Construction Sector Transparency Initiative

Ethiopia

AGGREGATION, ANALYSIS, AND SYNTHESIS OF DISCLOSURE AND ASSURANCE REPORTS OF CONSTRUCTION PROJECTS COVERED BY COST-ETHIOPIA

# AGGREGATION STUDY REPORT


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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AT | Assurance Team |
| CoST | Construction Sector Transparency Initiative |
| DB | Design-Build |
| DBB | Design-Bid-Build |
| EIA | Environmental Impact Assessment |
| ERA | Ethiopian Roads Authority |
| ICB | International Competitive Bidding |
| ICP | Initial Contract Price |
| IDS | Infrastructure Data Standard |
| MOE | Ministry of Education |
| MPI | Material Project Information |
| MoWR/MoWIE | Ministry of Water Resources / Water Irrigation and Energy |
| NCB | National Competitive Bidding |
| PE | Procuring Entity |
| PM | Project Management |
| RIB | Restricted International Bidding |
| RFP | Request for Proposals |
| RNB | Restricted National Bidding |
| SCI | Service Contract I – Design Consultancy Service Contract |
| SCII | Service Contract II – Supervision and Contract Administration Consultancy Service Contract |
| ST | Study Team |
| TOR | Terms of Reference |
| TPC | Total Project Cost |
| USD | United States Dollar |
| WC | Works Contract |
| WWCE | Water Works Construction Enterprise |

# EXECUTIVE SUMMARY

The Construction Sector Transparency Initiative (CoST) is a country centered initiative to improve the value for money spent on public infrastructures by increasing transparency in the delivery of Government financed construction projects.

Disclosure of Material Project Information (MPI) or Infrastructure Data Standard (IDS) by its latest name is one of the three essentials of CoST. Assurance of the disclosed information and demand for accountability based on the disclosed information are the other basics of the Initiative.

In its course, CoST-Ethiopia has disclosed 52 construction projects from the three sectors, namely building, road, and water. All the projects covered by the disclosure have their own specific reports and to get better and more complete picture of the sectors and the industry at large; a study on aggregation, analyzing and synthesizing of the findings of the reports is essential. The results of such a study could be used as input by the Procuring Entities, the Government and other interested group.

The contents of key variables selected for the purpose of the Aggregation Study include tender process, construction cost, construction time, causes for concern, and other issues with other sub categories and the results of extraction, aggregation, and synthesis reveal the following major findings within the scope of the Aggregation Study:

## 1. Projects by Volume of Work

The Aggregation Study covers 52 projects from the building, water, and road sectors with a total initial project cost of Birr1 36,475,343,121.60 (USD 3,268,239,130.51). Ten projects with total project cost of Birr 2,061,405,198.89 (USD 158,474,490.35) are from the building sector; ten projects with total project cost of Birr 8,274,042,506.69 (USD 848,082,310.83) are from the water sector; and the remaining 32 projects with total project cost of Birr 26,139,895,416.02 (USD 2,261,682,329.33) are from the road sector.

## 2. Completeness of Project Studies

In relation to the process of project identification studies, water and road sector projects are implemented after feasibility, environmental, and other related studies are conducted followed by detailed engineering designs. However, building sector projects do not conduct feasibility and environmental impact assessment studies as part of project identification process except for one university project.

## 3. Tender Process

In the building sector, the majority of the projects in the building sector adopted a procurement delivery strategy of Design Bid Build (DBB) with separate consultancy services (SCI and SCII) and more that 75 per cent of the design and supervision contracts are outsourced to a single consultant by direct award. For Works contract, the majority of building contracts are procured through open bidding under National Competitive Bidding (NCB) procedure and the level of competition can be taken as fair competition2 for 70 per cent of the projects.

In the road sector, the level of competition in the Works contract is less than 50 per cent and is regarded as low for more than 76 per cent of the projects while for a relatively higher number of projects, the level of competition for both consultancy service contracts is regarded as fair, i.e. 63 per cent of the design

[1] Ethiopian currency

[2] Level of competition is taken as fair when greater than 50 per cent of the bidders who purchased bid document or shortlisted consulting firms participated in the technical and financial competing

contracts and 77 per cent of the supervision contracts procured in this sector can be taken as fair procurement with more than 50 per cent level of competition.

In the water sector, single source procurement is applied for the majority of projects as a preferred mode of procurement; i.e. direct award was applied for 70 per cent of the design contracts and 87.5 per cent of the supervision and Works contracts. The remaining contracts were procured through International Competitive Bidding (ICB) due to a mandatory requirement of the financer, the World Bank. In this sector, only 11 per cent of the design contracts and 12.5 per cent of the Works contracts is regarded as fair competition indicating a much lower level of Competition in the sector.

Furthermore, the majority of the projects in the building and water sectors were procured through National Competitive Bidding (NCB) with 83 and 95 per cent shares respectively. In the road sector, however, a slight majority of projects (53 per cent) were procured through International Competitive Bidding procedure. At industry level, 60 per cent of the projects covered by CoST-Ethiopia were procured through National Competitive Bidding while the remaining 40 per cent were procured through International Competitive Bidding procedure.

For Works contracts, it is revealed that all of the projects of the ICB contracts and 93 per cent of the projects of the NCB contracts have got sufficient bid preparation periods. The efficiency of bid evaluation and contract signing activities on these contracts is 73 and 20 per cent respectively indicating that there is a delay in contract signing for most of the Works contracts.

## 4. Construction Cost

### 4.1 Cost Overrun

The aggregate cost overrun at the time of disclosure of projects at industry level is 17.09 per cent that doesn't include the price escalation payment. At the time of disclosures, there is 65.18 per cent cost overrun in the water sector, 6.81 per cent in the building sector, and 3.18 per cent in the road sector.

The projects sampled for disclosure by CoST-Ethiopia assumed a different progress status, varying from near commencement to completion status and in order to show the actual cost overrun at the completion period of the projects, the cost overrun results have been updated for a selected number of projects from the three sectors. The update was performed by selecting six Works contracts from the building sector; thirteen from the road sector; and six from the water sector that were considered by CoST-Ethiopia.

The updated summary of cost overrun reveals that the aggregate cost overrun at industry level is 76 per cent and the average cost overrun in the building sector is 16.43 per cent; 41.61 per cent in the road sector; and 170.57 per cent in the water sector.

### 4.2 Reasons of Cost Overrun

Design change, incomplete designs, and changes in quantity are major reasons of cost overrun that share nearly 92 percent of the reasons for cost overrun in the building sector. In the road sector; the reasons of cost overrun are evenly distributed among six categories where design change is the major reason of cost overrun in the sector and incomplete design is not reported as a reason of cost overrun.

In the water sector; design change, scope change, and changes in quantity each share 26 per cent as a major reason for cost overrun with total share of 78 per cent followed by incomplete design.

### 4.3 Price Escalation

Price escalation payments made in the building sector is 6.3 per cent of the total project cost as summarized from two out of ten building projects covered by CoST-Ethiopia. The price escalation payments in the water and road sector projects are, respectively, 9.03 and 12.35 per cent of the total initial project costs

considering price escalation payments disclosed by the Procuring Entities. On average, around 12 per cent of the aggregate project cost has been paid by the Public Bodies as price escalation on construction projects that are covered by CoST-Ethiopia.

## 5. Construction Time

### 5.1 Time Overrun

The maximum time overrun is recorded in the water sector by 288 per cent of the completion period (1901 days) and the minimum time overrun is recorded in building sector. However, since most projects were undergoing and not completed during the Assurance process, the time overrun presented in this study cover only for the period of time that the disclosure was made and does not show the actual overrun at the completion of these projects. For this reason, the results have been updated for selected projects as performed for cost overrun by updating some of the projects covered by CoST-Ethiopia whose status of completion was above eighty per cent.

The updated summary of time overrun shows that the industry level time overrun is 124.43 per cent and the time overrun for the building, road, and water sectors is 160.70 per cent, 63.34 per cent, and 149.25 per cent respectively.

### 5.2 Reasons of Time Overrun

In the building sector; design change and change in quantity being reasons of time overrun with 25 and 17 per cent shares respectively, the major reason of time overrun with 42 per cent share include delay causes related to the contractual obligations of the parties including land issue, energy crisis, power and water supply, shortage of finance and budget planning, unavailability of foreign currency, scarcity of construction materials on local market, poor provisions of equipment and skilled manpower, etc.

Design change and force majeure (including inclement weather condition) each share 22 per cent of the reason of time overrun in the road sector while other reasons such as Contractor's low capacity, land acquisition related problems (Employer's contractual obligation), etc constitute the major reasons of time overrun with 26 per cent share in this sector.

In the water sector; incomplete design (20 per cent), scope change and changes in quantity (17 per cent each), and design change (16 per cent) are reasons of time overrun that delay project completion in the sector. The other reason of time overrun in the sector with 20 per cent share is a combination of reasons related to the capacity and efficiency of the contracting parties.

## 6. Causes for Concern

Project delay is the major causes for concern followed by procurement problems and cost overrun in the building sector. Project identification issues is the least causes for concern in the building sector even if feasibility and environmental impact assessment studies were not conducted for the majority of projects in the sector.

In the road sector, procurement issues are the major causes for concern with 33 per cent share followed by project delay (21.4 per cent), contract administration issues (17.1), and cost overrun (15.7 per cent).

In the water sector, different causes for concern were obtained from the analysis where procurement regulation and capacity building issues, contract administration practices, time and cost overrun are all reported to be causes for concern in the sector.

The aggregate summary of the causes for concern at industry level shows that procurement problems, project delay (nonperformance to the initial contract period), cost overrun, and contract administration problems are the major causes for concern with 26.4, 22.2, 16.7, 16.7 per cent shares respectively.

## 7. Key Findings

In the building sector, the design and supervision contracts for the majority of the projects are procured through direct award and there is no competition for these services. Also, the average updated cost overrun in this sector is 16.43 per cent and the price escalation payment that was paid for two projects out of the sampled ten projects is 6.03 per cent. The majority of Works contracts in the building sector do not have price escalation provisions owing to the requirements that price adjustment is allowed for projects whose initial completion period is above 18 months.

In the water sector, direct award procurement is applied for the majority of projects except the World Bank financed projects (#2) with a main objective of reducing the time required for the procurement of the design, supervision, and Works Contracts so that projects could commence immediately after the go ahead for project implementation was obtained from the concerned authority. The consultant and contractor appointed in this arrangement are Government owned firms engaged in the water sector for a longer period of time with institutional links to the project implementing Ministry office.

Contract document preparation problem was observed on most water sector projects even for consulting service contracts as to the main requirements such as staff requirement and submission deadlines that was recorded as a point of dispute and a barrier for proper contract administration. In summary, contract document preparation problem; construction without having detailed engineering design; revision without limit (excessive number of variations); setting short period of time for completion; and late commencement by the consultant and contractor engaged in the sector are some of the observed problems in the water sector that could hide performance problems by the consultant and contractor.

In the road sector, design build (DB) project delivery method is applied for 17 per cent of the and the level of competition for the Works contracts is less than 50 per cent for the majority of projects, i.e. the level of competition can be regarded as low for more than 76 per cent of the projects. Only 26 per cent of the projects score a level of Competition of 50 per cent and above indicating that Works contracts are procured with lower competition in the road sector.

The analysis of sufficiency of bid floating period and efficiency of bid evaluation process in the road sector revealed that all of the projects under the ICB and 93 per cent of the projects under NCB procedures have got sufficient bid preparation periods and efficiency of bid evaluation and contract signing processes is 73 and 20 per cent respectively.

# I. INTRODUCTION

## 1. Background

The Construction Sector Transparency Initiative (CoST) is a country centered initiative to improve the value for money spent on public infrastructures by increasing transparency in the delivery of Government financed construction projects.

Disclosure of Material Project Information (MPI) or Infrastructure Data Standard (IDS) by its latest name is one of the three essentials of CoST. Assurance of the disclosed information and demand for accountability based on the disclosed information are the other basics of the Initiative.

In its course, CoST-Ethiopia has disclosed 52 construction projects from the three sectors, namely building, road, and water. All the projects covered by the disclosure have their own specific reports and to get better and more complete picture of the sectors and the industry at large; a study on aggregation, analyzing and synthesizing of the findings of the reports is essential. The results of such a study could be used as input by the Procuring Entities, the Government and other interested group.

This Aggregation Study was conducted with the objective of having summaries of the reports that could enable Procuring Entities, Government, and other stakeholders get full and more complete pictures of the reports at sector and industry level.

## 2. Objectives of the Study

The objectives of the study are to:

a) have summaries of the reports that enable Procuring Entities, Government, and other stakeholders get full and more complete pictures of the reports at sector and industry level;
b) increase the viability of findings of the reports;
c) show the causes of deficiencies and reasons of successes identified in the study that could indicate future directions; and
d) look into the improvements made in due course.

## 3. Scope of the Study

The Scope of the study includes the following:

- Extraction, aggregation, analyzing, and synthesizing of the project information of the 52 projects covered by the disclosure and assurance process of CoST-Ethiopia in understandable way by employing appropriate statistical methods or parameters;
- Assessment of improvements made by comparing variables used for the baseline study with the current situation; and presentation of the results employing appropriate techniques (computer aided tables, charts, graphs, and statements);
- Pinpointing the root causes for the observed deficiencies and successes.

## 4. The Study Team and Description of CoST Projects

The Study Team (ST) comprises three senior construction management professionals (namely Ato Asmerom Taddese, Ato Hagos Abdie, and Ato Kasiem Seid) who have been working with CoST-Ethiopia and Ato Kasiem Seid has been assigned as a Study Team leader by the team for the assignment.

**Table 1: Summary of project information**

| Phase/Program | Sector | | | Total | |
|---|---|---|---|---|---|
| | Building | Water | Road | No | % |
| Pilot | 5 | 5 | 15 | 25 | 48 |
| Full-fledged | 5 | 5 | 17 | 27 | 52 |
| **Total** | **10** | **10** | **32** | **52** | **100** |

## 5. Approaches and Methodology

The following are the broader activities that the Study Team covered in the course of executing the assignment as its study approaches and methodology:

a) Initial Review Work;
b) Extraction of Projects and Contracts Data;
c) Aggregation of MPIs (IDS);
d) Analysis of the aggregated MPIs (IDS);
e) Synthesis and interpretation of the analyzed MPIs(IDS); and
f) Finalization of report write-up and presentation.

## 6. Identified Key Variables for Aggregation, Analysis, and Synthesis

The list of key variables identified for aggregation, analysis, and synthesis include completeness of project identification phase; tender process such as project delivery strategy, mode of procurement, scope of competition; construction cost; construction time; causes for concern; and other related issues. Table 2 summarizes the list of key variables identified for aggregation, analysis, and synthesis works.

**Table 2: Key variables for the study**

| # | Content |
|---|---|
| **1** | **Completeness of Project Identification Phase** |
| **2** | **Tender Process** |
| 2.1 | Project Delivery Strategy |
| 2.2 | Mode of Procurement |
| 2.3 | Scope of competition |
| 2.4 | Length of Procurement; Sufficiency to prepare responsive EOI/Bids; Compliance with the principles of Procurement and Efficiency |
| **3** | **Construction Cost** |
| 3.1 | Project cost |
| 3.2 | Minimum, Maximum, and Average cost overruns at sector and industry levels |
| 3.3 | Price escalation at sector and industry levels |
| 3.4 | Reasons for cost overrun |
| **4** | **Construction Time** |
| 4.1 | Completion time |
| 4.2 | Time overrun (Minimum, Maximum, and Average at sector and industry levels) |
| 4.3 | Reasons for time overrun |
| **5** | **Issues of Concern** |
| 5.1 | Causes for concern at project, sector, and industry level |
| 5.2 | Root causes on the observed problems at project, sector, and industry level |
| 5.3 | Proposed solutions to the problems |
| **6** | **Assessment of Project Development Contracts** |
| 6.1 | Cost and time overrun in design consultancy service contract |
| 6.2 | Cost ratio - Consultancy services to Works |
| 6.3 | Time taken for procurement process (services and Works) |

# II. EXTRACTION, AGGREGATION, AND ANALYSIS

## 1. Projects by Volume of Works [Project Cost]

A total of 52 construction projects were considered of which 10 projects are from the building sector; 10 projects from the water sector; and the remaining 32 projects from the road sector.

The projects covered by this study amount to more than 2 billion birr in the building sector, 26 billion birr in the road sector, and 8 billion birr in the water sector as shown in Table 3. The total volume of projects covered by this study is, therefore, Birr 36,475,343,121 (USD 3,268,239,130.51).

