, responsiveness and other factors explains its dissatisfaction with the bid evaluation procedure currently in use in their organization while the other four describes their satisfaction. On the other hand, only three of the 17 experts in the second group replied no for the question whether they are satisfied with the current procedure, and five of the respondents somewhat satisfied. The summary of respondents' opinion on their satisfaction on the bid evaluation procedure currently in use in their organizations is shown in *Figure 4.5* below.

**Fig. 4.5 Respondents satisfaction on current bidding procedure**



#### 4.3.2.2. Frequency of Project Delivery and Bid-Award Methods.

Three types of project delivery and bid awarding procedures; Competitive, Negotiated, RFP/RFQ, were identified and respondents were asked to choose the frequency, in %, of their organization's work awarded under these methods. In addition to these three methods, respondents were given the chance to indicate any other types of procedures their company's work might have been awarded. The response is summarized in Table 4.6.

**Table 4.6 Frequency of project delivery and bid award methods**

No.	Frequency in %	Competitive	Negotiated	RFP/RFQ	Others
1.	0% to 25%	0	0	0	0
2.	25% to 50%	2	0	1	2
3.	50% to 75%	0	0	0	0
4.	75% to 100%	20	0	0	0

The traditional competitive responsive least bidder bid awarding system has the highest frequency chosen by respondents (20), only two people said their organization use this procedure rarely (25% to 50% of the projects). Two respondents said that their organization use direct procurement for small construction projects and only one person said they use RFP for some projects (25% to 50%). None of the respondents has said negotiation is applied in their organization for the procurement of works.

Professionals from private organizations were also asked similar questions to indicate in % of their business obtained under the above delivery and bid-award methods. Synonymously, all respondents (27) indicated that their business has been obtained solely through the traditional competitive responsive least bidder bid awarding procedure.

#### **4.3.2.3 Ratings on Different Bidding Methods**

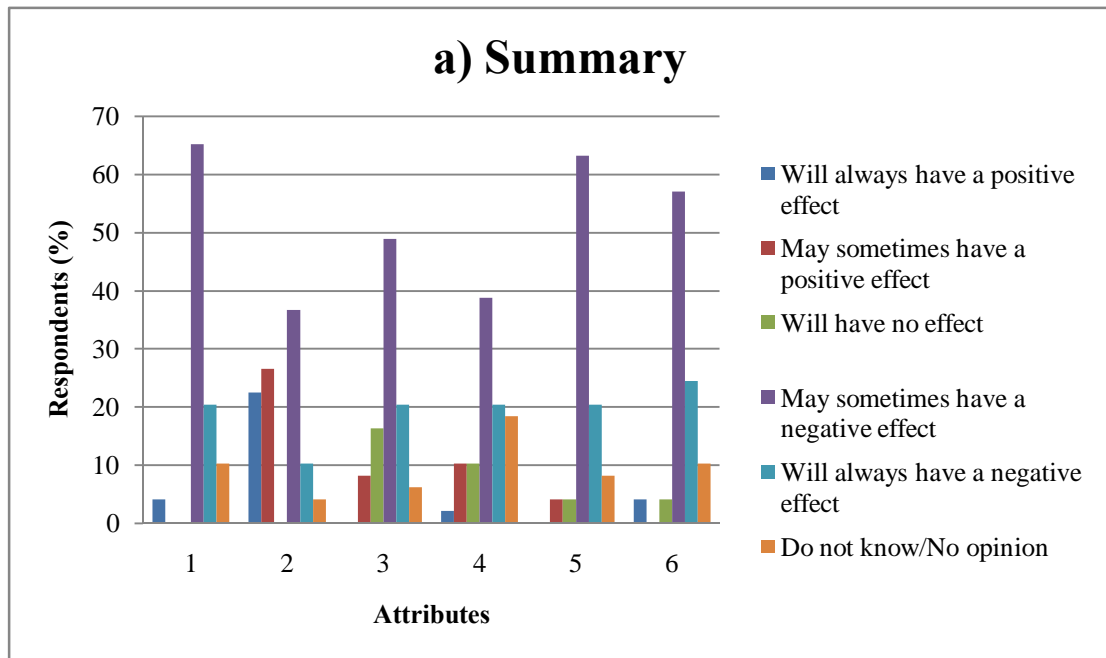
In the third part of the questionnaire, question 5, subjective rating on different attributes for the selected contract-award procedures of both construction organizations and public body respondents were asked. They were asked to rate each method on the basis of contractor's profit, employer's cost, disputes/claims, coordination, quality control, and project duration. They were advised to indicate, using a predefined scale, each method's possible effect on the attributes listed. The responses are discussed below.

##### **i. Competitive Low Bid Method**

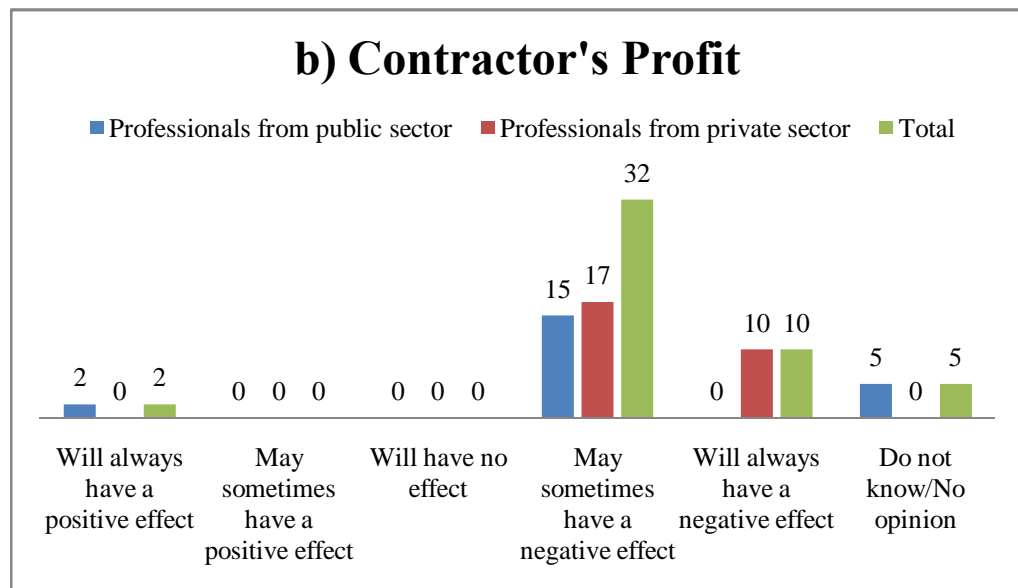
The results obtained for the competitive low bid method are shown in *Figure 4-6a to g*. Majority of the respondents, about 65%, thought that the current bidding method might sometimes have negative effect on contractor's profit. About 37% of the respondents believed that the method might sometimes have a negative effect on the owner's cost and the other 27% believed that it might sometimes have a positive effect in this regard. A majority of respondents indicate that competitive low bid method might sometimes have a negative effect on dispute/claims (49%), quality control (63%), and project duration (57%). On the project coordination issue, 38% of the respondents felt that it might have a negative impact and about 18% of the respondents indicate that they didn't know whether the method did have any effect on the issue.

As competitive low bid method is the major type of bid evaluation and contract award procedure for public projects, all construction projects included in this study were those which are awarded in this method. Interestingly, construction professionals from both groups (private and public) acknowledged the negative impact of this method on the contractor's profit. And hence the contractor will be forced to compromise quality of works to compensate the price. In addition, variations claims and other disputes are very common on construction projects awarded on least price procedure. Contracts awarded on least price procedure are also known for their unsatisfactory mobilization of resources, which leads to delays on project duration.

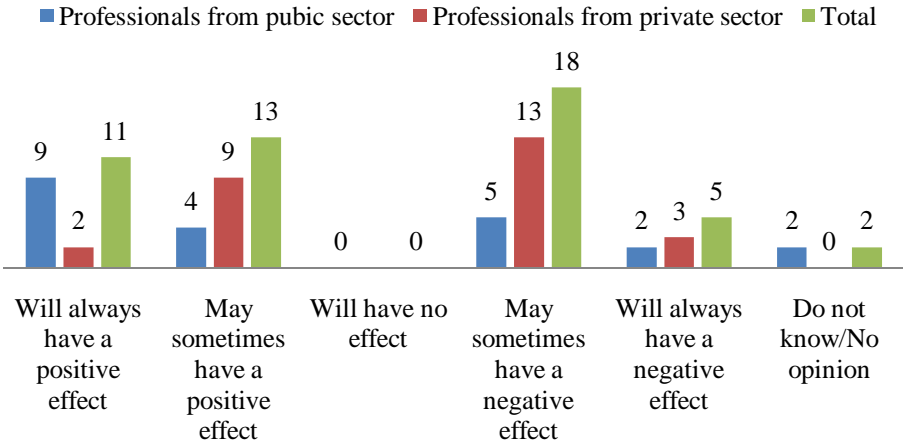
**Fig. 4.6 Ratings on competitive low bid method**



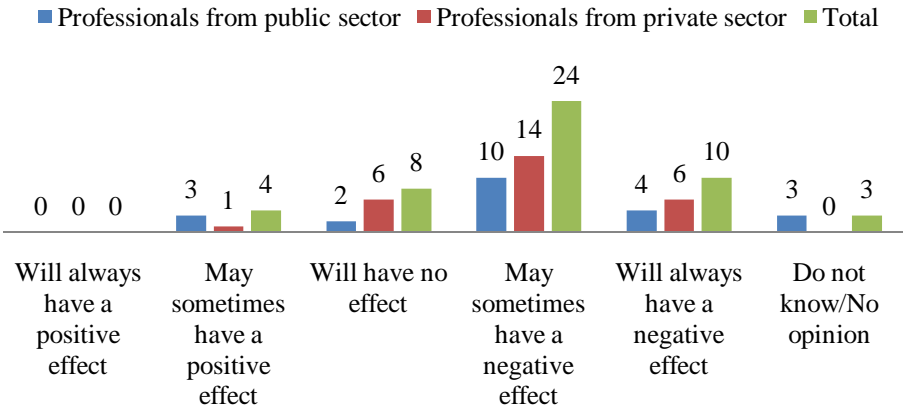
1= Contractor's profit, 2= Owner's cost, 3= Disputes/Claims, 4= Coordination, 5= Quality control, 6= Project duration



