



ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
DEPARTMENT OF PROJECT MANAGEMENT
POST GRADUATE PROGRAM

**CRITICAL FACTOR OF SUBCONTRACTOR EVALUATION
AND SELECTION: THE CASE OF ADDIS ABABA ROAD
PROJECT**

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Addis Ababa University School of Commerce

Department of Project Management

Post Graduate Program

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**Critical Factor of Subcontractors Evaluation and Selection:
the Case of Addis Ababa Road Project**

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Commerce in Partial Fulfillment of the Requirements for the Award
of Master of Arts Degree in Project Management**

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Addis Ababa, Ethiopia

Statement of Declaration

I, the undersigned, affirm that this thesis, "Critical Factors in Subcontractor Evaluation and Selection: The Case of the Addis Ababa Road Project," is my original work. With the guidance and support of the research advisor, I conducted the research independently. This research has not been submitted for consideration for any degree or diploma program at this or any other school, and all sources of materials used for the thesis have been duly acknowledged.

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Statement of Certification

We, the members of the board of examiners, confirm that we have read, evaluated, and examined the candidate's thesis prepared by Girmachew Mamushet. We recommend that the thesis be approved as satisfying the thesis requirement for a Master of Art degree in Project Management Stream.

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Table of Contents

Acknowledgements	I
List of Tables	V
ABSTRACT	VIII
CHAPTER ONE	1
1.INTRODUCTION	1
1.1.Background of the Study	1
1.2.Statements of the Problems	4
1.3.Study Questions	5
1.4.Research Objectives	5
1.4.1.General Objectives	5
1.4.2.Specific Objectives	5
1.5.Significance of the Study	5
1.6.Scope of the Study (Delimitation of the Study)	5
1.7.Limitations of the Study	6
1.8.Organization of the Thesis	6
CHAPTER TWO	7
2.LITERATURE REVIEW	7
2.1.History of Addis Ababa City Roads Development	7
2.2.Introduction of this chapter	12
2.3.Participants in the construction project	12
2.3.1.Employer /Client/	13
2.3.2.Consultant	13
2.3.3.General Contractor	13

2.3.4.Subcontractor	13
2.4. Contract	14
2.4.1. Main Contract	14
2.4.2. Subcontracting	14
2.5 Subcontracting in Construction Industry.....	15
2.5.1 Types of Subcontracting	16
2.5.2 Reasoning for Subcontracting	18
2.6. Subcontractor Selection Process	20
CHAPTER THREE	31
3. RESEARCH METHODOLOGY	31
3.1 Introduction	31
3.2 Research Design.....	31
3.3 Sources of Data and Information	31
3.4 Design of the survey.....	32
3.4.1 Questionnaire design	32
3.5 Population and Sampling	32
3.5.1 Research Population	32
3.5.2 Data Collection	33
3.6. Methods of Data Analysis	33
3.7. Validity of the study	33
3.8. Ethical issue.....	34
CHAPTER FOUR.....	35
4. DATA PRESENTATION, ANALYSIS AND DISCUSSION OF THE RESULT	35
4.1 INTRODUCTION.....	35
4.2 Statistics of Respondents.....	35

4.3. General Information	36
4.3.1. Educational Background.....	37
4.3.2. Role of Respondents in the Company	38
4.3.3. Work Experience	39
4.4. Analysis of Main body of Survey Results.....	40
4.4.1. Reasoning for Subcontracting	40
4.4.2. Sub-Contractor Selection Criteria	43
CHAPTER FIVE	47
5. CONCLUSION AND RECOMMENDATION.....	47
5.1 Introduction	47
5.2 Conclusions	47
5.3 Recommendations	48
Reference	50
APPENDIXES	58

List of Tables

Table 2.1 Parties involved in Addis Ababa road projects.....	9
Table 4.1: Overall survey response level.....	36
Table 4.2 Profiles' about Respondents	37
Table 4.3: Importance Level from RII.....	41
Table 4.4 Relative Importance Level of Reason for Sub-Contracting.....	42
Table 4.5 ranking of selection criteria	43

List of Figure

Figure 2.1 Addis Ababa city road network.....	8
Figure 2.2 evaluation criteria for subcontractor selection	24
Figure 2.3 an example of a flowchart outlining a step-by-step methodology for subcontractor Selection	30
Figure 4.1 Educational Background	38
Figure 4.2 Role of the respondents on their firm	39
Figure 4.3 Experiences of Respondents.....	40
Figure 4.4 Top 5 RII and ranking of each party respondent.....	45

Acronyms

AACRA= Addis Ababa City Road Authority

FIDIC= Federation Internationale des Ingenieurs Conseil

GC = General Contractor

GDP= Grosse Domestic Product

PPA= Public Procurement Agency

RII = Relative Important Index

SME = Small and Micro Enterprises

SPSS= Statistical Package for Social Science

ABSTRACT

Because construction projects have become increasingly sophisticated, the vast majority of them are now subcontracted, allowing for specialization and reducing the workload of the main contractor. The study's main objectives were to look into the rationale for subcontracting and to identify subcontractor selection criteria in Addis Ababa road projects. The information was acquired using a questionnaire survey from a group of specialists and a sample of purposely selected 43 participants that work on road projects in Addis Ababa and the required data were collected from 15 main contractors, 14 consultants and 14 client's representative. Descriptive method used and using Excel and SPSS software, respondents' responses are organized and statistical analysis was carried out. Subcontracting reasons and considerations used by primary contractors to choose suitable subcontractors, listed by relative importance index value. The results showed fourteen factors from 24 subcontractor selecting criteria were ranked High Relative Importance Level; nine factors score High-Medium Relative Importance Level, and one selecting criteria ranked Medium level. The research found out four reasons as High Relative Importance Level; four reasons as High-Medium Relative Importance Level, and two reasons as Medium important level from 10 questions of reasoning for subcontracting. The results of the survey suggest that looking for specialist services, reducing delays, obtaining technology transfer, and performing a certain volume of work are all highly crucial reasons for subletting a portion of the project. On the other hand, fourteen of the 24 criteria used to choose suitable subcontractors were the most important. These are experience in similar projects; quality performance in previous projects; specialty in certain type of work; current workload and commitment; evidence of adequate resources/ materials, equipment and machinery; possession of qualified, skilled and strong workmanship; regular and effective communication with main contractor; leadership qualities and ability to manage own workmanship; history of contract completion; commitment to do remedial works; ability to work efficiently with other subcontractors; compliance of the subcontractor's submitted schedule with the project's overall schedule; Financial strength; and the subcontractor's subsequent approval by the owners.

Key Words: -Main contractors, Subcontractors, Reasoning for subcontracting, Selection criteria.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The construction industry is one of Ethiopia's most important sectors for economic development, as well as one of the most important sectors in the global economy. It accounts for about 8% of the global gross domestic product (GDP) (MEGARON 2014). According to Ayalew et al. (2016), the Ethiopian construction industry now contributes 5.6 percent of GDP, which is close to the sub-Saharan average (6 percent).

Road construction is one of the most important parts of the construction industry, contributing significantly to national growth and requiring large financial and human resources. This demonstrates the importance of the construction industry in both the global and local economies. Infrastructure development has always been a part of life, dating back to the dawn of time and humanity. Ethiopia's construction industry is currently driving development and industrialization, as well as modernizing the livelihoods of those who work in it, and is expected to do so in the future. The construction industry is a driving force for technology, innovation, and general progress because it demands a lot of work and employs the majority of the country's workforce.