**Table 3: Projects by volume of Works**

| Sector | Amount (Birr) | Amount (USD) | Remark |
|---|---|---|---|
| Building | 2,061,405,198.89 | 158,474,490.35 | The figures are the Initial Contract Price (ICP) recorded in the Assurance Reports. |
| Road | 26,139,895,416.02 | 2,261,682,329.33 | |
| Water | 8,274,042,506.69 | 848,082,310.83 | |
| Industry Level | **36,475,343,121.60** | **3,268,239,130.51** | |

## 2. Completeness of Project Studies

Completeness of project studies is concerned with project identification studies such as Feasibility and Environmental Impact Assessment (EIA) studies. The study compiled and summarized whether the respective Procuring Entities (PEs) conducted these studies for their projects by looking at the availability of these studies in the disclosure of the project information during the assurance process. It deals with the availability of Feasibility and EIA studies and analyzed the number and per cent of projects with Feasibility study, EIA study, and both studies for each of the projects from the building, water, and road sectors.

The analysis of the Assurance reports from the total of 52 projects revealed that water and road sector projects are implemented after feasibility, environmental, and other similar studies are conducted. In these projects, detailed engineering design follows the completion of project identification studies.

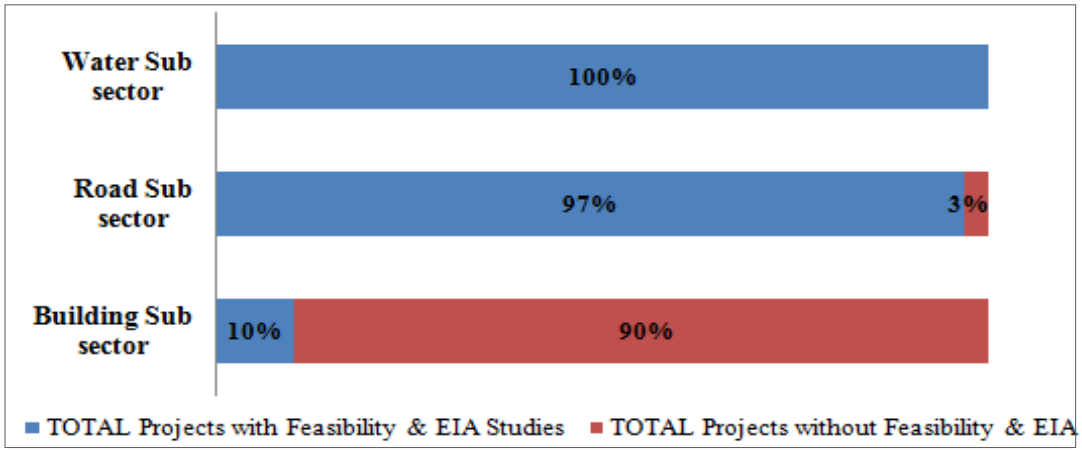


**Figure 1 Feasibility and EIA studies**

As shown in Figure 1, however, building sector projects did not conduct feasibility and environmental impact assessment studies except one university project and these projects have been implemented without studying the feasibility and environmental impact assessments.

# 3. Tender Process

Tender process deals with the following issues in relation to the procurement of consultancy services and Works contracts:

- Delivery Strategy; Mode of Procurement; and Level of Competition;
- Share of NCB and ICB in the Public Works;
- Procurement Efficiency and Sufficiency of Bidding Period;
- Procurement Length and Project Implementation Periods.

The procurement information is summarized for Design Consultancy Service Contract, hereinafter called "Design Contract or Service Contract I, SCI", Supervision and Contract Administration Consultancy Service Contract, hereinafter called "Supervision Contract or Service Contract II, SCII", and Works Contract (WC) separately.

For the purpose of this study, the modes of procurement and bidding methods have been abbreviated and the results have been analyzed as shown below:

| | |
|---|---|
| SSS | Single Source Selection (Direct Procurement) |
| OB - NCB | Open Bidding under National Competitive Bidding Procedure |
| OB - ICB | Open Bidding under International Competitive Bidding Procedure |
| RB - NCB | Restricted Bidding under National Competitive Bidding Procedure |
| RB - ICB | Restricted Bidding under International Competitive Bidding Procedure |
| RFP - NCB | Request for Proposal under National Competitive Bidding Procedure |
| RFP - ICB | Request for Proposal under International Competitive Bidding Procedure |
| TSB - NCB | Two stage Bidding under National Competitive Bidding Procedure |
| TSB - ICB | Two stage Bidding under International Competitive Bidding Procedure |

## 3.1 Delivery Strategy, Mode of Procurement, & Level of Competition in the Building Sector

For the purpose of this study, level of competition is evaluated as a percentage of the number of applicants to the number of bidders submitting their proposals or bids and it is taken as fair competition if at least half (more than 50 per cent) of the applicants submitted their proposals or bids and is taken as low competition otherwise.

As shown in Figure 2, the majority of projects in the building sector adopted a procurement delivery strategy of Design Bid Build (DBB) with separate Consultancy Services and the remaining 30 per cent is DBB with either Combined Consultancy Service Contracts or Project Management Contract.

From Figure 3, it can be seen that more than 75 per cent of the design and supervision

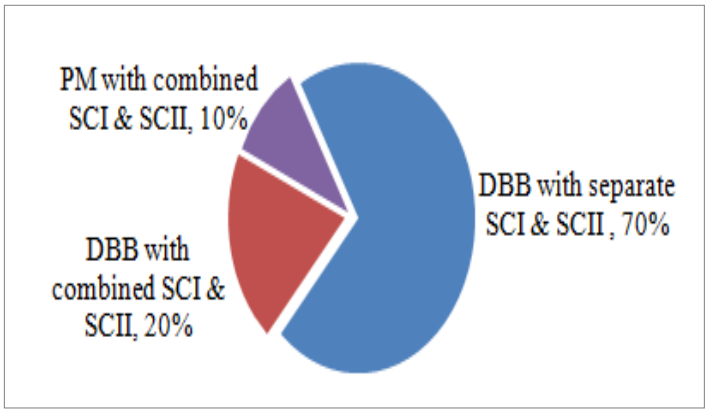


**Figure 2 Project delivery strategy - building sector**

contracts is outsourced to a single consultant by direct award and for Works contract, the majority of building contracts are procured through open bidding under National Competitive Bidding procedure.

Similarly, Figure 4 indicates that there is no competition for the majority of design and supervision contracts and for Works contract, the level of competition can be taken as fair competition for 70 per cent of the projects while there is low or no competition for the remaining 30 per cent of the projects.

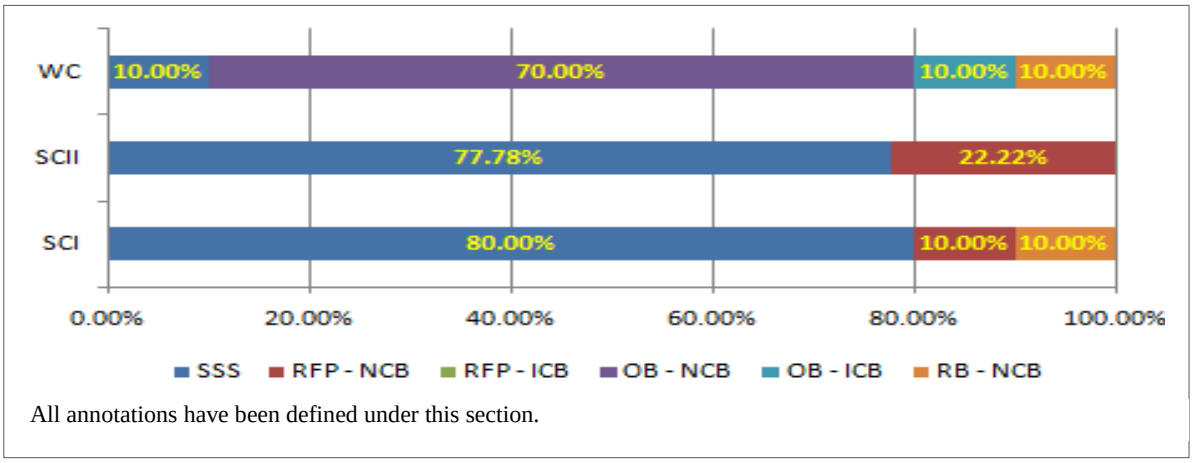


**Figure 3 Mode of procurement and bidding methods (Services and Works) - building sector**

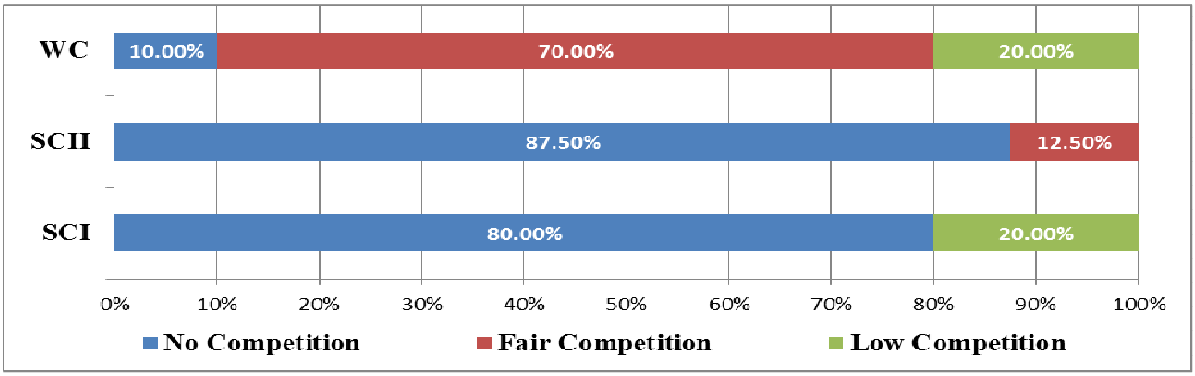


**Figure 4 Level of competition in the procurement process - building sector**

## 3.2 Delivery Strategy, Mode of Procurement, & Level of Competition in the Road Sector

In the road sector (Figures 5 to 7), a similar trend of project delivery strategy to the building sector is observed except that Design Build (DB) shares 17 per cent of the road projects among the projects covered in the Aggregation Study and Project Management Contract is not applied in the road sector.

National and International Competitive Bidding procedures are applied almost equally in the Works contracts with nearly 45 and 37 per cent shares respectively.

Supervision contracts in this sector are procured through NCB and ICB for 70 and 25 per cent of

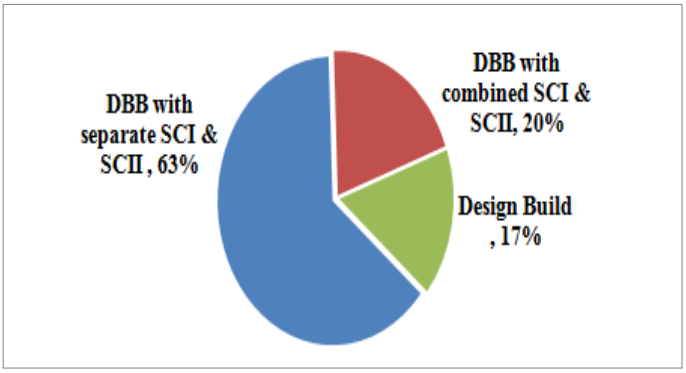


**Figure 5 Project delivery strategy - road sector**

the projects respectively while design contracts are procured through NCB and ICB for 58 and 26 per cent of the projects respectively.

The level of competition in the Works contract of the road sector is less than 50 per cent for the majority of projects; that is, the level of competition can be regarded as low for more than 76 per cent of the projects. For a relatively higher number of projects, however, the level of competition for both consultancy service contracts is regarded as fair, i.e. 63 per cent of the design contracts and 77 per cent of the supervision contracts procured in the road sector can be taken as fair procurement with more than 50 per cent level of competition.

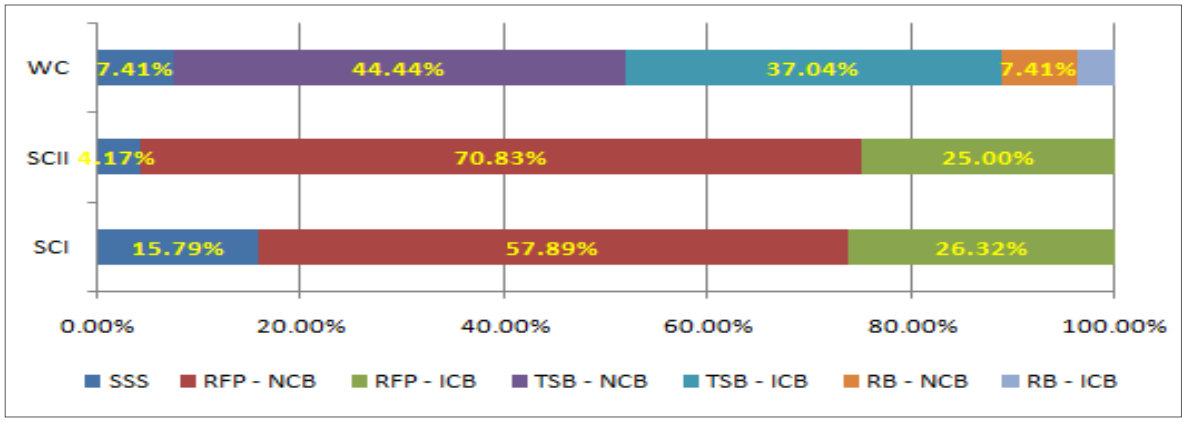


**Figure 6 Mode of procurement and bidding methods (Services and Works) – road sector**

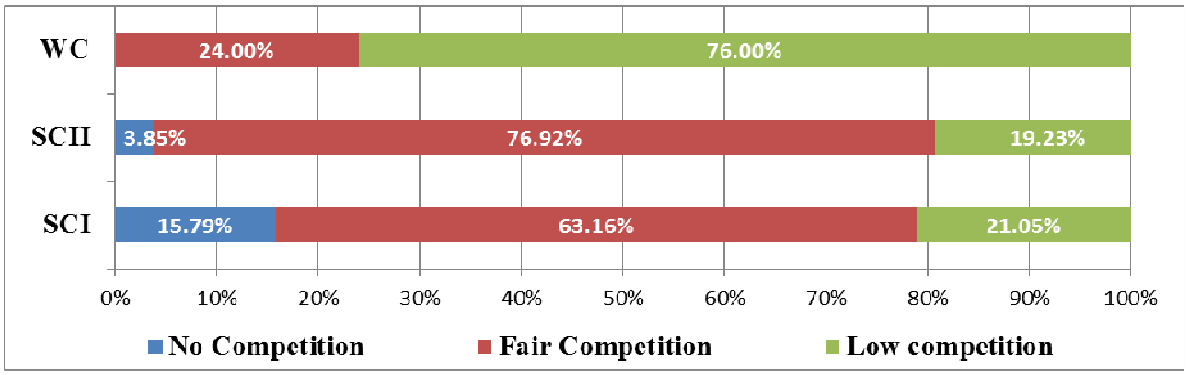


**Figure 7 Level of competition in the procurement process - road sector**

## 3.3 Delivery Strategy, Mode of Procurement, & Level of Competition in the Water Sector

Figure 8 reveals that project delivery method applied for the majority of projects (60 per cent) in the water sector is DBB with combined consultancy service contracts.

For the three contracts, single source procurement (direct award) is applied for the majority of projects as a preferred mode of procurement in the water sector; i.e. it was applied for 70 per cent of design contracts and 87.5 per cent in supervision and Works contracts. The other contracts were procured

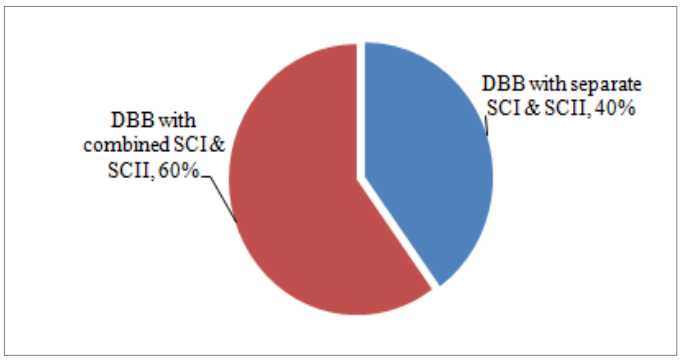


**Figure 8 Project delivery strategy - water sector**

through open bidding under ICB procedure as a mandatory requirement of the financer, the World Bank

In this sector, only 11 per cent of the design contracts and 12.5 per cent of the Works contracts is regarded as fair competition indicating a much lower level of Competition.