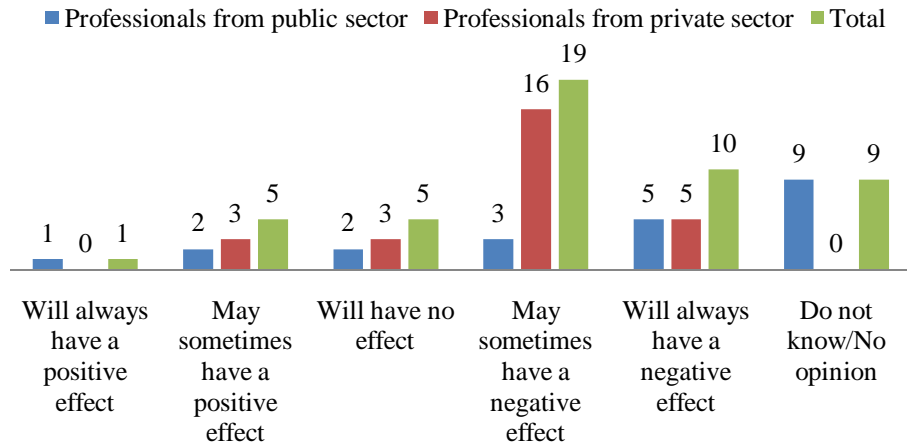
### c) Owner's Cost



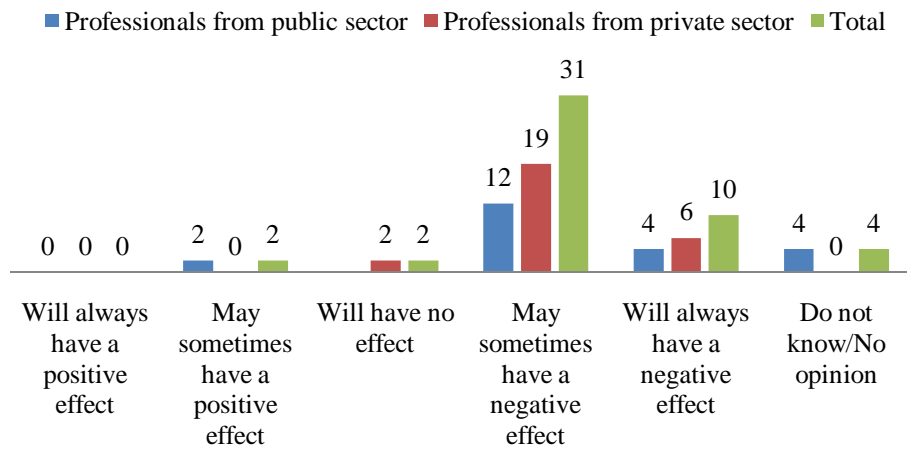
### d) Disputes/Claims

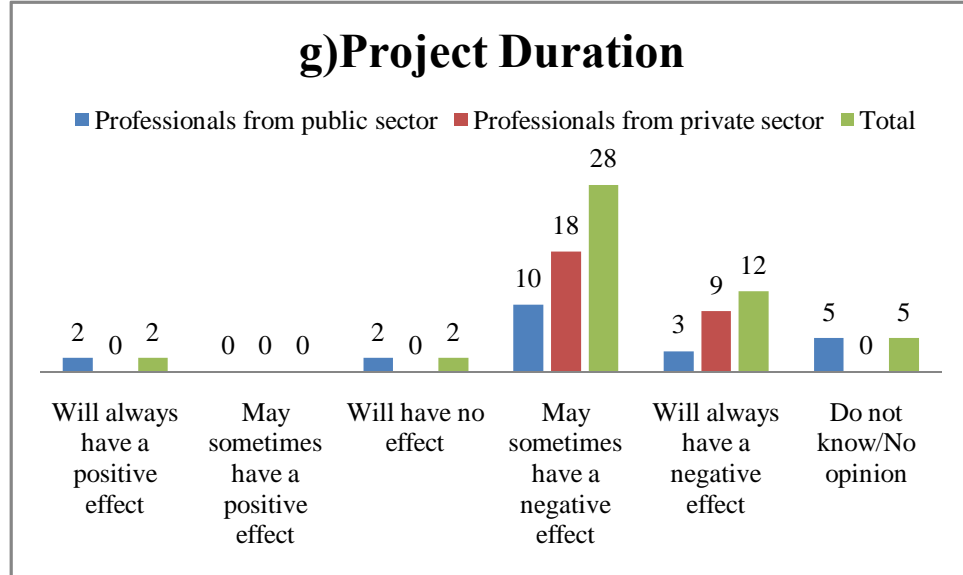


### e) Coordination



### f) Quality Control



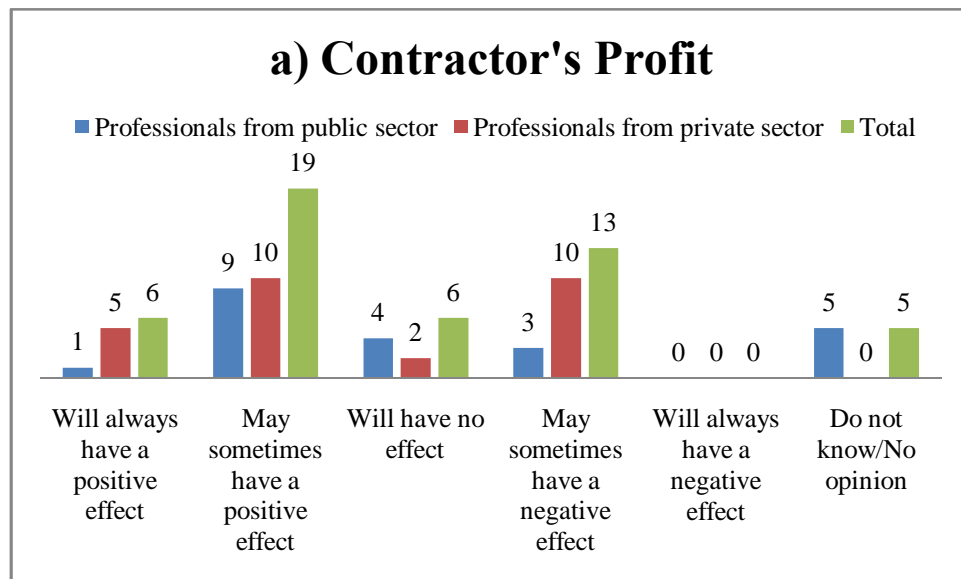


#### ii. Competitive Average Bid Method

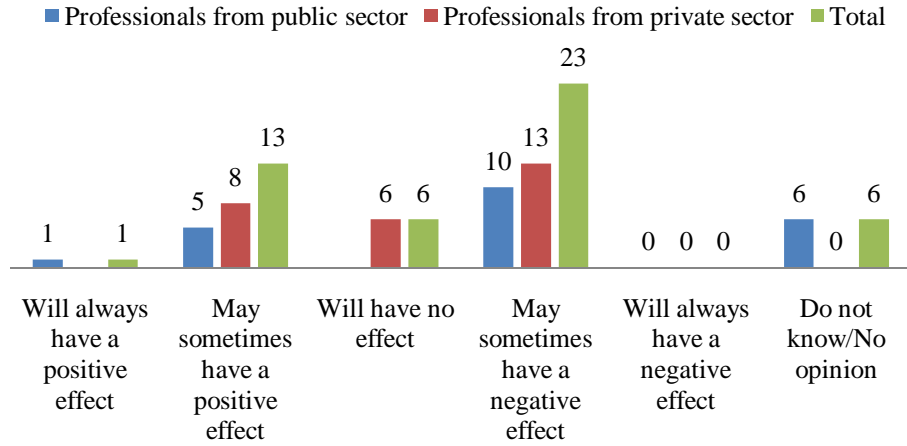
Responses on the competitive average bid method are summarized in *Figures 4.7 a to f*. About 19% of the private construction firms respondents indicated that they were not sure about how it would affect the listed attributes. About 23% of professionals from the public sector indicated the same. About 37% of the private sector and 41% of professionals from the public sector felt that the method might have a positive effect on contractor profit. 37% of the construction organizations respondents indicated that the method might have a negative effect on contractor profit. On the issue of owner's cost, the two groups reflected different ideas. About 30% of the construction organizations thought there would be a positive effect, and 48% indicated a negative effect. 27% of professionals from the public sector felt that owner's cost would be positively impacted if this method is used while 45% them indicated that the method might have a negative effect. 41% of respondents from public sector indicated that it might improve quality and would have positively affected coordination(50%),disputes/claims(41%) and project duration (55.5%). Majority of respondents from the private constructions firms indicated that this method might or would affect disputes/claims (55.6%), coordination (40.7%),quality control (55.5%), and project duration (41%) positively.

Competitive average bid method is not included in the Federal Government procurement law. Therefore, no single project can be found to study the actual performance of such contracts. However, construction professionals have reflected their ideas on this procedure based on their personal knowledge and through discussions with the researcher. Most of the participants granted the merits associated with awarding contracts to the responsive bidder whose bid is closest to some average, not for the minimum. They believed that abnormally low bids become the major headache of the construction industry. However, professionals from the public sector reflected their worry on the negative impact it might have on the owner's cost.