A road is a crucial piece of infrastructure built by the government, with the assistance of foreign governments or the private sector, to offer transportation services for automobiles and pedestrians to safely transfer passengers and commodities from one location to another.

It is regarded a success if the road project meets the needs of the client and stakeholders in terms of time, money, and quality. To achieve these objectives, the concept of selecting the right person for the right job should be followed. Otherwise, risk can take many forms, including time and cost overruns, financial losses, loss of life, environmental harm, material waste, and a variety of other failures.

Ethiopia has prioritized improving the country's road infrastructure, both in terms of quality and scope. The Addis Ababa City Road Authority (AACRA) invests a significant amount of money and resources in order to expand and rehabilitate the current road network and offer adequate infrastructure to the city's residents. According to the AACRA Communication Affairs Directorate, AACRA spent more than 20 billion birr on road improvements from 2006 to 2016. (2017).

Construction is one of the three economic sectors that the Ethiopian government has identified as requiring special attention in order to promote the country's development. However, Ethiopia's domestic construction industry continues to be plagued by a lack of capital, outdated and limited equipment, low levels of equipment availability and utilization, technical, managerial, financial, and entrepreneurial skills deficiencies, limited private sector experience and participation in construction and consultation projects, and insufficient and ineffective use of labor-based road construction and paving.

Subcontracting is a common practice in Addis Ababa municipal road projects, though its current contribution to project completion on time, cost savings, and quality work delivery is being questioned. Poor subcontracting performance, according to Koshe and Jha (2016), is one of the causes of construction project delays in Ethiopia. Though subcontracting has been used on AACRA projects for some time, the challenges surrounding subcontracting have not been adequately addressed in isolation from other factors that affect road project performance.

Subcontracting is a project delivery business strategy used by main contractors to deal with construction market uncertainties and risks like financial, completion, and quality. It is a process of subletting trade or work packages to ordinary contractors or to specialist contractors, commonly referred to as sub-contractors (Thomas E. Uher and Philip Daveport(2009).

Subcontracting allows main contractors to engage smaller, more competitive firms with lower overhead costs and a better understanding of local market conditions, practices, and procedures, cutting direct costs and overheads. It is the manner of construction organization in which the prime contractor is authorized to, and commonly does, complete some or even all of its contract obligations through other contracting entities.

The construction contract involves a number of parties. In most cases, the project's main contract is signed by the employer, the consultant, and the general contractor. A construction project has been awarded to a general contractor with a proven track record to complete a specific task. The general contractor is responsible for the management process, such as executing agreements with the clients, project finance, supplying material and equipment and reviewing the progress of the project (Benjaoran, 2009).

A general contractor may hire a sub-contractor to carry out a specific part of the general contractor's works. A subcontractor is a person who agrees to perform some or all of the obligations that the main contractor is required to perform under a separate main contract with the employer in the context of a construction project (subcontracting UK 1st edition). According to some definitions, a subcontractor is a construction company that contracts with the general contractor to implement and complete the project's work packages, which includes providing labor (workers), equipment, tools, designs, and other materials (Abbasianjahromi, Rajaie, & Shakeri, 2013; Arditi & Chotibhongs, 2005).

Contractually, main contractors are responsible for the construction of projects, but they rely on subcontractors and/or specialist contractors and suppliers to execute the works (Obafemi et al, 2013). The contractual relationship between the main contractor and the subcontractors has become more popular (El-Mashaleh, 2009; Hinze & Tracey, 1994; Kale & Arditi, 2001). The subcontractors' performance determines a general contractor's total performance. As a result, subcontractors play a critical role in ensuring that projects are finished on time, on budget, to specified quality standards, and in a safe environment.

As a result, the idea of picking the appropriate person for the right role may have an impact on project success. However, the construction industry in developing countries, which accounts for a large number of SMEs, is still not given the attention it deserves when it comes to subcontractor selection (Abbasianjahromi et al., 2013; Ulubeyli, Manisali, & Kazaz, 2010). Choosing the proper subcontractor is a difficult task. As a result, selecting the right subcontractor for a construction project can be challenging for both owners and project managers. If the subcontractor is not chosen according to the acceptable selection criteria, the construction project may face delays, price increases, and poor quality, putting the main contractor at risk.

Main contractors' risks are reduced when specialized subcontractors are involved in the construction process. On the other hand, if the subcontractor selection process does not align with the project site, size, market characteristics, and owner expectations, it will inevitably have negative consequences. As a result, selecting the subcontractors and their selection criteria have become topics of interest to many researchers (Arditi & Chotibhongs, 2005; El-khalek, Aziz, & Morgan, 2019; Ng, Luu, & Chu, 2008; Shivam & Kashiyani, 2018; Ulubeyli, Kazaz, & Arslan, 2017).

Thus, the goal of this research is to identify the factors that are considered important when selecting subcontractors for the Addis Ababa road project. By using selection criteria from previous studies and practices in a specific project environment, the study will examine these factors not only from the perspective of contractors, but also from the perspective of experts from the client and consultants.

1.2. Statements of the Problems

Subcontracting is useful in shifting financial risks and costs, adding quality and efficiency, creating a more vibrant and competitive industry (Dykstra 2011). According to discussions and preliminary observations, major contractors in Addis Ababa sublet the majority of their work to subcontractors. While road projects in Addis Ababa frequently use subcontractors, poor subcontractor selection leads to delays, price increases, and poor project performance. Poor subcontracting performance, according to Koshe and Jha (2016), is one of the causes of construction project delays in Ethiopia. If a subcontractor fails to meet the contractual requirements, the main contractor faces delays, cost overruns, and poor quality (Nguyen, Likhitrungsilp, & Onishi, 2020; Pham et al., 2020).

Unqualified subcontractors will have a negative impact on the project when it is in operation. Subcontracting can be a risk to construction projects (Yoke-Lian et al., 2012).

Many firms base their contracts primarily on the subcontractor's financial quotation; they do not consider other technical experiences, required resources, or the contractor's ability to work, and they pay little attention when making a decision.

The success and efficacy of the project partners' cooperative relationship had an impact on the project's overall success. As a result, many academics are interested in the process of selecting subcontractors and the criteria used to do so (Arditi & Chotibhongs, 2005; El-khalek, Aziz, & Morgan, 2019; Ng, Luu, & Chu, 2008; Shivam & Kashiyani, 2018; Ulubeyli, Kazaz, & Arslan, 2017).

The construction sector, in general, is facing a number of issues as a result of a lack of criteria for proper subcontractor selection. The literature also shows, there are no specific criteria for selecting the subcontractors by the main contractors.

1.3. Study Questions

- I. What are the reasons for subcontracting?
- II. What are the selection criteria for Addis Ababa road projects?

1.4. Research Objectives

This study has the following general and specific objectives that it intends to achieve

1.4.1. General Objectives

The main objective of the study is to examine the existing subcontractor selection factors and identify the criteria that will determine the sub-contract selection for road projects in Addis Ababa.

1.4.2. Specific Objectives

- Prioritize the reasons for subcontracting based on their ranking
- Investigate subcontractor's selection criteria in Addis Ababa road construction projects.