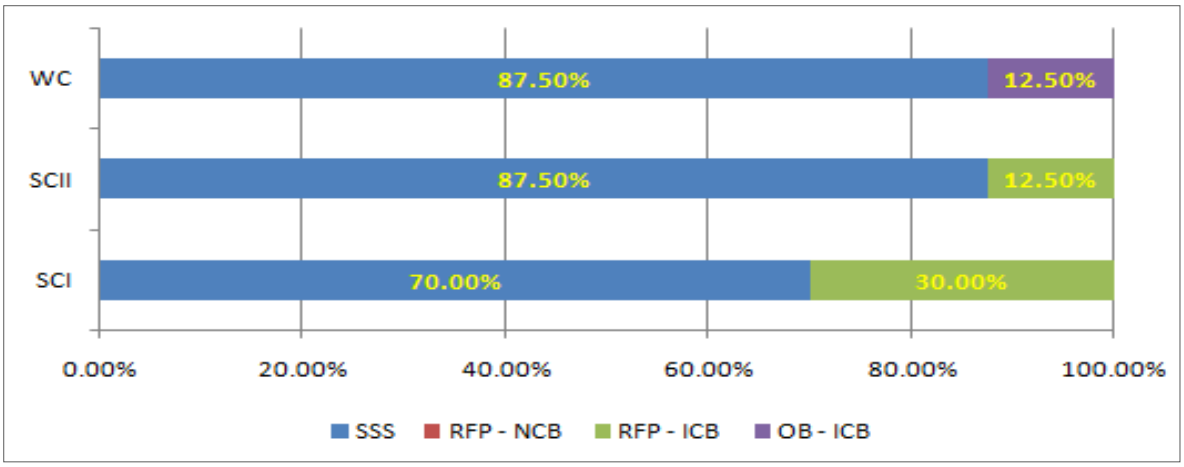


**Figure 9 Mode of procurement and bidding methods (Services and Works) – water sector**

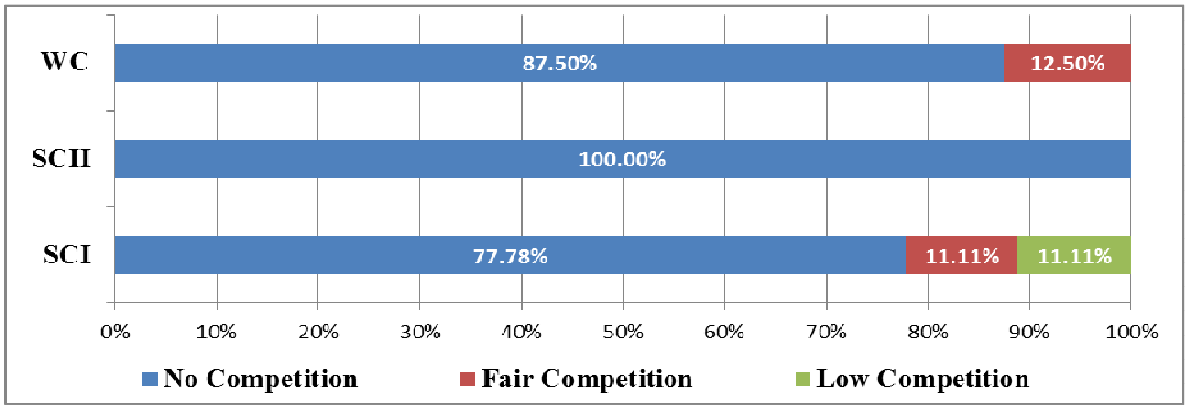


**Figure 10 Level of competition in the procurement process - water sector**

## 3.4 Share of NCB and ICB in Building, Road, and Water Sector Projects

As shown in Figure 11, the majority of the projects in the building and water sectors were procured through National Competitive Bidding with 83 and 95 per cent shares respectively. In the road sector, however, a slight majority of projects were procured through international competitive bidding with 53 per cent shares from the road sector projects.

At industry level, 60 per cent of the projects covered by CoST-Ethiopia were procured through National Competitive Bidding while the remaining 40 per cent were procured through International Competitive Bidding procedure.

In summary, the study revealed that the majority of projects at industry level were procured through DBB either with separate or combined consultancy service contract and some trends of DB and PM Contracts were also observed in the road and building sectors respectively.

Also at industry level, the mode of procurement for the majority of design consultancy service contracts was single source procurement followed by open bidding under national and international competitive bidding procedures.

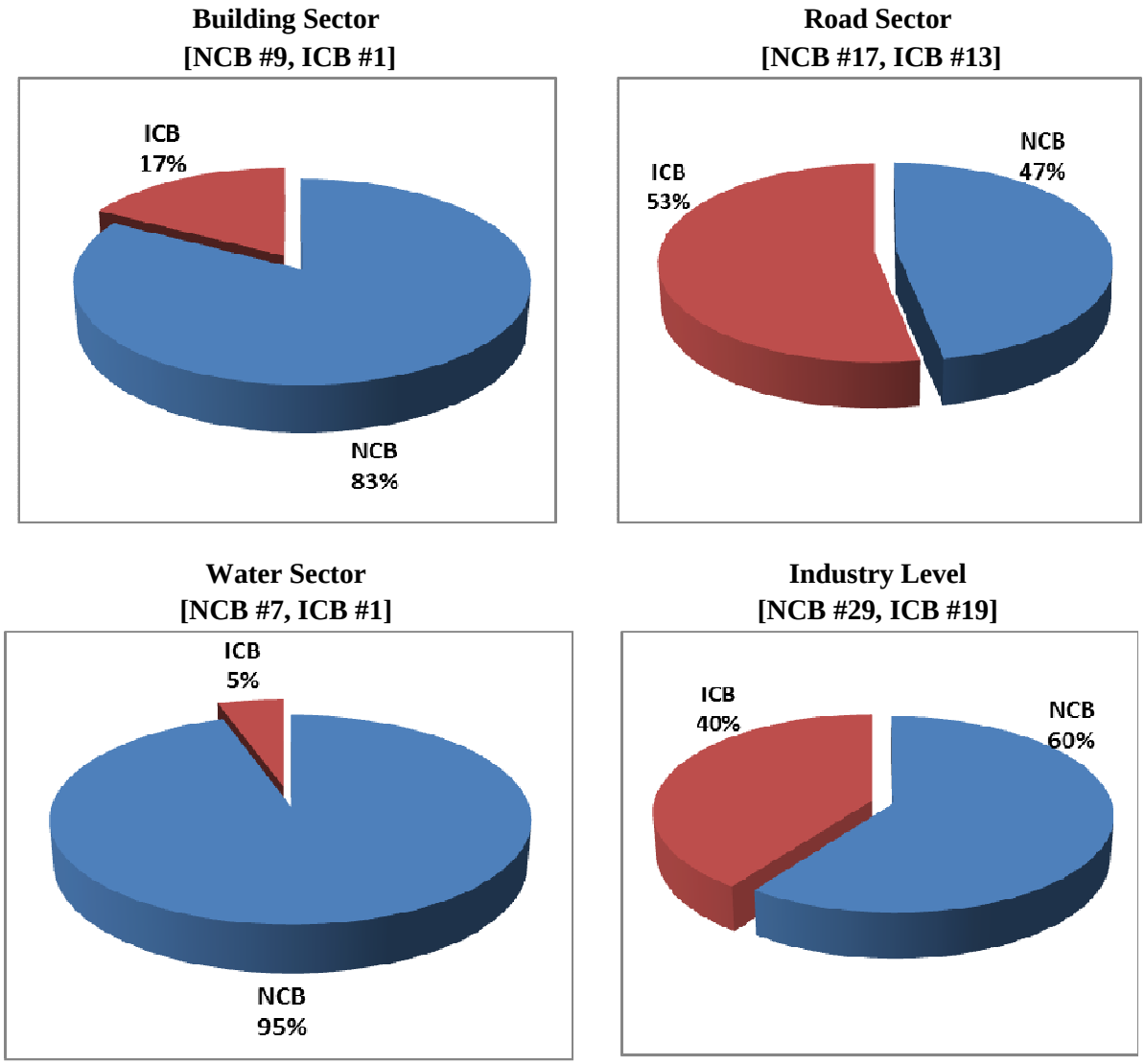


**Figure 11 Share of NCB and ICB contracts in birr and number**

## 3.5 Procurement Efficiency and Sufficiency of Bid Floating Period

The bid preparation (floating) period, bid evaluation period, duration between contract award and signing have also been summarized for the design, supervision, and Works contracts under the building, road, and water sector projects. The result has then been compared to the requirements of procurement directives, guidelines, and general principles. Under the rules of procurement, the minimum bid preparation period is 30 and 45 days for the national and international competitive bidding procedures respectively.

The sufficiency of bid preparation (floating) period is then evaluated according to this requirement and a percentage of sufficiency of floating period for the contracts is summarized for the three sectors and at industry level. Furthermore, efficiency of the Procuring Entities' bid evaluation is summarized by comparing the time taken for bid evaluation against the commonly applied bid validity period of 90 days.

Similarly, the time taken between contract award and contract signing has been compared to the procurement rules that states contracts have to be signed between 7 to 15 days of the contract award date.

Table 4 provides information and analysis on summarization and evaluation of the sufficiency of bid preparation (floating) period as compared to the minimum durations together with the efficiency of bid

evaluation and contract signing processes. For design contracts at industry level, the projects with available data indicate that sufficient bid preparation period was given for all projects of ICB contracts and for 75 per cent of the projects of NCB contracts. While there is a delay of contract signing of this service contract at industry level, the efficiency of bid evaluation is 80 per cent indicating that Procuring Entities bid evaluation period is less than 90 days for the majority of design contracts.

Similarly, Table 5 reveals that sufficient information was obtained for supervision consultancy service contracts only in the road sector and nearly 75 per cent of the projects with available data indicate that sufficient bid preparation (floating) period was given to supervision consultancy service contracts for both NCB and ICB contracts. The efficiency of bid evaluation and contract signing activities is, however, 56 and 42 per cent for NCB and ICB contracts respectively.

For Works contract; sufficient bid information is obtained in the road sector, only some information was obtained in the building sector, and no information was obtained in the water sector as the procurement strategy applied for most of the projects in this sector is direct procurement. From Table 6, it is revealed that all of the projects under the ICB and 93 per cent of the projects under NCB procedures have got sufficient bid preparation periods and the efficiency of bid evaluation and contract signing processes is 73 and 20 per cent respectively.

Generally, there is a delay in contract signing where the period between contract award and contract signing ranges from a minimum of 28 days to a maximum of 91 days in design consultancy service contracts; from a minimum of 7 days to a maximum of 248 days in supervision consultancy service contracts; and from a minimum of 8 days to a maximum of 207 days in Works contracts.

**Table 4: Procurement efficiency for design contract [SCI]; in days**

| | **Bid Preparation / Floating Period** | | **Bid Evaluation Period** | **Contract Signing Period** | **Combined Bid Evaluation & Contract Signing** |
|---|---|---|---|---|---|
| **Criteria for Comparison** | **Min=30 NCB** | **Min=45 ICB** | **Max = 90** | **Max = 15** | **Max = 105** |
| **Industry Level** | | | | | |
| No. of Projects with sufficient data | 12 | 5 | 10 | 4 | 4 |
| No. of Projects fulfilling the Criteria | 9 | 5 | 8 | 0 | 0 |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **75.00** | **100.00** | **80.00** | **0.00** | **0.00** |
| **Building Sector** | | | | | |
| No. of Projects with sufficient data | 1 | - | 1 | - | - |
| No. of Projects fulfilling the Criteria | 0 | - | 0 | - | - |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **0.00** | **-** | **0.00** | **-** | **-** |
| **Road Sector** | | | | | |
| No. of Projects with sufficient data | 11 | 3 | 9 | 4 | 2 |
| No. of Projects fulfilling the Criteria | 9 | 3 | 8 | 0 | 0 |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **81.82** | **100.00** | **88.89** | **0.00** | **0.00** |
| **Water Sector** | | | | | |
| No. of Projects with sufficient data | - | 2 | - | - | 2 |
| No. of Projects fulfilling the Criteria | - | 2 | -- | - | 0 |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **-** | **100.00** | **-** | **-** | **0.00** |

**Table 5: Procurement efficiency for supervision contract [SCII]; in days**

| | Bid Preparation / Floating Period | | Bid Evaluation Period | Contract Signing Period | Combined Bid Evaluation & Contract Signing |
|---|---|---|---|---|---|
| **Criteria for Comparison** | **Min=30 NCB** | **Min=45 ICB** | **Max = 90** | **Max = 15** | **Max = 105** |
| **Road Sector** | | | | | |
| No. of Projects with sufficient data | 19 | 4 | 9 | 12 | 1 |
| No. of Projects fulfilling the Criteria | 14 | 3 | 5 | 5 | 0 |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **73.68** | **75.00** | **55.56** | **41.67** | **0.00** |

**Table 6: Procurement efficiency for Works contract [WC]; in days**

| | Bid Preparation / Floating Period | | Bid Evaluation Period | Contract Signing Period | Combined Bid Evaluation & Contract Signing |
|---|---|---|---|---|---|
| **Criteria for Comparison** | **Min=30 NCB** | **Min=45 ICB** | **Max=90** | **Max=15** | **Max=105** |
| **Industry Level** | | | | | |
| No. of Projects with sufficient data | 15 | 9 | 22 | 15 | - |
| No. of Projects fulfilling the Criteria | 14 | 9 | 16 | 3 | - |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **93.33** | **100.00** | **72.73** | **20.00** | **-** |
| **Building Sector** | | | | | |
| No. of Projects with sufficient data | 2 | 1 | 3 | - | - |
| No. of Projects fulfilling the Criteria | 2 | 1 | 1 | - | - |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **100.00** | **100.00** | **33.33** | **-** | **-** |
| **Road Sector** | | | | | |
| No. of Projects with sufficient data | 13 | 8 | 19 | 15 | - |
| No. of Projects fulfilling the Criteria | 12 | 8 | 15 | 3 | - |
| Sufficiency of Floating Period / Efficiency of Evaluation (%) | **92.31** | **100.00** | **78.95** | **20.00** | **-** |

## 3.6 Procurement Length and Project Implementation Periods

Procurement length and project implementation periods together with comparison of design period to construction completion period are also part of the themes under this Aggregation Study. With the assumption that projects could be implemented successively after engineering design and contract document preparation is completed, the following figures (Figure 12 to 14)3 indicate construction project implementation durations adding design contract procurement duration, design period, Works contract procurement duration, and construction completion periods at sector and industry level.