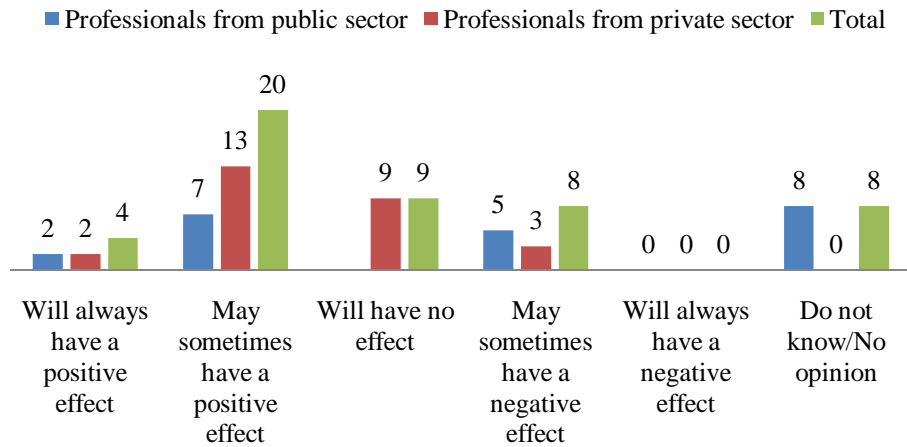
**Fig. 4.7 Ratings on competitive average bid method**



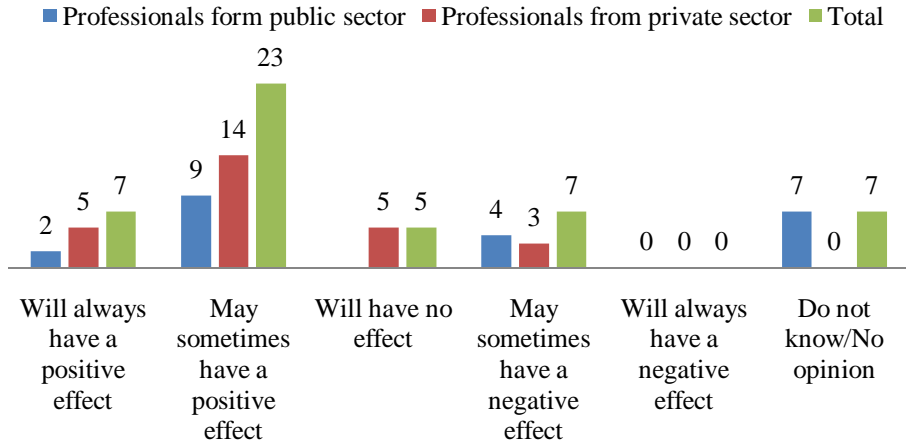
## b) Owner's Cost



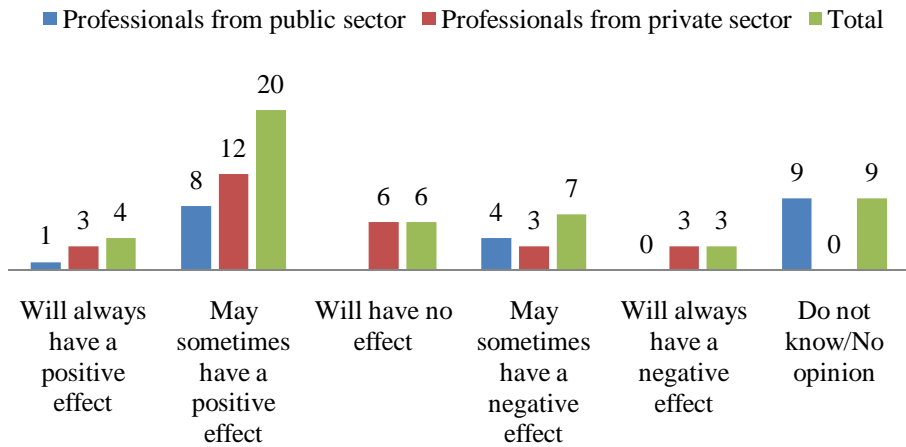
## c) Disputes/Claims

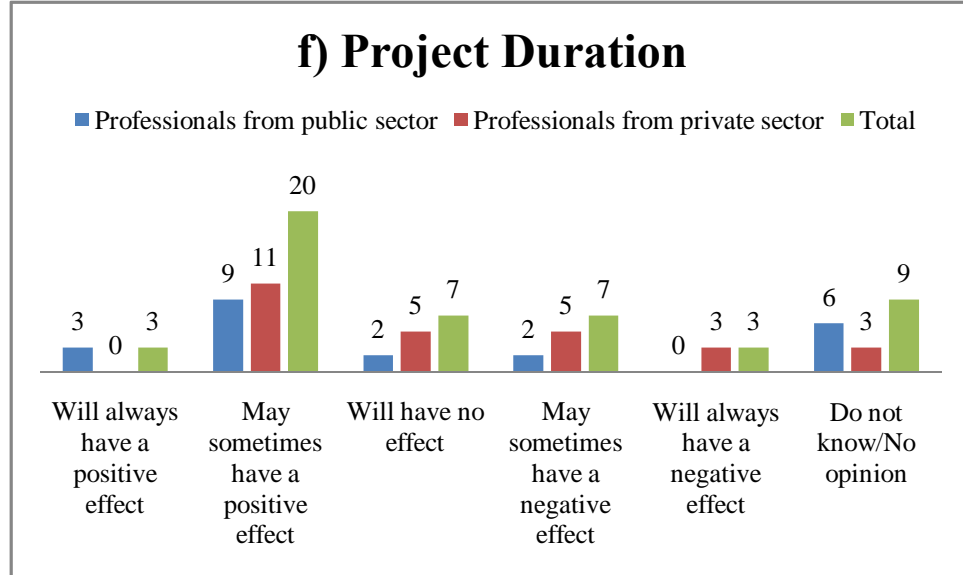


### d) Coordination



### e) Quality Control



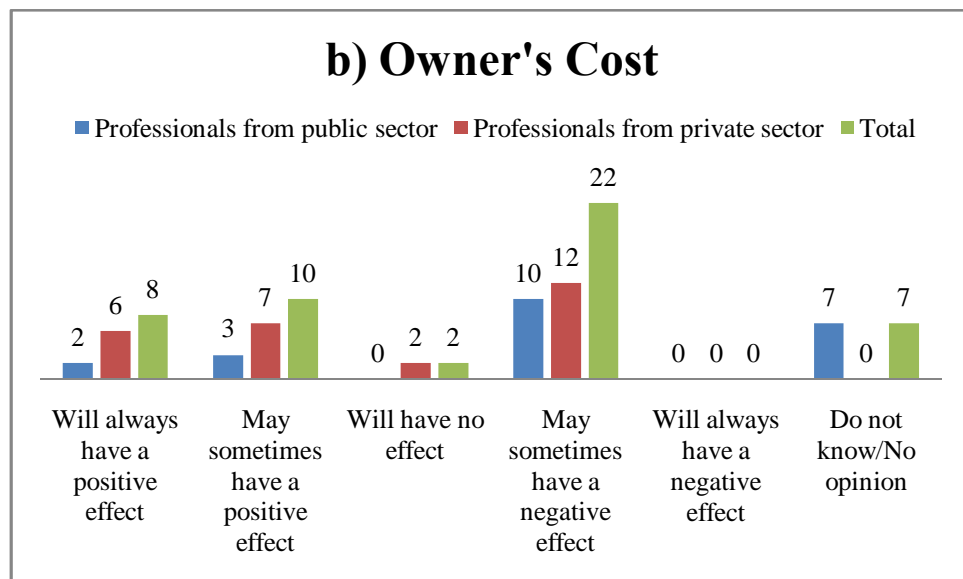
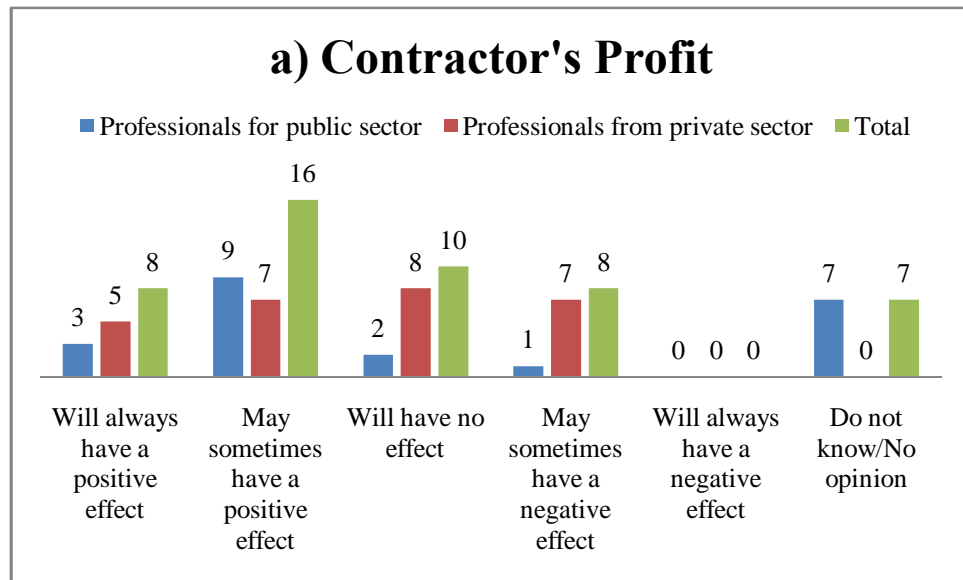


### iii. RFP/RFQ (Competitive Negotiated) Method

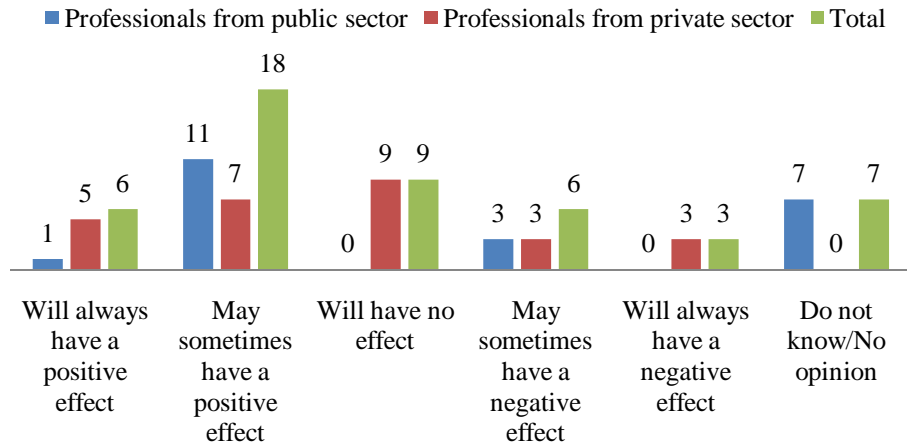
Most of the respondents in the construction organization group (44.4-66.7%) indicated that the RFP/RFQ method would positively affect all the listed attributes. The responses are shown in *Figures 4.8a to f*. A considerable portion in the public organization respondents (27.3-36.3%) indicated that they did not know how it would have any effect on the attributes listed. It is interesting to note that although most of the respondents from public organizations felt that this method would positively impact most of the attributes, 45.5% of them thought it might affect owner's cost negatively.