1.5. Significance of the Study

The major significances of this research are:

- Helps project owners and contractors improve their sub-contracting strategies.
- Will have significant contribution in helping the general contractor to complete their projects within scheduled period of time, reasonable cost and required quality.
- It creates a healthy contract relationship and prevents conflicts caused by the incompetence of subcontractors and prevents them from incurring unnecessary expenses.
- It will help future researchers as a reference in this regard.

1.6. Scope of the Study (Delimitation of the Study)

- The study included contractors, client and consultant's only working on construction projects in Addis Ababa.
- Participating in this research is only currently working grade 1 contractors, grade 1 consultants and Addis Ababa road authorities.

1.7. Limitations of the Study

The study's shortcomings include a lack of time for research, a lack of investigation, and the difficulty of obtaining important documents in a short period of time, as well as the fact that some respondents who received the questionnaire did not answer to enquiries promptly. Due to a time constraint, data collection was being limited to the Client, Consultants, and Contractor, but not the Subcontractor. As a result, the projected research outcomes may not reflect the actual state scenario, and additional research for the inclusion of subcontractors may be required.

1.8. Organization of the Thesis

There are five significant chapters in this research. The first chapter is an introductory section that covers the following topics: study background, statement of the problem, research questions, study objectives (both general and specific), significance of the study, scope (as applied to this study), research limitations and ethical considerations, definition of terms used, and study organization. The second chapter will attempt to give a survey of related literatures relevant to the study's issue. Global subcontracting methods, the need for subcontracting, subcontractor selection criteria, benefits of subcontracting, subcontracting processes, and subcontracting issues are discussed in this chapter.

The third chapter will cover the study's methodologies, as well as a description of the study's organization/area, research approach/design, data types and sources, target population& sample, sample selection procedure, data collection instruments & tools, data collection procedures, and data analysis methods. The study's results and discussion are covered in Chapter four using data analysis tools. The study's summary, conclusion, and recommendations will be presented in the last chapter.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. History of Addis Ababa City Roads Development

Addis Ababa city was founded by Minellik II and Empress Taitu in 1886. The history of the city's road development also begins from the inception of the city.

Minellik II constructed the first ever two roads in the city as well as in the country that stretch from Addis Ababa to Addis Alem and from his palace to British embassy in 1902. In 1904 the first roller was imported by the Emperor and was pulled by many people for its operation. Emperor Minellik was also believed to be the first in importing cars in Addis Ababa and introduced the car technology in the city for the first time in 1907 E.C. The country's modern road construction in general and Addis Ababa in particular is highly interlinked with Emperor Haile Sellase's ruling period. During the regime of Haile Sellase a number of contractors were organized to carry out road construction (Addis Ababa City Road Authority Bulletin (2000 - 2004), Addis Ababa, 2004).

The first agency to be established by the Government to construct roads was the Public Works Department. It was established to construct roads in Addis Ababa and in its surrounding. After a few years this Department was raised to a ministerial level and Addis Ababa also got the chance to establish its road development organizational structure.

When it was decided for Addis Ababa to have a mayor and a council in 1942, the city roads construction and maintenance was organized under the municipality. To fulfill the road construction activities together with building works, the "Road and Building Works" Department was established. This Department stayed till the replacement of the Haile Sellase regime by the Derge regime performing its duties. But no fundamental organizational change of the department was observed during the Derg regime (Addis Ababa City Road Authority Bulletin (2000 - 2004), Addis Ababa, 2004).

In 1993 the existing government established regional governments and gave them power to administer their regions with autonomy. During this time Addis Ababa was also established as one of regions. The Addis Ababa administration during this period established the "Bureau of Works and Urban Development" and the bureau organized a department under it to carry out the

road construction and maintenance works. The newly established road department constructed and maintained the City's roads till the establishment of the Addis Ababa City Roads Authority in March 15, 1998 by regulation no 7/1998 to be administrated by board of directors to construct, maintain and administer the road works in Addis Ababa by the city administration. The total length of roads constructed in the city till the establishment of the authority in March 15, 1998 was 1300km of which 900 km was gravel road and the remaining 400 km was Asphalt surfaced road. The Addis Ababa City Roads Authority has done remarkable progress in the city roads expansion and upgrading in the last 11 years since its establishment (Addis Ababa City Road Authority Bulletin (2000 - 2004), Addis Ababa, 2004).

A significant share of the urban growth is taking place in large cities like Addis Ababa. Especially, the number of conglomerates with more than 5 million inhabitants will grow. Middle and low income countries show the highest urban population increase, especially in Sub Saharan Africa (Cohen, 2004). Despite some economic benefits, the rapid urban growth in developing countries is outstripping the capacity of most cities to provide adequate services for their citizens (Cohen, 2004). A high urbanization rate in combination with the intense desire for car ownership in developing countries causes a rapid growth of motorization (Gakenheimer, 1999). On the other hand, a lack of infrastructure and weak road network maintenance put extra stress on growing traffic flows with congestion, pollution and a low road safety level as a result Gakenheimer, (1999).

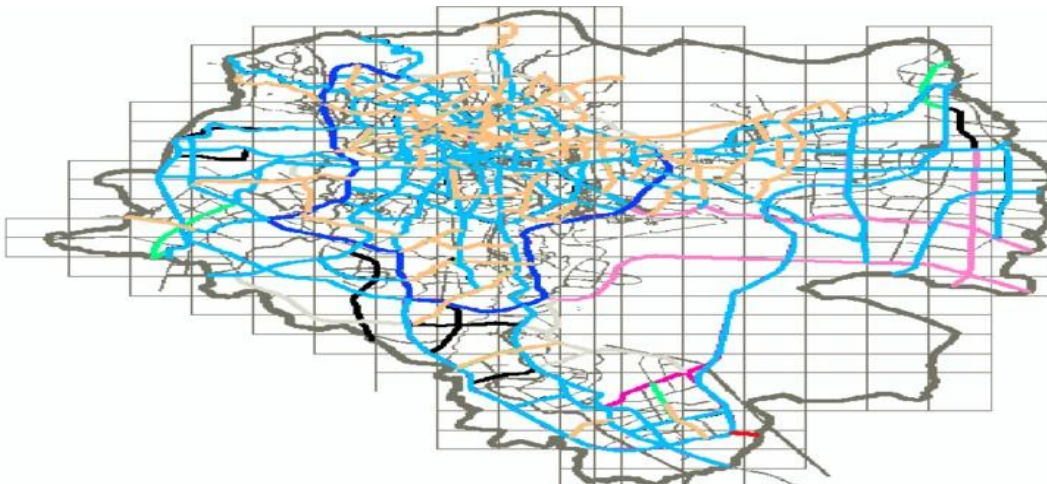


Figure 2.1 Addis Ababa city road network

Source: From internet

Improved mobility in urban areas in developing countries is possible by building new infrastructure. However, this is a long term and expensive solution also transport is a key requirement for economic and social development to take place. The lack of it causes isolation, backwardness and poverty. So, this improvement of constructing new roads and urbanization must be evaluated frequently.

According to the current situation of the AACRA project report; there were 28 asphalt road projects in the works between 2017 and 2022. In those projects, 19 contractors, 12 consultants, and 1 client are involved.