[3] The minimum, average, and maximum periods are derived from the selected projects (not a single project)

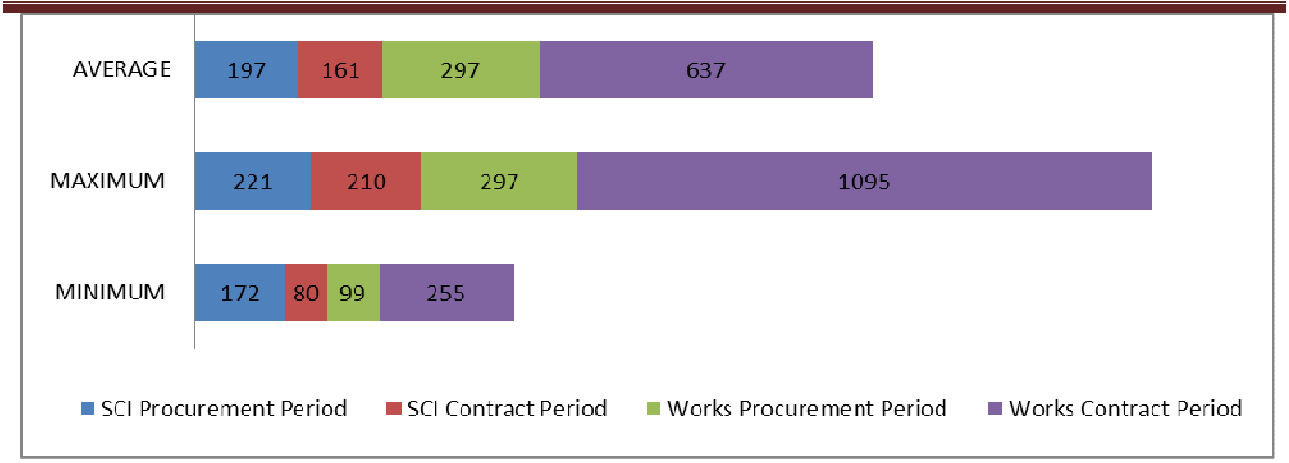


**Figure 12 Project implementation durations (days) in the building sector**

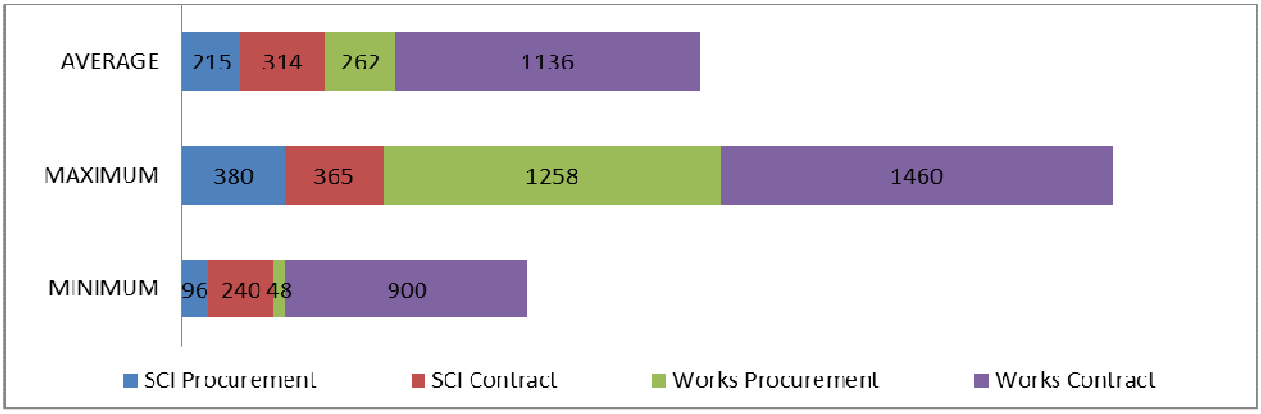


**Figure 13 Project implementation durations (days) in the road sector**

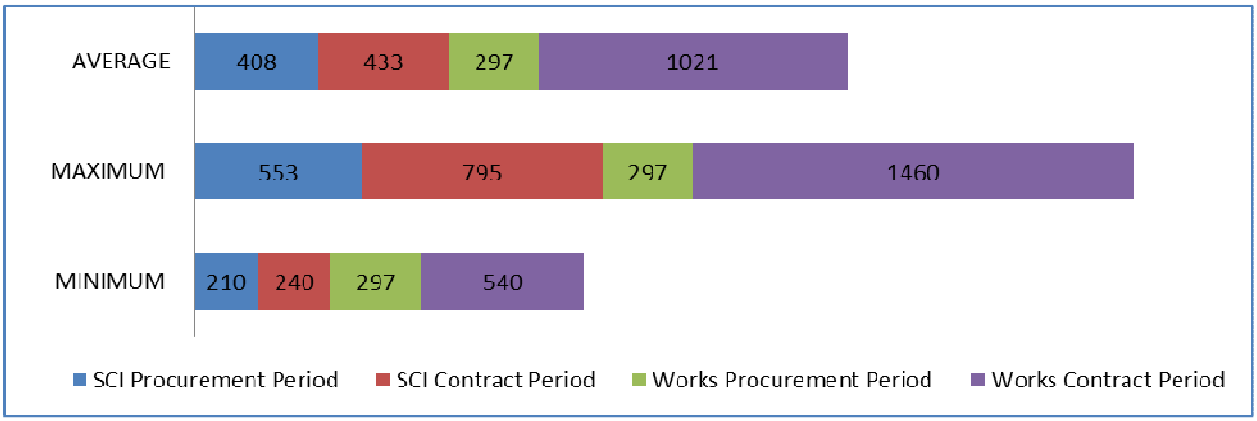


**Figure 14 Project implementation durations (days) in the water sector**

For design consultancy service contract, the average time for procurement and design period is respectively 245 and 311 days and for Works contract, the average time for procurement and completion period is respectively 307 and 990 days. If projects are successively implemented in this manner, the total implementation period of construction projects could be 1787 calendar days (nearly five years) without considering delays in design service and construction works.

With this approach, the minimum and maximum time period a construction project could be implemented is respectively 479 and 4,066 days. Figure 15 provides a comparison of selected project implementation periods with the minimum, maximum, and average time period from the building, road, and water sector

projects. The majority of projects indicated in this figure have more time period that the average total implementation period summarized in this study.

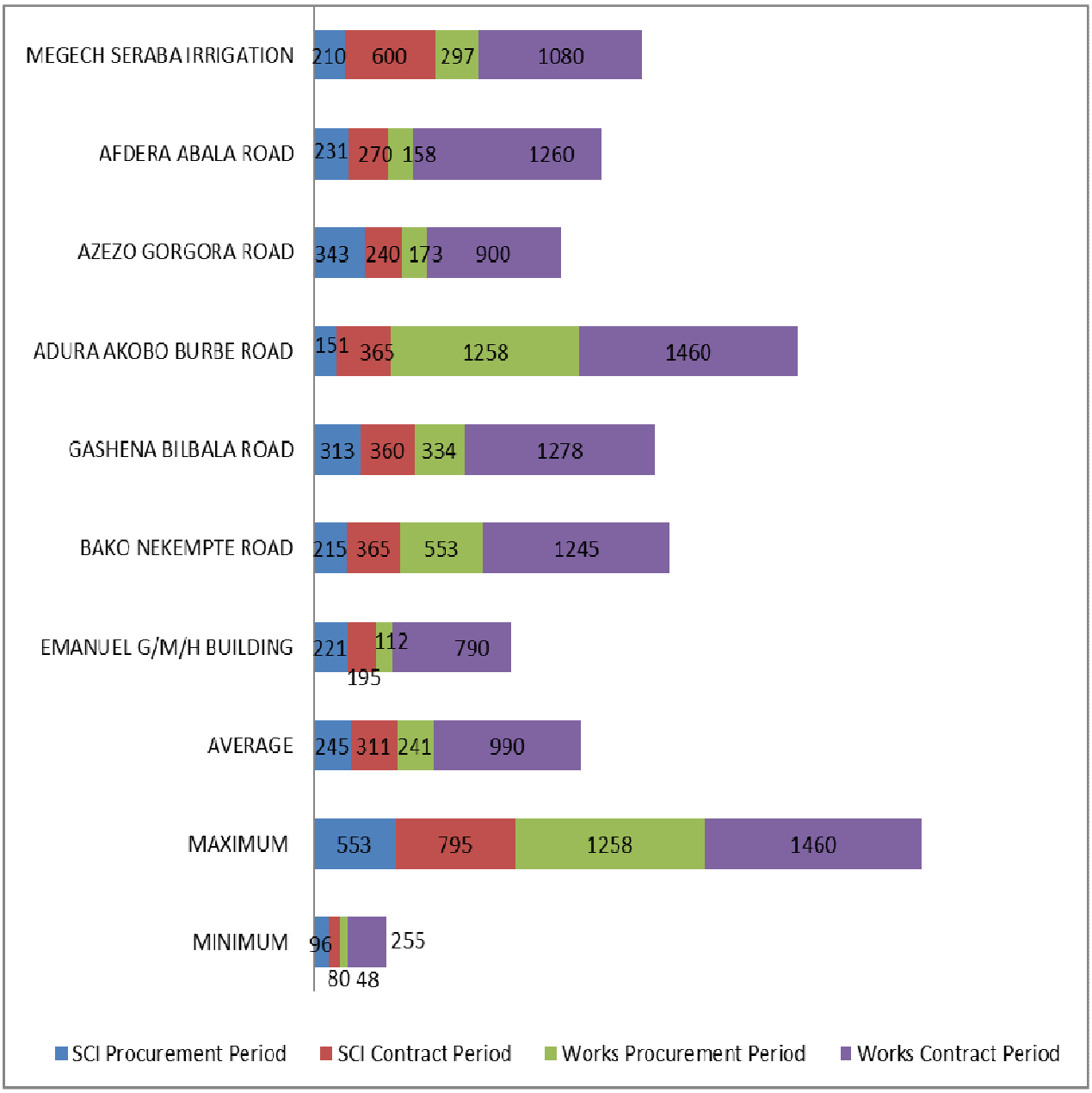


**Figure 15: Project implementation durations (days) at industry level**

The minimum, maximum, and average procurement for design consultancy service, supervision consultancy service, and Works contracts for the three sectors have been summarized in Table 7 below.

In the building sector, the procurement length for Works contract is less than the procurement length of both service contracts with a maximum procurement period of 221 days to recruit of a consultant with combined design and supervision contracts. In the road sector; a shorter procurement length is observed to recruit design consultant and the procurement length for supervision and Works contracts runs from a minimum of 48 days to a maximum of 1,258 days.

Even though the number of available data obtained from the water sector projects is small for concluding remarks owing to the direct procurement strategy of the sector, the procurement length of both services and Works contract took more time period than the other sectors; i.e. from 210 to 553 days.

**Table 7: Minimum, Maximum, and Average procurement length**

| | SCI | SCII | Works |
|---|---|---|---|
| **Building Sector** | | | |
| No. of Projects with sufficient data | 2 | 1 | 5 |
| Minimum Procurement Length - Days | 172 | 221 | 99 |
| Maximum Procurement Length - Days | 221 | | 179 |
| Average Procurement Length - Days | 197 | | 124 |
| **Road Sector** | | | |
| No. of Projects with sufficient data | 15 | 26 | 24 |
| Minimum Procurement Length - Days | 96 | 53 | 48 |
| Maximum Procurement Length - Days | 380 | 1,018 | 1,258 |
| Average Procurement Length - Days | 215 | 304 | 262 |
| **Water Sector** | | | |
| No. of Projects with sufficient data | 3 | 1 | 1 |
| Minimum Procurement Length - Days | 210 | 484 | 297 |
| Maximum Procurement Length - Days | 553 | | |
| Average Procurement Length - Days | 408 | | |
| **Industry Level** | | | |
| No. of Projects with sufficient data | 20 | 28 | 30 |
| Minimum Procurement Length - Days | 96 | 53 | 48 |
| Maximum Procurement Length - Days | 553 | 1,018 | 1,258 |
| Average Procurement Length - Days | 245 | 307 | 241 |

As part of the last analysis of the collected information under this heading, the design period is compared to the total implementation (design and construction) periods to analyze the time allotment for design of construction projects, i.e. to analyze the sufficiency of design periods as compared to the sum of design and construction periods.

Figure 16 shows that the average design period is nearly 23 per cent of the total implementation period at industry level where the building and road sector projects design period are slightly lower than the industry average while for the water sector projects, it is above the average industry level.

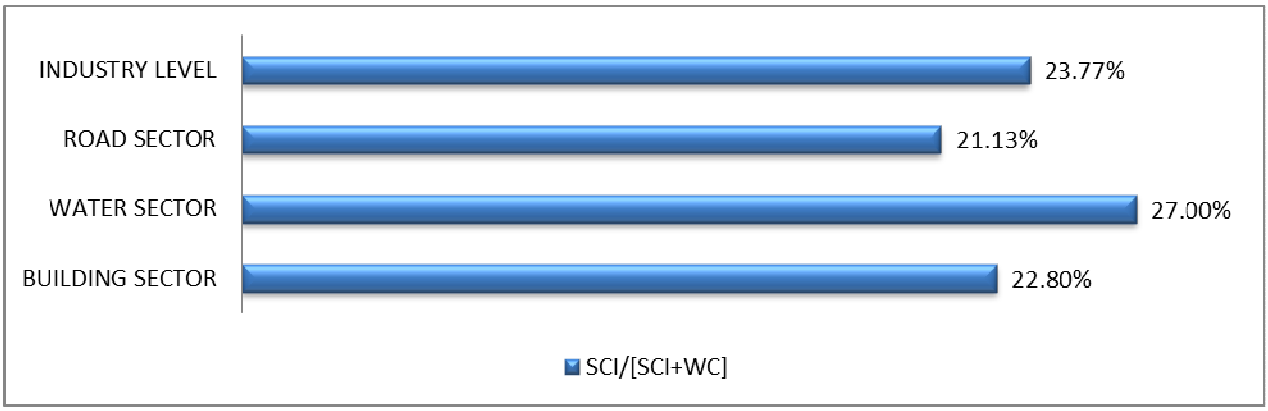


**Figure 16: Design period and total implementation period ratio**

# 4. Construction Cost

## 4.1 Cost Overrun

During the pilot and full-fledged program of CoST-Ethiopia, most (if not all) of the projects covered in the Assurance report preparation were ongoing at different stages. The Aggregation Study summarized the project costs at the start and at the time of Assurance studies considering cost variations during the construction phase for all of the projects.

In effect, cost overrun of the projects at the time of Assurance report preparation has been compiled and analysis of the minimum, maximum, and average cost overrun at sector and industry level has been performed. Together with summarizing these variables, the reasons of cost overrun as provided in the Assurance Reports were also analyzed and discussed under this part of the Aggregation Study.

From the analysis results, it can be seen that the aggregate cost overrun at the time of disclosure of both pilot and full-fledged projects at industry level is 17.09 per cent. This percentage of cost overrun is in addition to price escalation payment that is summarized in the next section of this Aggregation Study. The summary of cost overrun is compared to the initial contract price of projects that mostly arise from variation orders, quantity remeasurement during construction, and other cost varying events except price escalation payments. At sector level, there is 65.18 per cent cost overrun in the water sector, 6.81 per cent in the building sector, and 3.18 per cent in the road sector.

A possible explanation for the cost overrun in the water sector could be that the initial contract price is determined before detailed engineering design is carried out and construction of most water sector projects are procured through single source procurement. Also, the majority of the water sector projects commence based on feasibility study and preliminary deigns (if any) while detailed engineering design was carried out in parallel to the construction of these projects.

**Table 8: Cost overrun summary**

| COST OVERRUN SUMMARY | | | |
|---|---|---|---|
| **SECTOR** | **PILOT (%)** | **FULL-FLEDGED (%)** | **TOTAL (%)** |
| Building | 1.49 | 8.18 | **6.81** |
| Road | 2.40 | 3.54 | **3.18** |
| Water | 63.56 | 66.91 | **65.18** |

It has to be noted, however, that the cost overrun summarized in this study is for a period of time the Assurance studies were carried out and these figures may vary at the completion of the projects. That is, the estimated or actual project cost at completion of these projects was not obtained from the Assurance Reports and cost overrun summarized under this Aggregation Study only considers up to the time of the disclosure of the respective projects.

For this reason, the cost overrun data have been updated for a selected number of projects from the three sectors considering some of the projects covered by CoST-Ethiopia whose status of completion was above eighty per cent. Among the fifty two construction projects covered by CoST-Ethiopia; six projects were selected from the building sector; thirteen from the road sector; and six from the water sector.

As depicted in Figure 17, the updated summary of cost overrun shows that there is 76 per cent cost overrun at industry level and the average cost overrun in the building, road, and water sectors is respectively 16.43; 41.61; and 170.57 per cent.

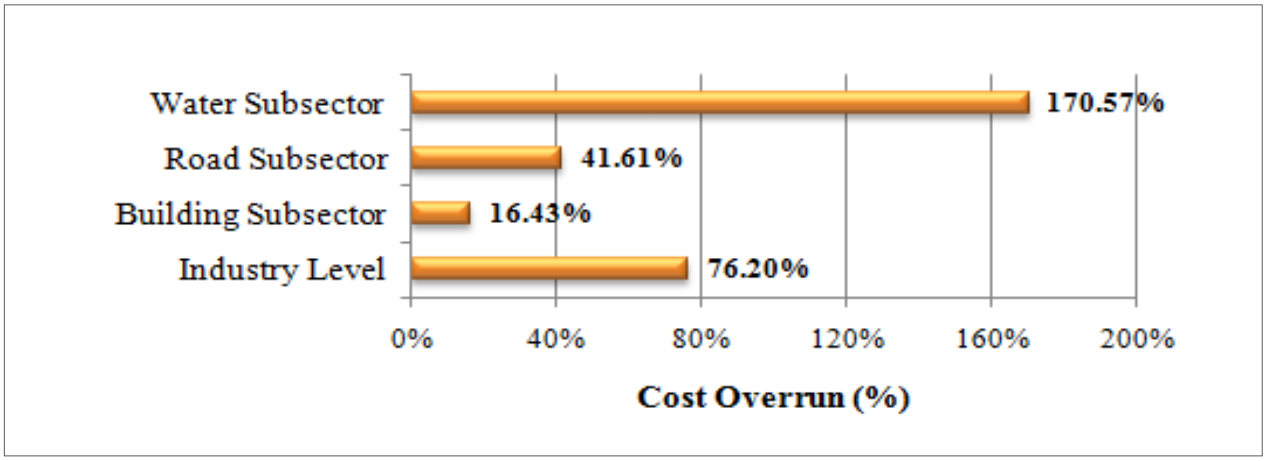


**Figure 17: Updated average cost overrun**

Most of the building, road, and water sector projects experience cost overrun to a certain degree depending on the reasons of cost overrun on each sector. Figure 18 indicates that the minimum cost overrun in the building, road, and water sector projects are respectively 1.69 million birr (0.74 per cent of the initial contract price, ICP), saving of 21.67 million birr (negative 3.40 per cent of the ICP), and 3.34 million birr (0.79 per cent of the ICP) respectively. At industry level, the maximum cost overrun is recorded in the water sector with 1.76 billion birr, 208.9 per cent of the initial contract price.