Although RFP/RFQ method is introduced in the procurement law, its application is limited to consultancy services. The major drawbacks raised associated with this procedure are its susceptibility for fraud and corruption. Most professionals believed that this method can be used only for small projects and/or special projects which need special attention for public interest. This method is discouraged mainly to avoid corruption during selection of contractors for negotiation and possible ring formation among selected contractors which ultimately increases owner's cost.

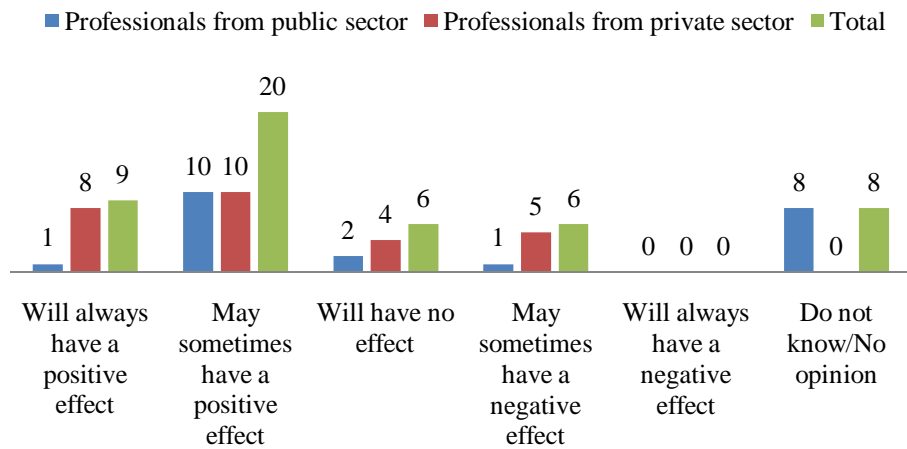
**Fig. 4.8 Ratings on RFP/RFQ bid method**

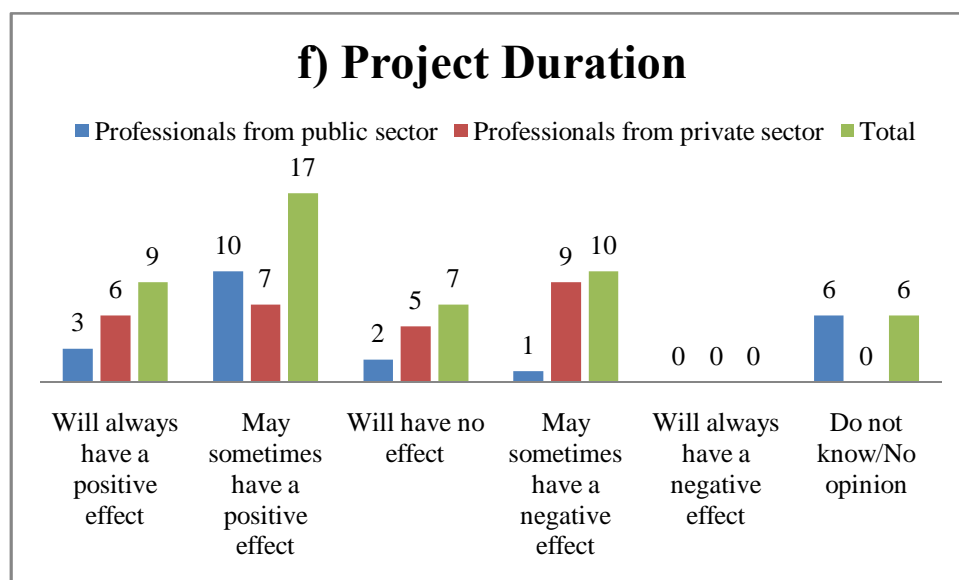
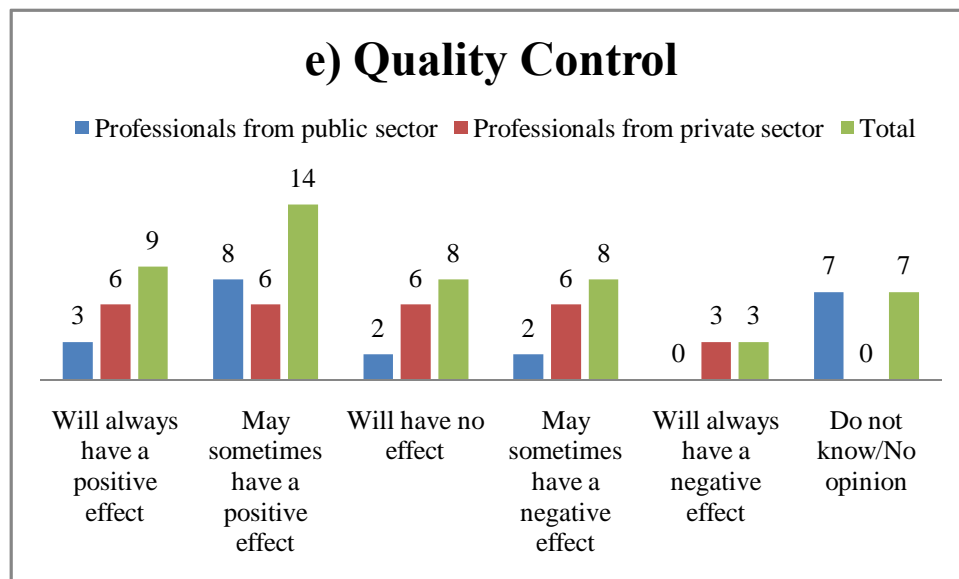


### c) Disputes/Claims



### d) Coordination





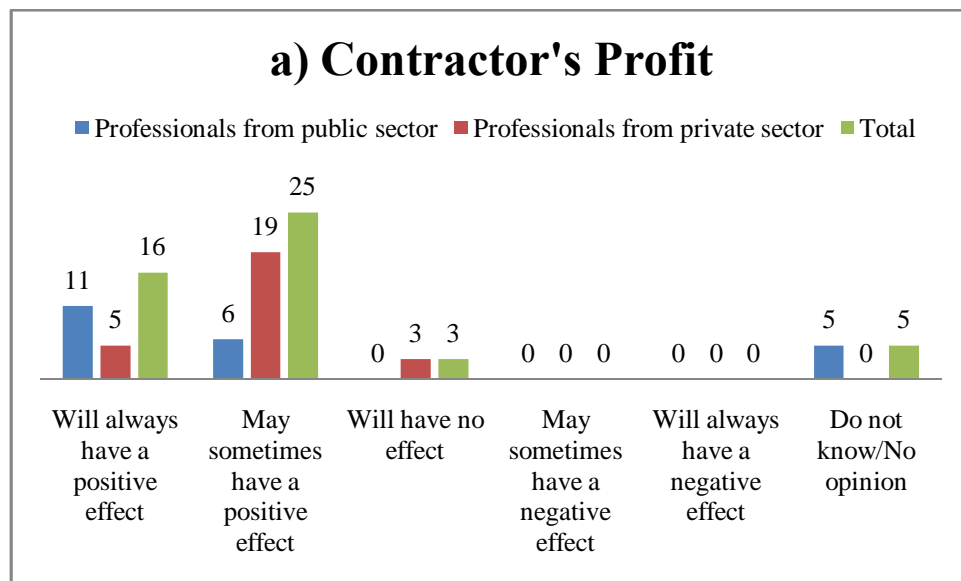
#### iv. Negotiated Bid Method

Responses of professionals from both private construction organizations and public sectors are summarized in *Figures 4.9a to f*. 59.3-88.9% of the responding construction organizations indicated that this method either would or might have a positive effect on the listed attributes except the owner's cost (13.6). 63.6% of the public organizations and 81.5% of private organizations responded that the method either would or might have a negative effect on owner's

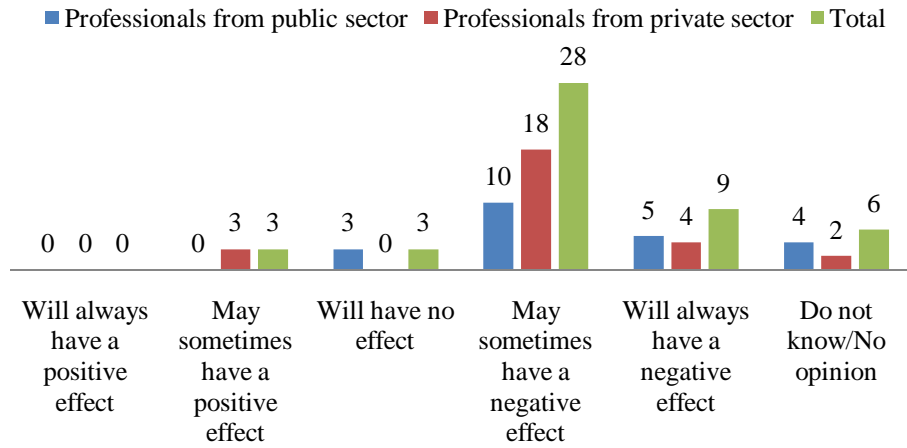
cost. About 50-77.3% of the public agencies indicated positive effect on the listed attributes except owner's cost (none).

Negotiated bid method is restricted to procurement of variation works in public procurement. The main reason for its unpopularity is its vulnerability for fraud and corruption during contractor's selection and during negotiation of price with the selected contractor. It is also discouraged because the method does not guarantee equal opportunity for contractors which can satisfy the minimum technical requirements. If contracts are awarded by negotiation, all listed attributes will be improved except owner's cost. Therefore, great care should be taken during contractor's selection and during the negotiation of prices between the contractor and the owner.