Table 2.1 Parties involved in Addis Ababa road projects

S.No.	Project Name	Length (m)	Road Width (m)	Contractor's Name	Contract Signing Date (GC)	Consultant's Name	Status of project
1	Alemtsehay bridge-Shegole Road junction	209 2	20	Melcon Construction	1-Mar-17	Best Consulting Engineers Plc	provisionally accepted
2	Megenagna - Water Resource - Ministry of Agriculture Store (AACTA Junction-AAWSA Head office-W/17 Health Center)	167 0	20	HaFCON	27-Dec-17	Best Consulting Engineers	ongoing
3	Shiromeda- Kidanemiret	210 0	20	AACRA Own Force	22-May-15	Best Consulting engineers Plc	ongoing
4	Ararat Hotel - kotebe collage Lot 1	310 0	30	Diriba Defersha General Contractor	10-Feb-17	United Consulting Engineers Plc	ongoing
5	kotebe collage - Kara Lot 2	284 0	30	Tekelberhan Ambaye	10-Feb-17	Guadewana Engineers plc	contract terminated
6	Kality Roundabout - Tuledimtu Roundabout		50	IFH	16-Apr-16	Engineer Zewdie Eskinder	Ongoing
7	Package 34 Road Project, Lot2: Worde 12 Intersection Bulbula RR Bulbula 40/60 Condominium and End of Nova Real Estate,including Link Road Project	420 0	30	Rama Construction	30-Aug-17	Highways Consulting Engineers Plc	ongoing

8	Package 34 Road Project, Lot1: Bole Bulbula Quarry Entrance - Woreda 12 Intersection - Bulbula 40/60 Condominium	3824	30	FAL General Contractor	31-Aug-17		ongoing
9	Package 36; Haile garment RA - Jemo RA	4520	120	Melcon Constructio n	27-Dec-17	United Consulting Engineers Plc	ongoing
10	Shiromeda-Kuskuam asphalt road project	1436	30	Yotek Constructio n plc	20-Aug-18	Best Consulting Engineers	under provisional acceptance process
11	Bole Michael Road Over pass and nearby Approach Roads Project	5557	10/15/20/30	Aser Constructio n plc	11-Nov-19	Hghways Consulting Engineers	ongoing
12	Construction of Bole International Airport to Goro (Package of 39, Lot II, Bole Homes Gumurk and Gumurk Gergi Roba Dabo) Asphalt Roads Project	4920	60	Aser Constructio n plc	22-Mar-21	United Consulting Engineers Plc	ongoing
13	Agusta- wyra junction road project	1500	30	TNT Constructio n plc	29-Jan-20	Omega Consulting Engineers	ongoing
14	Ring Road junction Improvement project :Contract II: Saris Abo and Lebu Intersections			China First Highway Engineering Co.Ltd	20-Jul-20	STADIA Engineering Works Consultants Plc	ongoing
15	Kality Ring Road - Bulbula - Kilinto Roundabout Road Projects (LOT-2)	10500	40/50	China Communica tions Constructio n Company Limited ; CCCC	4/16/2016	Highway Engineers and Consultants Plc	Ongoing
16	Kera Kebet Beret - Gofa Mebrat Hail Condominium Junction Road Project	2140	30	MELCON Constructio n PLC	12/27/2017	Best Consulting Engineers Plc	Ongoing
17	CMC Michael Overpass Bridge and Approach road Project	660	35	Macro General Contractor and Trading PLC	10/16/2014	Classic Consulting Engineers Plc	Ongoing
18	Ras Desta - Kechene Medhanialem	2500	30	Markan Trading	8/17/2018	Best Consulting Engineers Plc	Ongoing
19	Fafa Food Factory - Dama Hotel - Bihere Tsege - Sene Zetgne School - Debrezeit Road	3515	15/20	Yotec Constructio n	8/20/2018	United Consulting Engineers Plc	Ongoing

	Project						
20	Alexander Pushkin Square - Gotera Interchange EPC Road Construction Project	380 0	30/4 0	China Firist Highway Engineering Co. Ltd.	7/18/20 19	Best Consulting Engineers Plc	Ongoing
21	Autobes Tera - Mesalemia - 18 Mazoria (Kolfe Ring Road Project)	335 0	40/5 0	China Railway Seventh Group Co. Ltd.	11/8/20 18	Omega Consulting Engineers PLC	Ongoing
22	CMC Junction - Summit Medhanialem and Goro - CMC Overpass Bridge Junction to CMC RA - Summit Road Junction	493 4	20	Rama Constructio n PLC	5/11/20 20	FORTRESS Engineering Consultants & Associates PLC	Ongoing
23	Nigeria Embassy - Kechene Ring Road	214 6	20	Abita Constructio n PLC	2/24/20 20	Omega Consulting Engineers PLC	Ongoing
24	Tuludimtu Condominium Access Road Project	138 0	40	Diriba Defersha General Contractor PLC	2/6/202 0	Gondwana Engineering Plc in sub consultancy with YAWIT Engineering Plc	Ongoing
25	Construction Works of Package 37 Lot-1 Ring Road Junction Improvement Project, Contract I: Imperial and Kadisco Intersections	182 4	41	China Firist Highway Engineering Co. Ltd.	8/20/20 20	Stadia Engineering Works Consultant Plc	Ongoing
26	Bole Arabsa Condominium - Ayat Condominium	330 0	30	Senan construction PLC	2/10/20 17	Beza Consulting Engineers Plc	Provisionally Handed Over
27	CMC AYAT Road Junction-Gurad shola Summit Road and CMC Summit -Meri	212 8	20	IFH Engineering Plc	2/9/201 8	United Consulting Engineers Plc	Provisionally Handed Over
28	Construction of Corridor Civil Works of Bus Rapid Transit (BRT) B2 Pilot Line Project	174 00	8 to 10.5	RAZEL-BEC	7/3/202 0	SAFAGE JV With ITP and Hamda	Ongoing

2.2. Introduction of this chapter

A construction project involves many parties, such as owners, designers, construction main contractors, subcontractors, maintenance contractors, and material suppliers (Moore et al, 1992). The success of the project depends on the participants in the construction project.

Construction project awarded, to a general contractor, which has a good track record, to conduct a specific project. The general contractor is responsible for the management process, such as executing agreements with the clients, project finance, supplying material and equipment and reviewing the progress of the project (Benjaoran, 2009). Although the general contractor may complete some specialized work on its own; it should work with qualified subcontractors for the successful completion of the project.

A subcontractor is a party that signs a contract with the client or a main contractor to perform a specific task or work for the main contractor as part of a project (Vivian, 2000). Hiring subcontractors offers a number of advantages for the construction projects. Subcontracting is a solution to uncertainty and complexity whereby trust, technical and financial risks are shared between the parties (Brook, 2008). Uher et al, 2009 defines, it has been a process that offers better utilization of resources, a greater degree of specialization of trades and therefore better efficiency and economy of the building process.

Subcontracting firms are increasingly specialized and outstanding in their fields and work to meet the rigorous needs of the main contractors (Arditi & Chotibhongs, 2005; Choudhry, Hinze, Arshad, & Gabriel, 2012). Subcontractors can be divided into three main groups: (i) subcontracting related to trade, material provider for the project; (ii) special services subcontracting that provide individual services such as mechanical and electrical construction, tank systems, lighting, sound, etc.; and (iii) workforce contractor, supplying skilled workers to perform parts of the construction works (Mbachu, 2008).