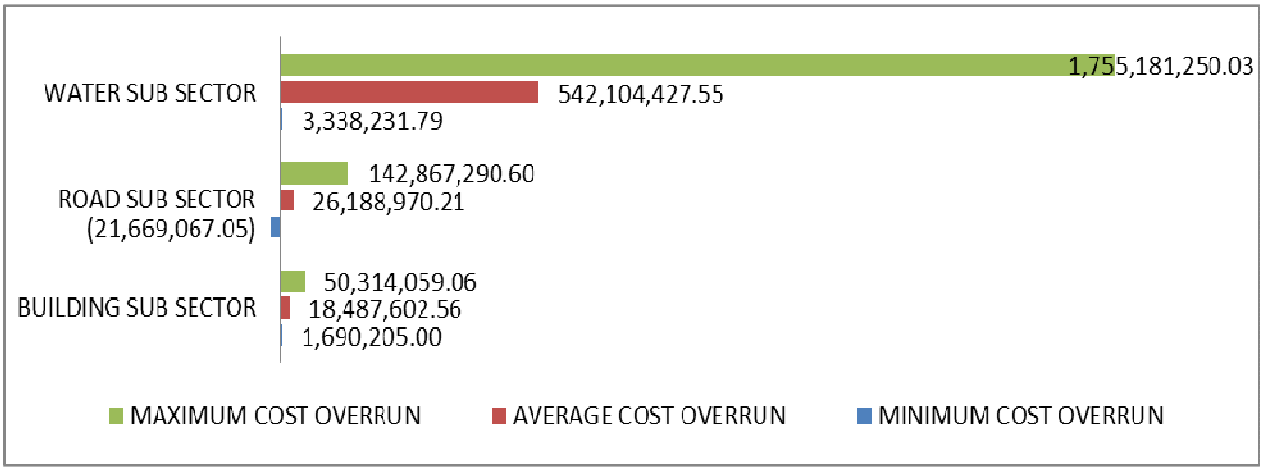


**Figure 18: Minimum, Average, and Maximum cost overrun in birr**

## 4.2 Reasons of Cost Overrun

For the purpose of this analysis, the reasons of cost overrun have been summarized for the three sectors and aggregated into seven categories of:

- incomplete design;
- design change (though variation);
- project scope change;
- changes in quantity (up on remeasurement);
- force majeure (events not caused by contracting parties);
- price hike /inflation;
- other reasons such as construction difficulty, Employer's inactions, shortage of materials, etc that increased the cost of the project.

As can be seen from Figure 19, design change, incomplete designs, and change in quantity are major reasons of cost overrun that share nearly 92 percent of the reasons for cost overrun in the building sector. In the road sector, the reasons of cost overrun are evenly distributed among six reasons where incomplete design as a reason of cost overrun was not reported and design change is the major reason of cost overrun.

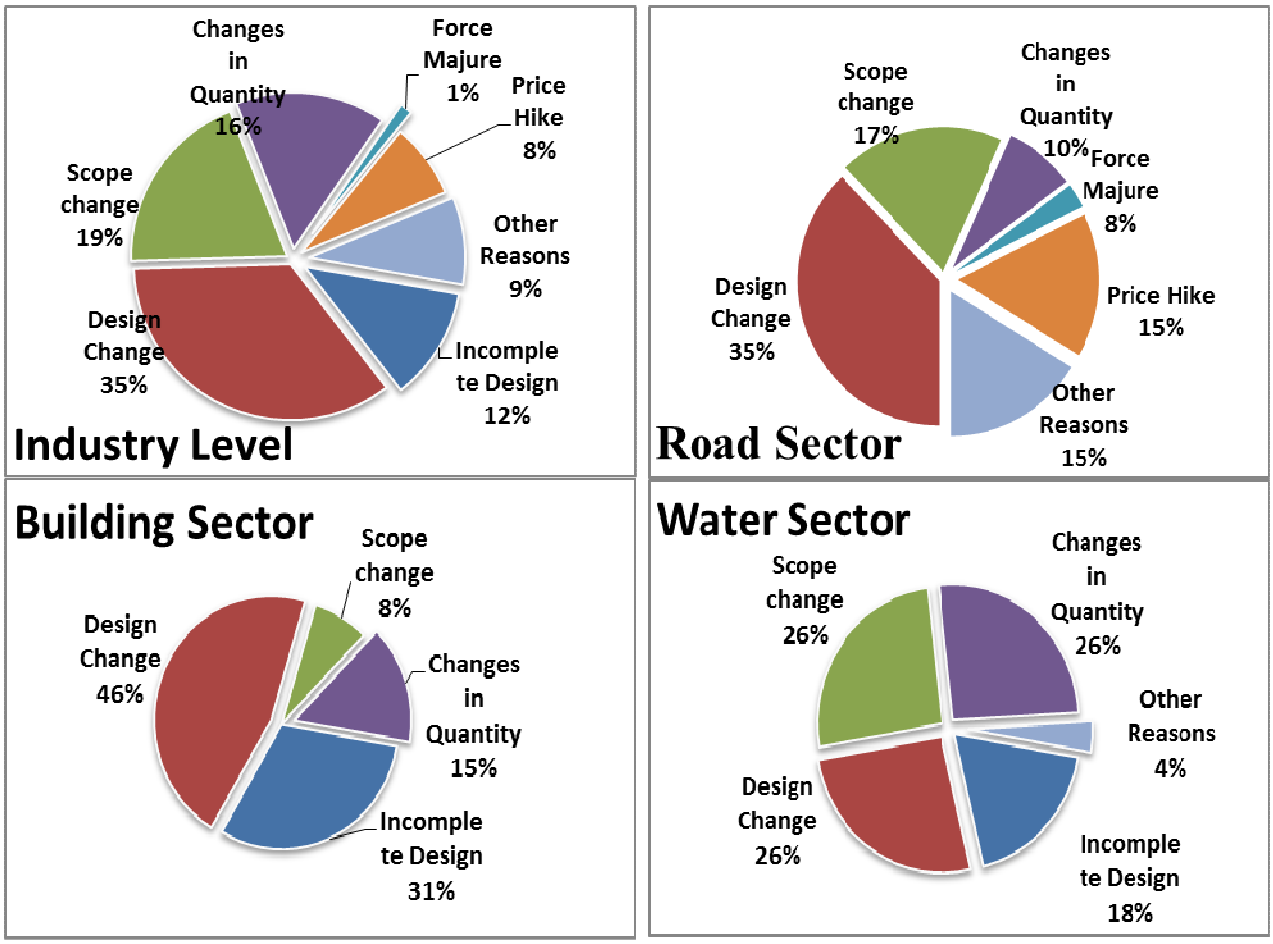


**Figure 19: Reasons of cost overrun**

In the water sector; design change, scope change, and changes in quantity each share 26 per cent as a reason for cost overrun with a total of 78 per cent followed by incomplete design. The aggregated summary at industry level shows that design change is the major reason of cost overrun (35 per cent) and force majeure is the least ranked reason of cost overrun (only 1 per cent).

### 4.3 Price Escalation

For most projects, price escalation payments are paid to the Contractor by Procuring Entities pursuant to their respective contract agreement provisions. Figures 20 and 21 reveal around 12 per cent of the aggregate project cost has been paid by the Procuring Entities on construction projects. This average figure was summarized from projects at the stage of the construction projects when the pilot and full-fledged Assurance Reports were prepared and amounts to 2.5 billion birr out of the total 21.7 billion birr construction project.

For water and building sector projects, the coverage of price escalation payments is limited to cement, reinforcement bar, and fuel for which sufficient information was not disclosed by the Procuring Entities and respective project participants. For these reasons, a higher amount of price escalation payment is presumed to be paid at the time of disclosure.

Price escalation payments made in the building sector is nearly 6.3 per cent of the total project cost as summarized from two out of ten building projects covered by CoST-Ethiopia. Moreover, most building projects whose completion period is less than 18 months do not provide price escalation payment clauses in their contract agreement.

The price escalation payments in the water and road sector projects are respectively 9.03 and 12.35 per cent of the total initial project costs considering price escalation payments disclosed by the Procuring Entities.

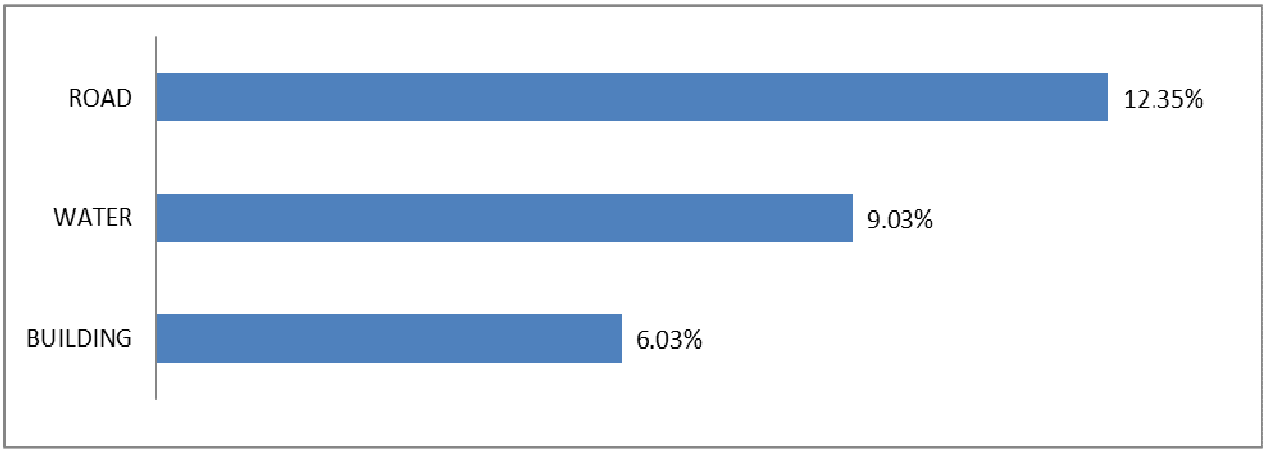


**Figure 20: Average price escalation payment as compared to their respective total project cost by sector**

It has to be noted that as the project progresses and when completion dates are extended for these projects, price escalation payments would rise than indicated in this study. Hence, the summarized price escalation payments do not indicate the actual price escalation payments of the projects at the time the projects are completed.

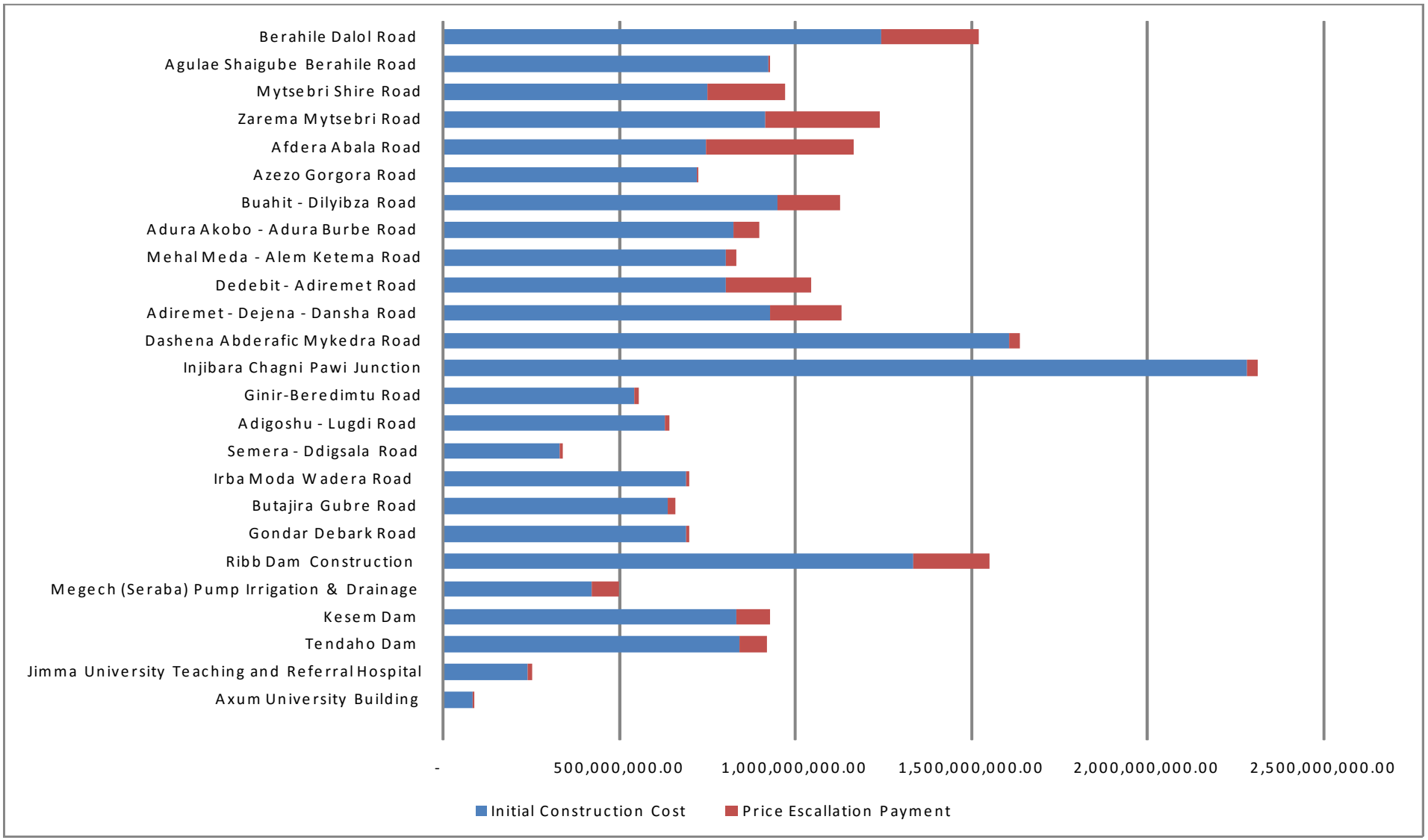


**Figure 21: Project cost and price escalation payments at disclosure time**

# 5. Project Development Cost Assessment

## 5.1 Services/Works Cost Ratio

The costs of design contract (SCI) and the supervision contract (SCII) has been summarized as a percentage of project costs to indicate the practical share of the costs for design and supervision services from the total project cost (TPC)4.

Table 8 indicates that at industry level, the average cost share of the design consultancy service contract is 1.23 per cent of the construction cost and the supervision consultancy service contract is 3.01 per cent of the construction cost. The average share of both service costs is 3.80 per cent of the construction cost and the share of these service costs is minimum in the building sector and maximum in the water sector.

Similarly, Figure 22 indicates that at industry level, the average cost share of the design consultancy service contract is 1.15 per cent of the Total Project Cost (TPC) and the supervision consultancy service contract is 2.68 per cent of the Total Project Cost. The average share of both service costs is 3.45 per cent of the total project cost and the share of these service costs is minimum in the building sector and maximum in the water sector.