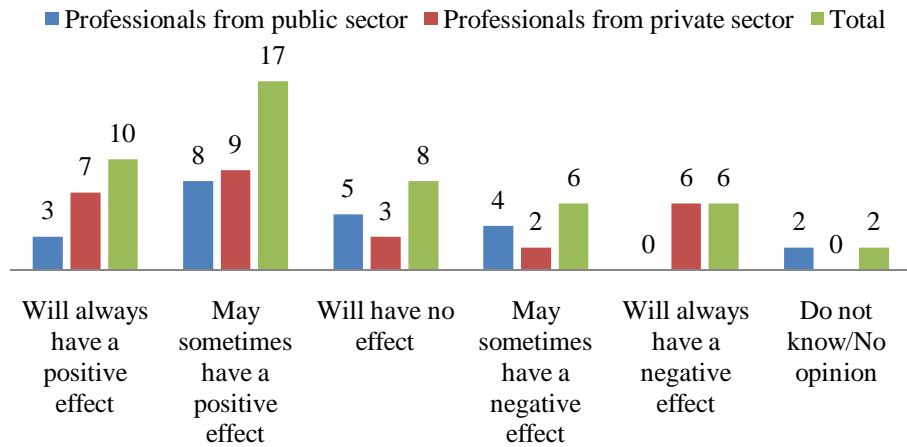
**Fig. 4.9 Ratings on negotiated bid method**



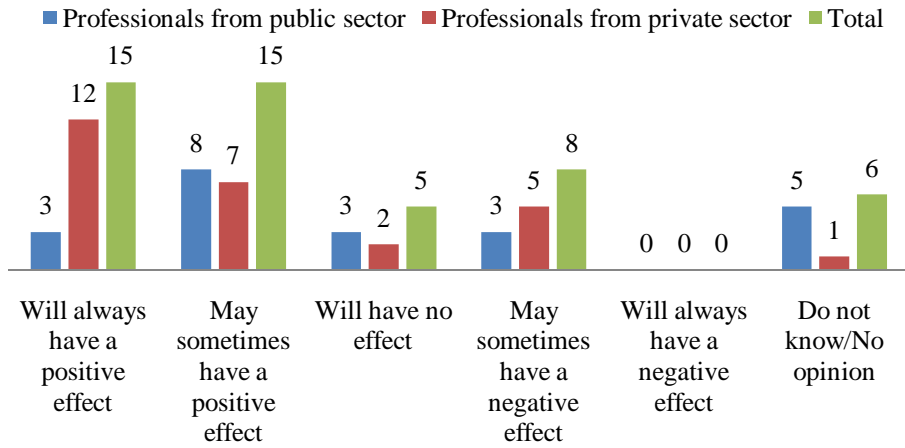
## b) Owner's Cost



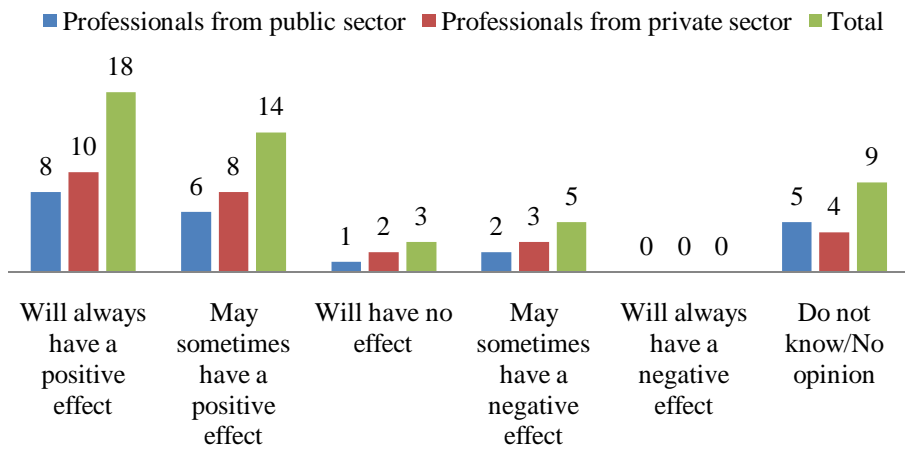
## c) Disputes/Claims

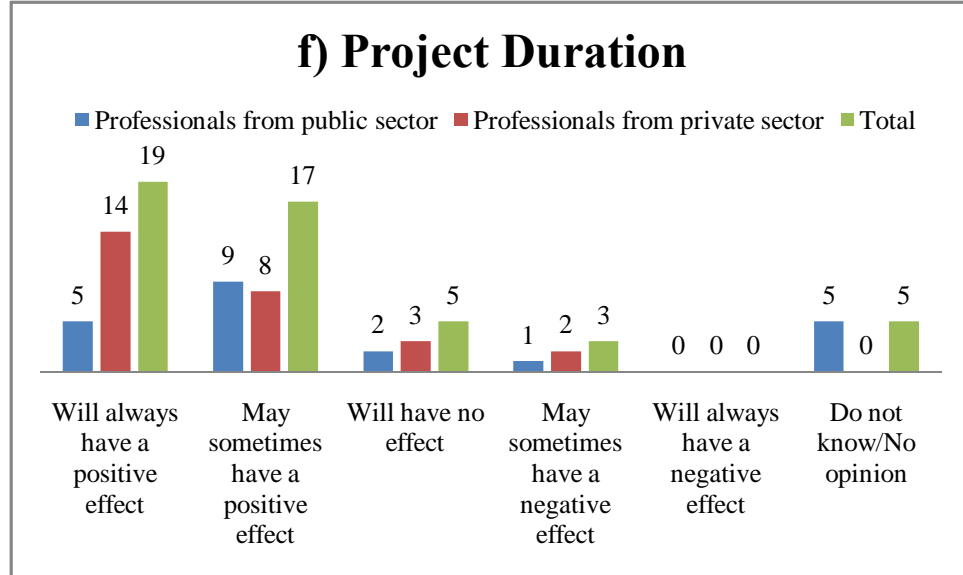


### d) Coordination



### e) Quality Control





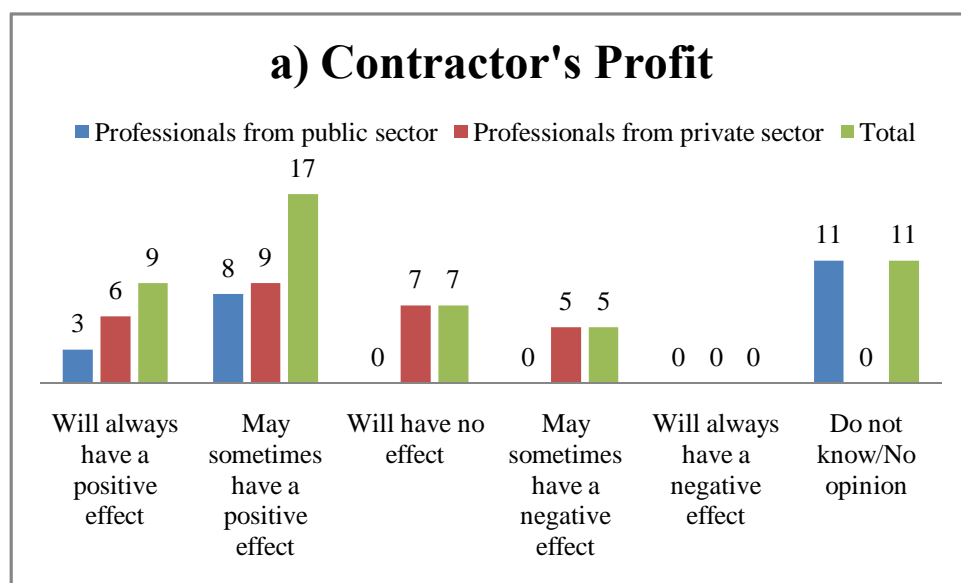
**v. Subjective Rating Method**

Figures 4.10a to f show the response distributions of the respondents from private construction firms and public organizations on the subjective rating method. About 55.6% of the construction firm respondents indicated that it would have a positive effect on contractor profit, 50% of the public sector respondents indicated the same. A considerable portion of public organization respondents (50%) said they didn't know its effect on contractor's profit. 55.6% of respondents from the private sector felt that it would impact owner's cost negatively. About 31.8% in public sector group indicated that it might negatively impact the owner's cost. 36.4-50% of the public sector respondents indicated that they did not know whether this method would have any effect on the listed attributes. About 40.7-59.3% of the responding professionals from the private sectors indicated positive impact of this method on disputes/claims, coordination, quality control, and project duration. Among the public sector respondents about 36.4% thought it might have a positive effect on coordination, quality control, and project duration.

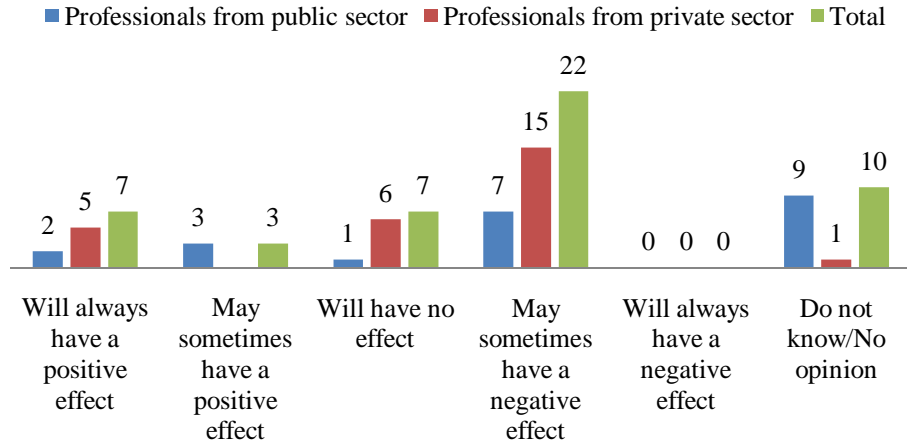
The Federal Government procurement law does not allow subjective rating method for procurement of works. People in favor of this procedure strongly argue that this method would encourage competent contractors to participate in the tender process. And hence, the possibility

of selecting responsive and responsible contractor will be higher. In addition, inexperienced contractorø which might offer abnormally low bids will have little chance of winning the tender because the winner is identified by the cumulative result of the technical and financial offers. However, most professionals believe that this procedure might positively affect the ownerø cost. Moreover, highly qualified professionals for the bid document preparation and evaluation of bids will be important if subjective rating bid method is used.