2.3. Participants in the construction project

Many stakeholders are normally involved in a building project to guarantee that it is productive. Owners, contractors, consultants, project managers, designers, shareholders, legal authorities, employees, subcontractors, suppliers, service providers, financial institutions, insurance companies, and others are all eligible participants. Among them employer/client/, consultant,

main contractor and subcontractor are parties directly involved in the construction industry. (Henry, 2017)

2.3.1. Employer /Client/

The contracting party for whom the work is performed is referred to as the 'employer.' The employer is also known as the 'owner,' 'customer,' 'purchaser,' or even 'developer.' The employer is the initiator and financier to the entire construction project (Syahidah, 2017).

According to FIDIC Red Book (2005), “Employer” means the person named as employer in the Contract Data and the legal successors in title to this person.” According to PPA (2011), “Employer” means “Procuring Entity” as defined in the Public Procurement Proclamation.”

2.3.2. Consultant

Construction consulting is carried out by a team of experts known as consultants. The client appoints consultants to perform specialized tasks on the project. Various aspects of construction can be consulted on, such as structural design, analysis, project management, construction management, contracts, and surveying. The consultant is chosen by the client from among the above-mentioned specialties or a group for diverse expertise is supplied for a project, depending on the project. Consultants are in charge in project budgeting and management, to advice the client and give solutions (Syahidah, 2017).

2.3.3. General Contractor

The contractor enters into a contract with an employer to build or create anything on his or her own. According to FIDIC Red Book (2005), “Contractor” means the person(s) named as contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person(s). A general contractor or prime contractor in charge of overseeing a construction site on a daily basis, managing vendors and trades, and communicating information to all parties involved during the duration of a construction project. According to PPA (2011), the term “Contractor” means “Supplier” as defined in the Public Procurement Proclamation.

2.3.4. Subcontractor

The subcontractor has a contract with the main contractor to do a portion of the work, but no contract, duties, or rights against the employer. According to FIDIC Red Book (2005),

“Subcontractor” means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

A subcontractor is a construction company that contracts with the main contractor with the responsibility of implementing and completing the project’s work packages, including supplying the workforce (workers), equipment, tools, designs, and other supplies (Abbasianjahromi, Rajaie, & Shakeri, 2013; Arditi & Chotibhongs, 2005).

2.4. Contract

2.4.1. Main Contract

A contract is an agreement made between two or more individuals with the goal of creating legally binding responsibilities. (GoE, 1960) Defines, A contract is an agreement whereby two or more persons as between themselves create, vary or extinguish obligations of a proprietary nature. A construction contract is an agreement between an employer and a contractor to build, repair, modify, renovate, or even demolish something within a specified time frame, at a specified price, and to specified specifications.

Article 2610 of the Civil Code of Ethiopia defines a construction contract as "a contract of work and labor is a contract whereby one a party, the contractor, undertakes to produce a given result, under his own responsibility, in consideration of a remuneration that the other party, the client, undertakes to pay him." Once a construction contract is signed, both the contractor and the employer must follow the contract's provisions or face legal action.

2.4.2. Subcontracting

Subcontracting is common in the construction industry. The practice of bringing in an outside organization or individual to perform specific elements of a contract or project is known as subcontracting. The term "subcontracting" is defined in a variety of ways; According to Encarta Dictionary (2004) it is a secondary contract in which the person or company originally hired in turn hires somebody else to do all or part of the work.

The subcontractor works with a contractor in exchange for a fee, providing their specialized skill set. Concise Oxford Dictionary (2008), states it is a contract to do work for another company as part of a larger project. Ethiopian civil code Art.3201 also defines A sub-contract is a contract

whereby the party having contracted with the administrative authorities substitutes a third party for himself for the performance by the latter of a part only or of an item of the contract.

Subcontracting is a business strategy used by main contractors to deal with construction market uncertainties and to transfer risks such as financial risks, completion risks, and employee responsibilities. Subcontracting is a mechanism used by contractors to redistribute their risks to an organization at the next level along the supply chain (A.S.Y. Chung et.al. 2006)

Subcontracting also makes it easier to produce high-quality work by allowing user to hire specialized subcontractors who have the necessary knowledge and skills in specialized trades. Subcontracting allows the main contractor to lower operating costs and thus improve competitiveness.

2.5 Subcontracting in Construction Industry

Subcontractors are specialized contractors hired to accomplish specific tasks on a project, and they play a significant part in the business. In many projects, especially building projects, the work carried out by subcontractors can amount to 80–90% of the total work. Hinze and Tracey (1994), and Dainty et al. (2010), stated that 57% of the gross amount of construction work (including small-scale maintenance repairs) consists of consumables and subcontracting services. The study conducted in Zambia stated that up to 90 % of the work on a construction project is performed by subcontractors Rajput and Agarwal (2015). Lin (2011), stated that In Singapore, about 60% to 70% of construction work is subcontracted. According to Okunlola (2015), a study conducted in Nigeria; at least 70% of construction work is subcontracted by the main contractor. Kumaraswamy and Matthews (2000), asserted that subcontractors can contribute up to 90% of the total construction project value.

Subcontracting is a solution to uncertainty and complexity whereby trust, technical and financial risks are shared between the parties (Brook, 2008). Traditionally, the term, sub-contracting is used in construction projects when a main contractor exists (Al-Imam, 2012).

According to FIDIC Red Book (2005) construction subcontracting have been discussed that, ‘The Contractor shall not subcontract the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not subcontract any part of the Works without the prior consent of the Engineer. Any such consent shall not relieve the Contractor from any liability or

obligation under the Contract and he shall be responsible for the acts, defaults and acts, defaults or neglects of the Contractor, his agents, servants or workmen.

Government of Ethiopia requests contractors to outsource at least 15% of the total amount of work to Small and Micro Enterprises (SMEs) for public construction works and 10% for private construction works. It also states that subcontractors must satisfy the eligibility criteria applicable to the award of the contract and they cannot be in any of the situations excluding them from participating in contract (PPA, 2011).

Furthermore, construction technology has advanced in complexity. As a result, there was a greater demand for highly developed skills and experience, which led to an expansion in specialty trades. Due to the uniqueness of each construction project, the work force is transient, multiple craft are involved, and each project is planned and worked in short time frames, and variety of materials and equipment required, one single construction project is often sublet to many subcontractors (Sambasivan, 2007). Since subcontracting has become such a substantial part of construction project work, it is only natural for a main contractor to pay close attention to it.

Subcontracting is practiced for a variety of reasons. The primary reason for subcontracting work is that need of specialized workman for specific task and it needs when the main contractor is not able to afford the cost of the full-time employment of skilled workers in each of the several specialized trades needed to complete construction projects (Al-Imam, 2012).

The market forces the incorporation of cutting-edge technologies; as a result, specialized subcontractors are vital to a project's success. Completing projects with the required time, budget and quality depends mainly on the ability of subcontractor (Benjaoran, 2015).

2.5.1 Types of Subcontracting

Subcontracting firms are increasingly specialized and outstanding in their fields and work to meet the rigorous needs of the main contractors (Arditi & Chotibhongs, 2005; Choudhry, Hinze, Arshad, & Gabriel, 2012).

Subcontractors are mainly grouped into three types. It may be specialist subcontracting, generalist and specialist trade subcontractors, or labor only subcontracting (Mudzvokorwa, 2016).