**Table 9: Summary of consultancy service cost and project cost ratio**

| | Service Cost to Project Cost | | | Service Cost to Total Project Cost | | |
|---|---|---|---|---|---|---|
| | SCI/WC | SCII/WC | [SCI+SCII] / WC | SCI / [SCI+SCII+WC] | SCII / [SCI+SCII+WC] | [SCI+SCII] / [SCI+SCII+WC] |
| No of Projects with sufficient data | 30 | 35 | 42 | 30 | 35 | 42 |
| Building Sector | 0.40% | 1.73% | 2.52% | 0.39% | 1.65% | 2.40% |
| Water Sector | 2.03% | 7.35% | 8.90% | 1.69% | 6.05% | 7.56% |
| Road Sector | 1.21% | 1.97% | 2.67% | 1.14% | 1.88% | 2.54% |
| Industry Level | **1.23%** | **3.01%** | **3.80%** | **1.15%** | **2.67%** | **3.45%** |
| **SCI – DESIGN CONTRACT; SCII – SUPERVISION CONTRACT; WC – WORKS CONTRACT** | | | | | | |

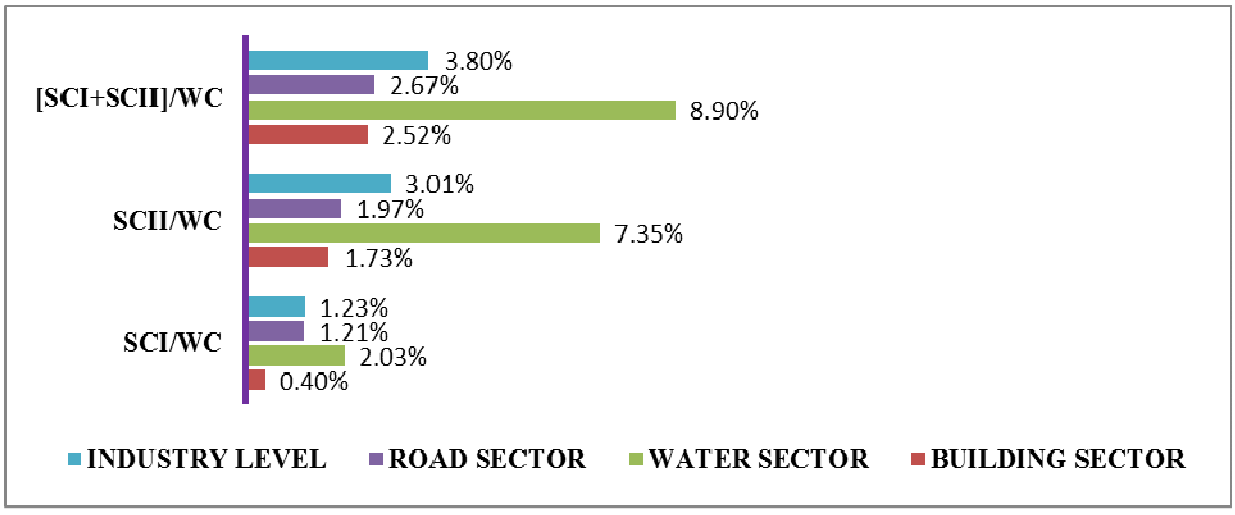


**Figure 22: Services, Works, and Project cost ratios**

[4] Total project Cost (TPC) is the sum of costs of design consultancy service, supervision consultancy service, and Works contracts

# 6. Construction Time

## 6.1 Time Overrun

As with cost overrun, the maximum time overrun is recorded in the water sector by 288 per cent of the completion period (1901 days) and the minimum time overrun is recorded in the building sector. Figure 23 shows the minimum, maximum, and average time overrun of projects from the three sectors. Also, Figure 25 shows completion period with time overrun for all projects considered by CoST-Ethiopia.

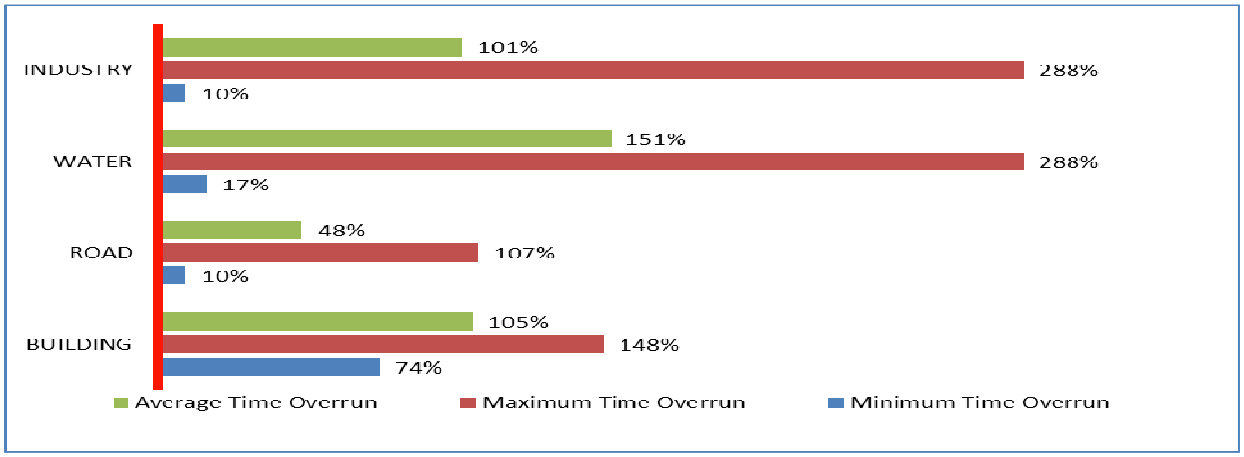


**Figure 23: Minimum, Maximum, and Average time overrun**

As most projects were undergoing and not completed during the Assurance process, the time overrun presented in this study cover only for the period of time the disclosure was made and the time overrun does not show the actual time overrun at the completion of these projects.

For this reason, the results have been updated for selected projects as performed for cost overrun. The update was considering some of the projects covered by CoST-Ethiopia whose status of completion was above eighty per cent for most of the selected projects.

As shown in Figure 24, the updated summary of time overrun shows that the industry level time overrun is 124.43 per cent and the time overrun for the building, road, and water sectors is 160.70 per cent, 63.34 per cent, and 149.25 per cent respectively.

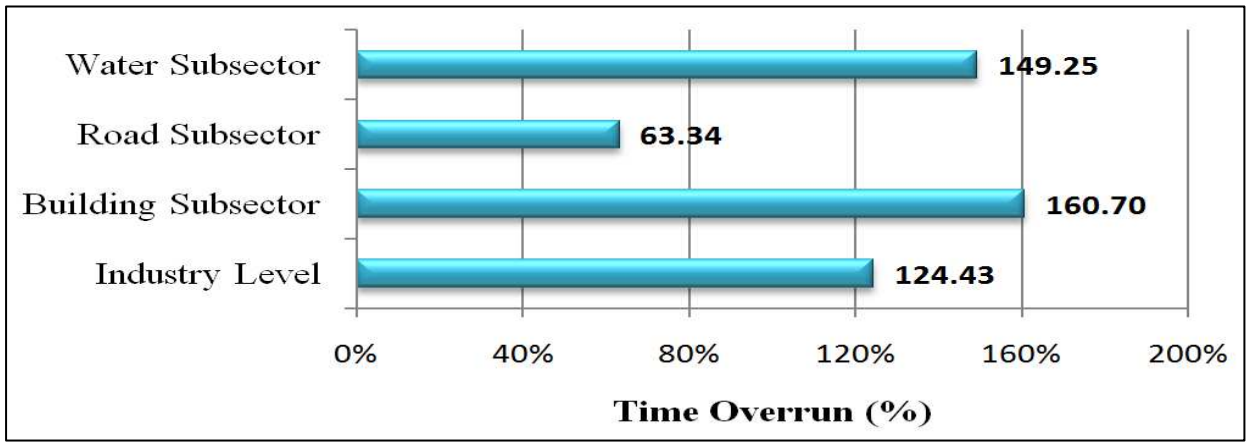


**Figure 24: Updated average time overrun**

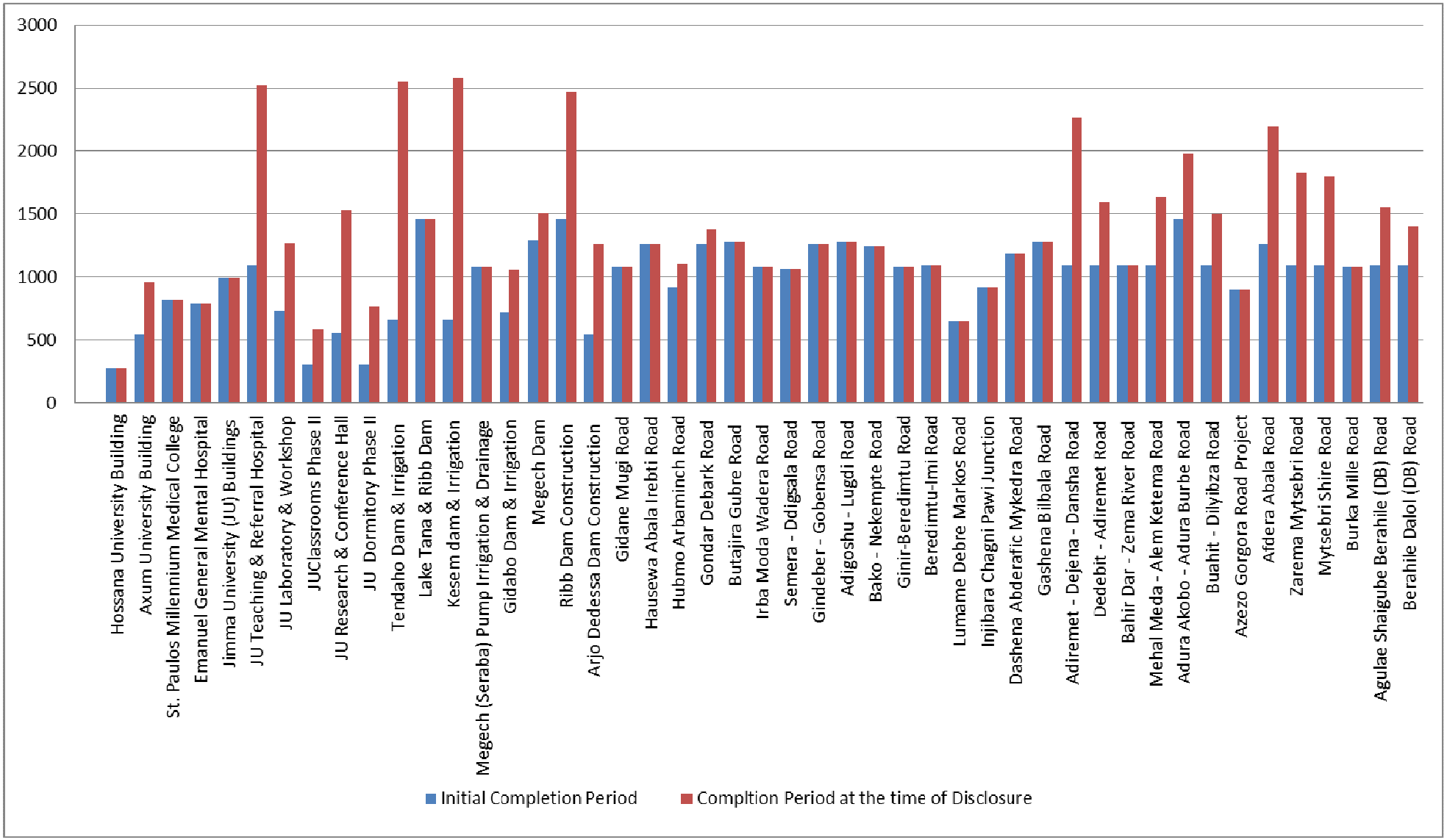


**Figure 25: Initial completion period and completion period at the time of disclosure in days for the three sectors**

## 6.2 Reasons for Time Overrun

Similar to the reasons for cost overrun, the reasons of time overrun have been summarized for the three sectors and aggregated into seven categories of:

- incomplete design;
- design changes;
- scope change;
- changes in quantity;
- force majeure and adverse weather conditions
- poor completion time estimation, and
- other reasons such as contractor's low capacity, Employer's inactions, shortage of materials, and construction difficulty.

In the building sector; design change and change in quantity being reasons of time overrun with 25 and 17 per cent shares respectively, the major reason of time overrun in this sector with 42 per cent share include other reasons such as land acquisition issues, energy crisis, power and water supply, shortage of finance and budget planning, unavailability of foreign currency, scarcity of construction materials on local market, poor provision of equipment and skilled manpower, etc.

In the road sector, design change and force majeure (including inclement weather condition) each share 22 per cent of the reason of time overrun while other reasons such as Contractor's low capacity, land acquisition related problems (Employer's contractual obligation), etc constitute the major reasons of time overrun with 26 per cent share.

In the water sector; incomplete design (20 per cent), scope change and change in quantity (17 per cent each), and design change (16 per cent) are reasons of time overrun that delay project completion. The other reason of time overrun in the sector with 20 per cent share is a combination of other reasons related to the capacity and efficiency of project participants such as Contractor, Consultant, and Employer.

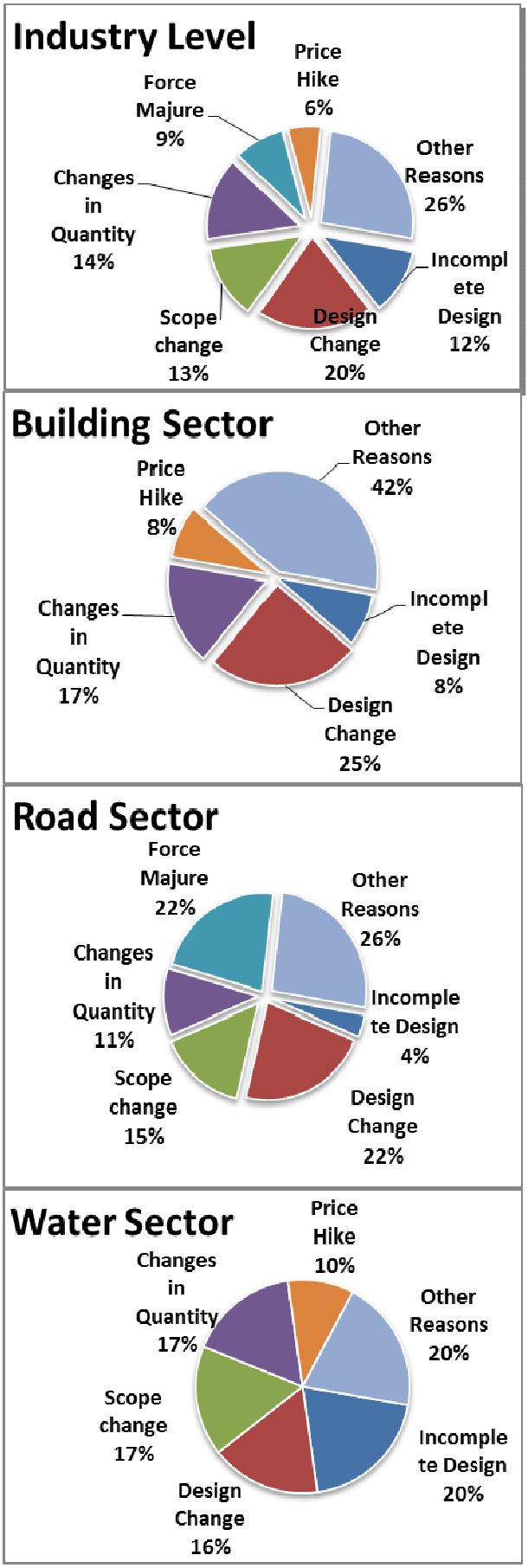


**Figure 26: Reasons for time overrun**

## 7. Causes for Concern

The causes for concern that was provided in the Assurance Reports have been grouped into seven categories in a similar way to the reasons of cost and time overrun. The categories of causes for concern that call for intervention in each of the projects are aggregated into the following:

- cost overrun;
- time overrun;
- project identification issues;
- procurement issues;
- contract administration issues;
- capacity building issues;
- procurement regulation issues.

The categories listed above were grouped according to the causes for concern provided in the Assurance Reports and analysis was made based on the frequency of the causes for concern provided for each of the projects covered by CoST-Ethiopia.

Figure 27 reveals that, project delay is the major causes for concern followed by procurement problems and cost overrun in the building sector. A project identification issue is the least causes for concern in this sector even if feasibility and environmental impact assessment studies were not conducted for the majority of projects in the sector.

In the road sector, procurement issues are the major causes for concern with 33 per cent share followed by project delays (21.4 per cent), contract administration issues (17.1 per cent), and cost overrun (15.7 per cent).

In the water sector, different causes for concern were obtained from the analysis where procurement regulation and capacity building issues, contract administration practices, time and cost overrun are all reported to be the causes for concern in the sector.

The aggregate summary of the causes for concern at industry level shows that procurement problems, project delays, cost overrun, and contract administration problems are the major causes for concern.