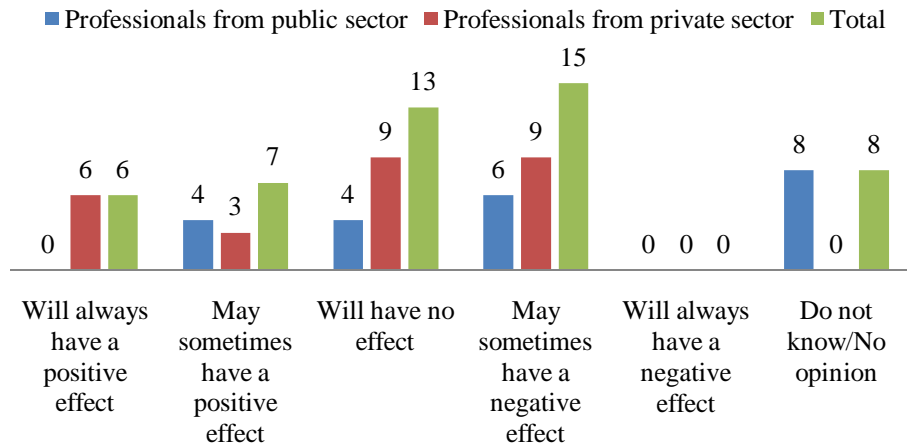
**Fig. 4.10 Ratings on subjective rating method**



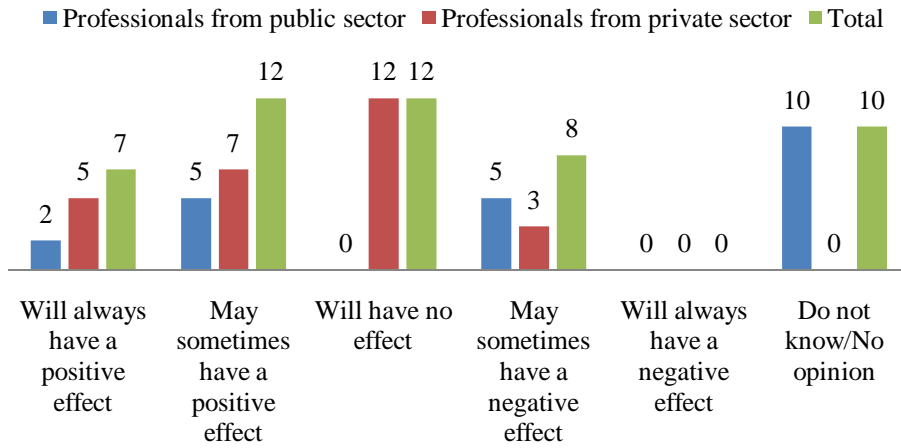
## b) Owner's Cost



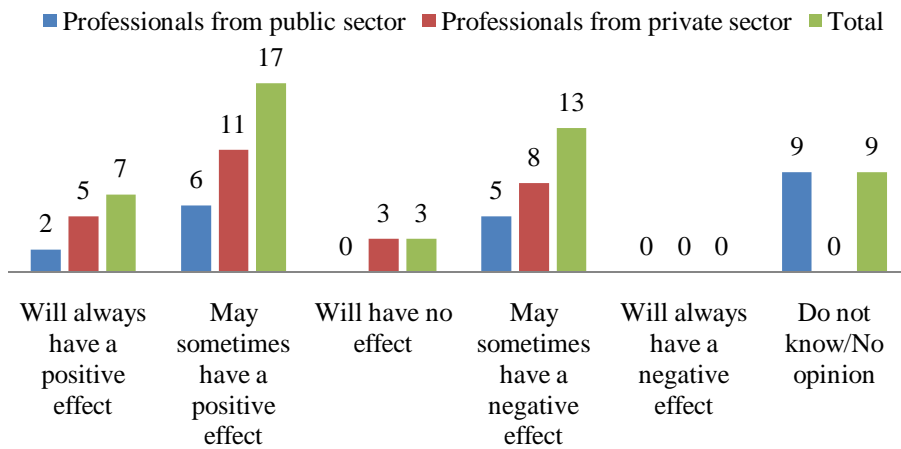
## c) Disputes/Claims

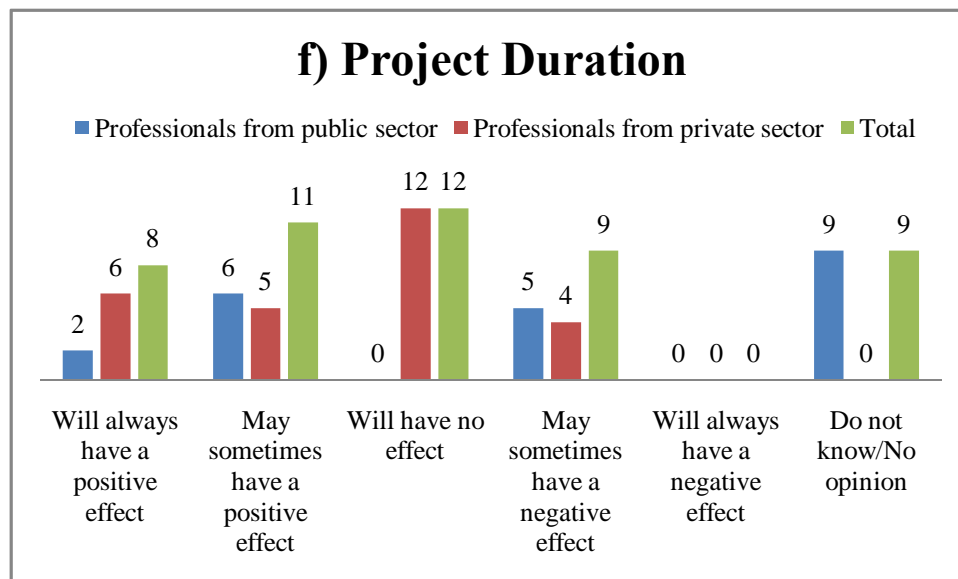


### d) Coordination



### e) Quality Control





#### 4.3.2.4 Opinions on Stated Effects and Alternative Bidding Practices

In question 6 respondents were asked to provide a score to each of the statements based on their degree of agreement (or disagreement). The responses obtained from both professionals from public institutions and private organizations are shown in *Tables 4.7a to l*.

**Table 4.7 Responses given to different bidding practices**

**a) Competitive bidding system has worked well in the past and therefore will work well in the future. No change is necessary**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
	Public	no	5	9	7	0
%		22.7	40.9	31.8	0	4.5
Private	no	0	13	11	3	0
	%	0	48.1	40.7	11.1	0
Total	no	5	22	18	3	1
	%	10.2	44.9	36.7	6.1	2

Majority of the respondents, 40.9% from public and 48.1% from the private respondents, said that they would agree with the current bidding system and they believe that no change is necessary. On the other hand, a considerable portion of respondents from the private sector (51.8%) strongly disagree or disagree with this statement. The figure for public sector respondents who didn't strongly disagree was 31.8%.

**b) Competitive system with provision to award contracts to bidders closest to the average of all bidders should be adopted**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	4	9	6	1	2
	%	18.2	40.9	27.3	4.5	9.1
Private	no	0	15	10	2	0
	%	0	55.6	37	7.4	0
Total	no	4	24	16	3	2
	%	8.2	49	32.7	6.1	4.1

About 59% of public sector respondents believe that competitive system with provision to award contract to bidders closest to the average of all bidders should be adopted; about 31.8% was against this idea. Synonymously, majority of the respondents from the construction organizations (55.6%) agreed on this statement while 44.4% of them did reject this alternative.

**c) Competitive system with provision to award contracts to lowest bidder which is within some predefined range of the engineer's estimate should be adopted**

Big differences on opinions from the two groups were observed on this issue. While majority of the public sector respondents (63.7%) would agree or strongly agree with the statement, 62.9% of the respondents from construction organizations were against the idea.

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	4	10	4	3	1
	%	18.2	45.5	18.2	13.6	4.5
Private	no	3	7	11	6	0
	%	11.1	25.9	40.7	22.2	0
Total	no	7	17	15	9	1
	%	14.3	34.7	30.6	18.4	2

**d) Competitive system with provision to award contracts to bidders closest to the average of all bidders and the engineer's estimate should be adopted**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	3	8	7	2	2
	%	13.6	36.4	31.8	9.1	9.1
Private	no	3	19	5	0	0
	%	11.1	70.4	18.5	0	0
Total	no	6	27	12	2	2
	%	12.2	55.1	24.5	4.1	4.1

Professionals from the private construction organizations were in favor of this contract award method, 81.5% of them would agree or strongly agree. Similarly, majority of public sector respondents (50%) supported the idea though a considerable portion of them (39.9%) explained their disagreement and 9.1% of the respondents in this group said they have no opinion on the issue.

**e) A combination of competitive and negotiated procedures should be used**

The two groups were also separated on this alternative. Majority of the public sector respondents (54.6%) gave their support, a considerable portion of this group (40.9%) were against. On the contrary, 59.2% of the respondents from the private construction organizations respondents

would disagree or strongly disagree with this alternative. Only 29.6% of respondents in this group showed their agreement.

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	No	2	10	1	8	1
	%	9.1	45.5	4.5	36.4	4.5
Private	No	0	8	13	3	3
	%	0	29.6	48.1	11.1	11.1
Total	No	2	18	14	11	4
	%	4.1	36.7	28.6	22.4	8.2

**f) Bidding procedure should depend on type and complexity of the project**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	17	5	0	0	0
	%	77.3	22.7	0	0	0
Private	no	22	5	0	0	0
	%	81.5	18.5	0	0	0
Total	no	39	10	0	0	0
	%	79.6	20.4	0	0	0

**g) Prequalification of contractors should be used instead of changing the traditional bidding procedure**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	9	5	7	0	1
	%	40.9	22.7	31.8	0	4.5
Private	no	2	10	5	10	0
	%	7.4	37	18.5	37	0
Total	no	11	15	12	10	1
	%	22.4	30.6	24.5	20.4	2

It was interesting to note that all respondents from both groups supported the idea of using different bidding procedures depending on the type and complexity of projects.