- ❖ **Specialist subcontractors:** These types of subcontractors provide a special task on a project. They provide services like electrical, plumbing, heating, fixing of doors and windows etc.
- ❖ **Generalist and specialist trade subcontractors:** this types of subcontractors provide overall trade services or specialize on specific tasks such as plastering, painting and block work; and
- ❖ **Labor-only subcontractors or volume subcontracting:** These types of subcontractors are skilled laborer that mainly done labor-only services on a project. The materials and management will afford by the main contractor.

Subcontracting is used in almost every construction project. It is not uncommon for subcontractors to perform the majority of the primary contract work, with the main contractor managing and controlling the subcontractors. As a result, the number of subcontractors working on the main contract may be rather large.

According to the contractual point of view, subcontractors could be categorized as domestic subcontractors, nominated subcontractors, and selected subcontractors (Syahidah, 2017):

- **Domestic subcontractor:** A domestic subcontractor is selected and employed by the main contractor to perform specific tasks. The scope of works of a domestic subcontractor includes all the works stated in the subcontract in accordance with order from the main contractor (Mudzvokorwa, 2016). The main contractor remains fully liable to the employer for the works particularly in respect of the workmanship and delay caused by the sub-contractors (Kale and Arditi, 2001).
- **Nominated subcontractor:** Nominated by the client or client's agent to undertake specified aspects of the main contract. Nomination is the practice by which an employer, through the contract administrator, selects persons who then enter into sub-contracts with the main contractor (Murdoch & Hughes, 2000).
- **Selected subcontractors:** A named subcontractor is appointed by the employer in the main contract and is hired by the main contractor to carry out part of the main contract work. A subcontractor selected by the contractor in consultation with the employer in terms of the requirements of the contract (Syahidah, 2017).

2.5.2 Reasoning for Subcontracting

Subcontracting is used by economic operators for a variety of reasons. Beardsworth et al (1988) pointed out that organizations could see subcontracting as an alternative for some economic activities. It is often financially and commercially advantageous to do so. For example, a contractor may determine that using a specialist subcontractor for a specific contract piece is less expensive than executing that contract element itself. The reason for this is because a specialist subcontractor will have the equipment and knowledge that the contractor lacks. In some situations, a contractor may not be permitted to perform all of the services or work that the contracting authority requires. Main contractors prefer to complete project tasks with the help of other parties due to mitigating dispensable costs, escaping from uncertainty and financial burden or carrying out works requiring different specialties. (Abbasianjahromiet al.2016), and (J. Mbachu2008).

The construction industry has a dynamic nature and is strongly associated with the economic parameters. So as to successfully manage construction projects, one need to satisfy several criteria like meeting customer expectations, completing projects under budget and on time. Aligned with the economic growth, construction projects become larger and complex, which make them hard to manage.

The scope of construction projects sometimes requires the assignment of various tasks to subcontractors. Especially, complexity and dynamic nature of construction projects brings the need for subcontractor involvement to effectively execute the projects.

Subcontractors play an important role in the capital risk, resources, administrative effort, and business skills that support the country's major industry. The following are the key reasons for subcontracting:

- **Cost-efficient:** Recruiting a full-time staff to handle extra or devoted work can be costly, as it requires paying employees' salaries year round and providing benefits to all employees. At this time, subcontracting is the most cost-effective option, especially if the activity is seasonal and not permanent.
- **Available to assist with large scale projects:** Subcontracting has become the norm in the construction industry to meet the demand for specialized knowledge, advanced equipment, and large investment costs (Lew Yoke-Lian et al. 2012). Subcontractors are used by

businesses for a variety of large and complex tasks that require additional expertise. The organization's subcontracting team is a valuable resource because it allows it to take on larger projects and clients. It puts together a specialized team and provides extra help for unique contracts and projects.

- **Reduction of delays:** Attempting to do a task for which one lacks the requisite resources or expertise will take substantially longer and therefore will not be able to finish the assignment within the time frame set. On the other side, subcontracting a specific work permits a corporation to achieve deadlines that would otherwise be difficult to meet.
- **Flexibility:** The ability of a company to adjust to market developments is referred to as flexibility. Subcontracting enhances the company's flexibility (worker functions), volume (number of workers), and financial performance (smaller fixed costs).
- **Access to specialized skills and know-how:** One of the most important reasons to subcontract is to gain immediate access to specialist knowledge and abilities. Companies cannot afford to own, run, control, and maintain specialized plants and equipment because they are rarely used on a typical project (John, 1991). Hiring a permanent staff or even a single person to handle it will result in costs that will be thrown away once the services are no longer needed. Subcontracting, on the other hand, allows a business to acquire a specialized service for a specific period of time and then cancel it after the work is completed.
- **Confirm quality:** The subcontracting team of a company is usually made up of experts in the field who ensure the quality of the product and services delivered, as well as a budget, criteria, and expectations. Some jobs necessitate high-priced equipment, tools, or human resources. A company cannot afford to buy or hire them for an extended period of time. Subcontracting saves both time and money, which is why businesses should utilize professionals because they guarantee quality.
- **Reduce training cost:** The main contractor can reduce the cost of training, research and development.
- **Encourage enterprise:** Governments frequently strive to stimulate initiative and enterprise, particularly through tax incentives, in order to expand the pool of self-employed potential subcontractors.

- **Preserving brand name:** Missed deadlines and poor quality work are enough to harm a company's name and reputation. When a subcontracting team is needed, it is preferable to engage one to protect the company's name and image in the market.
- **Transfer the risk:** Subcontracting helps to shift risk from the prime contractor to the subcontractor and promotes specialization (Sergio Maturana et.al. 2007). From an insurance standpoint, the shared obligation reduces risk exposure. This aids in the insurer's negotiation of better premiums and coverage.
- **Cost control:** It reduces direct costs and overheads, and allows main contractors to use more competitive local firms with their lower overhead costs and better knowledge of the local market conditions, practices and procedures (World Bank, 2009).
- **Increased productivity:** A business entity may be unable to focus on its own growth and development at times. Instead, it is slowed down by monotonous and time-consuming duties such as paperwork. Subcontracting isn't just for obtaining specialist talents and knowledge; it may also be used to meet the organization's necessary routine tasks. It allows the organization to focus on its main activity (Mazaud& Lagasse 2009)

2.6. Subcontractor Selection Process

Selecting the appropriate subcontractor is one of the most important factors that affect the success of the construction company (Gul Polat et.al. 2016).The selection of the right subcontractor increases the general contractor's success in construction projects (Yinet.al. 2009). The contractors usually sublet the works to the subcontractors to transform the risks (Felix Quentin Biketi et.al. 2017).The primary goals of the subcontractor selection process in construction projects is to reduce project risk, optimize quality and build and maintain good working relations between project parties (Bailey, 2016).

The selection process of subcontractors is a critical issue which is highly affected on the time, quality and performance of the project (H.W.L. Chamara et.al. 2015).Having the capacity to select the most appropriate subcontractor for a specific assignment is a crucial attribute for a general contractor to achieve competitive advantage, which can result in both value/cost/advantages over other competitors.

Subcontracting allows main contractors to keep their organizations lean and nimble while relying on the expertise of subcontractors. Although the success of a project does not depend wholly on

judicious subcontractor selection, choosing the right subcontractors is important because many defaults in the past have been due to subcontractors accepting jobs they are incapable of undertaking and good subcontractors being given inappropriate contracts Okoroh and Torrance 1999; (Kumaraswamy and Matthews, 2008). A simple subcontract is the source of quality problems and contract disagreements (Ouyang Yong, 2015).