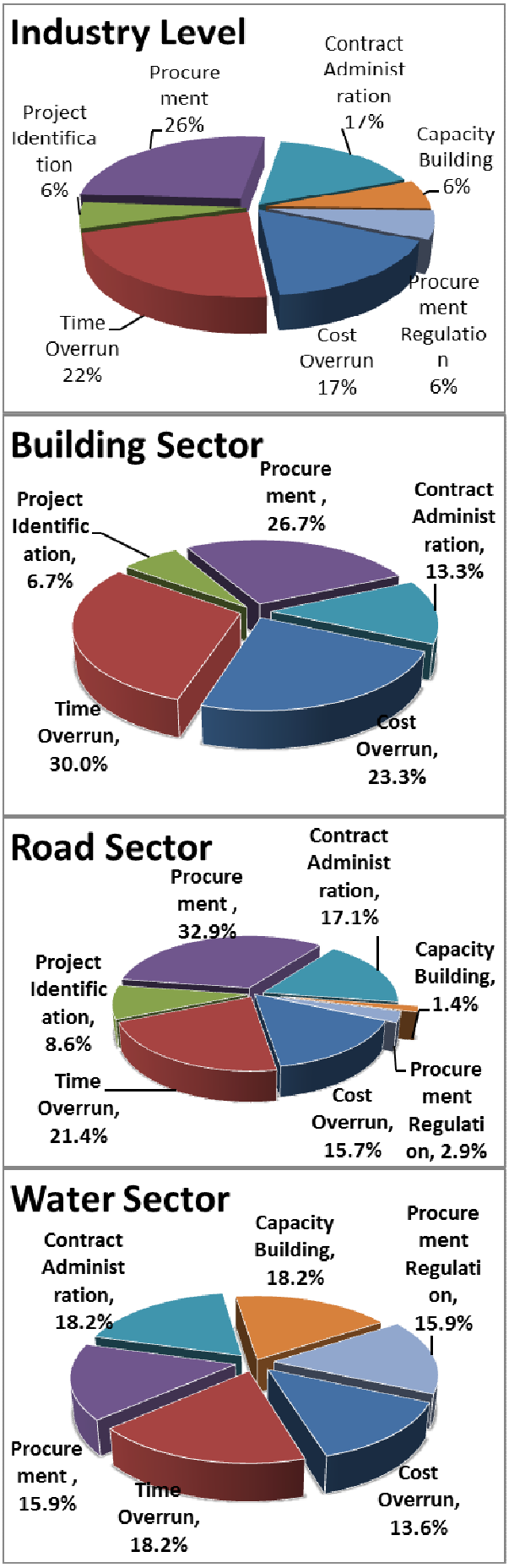


**Figure 27: Summarized causes for concern**

# III. STUDY FINDINGS AND RECOMMENDATIONS

## 1. Findings

The projects covered by CoST-Ethiopia from the building, water, and road sectors could be taken as representative sample both in number and volume of projects and therefore, the findings of this Aggregation Study are believed to be indicative of the sectors' and industry's project implementation practices. And, for the purpose of this study; the building sector include ten projects, the water sector includes ten projects, the road sector includes thirty two projects.

The main objective of the study is to summarize the facts provided in each of the Assurance Reports that could indicate common behaviors of a construction project implementation practices and to forward recommendations based on the findings of the study.

### 1.1 Building Sector

In the building sector, 90 per cent of the projects did not conduct feasibility and environmental impact assessment studies and these projects have been implemented without studying the feasibility and environmental impact assessments. Also, the design and supervision contracts for the majority of these projects are procured through direct award and there is no competition for these services.

The average cost overrun in the building sector is 6.81 per cent and the price escalation payment that was paid for two projects out of the sampled ten projects is 6.03 per cent of the initial contract price. The majority of the building projects do not have price escalation provisions owing to the requirements that price adjustment is allowed for projects whose initial completion period is above 18 months.

The average design fee for building sector projects is 0.4 per cent of the construction cost and the supervision and contract administration service fee for building and road sector projects is almost similar. The minimum, average, and maximum time overrun in the building sector projects is respectively 74, 105, 148 per cent and the average cost overrun in the building sector is more than twice the average time overrun in the road sector.

### 1.2 Water Sector

Direct award procurement is applied for the majority of projects in the water sector except the World Bank financed projects (#2) with a main objective of reducing the time required for the procurement of the design, supervision, and Works Contracts so that projects could commence immediately after the go ahead for project implementation was obtained from the concerned authority. The consultant and contractor appointed in this arrangement are Government owned firms engaged in the water sector for a longer period of time with institutional links to the project implementing ministry office.

The Procuring Entity initiate implementation phase (construction) before detailed design is completed and projects in this sector are planned to start construction based on feasibility studies and preliminary designs while detailed engineering designs are being performed in parallel to the construction. For this main reason, there is no complete engineering design prior to construction and contract document is deficient at the time of contract signing or at the time of commencement for most of these projects.

All these projects suffer cost overrun and delay in completion due to the procedural arrangements that could be indicative of the fact that the approach did not result the objective of reduced project implementation periods, i.e. projects delayed and their costs increased substantially and reasons for these problems emanate from the absence of detailed engineering design and complete contract documents.

Contract document preparation problem was observed on most water sector projects even for consulting service contracts as to the main requirements such as staff requirement and submission deadlines that was recorded as a point of dispute and a barrier for proper contract administration. That is, when contract documents do not clearly indicate the contract requirement on both consultant and contractor agreements, it hinders proper contractual actions because of absence of clear provisions.

In summary, contract document preparation problem; construction without having detailed engineering design; revision without limit (excessive number of variations); setting short period of time for completion; and late commencement by the consultant and contractor engaged in the sector are some of the observed problems in the water sector projects that could hide performance problems by the consultant and contractor.

Also, one of the problems with incomplete contract document is on contract quantity estimation that even affects including subcontract agreements made by the main contractor and subcontractors. Water Works Construction Enterprise (WWCE) is the Contractor that is directly appointed for the construction of most of the water sector projects and this firm applied open tendering procedures to subcontract parts of the Works. This contractor made subcontract agreements with foreign contractors by open tendering procedure for which one the subcontract with 28 million Birr increased to 100 million birr (by 357 per cent) and another subcontract with 1.42 million USD has increased to 2.36 million USD (by 166 per cent) due to the quantity estimation problem in the contract document.

Furthermore, a sample of the performance of an international design consultant, a design service period for one of the projects was 20 months and the consultant has got a further eight months extension of time. However, there was a delay in submission of the final designs and related studies by more than 16 months indicating that even in the case of ICB contracts, design submission could take nearly three years in the sector.

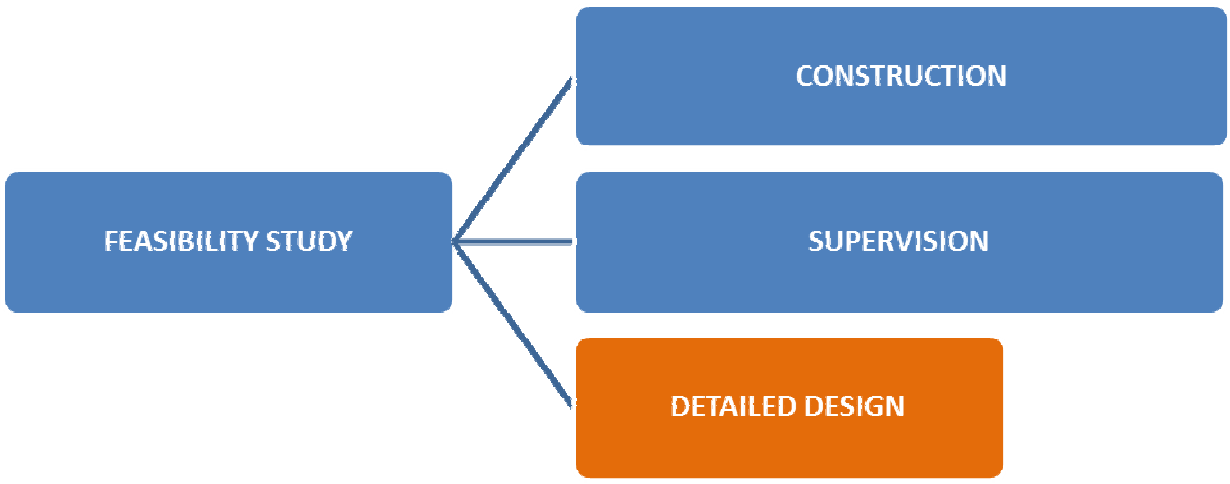


**Figure 28: Parallel construction and design phases; project implementation based on feasibility studies and preliminary designs**

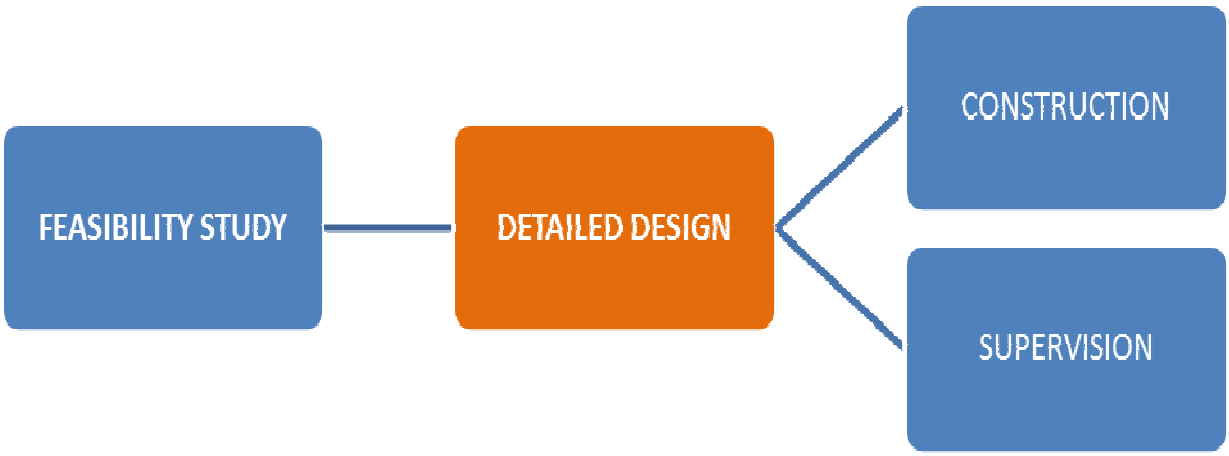


**Figure 29: Construction phase following design phase; project implementation based on detailed design**

### 1.3 Road Sector

Design build (DB) project delivery method is applied in the road sector for 17 per cent of the total 32 projects as a suitable delivery method in solving part of the construction problems that could arise from inappropriate delivery strategy.

The level of competition in the Works contract of the road sector is less than 50 per cent for the majority of projects, i.e. the level of competition can be regarded as low for more than 76 per cent of the projects. in other words, only 26 per cent of the projects score a level of Competition of 50 per cent and above indicating that Works contracts are procured with lower competition in the road sector.

The analysis of sufficiency of bid floating period and efficiency of bid evaluation process in the road sector revealed that all of the projects under the ICB and 93 per cent of the projects under NCB procedures have got sufficient bid preparation periods and efficiency of bid evaluation and contract signing processes is 73 and 20 per cent respectively.

In the road sector; a shorter procurement length is observed to recruit design consultant and the procurement length for supervision and Works contracts runs from a minimum of 48 days to a maximum of 1,258 days.

## 2. Recommendations

### 2.1 General Recommendations

#### a) Recommendations related to Procurement Process

As a general recommendation for assuring the “value for money” for construction projects, Procuring Entities and Government bodies need to manage and monitor the procurement and contract execution performance problems and the root causes of longer procurement durations and project delays need be addressed by conducting further assessments.

The longer duration of procurement process for both services and Works contracts need be reduced by avoiding inefficiencies in the procurement process.

### b) Records of Procurement

Unlike the procurement directive that prescribes the Procuring Entities to maintain records and documents regarding their public procurement undertakings, the findings of this study reveals that most of the Procuring Entities did not maintain necessary records and documents regarding their public procurement. However, the Ethiopian Roads Authority has a practice of maintaining records of its service and Works contract procurements that could be a good lesson for other sectors.

### c) Compliance with the Principles of Procurement

The Proclamation and Directive for Public Procurement stipulate that execution of public procurement must comply with the principles that support the country's economic development by ensuring economy, efficiency, and effectiveness. For this reason, the time input that the Procuring Entity utilizes in the procurement of services and Work contracts need be reasonably short enough to ensure the required efficiency in the execution of the contracts.

Also, the bid preparation (floating) period that a Procuring Entity has to set need be defined taking into consideration the time it takes for bidders to prepare a responsive bid and to gather the necessary information to fulfill the preconditions required in the bid documents.

During the detailed evaluation stage of the financial bids for Work contract, the Ethiopian Roads Authority compares the Lowest Bidder's offer with the Engineer's Estimate (as a whole, on Bill Group Basis, unit rates of major items) and unit rates of major items of "Other Recently Signed Projects". To this respect, the Procuring Entity's effort to avoid unbalanced bid offers and ensure economy in the execution of public procurement is can be taken as good lesson for other sectors.

### d) Project Development Practice

In a construction project, the owner holds the key to influence the construction costs, quality and delivery time of a project because any decision made at the beginning stage of a project life cycle has greater influence than those made at later stages. Therefore, the Procuring Entity need to allocate time sufficient time and budget to obtain the best expertise of professional services to provide adequate planning and design works.

### e) Cost and Time Estimation and Budgeting Process

The prevailing practice of design service and construction completion period estimation is should not be based on individual manager's experience/ planners' subjective decision and it is essential to provide a scientific tool or procedure to support the current approach in the determination of completion period of construction projects.

Similarly, the existing practice of cost estimation and budgeting process of construction projects looks on low level of project definition which in turn is defined by the maturity or extent and types of input information available to the estimating process. Such inputs include project scope definition, requirements documents, specifications, project plans, drawings, calculations, lessons learned from past projects, reconnaissance data, and other information that must be developed to define the project.

Moreover, there is no well-defined documentation requirement used to support the type of estimates used in that industry. It is thus advisable to develop unified and systematic tool for cost estimation and budgeting process and develop timely Cost Estimating Relationships (CER) that is used to perform the costing operation.

### f) Contract Administration

It is recommended to maintain an in-house construction management consultancy service especially for contract administration capability so that the Procuring Entity discharges its responsibility in following up of performance of contracts through monitoring the performance of contracts and providing contractual support to the contractors.

### g) Number of Shortlisted Firms for Consultancy Services

A good lesson from the water sector on short listing practice is provided hereunder. One of the projects in this sector was financed by the World Bank and design consultant selection was based on ICB procedure and for that the Procuring Entity has shortlisted six consulting firms with two reserves. The issuance of the RFP was delayed for approval and related issues and one of the shortlisted firms declined to be kept in the shortlist for the delay in the issuance of the RFP by 172 days.

The Procuring Entity has included one of the reserved consulting firms in order to increase the competition level within the maximum allowed number of shortlist which approach helped the Procuring Entity to get four firms that submit proposals out of which only two were technically responsive. This approach reduced the risk of a much lower competition because of small number of shortlisted firms and this could be a good practice for other sectors with the objective of increasing the number of competent consultants.

### h) Subcontract Arrangements in the Road Sector

Subcontracting arrangements are highly instrumental in promoting and ensuring knowledge transfer and maintenance of equity and specializations. In light of these multitude advantages, Procuring Entities need to enforce the subcontracting provisions stipulated in the contract while taking into account the minimum and maximum value of subcontractors, type of the works, and minimum number of domestic subcontractors provided in the contract document.

Also, beyond mere budgeting of significant amount of money for Sexually Transmitted Diseases (STD) and HIV/AIDS Alleviation Measures, Traffic Management, Environmental Protection and Mitigation Measures as a pay items in the contract, the Procuring Entity shall give utmost attention for proper execution of these activities to fulfill their intended objectives.

### i) Direct Award Appointment

The majority of water sector projects were procured through direct procurement that was not participatory especially for local consultants and contractors and didn’t result in better management with regard to timely completion of these projects in addition to the high cost overrun recorded in the sector.

### j) Setting Realistic Completion Period

Especially on the water sector, a realistic completion period was not provided for the dam projects that are large in scope and complexity where the initial completion period for some of these projects was equal to a completion period given to a building project. This problem was also observed in the building and road sector projects and a modern way of estimating construction period need be applied for each of the projects considering their specific characteristic and nature of the projects. Similarly reasonable time for design and project studies need be given for all consultancy services as for example for one internationally awarded consultant in the water , the design and study period given was 20 months plus 8 months extension of time.