On the prequalification issue, the two groups were reacted differently. Majority of respondents from public organizations (63.6%) would agree or strongly agree with this alternative, about 32% them in the same group were against. On the other group, about 54% of the professionals were not in favor of the issue. About 45% of the repliers in this group supported the alternative.

**h) Subjective Evaluation factors (such as, schedule, organization, and qualification of personnel) other than cost should be reflected in contract award**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	5	9	3	2	3
	%	22.7	40.9	13.6	9.1	13.6
Private	no	5	19	0	3	0
	%	18.5	70.4	0	11.1	0
Total	no	10	28	3	5	3
	%	20.4	57.1	6.1	10.2	6.1

**i) Traditional bidding procedure (Competitive low-bid) encourages contractors to be innovative**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	0	2	13	5	2
	%	0	9.1	59.1	22.7	9.1
Private	no	0	2	8	17	0
	%	0	7.4	29.6	63	0
Total	no	0	4	21	22	2
	%	0	8.2	42.9	44.9	4.1

The reflection of subjective evaluation factors other than cost in contract award was highly favored by private sector respondents (88.9%). Majority of the repliers in the other group (63.6%) also gave their support for this issue. A considerable portion of respondents in public organizations (13.6%) did not know about this contract award method.

**j) Traditional bidding procedure guarantees the lowest cost project, but not necessarily the best**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	10	8	2	0	2
	%	45.5	36.4	9.1	0	9.1
Private	no	11	16	0	0	0
	%	40.7	59.3	0	0	0
Total	no	21	24	2	0	2
	%	42.9	49	4.1	0	4.1

**k) Favoritism and corruption cannot be avoided if negotiated bid procedure is used**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	7	7	5	0	3
	%	31.8	31.8	22.7	0	13.6
Private	no	12	15	0	0	0
	%	44.4	55.6	0	0	0
Total	no	19	22	5	0	3
	%	38.8	44.9	10.2	0	6.1

**l) Bid evaluation method should depend on the type of contract (e.g. design-build, turn-key, fixed-price, cost-reimbursable) selected**

Respondents		Strongly Agree	Agree	Strongly Disagree	Disagree	No Opinion
Public	no	9	7	3	0	3
	%	40.9	31.8	13.6	0	13.6
Private	no	20	7	0	0	0
	%	74.1	25.9	0	0	0
Total	no	29	14	3	0	3
	%	59.2	28.6	6.1	0	6.1

**4.3.2.5 Other Comments**

Only one comment was given by a participant from the public sector. He stated, “The traditional bidding system which has been used follow the least bidder which will no guarantee the quality of work. Most of our contractors try to submit the lowest rate by thinking the way they will gain that money by compromising the quality of the work. So, in awarding a bid higher percentage should be given to the technical proposal than the financial proposal.”

It is uncommon these days to see contractors submitting unrealistically low bids assuming that they will compensate the price through variations and claims. Although only one person has described his opinion in this regard, I understood through interviews and discussions that the idea has been shared by many others in the construction industry.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

The method of procurement of construction works has a significant role in the successful completion of the project. In this research, the performance of public owned construction projects awarded on the least bidder bid evaluation and contract award system were assessed. In addition, the researcher has tried to investigate opinions of construction professionals from private and public organizations about the current method of bid award procedure and other alternatives.

The following conclusions are drawn based on the assessment made on status of the projects and information gathered through questionnaires from construction professionals.

The researcher has investigated 22 public owned construction projects awarded on the basis of least bidder bid evaluation and contract award procedures. In addition, construction professionals' opinions regarding the current bid evaluation and contract award procedure and other alternatives were collected through 49 questionnaires (22 from public sector & 27 from private sector workers).

- ☐ All projects under the study have been awarded to responsive bidders with the least financial offers and the number of responsive bidders in most of the projects was found less than five.
- ☐ In all cases, the bids were awarded to the least bidders whose offers were less than the average of all bidders price.
- ☐ There was no engineers estimate for majority of the projects under the study. Because the current Federal procurement law does not incorporate the engineer's estimate in the bid evaluation and contract award procedure, most employers are discouraged to prepare the estimate.
- ☐ For those projects where the researcher was able to find engineers estimate, only few projects' engineers estimate were higher than the winners' offer. In most of the projects, the engineers' estimates were less than the average of all bidders offer.

- ▣ The progresses of all projects as compared to the approved schedule were less than 100%.
- ▣ It became difficult to find a clear relationship between the efficiency of projects and the ratio of winner's offer to the engineer's estimate and the average offers. Unrealistic engineer's estimate and unpredictability of the national market have partly affected the inconsistency of the relationships.
- ▣ Absence of standard price information from different level of the government about material, equipment and human resources and poor data base system of consultants and public clients are the major reasons for the unnatural engineer's estimate.
- ▣ Construction contracts with provision of price escalation are found performing better in the presence of startling inflation in the past few years than contracts with no price escalation.
- ▣ Most of the projects have been suffering in material and equipment shortages. Manpower shortage was also encountered in many projects.
- ▣ The researcher understood the respondents' unclear evaluation of contractor's performance in terms of qualities of materials and qualities of works. Most of the respondents believed that qualities are good because they related quality with structural failures only.
- ▣ Through the researcher's observation and in detailed discussion with construction professionals, major quality defects of works and materials has been observed in most of the projects under the study.
- ▣ The major reason for these quality defects has been the tendency of contractors to compromise their price because they had won the tender with abnormally low bids.
- ▣ It is discovered in the research that the progress as per the schedule of most projects awarded on the responsive least bidder bid award procedure was poor.
- ▣ It can be concluded from the research that least responsive bid evaluation and contract award procedure have been the main method of awarding public constructions works contract.

- ❏ Competitive low bid method has been highly criticized for its negative impact on contractor's profit, disputes/claims, coordination, quality control and project duration.
- ❏ Other alternative bidding procedures included in the study were highly appreciated by respondents for their positive effects on these attributes.
- ❏ Majority of the respondents supported the idea of adopting competitive system with provision to award contracts to bidders closest to the average of all bidders.
- ❏ Traditional bidding procedure has been criticized that it might guarantee the lowest cost project, but not the best.
- ❏ All respondents but few believed that traditional bidding procedure does not encourage contractors to be innovative.
- ❏ Respondents were divided into two opposite groups on the issue of adopting competitive system with provision to award contracts to lowest bidder which is within some predefined range of the engineer's estimate.
- ❏ Majority of the respondents have agreed to adopt competitive system with provision to award contracts to bidders closest to the average of all bidders and the engineer's estimate.
- ❏ Negotiated bid method is highly discouraged in the procurement of public construction works because it may foster fraud and corruption.
- ❏ Majority of the participants in the study have not accepted the use of combined competitive and negotiated bid method.
- ❏ Most people included in the study were interested about the use of prequalification of contractors instead of changing the traditional bidding procedure.
- ❏ All respondents believed that bidding procedure should depend on type and complexity of the project.
- ❏ Majority of the participants have the idea that subjective evaluation factors (such as, schedule, organization, and personnel) other than cost to be reflected in contract award.
- ❏ The idea of adopting different bid evaluation and contract award methods depend on the type of contract selected were also supported by majority of the participants.

## **5.2 Recommendations**

The findings of the research show the low level performance of public construction works contracts. The author of this thesis strongly recommends the Federal Government of Ethiopia to look for other alternative bid evaluation and bid award procedures.

Particularly, the researcher shared the idea of adopting the average bid method of awarding contracts among responsive bidders which are supported by many construction professionals included in the study. This method is highly preferable because it does not solely depend on either the engineer's estimate or the contractor's offer. On one hand, the engineer's estimate may minimize the risk of ring formation among contractors. On the other hand, the average of the contractor's bid may reflect the actual construction cost because they believed to have a detailed market assessment and hence an up-to-date prices.

In addition to the average bid method, as favored by all participants in the study, the Government should allow different bid evaluation and contract award procedures depending on the type and complexity of the project. Use of prequalification of contractors and use of subjective evaluation factors other than cost are the methods favored by construction professionals.

In this research it is discovered that Federal Government Projects performances are low in terms of quality and meeting schedule. In addition, it is also discovered that there is a higher appeal from construction professionals in the need of adopting other alternative bid evaluation and contract award procedures. Therefore, the researcher highly recommends fellow researchers to study the magnitude of the effect of the current bid evaluation and contract award system in the performance of Ethiopian public construction works.

It is also recommended that legislators should work along with higher institutions and other stakeholders before they produce/modify/change the bid evaluation and contract award system in the country. Finally, the concerned government body should consult professionals in this area on whether there is a need to modify/change the current legislation for procurement of works. And the modification/change, if any, should be based on research findings.