The selection process of subcontractors is a critical issue which is highly affected on the time, quality and performance of the project (H.W.L. Chamara et.al. 2015). To assure project success, only use contractors who are completely certified, as evidenced by their superior safety procedures and performance (DwarikaPuri et.al. 2014). Improper subcontractor selection can cause major issues both during and after the work is completed (Mohamed M. Marzouk et.al. 2013).

Selecting high-quality subcontractors increases the overall quality of projects and the general contractor's reputation and qualification for future contracts. It is critical to establish an effective framework for selecting subcontractors using the most effective ways.

In order to identify the best suitable subcontractors for the project, financial, technical, and general information about subcontractors is required. During the selecting process, main contractors should consider a variety of things. The factors may consist of the product quality, effectiveness, employment of skilled manpower, reputation of the company, accessibility to the company, completion of the work on time and cost etc., (Tayeh, 2019).

Several aspects should be considered when selecting an appropriate subcontractor for an efficient working relationship between the primary contractor and subcontractors, including cost, quality, time, and adequacy.

Many owners and general contractors are just interested in the lowest bidders. According to (MáriaKozlovská et.al2012) the lowest bid price is usually the key determinant factor in most selection processes. Although, price focused subcontractor selection criteria may suggest monetary cost savings, it does not reflect a true or optimum cost, possibly causing a false economy. Thus, *"subcontracts should be awarded based on the best possible combination of a variety of quantitative and qualitative criteria"* (Ulubeyli et al., 2010). In a study conducted by Turksis (Doloi, Iyer, and Sawhney, 2011)thirteen criteria for selecting the best contractor were introduced, including: "history of reasonable bid price submissions"; "a work history that indicates specialization and quality of workmanship in a particular construction skill";

"contractor's degree of quality control"; and "decorum, conduct, and non-disruptiveness of contractor staff and subcontractors"; "ability to meet project timeline"; "responsiveness to warranty issues"; "flexibility and collaboration when resolving delays"; and "coordination of operations that will generate noise, vibrations, dust, odors, safety concerns, and other activities".

According to (Koçak, Kazaz, &Ulubeyli, 2018) the subcontractor selection criteria also are the expected bid, reputation (past performance), accreditation from government agencies (quality), staff qualifications (technical capacity), financial status (number of public work in the past five years), timing (estimated project duration), construction health and safety records, management (including information provided and how subcontractors respond to documents necessary), production and capacity (technology level: equipment), location, shares for subcontractors.

Experience, historical performance, formal contacts, financial strength, and workload are among the essential criteria determining subcontractor selection, according to Ulubeyli et al. (2017). In addition, project knowledge, reliability, altruism, problem-solving ability, enthusiasm for the project, price, technical staff quality, labor, payment plan, and the number of subcontracting units required are all taken into account.

In Shivam and Kashiyan's (2018) study, the quality of the subcontractor's work was found to be important. Quality of work, on-time completion, craft standards, the lowest bid, and flexibility and cooperation when dealing with delays were among the aspects they considered. In addition, the scope of the completed project, financial stability, material resources, equipment, health and safety records, and reputation were all concerns.

When reviewing a subcontractor's work, a schedule is essential. Project duration, reputation (past performance based on the number of successful projects completed), expected price, employee qualifications, technology level (physical equipment), equity for subcontractors, subcontractor rating, health and safety profiles, general impressions, and subcontractors' response rates, workload (financial) over the past five years, all certified by government agencies, were among the factors used in Jordan's assessment (Abunada& Mohammed, 2018).

The other crucial consideration in choosing an appropriate subcontractor is adequacy in all respects. (Marzouk, El Kherbawy, &Khalifa, 2013) added selection criteria that helps to select appropriate subcontractor. These are, flexibility and collaboration when dealing with delays, quality compliance, a supplier's capacity to provide raw materials on schedule, ability to execute

the contract, a subcontractor's physical resources, bidding price, repayment difficulty, and flexibility in critical activities.

According to Henok (2018), six important factors that lead to willingness to cooperate among main contractors and subcontractors are collaboration, which encourages teamwork, develops cooperation between team members, stimulates information sharing, improves quality and timely project completion, improves service quality, and improves communication among project members.

In general, a well-defined and holistic selection framework provides a clear standard for performance benchmarking and guarantees that the right subcontractors are chosen for the assignment. Arslan et al. (2008) suggest a comprehensive evaluation criteria for subcontractor selection, which is displayed in Figure 2.1 below.