# ANNEXES

## Annex 1: Key Variables Considered in the Aggregation Study (ToR)

| # | Major Variables | Details |
|---|---|---|
| 1 | **Project Cost** | Cost of specific projects |
| | | Project cost at Sector Level |
| | | Project cost at Industry Level |
| 2 | **Completeness of Project Studies** | Feasibility study (Available/Not Available) |
| | | Environmental Impact Assessment (Available/Not Available) |
| | | Attention by the Projects for the two studies |
| | | Number (and percent) of projects with feasibility study |
| | | Number (and percent) of projects with EIA study |
| 3 | **Bid Statistics** | |
| a | Length of Procurement (with segments for bid floating, evaluation, award, project commencement) at Project Sector and Industry Level. Average values are used for sector and industry levels. | Minimum length of procurement (by segment and in total) |
| | | Minimum length of procurement (by segment and in total) |
| | | Minimum length of procurement (by segment and in total) |
| b | Level of competition at Project, Sector and Industry levels. Average values are used for sector and industry levels. | Number of firms who purchased Bid Document |
| | | Number of firms who submitted Bid Document |
| | | Number of firms who qualified |
| 4 | **Construction Cost** | |
| a | Cost overrun of projects | |
| | Cost overrun at project level (in percent and in absolute figures) | Project cost at the start |
| | | Project cost at the time of study |
| | | Estimated/actual project cost at completion |
| | Aggregation at Sector and Industry level (in percent and in absolute figures) of cost overrun | Minimum cost overrun |
| | | Maximum cost overrun |
| | | Average cost overrun |
| b | Reasons for Cost overrun of projects (explain as to how the following became reasons for cost overrun) | Design - incompleteness |
| | | Design - change of design |
| | | Scope change |
| | | Change in quantity |
| | | Price hike |
| | | Force majeure |
| | | Others, specify |
| 5 | **Price Escalation** | Price escalation at Project Level (in percent and in absolute figure) |

| | | |
|---|---|---|
| | | Price escalation at Sector Level (in percent and in absolute figure) |
| | | Price escalation at Industry Level (in percent and in absolute figure) |
| **6** | **Construction Time** | |
| a | Time overrun at project level (in percent and in absolute figures) | Estimated project completion time at the start |
| | | Estimated project completion time at the time of study |
| | | Estimated/actual project completion time at completion |
| | Aggregation at Sector and Industry level (in percent and in absolute figures) of time overrun | Minimum time overrun |
| | | Maximum time overrun |
| | | Average time overrun |
| | | Estimated time overrun for ongoing projects |
| b | Reasons for Time overrun of projects (explain as to how the following became reasons for cost overrun) | Design - incompleteness |
| | | Design - change of design |
| | | Scope change |
| | | Change in quantity/volume of work |
| | | Force majeure |
| | | Poor initial estimation of completion time |
| | | Others, specify |
| **7** | **Issues of Concern** | Issues of concern of specific projects<br>Implications of the causes of concern<br>Root causes for the issues of concern with remedial points<br>Cross cutting issues of concern at Sector Level with remedial points<br>Cross cutting issues of concern at Industry Level with remedial points |

**Annex 2: Project Details and Study Team Assignment**

| # | Project Name | Contract Date | Initial Contract Price [BIRR] | Initial Contract Price [USD] | Initial Construction Time [Days] | Assigned Study Team |
|---|---|---|---|---|---|---|
| **Building Sector Projects** | | | | | | |
| 1 | Implementation Process of 10 Universities - Hossana | 01 May 2010 | 18,401,563.94 | 1,374,173.99 | 270 | Asmerom Taddese |
| 2 | Implementation Process of 13 Universities - Axum | 12 Dec 2010 | 81,108,790.00 | 8,345,341.37 | 540 | |
| 3 | St. Paulos Millennium Medical College | May10 | 73,705,033.57 | 5,537,984.34 | 820 | |
| 4 | Emanuel General Mental Hospital | 09 Jun 2010 | 67,660,053.56 | 5,068,928.20 | 790 | |
| 5 | Jimma University Building Projects | 02 Jul 2008 | 309,525,592.83 | 32,405,322.29 | 991 | |
| 6 | Jimma University Teaching and Referral Hospital | May 2007 | 236,703,570.23 | 27,521,750.83 | 1095 | |
| 7 | Jimma University Laboratory and Workshop | 24 Jan 2011 | 355,925,389.92 | 21,719,984.74 | 730 | |
| 8 | Jimma University Classrooms Phase II | May 2012 | 340,932,496.71 | 19,555,273.04 | 300 | |
| 9 | Jimma University Research and Conference Hall | 3 May 2010 | 227,919,070.43 | 17,096,922.24 | 560 | |
| 10 | Jimma University Dormitory Phase II | 13 Jun 2012 | 349,523,637.70 | 19,848,809.31 | 300 | |
| **Road Sector Projects** | | | | | | |
| 1 | Tongo Beji Muji, Contract 2 Gidame Mugi | 17Apr 2008 | 372,420,036.56 | 39,505,637.16 | 1080 | Asmerom Taddese |
| 2 | Hausewa Abala Irebti | 04Jul 2008 | 746,341,435.30 | 78,436,262.94 | 1260 | |
| 3 | Hubmo Arbaminch Upgrading | 23Nov 2007 | 380,204,197.21 | 42,537,950.01 | 913 | |
| 4 | Abala Shaigube Design-Build Road Project | Mar 2010 | 707,955,759.00 | 53,398,382.79 | | |
| 5 | Gondar Debark Road Project | Dec 2008 | 690,779,965.26 | 70,871,033.68 | 1260 | |
| 6 | Injibara Chagni Pawi Junction | 22 Nov 2012 | 2,283,309,548.60 | 127,008,585.60 | 913 | |
| 7 | Dashena Abderafic Mykedra | 26 Nov 2013 | 1,607,687,055.78 | 85,198,042.17 | 1186 | |
| 8 | Lumame Debre Markos | 30Aug 2013 | 1,319,400,000.00 | 392,463,417.40 | 644 | |

| # | Project Name | Contract Date | Contract Price [Birr] | Contract Price [USD] | Construction Period [Days] | Assigned Study Team |
|---|---|---|---|---|---|---|
| **Road Sector Projects** (cont'd) | | | | | | |
| 9 | Semera - Ddigsala Road Project | 07Feb 2008 | 328,215,146.17 | 35,874,428.81 | 1066 | **Hagos Abdea** |
| 10 | Gindeber - Gobensa Road Project | 08Jan 2010 | 755,409,675.00 | 60,475,348.65 | 1260 | |
| 11 | Adigoshu - Lugdi Road Project | 10Apr 2007 | 627,709,145.85 | 73,722,373.11 | 1280 | |
| 12 | Gedo - Manabegna [Design Service] | Design stage | | | | |
| 13 | Bako - Nekempte Road Project | 29 Jul 2009 | 391,047,637.57 | 34,964,917.52 | 1245 | |
| 14 | Butajira Gubre Road Upgrading Project | Nov 2007 | 637,497,172.45 | 71,338,731.5 | 1278 | |
| 15 | Aposto-Wondo-Negele; Irba Moda Wadera Road | 24Dec 2008 | 690,779,965.26 | 6,320,2587.43 | 1080 | |
| 16 | GashenaLalibela-Sekota: Gashena Bilbala Road Project | 15 Jan 2014 | 1,442,916,047.83 | 76,139,309.16 | 1278 | |
| 17 | Adiremet - Dejena - Dansha Road Project | 23 Dec 2008 | 926,292,277.49 | 95,012,132.02 | 1096 | |
| 18 | Dedebit - Adiremet Road Project | 10 Feb 2010 | 801,212,552.61 | 60,720,921.00 | 1095 | |
| 19 | Bahir Dar - Zema River Road Project | 02 Sep 2013 | 1,236,755,640.33 | 66,143,739.46 | 1096 | |
| 20 | Meha lMeda–Alem Ketema Road Project | 27 Jun 2011 | 802,248,892.71 | 47,417,319.84 | 1096 | |
| 21 | Adura Akobo–Adura Burbe Road Project | 16 Mar 2009 | 823,697,031.20 | 74,968,784.69 | 1460 | |
| 22 | Buahit - Dilyibza Road Project | 29 Mar 2011 | 947,920,000.00 | 55,662,400.00 | 1096 | |

| # | Project Name | Contract Date | Contract Price [Birr] | Contract Price [USD] | Construction Period [Days] | Assigned Study Team |
|---|---|---|---|---|---|---|
| **Road Sector Projects** (cont'd) | | | | | | |
| 23 | Ginir-Imi-Gode Road Project: Ginir-Beredimtu | 22May 2008 | 541,718,515.05 | 57,263,326.72 | 1080 | **Kasiem Seid** |
| 24 | Ginir-Imi-Gode Road Project Contract 2: Beredimtu-Imi | Jun08 | 497,108,024.65 | 52,516,940.13 | 1095 | |
| 25 | Azezo Gorgora Road Upgrading Project | 23 Jan 2013 | 720,000,000.16 | 39,697,636.35 | 900 | |
| 26 | Hawsewa Abala Irebti, Contract I Afdera Abala | 04 Jul 2008 | 746,341,435.30 | 78,436,262.94 | 1260 | |
| 27 | Zarema Adiarkai Shire: Zarema Mytsebri | 30 Sep 2011 | 912,631,312.54 | 53,747,427.12 | 1096 | |
| 28 | Zarema Adiarkai Shire: Mytsebri Shire | 30 Sep 2011 | 747,452,284.82 | 44,019,569.19 | 1096 | |
| 29 | Combolcha-Bati-Mille: Burka Mille | 21 May 2013 | 1,285,666,666.10 | 69,721,619.64 | 1080 | |
| 30 | Agulae Shaigube Berahile (DB) | 03 Aug 2010 | 923,916,753.17 | 68,667,168.57 | 1095 | |
| 31 | BerahileDalol (DB) | 03 Aug 2010 | 1,245,261,242.05 | 92,550,073.73 | 1095 | |
| 32 | Azezo Gorgora | Sep 2014 | 720,000,000.16 | | 900 | |
| **Water Sector Projects** | | | | | | |
| 1 | Tendaho Dam & Irrigation Project | 03 Aug 2014 | 840,254,274.00 | 99,944,603.91 | 660 | **Kasiem Seid** |
| 2 | Ethiopian Nile Irrigation and Drainage Project | | | | | |
| 3 | Lake Tana Surrounding Projects and Ribb Dam | 01 Dec 2007 | 1,336,274,358.08 | 149,409,568.50 | 1460 | |
| 4 | Tana Beles Integrated Water Resources Management | Design stage | | | | |
| 5 | Kesem dam and Irrigation Project | Aug 2004 | 829,745,725.00 | 100,067,020.20 | 660 | |
| 6 | Megech (Seraba) Pump Irrigation and Drainage Project | 06 Jun 2012 | 420,692,188.27 | 24,099,457.98 | 1080 | |
| 7 | Gidabo Dam and Irrigation Project | 11 Jan 2010 | 303,386,292.79 | 24,216,658.11 | 720 | |
| 8 | Megech Dam Project | Aug 2008 | 2,451,953,329.63 | 254,904,386.10 | 1290 | |
| 9 | Ribb Dam Construction Project | 02 Oct 2007 | 1,336,274,358.08 | 149,996,560.40 | 1460 | **Hagos** |
| 10 | Arjo Dedessa Dam Construction Project | 31 Jan 2011 | 755,461,980.84 | 45,444,055.63 | 540 | **Abdea** |

**Annex 3: Summary of updated cost and time overrun records**

## A. Building Sector

| # | Project Name | Initial Contract Price | | Revised Contract Price | | Cost Overrun [%] | Completion Period [Days] | Approved EOT [Days] | Time Elapsed[5] [Days] | Time Overrun [%] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ETB | USD | ETB | USD | | | | | |
| 1 | Thirteen New Universities - Axum University | 81,108,790.00 | 8,345,341.37 | 93,519,474.77 | 4,214,680.00 | 15.30 | 540 | 99 | 980 | 81.48 |
| 2 | Emanuel General Mental Hospital | 67,660,053.56 | 5,068,928.20 | 85,943,780.51 | 3,856,380.00 | 27.00 | 790 | - | 1705 | 115.82 |
| 3 | Jimma University Additional Facilities | 309,525,592.83 | 32,405,322.29 | 378,997,541.15 | 17,080,400.00 | 22.40 | 1000 | 1540 | 2828 | 182.80 |
| 4 | Jimma University Teaching and Referral Hospital | 230,785,980.46 | 27,521,750.83 | 266,004,564.19 | 11,988,100.00 | 15.30 | 1095 | 297 | 3181 | 190.50 |
| 5 | Jimma University Laboratory and Workshop | 355,925,389.92 | 21,719,984.74 | 404,445,400.64 | 18,227,300.00 | 13.60 | 730 | 201 | 1990 | 172.60 |
| 6 | Jimma University Classrooms Phase II | 303,113,137.15 | 19,555,273.04 | 340,698,607.41 | 15,354,400.00 | 12.40 | 300 | 27 | 930 | 210.00 |
| | | | | | **Average cost overrun** [%] | **16.43** | | | **Average time overrun** [%] | **160.70** |

[5] Time elapsed is as of July 2016 or at completion for the projects selected form the three sectors

## B. Road Sector[6]

| # | Project Name | Initial Contract Price | | Revised Contract Price | | Cost Overrun [%] | Completion Period [Days] | Approved EOT [Days] | Time Elapsed [Days] | Time Overrun [%] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ETB | USD | ETB | USD | | | | | |
| 1 | Hausewa Abala Irebti | 746,341,435.30 | 78,436,262.94 | 1,534,515,474.36 | 69,156,600.00 | 105.60 | 1260 | - | 2171 | 72.30 |
| 2 | Tongo Beji Muji, Contract 2 Gidane Mugi Road | 372,420,036.56 | 39,505,637.16 | 447,630,512.74 | 20,173,500.00 | 20.20 | 1080 | - | 2877 | 166.40 |
| 3 | Hubmo Arbaminch Road | 380,204,197.21 | 42,537,950.01 | 521,783,421.62 | 23,515,400.00 | 37.20 | 913 | - | 2401 | 162.90 |
| 4 | Agulae Shaigube Berahile DB | 969,916,753.17 | 53,398,382.79 | 1,131,594,917.90 | 50,998,000.00 | 16.70 | 1095 | - | 1411 | 28.90 |
| 5 | Adiremet-Dejena-Dansha | 926,292,277.49 | 95,012,132.02 | 1,189,047,035.43 | 53,587,200.00 | 28.40 | 1096 | - | 2000 | 82.50 |
| 6 | Dashena Abderafic Mykedra | 1,458,501,868.8 | 85,198,042.17 | 1,589,039,838.55 | 71,613,900.00 | 9.00 | 1186 | - | 816 | - |
| 7 | MehalMeda–AlemKetema | - | - | - | - | - | 1096 | - | 1635 | 49.20 |
| 8 | Azezo Gorgora Road | - | - | - | - | - | 900 | - | 1173 | 30.30 |
| 9 | Zarema Adiarkai Shire, Cntract II : Mytsebri Shire | - | - | - | - | - | 1096 | - | 1770 | 61.50 |
| 10 | Berahile Dalol (DB) | - | - | - | - | - | 1095 | - | 1412 | 29.00 |
| 11 | Gindeber - Gobensa Road | - | - | - | - | - | 1260 | - | 1586 | 25.90 |
| 12 | Aposto-Wondo-Negele; Irba Moda Wadera Road | - | - | - | - | - | 1080 | - | 1924 | 78.20 |
| 13 | Buahit - Dilyibza Road | - | - | - | - | - | 1096 | - | 1836 | 67.50 |
| | | | | | **Average cost overrun** [%] | **41.60** | | | **Average time overrun** [%] | **70.00** |

[6] The update record was obtained from the PE's disclosure website

## C. Water Sector

| # | Project Name | Initial Contract Price | | Revised Contract Price | | Cost Overrun [%] | Completion Period [Days] | Approved EOT [Days] | Time Elapsed [Days] | Time Overrun [%] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ETB [million] | USD [million] | ETB [million] | USD [million] | | | | | |
| 1 | Tendaho Dam and Irrigation Project | 840.00 | 99.94 | 3,040.00 | 137.01 | 261.90 | 1460 | - | 3650 | 150.00 |
| 2 | Ribb Dam Construction | 1,336.00 | 149.99 | 4,631.00 | 208.71 | 246.63 | 1460 | - | 3165 | 116.75 |
| 3 | Gidabo Irrigation Project | 258.00 | 24.22 | 707.00 | 31.86 | 174.03 | 730 | - | 2343 | 221.00 |
| 4 | Kessem Dam and Irrigation Project | 829.00 | 100.07 | 1,939.00 | 87.39 | 133.90 | 1460 | - | 4289 | 193.75 |
| 5 | Megech (Serba) Pump Irrigation and Drainage project | 890.00 | 254.90 | 964.00 | 43.45 | 8.31 | 1095 | - | 1613 | 47.33 |
| 6 | Arjo Deddesa Dam construction Project | 755.50 | 45.44 | 2,256.00 | 101.67 | 198.63 | 548 | - | 1460 | 166.70 |
| | | | | | **Average cost overrun** [%] | **170.60** | | | **Average time overrun** [%] | **149.25** |