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## **APPENDICES**

**APPENDIX-A**

**DATA SHEET**

**PERFORMANCE EVALUATION OF PUBLIC CONSTRUCTION PROJECTS  
AWARDED IN LOWEST BIDDER BID-EVALUATION AND CONTRACT-AWARD  
SYSTEMS**

*Identification (Optional)*

Name of Employer: \_\_\_\_\_ Project Name: \_\_\_\_\_

Project ID No: \_\_\_\_\_ Type of Work: \_\_\_\_\_

1. Financial Evaluation of Bidders Summary

<b>Name</b>	<b>Corrected bid amount (Birr)</b>	<b>Remark</b>
Bidder 1		
Bidder 2		
Bidder 3		
Bidder 4		
Bidder 5		
Bidder 6		
Bidder 7		
Bidder 8		
Bidder 9		
Bidder 10		
Engineers Estimate		
Clients Estimate		

*Please fill only the first 10 least bidders if the number of tenderers is greater than 10.*

2. Status of the Project

<b>Description</b>	<b>Values</b>	<b>Remark</b>
Date of signature		
Contractor value main agreement birr		
Supplementary agreement birr		
Variation birr		
Total amount birr		

Contract time days		
Completion date		
Additional time given		
Extension of time given		
Revised completion date		
Time elapsed in days		
Time elapsed in %		
Percentage of work planned		
Percentage of work done		

3. Major Difficulties Encountered During the Construction Process

Major Difficulties By Type	Yes/No/Unknown
Material Shortage	
Equipment Shortage	
Cash Shortage	
Man Power Shortage	
Employer Interference	
Design/Drawing related	
Supervision Related	
Otherø	

4. Evaluation of the Contractorø Performance

Criteria	Poor/Fair/Good/Excellent/Unknown
Quality of Works	
Quality of Materials	
Progress as per the Schedule	

5. Any other comments: Attach additional pages, if necessary

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**THANK YOU FOR YOUR COOPERATION!!**

**APPENDIX-B**  
**QUESTIONNAIRE-PUBLIC RESPONDENTS**

**BID-EVALUATION AND CONTRACT-AWARD SYSTEMS IN PUBLIC  
CONSTRUCTION PROJECTS**

*Identification (Optional)*

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

1. What type of construction is your organization involved in?
  - A. Public buildings
  - B. Renovation/Additions/Interior
  - C. Heavy (Engineering/Highway)
  - D. Other (Please Specify): \_\_\_\_\_
2. How would you describe your organization's bid evaluation procedure?
  - A. Based on bid price only
  - B. Based on bid price and responsiveness
  - C. Based on bid price, responsiveness, and other factors,  
(Please Specify): \_\_\_\_\_
3. Are you satisfied with the bid evaluation procedure currently in use in your organization?
  - A. Yes
  - B. No
  - C. Somewhat
4. Please indicate Frequency, in %, of your organization's work awarded under the following project delivery and bid-award methods.

4.1 **Competitive** (Conventional method of awarding contract to the lowest responsive bidder)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

4.2 **Negotiated** (Negotiation with one or more preselected contractors)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

4.3 **RFP/RFQ** (Request for Proposal/Request for Qualification- Inviting proposals from contractors for prequalification and/or negotiation. Schedule, Quality Control and Cost Control techniques are considered in addition to the cost.)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

4.4 **Other.** Please specify \_\_\_\_\_

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

5. Use the following grading scale to indicate your ratings of each method on the basis of the attributes listed:

1. Will **always** have a **positive** effect
2. May **sometimes** have a **positive** effect
3. Will have **no** effect
4. May **sometimes** have a **negative** effect

5. Will **always** have a **negative** effect

6. Do not know/No opinion

*Example: if you select 5 for the attribute “coordination” against competitive low bid method, you are indicating that under this method coordination of project operation would always be adversely affected.*

	<b>Attributes</b>						
Bid Evaluation and Contract Award Methods	Contractor Profit	Owner's Cost	Disputes /Claims	Coordination	Quality Control	Project Duration	Other, please specify _____
Competitive Low Bid <sup>1</sup>							
Competitive Average Bid <sup>2</sup>							
RFP/RFQ <sup>3</sup>							
Negotiated <sup>4</sup>							
Subjective Rating <sup>5</sup>							
Other <sup>6</sup>							

<sup>1</sup> Conventional Federal practice of awarding contracts to responsive low bidder.

<sup>2</sup> Competitive, but the bid selected is nearest to the average of all bid offers.

<sup>3</sup> Contractors are invited to submit proposals for prequalification. Factors, other than cost, are considered to screen contractors. Contract is awarded or negotiated on the basis of sealed bids obtained from the selected contractors.

<sup>4</sup> Negotiation with preselected or prequalified contractors.

<sup>5</sup> Factors such as references from previous jobs, financial performance, bonding capacity, technical competence, etc. are subjectively rated and combined with the bid price to develop a scoring system. Bid is awarded to the highest scorer.

<sup>6</sup> Please specify: \_\_\_\_\_

6. With respect to the current bidding practices as you know them please indicate the degree to which you agree or disagree with the following statements using the following scale.

*4- Strongly Agree; 3-Agree; 2-Disagree; 1-Strongly Disagree; 0-No Opinion*

	<b>Description</b>	<b>Rank</b>
A	Competitive bidding system has worked well in the past and therefore will work well in the future. No change is necessary	
B	Competitive system with provision to award contracts to bidders closest to the average of all bidders should be adopted	
C	Competitive system with provision to award contracts to lowest bidder which is within some predefined range of the engineer's estimate should be adopted	
D	Competitive system with provision to award contracts to bidders closest to the average of all bidders and the engineer's estimate should be adopted	
E	A combination of competitive and negotiated procedures should be used	
F	Bidding procedure should depend on type and complexity of the project	
G	Prequalification of contractors should be used instead of changing the traditional bidding procedure	
H	Subjective Evaluation factors (such as, schedule, organization, and qualification of personnel) other than cost should be reflected in contract-award decisions	
I	Traditional bidding procedure (Competitive low-bid) encourages contractors to be innovative	
J	Traditional bidding procedure guarantees the lowest cost project, but not necessarily the best	
K	Favoritism and corruption cannot be avoided if negotiated bid procedure is used	
L	Bid evaluation method should depend on the type of contract (e.g. design-build, turn-key, fixed-price, cost-reimbursable) selected	

7. Any other comments: Attach additional pages, if necessary

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**THANK YOU FOR YOUR COOPERATION!!**

**APPENDIX-C**

**QUESTIONNAIRE-PRIVATE SECTOR RESPONDENTS**  
**BID-EVALUATION AND CONTRACT-AWARD SYSTEMS IN PUBLIC**  
**CONSTRUCTION PROJECTS**

*Identification (Optional)*

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

1. Primary area of business:
  - A. General Contractor
  - D. Building Contractor
  - E. Real Estate Developer/Builder
  - F. Specialty Contractor/Subcontractor
  - G. Consultant
  - H. Other (Please Specify): \_\_\_\_\_
2. Size of Firm/Organization:
  - A. Less than ten employees
  - D. 10 to 25 employees
  - E. 26-50 employees
  - F. Over 50 employees
3. How long is it since your company established?
  - A. Less than 2 years
  - B. 2 to 5 years
  - C. 5 to 10 years

D. More than 10 years

4. Please indicate Frequency, in %, of your business obtained under the following project delivery and bid-award methods. (only public projects)

**4.1 Competitive** (Conventional method of awarding contract to the lowest responsive bidder)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

**4.2 Negotiated** (Negotiation with one or more preselected contractors)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

**4.3 RFP/RFQ** (Request for Proposal/Request for Qualification- Inviting proposals from contractors for prequalification and/or negotiation. Schedule, Quality Control and Cost Control techniques are considered in addition to the cost.)

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

**4.4 Other.**

Please specify \_\_\_\_\_

- A. 0% to 25%
- B. 25% to 50%
- C. 50% to 75%
- D. 75% to 100%

5 Use the following grading scale to indicate your ratings of each method on the basis of the attributes listed:

1. Will always have a positive effect
2. May sometimes have a positive effect
3. Will have no effect
4. May sometimes have a negative effect
5. Will always have a negative effect
6. Do not know/No opinion

*Example: if you select 5 for the attribute “coordination” against competitive low bid method, you are indicating that under this method coordination of project operation would always be adversely affected.*

	<b>Attributes</b>						
Bid Evaluation and Contract Award Methods	Contractor Profit	Owner's Cost	Disputes /Claims	Coordination	Quality Control	Project Duration	Other, please specify _____
Competitive Low Bid <sup>1</sup>							
Competitive Average Bid <sup>2</sup>							
RFP/RFQ <sup>3</sup>							
Negotiated <sup>4</sup>							
Subjective Rating <sup>5</sup>							
Other <sup>6</sup>							

<sup>1</sup> Conventional Federal practice of awarding contracts to responsive low bidder.

<sup>2</sup> Competitive, but the bid selected is nearest to the average of all bid offers.

<sup>3</sup> Contractors are invited to submit proposals for prequalification. Factors, other than cost, are considered to screen contractors. Contract is awarded or negotiated on the basis of sealed bids obtained from the selected contractors.

<sup>4</sup> Negotiation with preselected or prequalified contractors.

<sup>5</sup> Factors such as references from previous jobs, financial performance, bonding capacity, technical competence, etc. are subjectively rated and combined with the bid price to develop a scoring system. Bid is awarded to the highest scorer.

<sup>6</sup> Please specify: \_\_\_\_\_

6 With respect to the current bidding practices as you know them please indicate the degree to which you agree or disagree with the following statements using the following scale.

*4- Strongly Agree; 3-Agree; 2-Disagree; 1-Strongly Disagree; 0-No Opinion*

	<b>Description</b>	<b>Rank</b>
A	Competitive bidding system has worked well in the past and therefore will work well in the future. No change is necessary	
B	Competitive system with provision to award contracts to bidders closest to the average of all bidders should be adopted	
C	Competitive system with provision to award contracts to lowest bidder which is within some predefined range of the engineer's estimate should be adopted	
D	Competitive system with provision to award contracts to bidders closest to the average of all bidders and the engineer's estimate should be adopted	
E	A combination of competitive and negotiated procedures should be used	
F	Bidding procedure should depend on type and complexity of the project	
G	Prequalification of contractors should be used instead of changing the traditional bidding procedure	
H	Subjective Evaluation factors (such as, schedule, organization, and qualification of personnel) other than cost should be reflected in contract-award decisions	
I	Traditional bidding procedure (Competitive low-bid) encourages contractors to be innovative	
J	Traditional bidding procedure guarantees the lowest cost project, but not necessarily the best	
K	Favoritism and corruption cannot be avoided if negotiated bid procedure is used	
L	Bid evaluation method should depend on the type of contract (e.g. design-build, turn-key, fixed-price, cost-reimbursable) selected	

7 Any other comments: Attach additional pages, if necessary

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**THANK YOU FOR YOUR COOPERATION!!**

## **DECLARATION**

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other universities and all sources of materials used for this thesis have been duly acknowledged.

Name: Laychluh Mehegiaw

Signature: \_\_\_\_\_

Place: Addis Ababa University, Faculty of Technology, Department of Civil Engineering

Date of Submission: \_\_\_\_\_