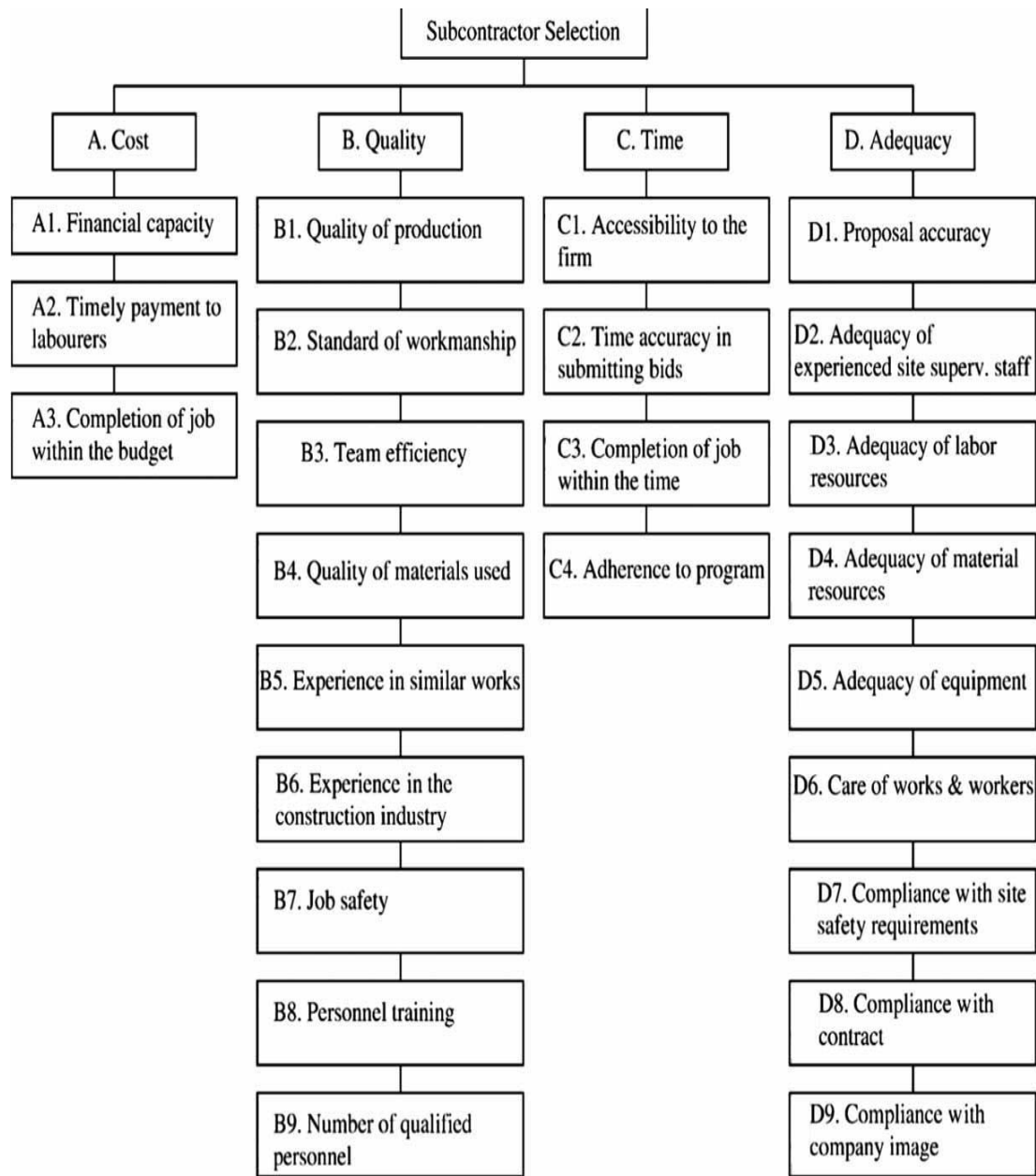


Figure 2.2 evaluation criteria for subcontractor selection

The following selection criteria are mostly specified in different studies for selection of subcontractor:

- **Technical Know-How**

Subcontractors are recruited to complete specific tasks on a project and, as a result, must have specific technical knowledge to complete the work (Kumaraswamy and Matthews 2000). (Arditi

and Chotibhongs 2005). Understanding of technical information about things and concepts required to do the job, as well as knowledge of processes and judgmental criteria essential for efficient or right action on the task, is referred to as technical know-how (Hunter 1983).

Technical knowledge is the understanding of complex aspects required to successfully complete activities associated with a specific profession. As a result, it allows for the development of technical competence and knowledge as well as the adoption of suitable working practices for competently operating machines and equipment (Russell et al. 1990; Shah and Murphy 1995) & (Peters 1981). Thus, the applied working methods, materials, machines, and tools evaluated on the basis of previous projects are indicative of a subcontractor's know-how.

- **Experience**

Another important factor to consider when choosing qualified subcontractors is previous experience. This comprises subcontractors with national and international experience in the field of work they have subcontracted in the past. These previous projects undertaken are evaluated by means of the number and scale measured in cost, duration, and square meters (Serdar, 2017). Past experience of subcontractors is an important factor used by main contractors for selection of suitable subcontractors because implementing similar previous projects enables the subcontractor to work smoothly, complete the works on time and helps to achieve the best quality (Felix, 2017).

- **Quality**

Apart from having the technical knowledge to complete specified tasks, the quality of the work delivered is an important determinant of overall project performance (Loh and Ofori 2000; Arditi and Chotibhongs 2005). The extent to which subcontractors deliver products or services that fulfill project objectives is referred to as quality. While technical expertise can help to improve the quality of the final product, additional aspects to consider when deciding if a subcontractor's final output meets project objectives include the working environment, quality planning and control, and employee attitude. Technical quality, functional quality, workmanship quality, and architectural quality are four dimensions of quality (Bennett and Pain, 1988).

- ✓ Technical quality is a measure of the building's technical quality, which includes the materials, components, fittings, and finishes.
- ✓ The functional quality of a project refers to how well it achieves the goals for which it was designed.
- ✓ Workmanship quality refers to the finished building's level of craftsmanship.
- ✓ Architectural quality is a measure of a structure's architectural and aesthetic excellence.
- **Price**

According to the economic Theory of the Firm (Coase 1937; Machlup 1946), the contractors' purpose is to maximize their profit. As a logical consequence of this theory, firms minimize costs given a level of output. Companies that fail to maximize earnings while cutting costs are unlikely to survive. To keep their firms afloat, main contractors must win tenders (Dulaimi and Hong 2002). Based on the contractors' need to minimize cost and maximize profit, they are likely to select subcontractors who submit the lowest price (Dulaimi and Hong, 2002).

A large number of bidders competing for a subcontract can make the subcontractor selection and negotiation processes more efficient while also lowering the value of the lowest bid. This means that as the number of competitor's increases, the anticipated bid price falls, reflecting the benefit of selecting from a larger pool of firms. Indeed, tender price has been the dominating decision basis in subcontracting choices for decades and is still shown to be a significant criterion (Greenwood 2001).

- **Cooperation**

In the construction industry, there are underlying difficult relationships and lack of communication among various parties (Higgin and Jessop 1965; Faulkner and Day 1986). Since subcontracted services have to be performed through relationships established between main contractors and subcontractors, cooperation or the extent to which subcontractors fulfill agreements and proactively solve and prevent problems is seen to be highly relevant for the operational efficiency of construction projects (Humphreys et al. 2003). This includes individuals who exhibit courtesy and altruism, do not make complaints, are helpful, and cooperate with co-workers and customers (Borman and Motowidlo 1993).

Cooperation or the extent to which subcontractors fulfil agreements and proactively solve and prevent problems is seen to be highly relevant for the operational efficiency of construction

projects (Arditi, 2005). Main contractors will be more willing to select subcontractors that show a positive attitude, commitment, and quick response to their needs. (Alinaitwe, 2007).

- **Adequacy in financial strength**

Financial strength is the basic element of responsibility and risk-sharing behaviour which is one of the most important advantages of subcontracting (Serdar, 2017). When a subcontractor is expected to bear construction losses on a project, or when the client and/or main contractor are experiencing cash flow or progress payment problems, the subcontractor's financial background and bonding capacity must be sufficient.

- **Past performance**

Past performance is a strong predictor of future performance and demonstrates a subcontractor's ability to finish a work, but it does not ensure future success. Past job performance has been demonstrated to be a reliable predictor of future job performance in studies (Hunter and Hunter 1984). Good performance in previous projects can be seen as the sign to improve a subcontractor's reputation and linked to company image (Hatash, 1997). Poor project performance may result in adversarial relationships among different construction parties (Henok, 2018).

- **Workload**

Numbers, types, locations, and scales of current/planned projects and completion percentages of current projects are included under this criterion (Arditi, 2005). Subcontractors with a high work load may submit a high quotation and, if selected, may not fit the main contractor's schedule, causing a delay (Bailey, 2016). This criterion aims to eliminate the risk of subcontractor failure arising out of excessive workloads (Alinaitwe, 2007).

- **Reputation**

Positive information about a subcontractor's behavior is an important consideration when choosing a subcontractor. If a subcontractor isn't well-known, it's more likely to have problems during the construction process. Potential or applied competitors and acts like a facilitator for formation of transactions in the future (Serdar, 2017).

- **Working relationship and Level of communication**

Communication ability and self-assurance are important components (Hatush, 1997). As a result, both main contractors and subcontractors place a high value on building working relationships, believing that greater communication will reduce the likelihood of misunderstandings. All variables must be considered, including communication between main contractors and subcontractors, mutual respect, and ease of contact. In this regard, an informal relationship between parties is perceived as a vital component of establishing and sustaining business partnership in practice (Arditi, 2005).

- **Selfless attitudes and Enthusiasm for the project**

This criterion includes determining how much a subcontractor can contribute to a project in a selfless manner. It is revealed whether a subcontractor is willing to accept the risk of using its extra financial and technical resources to complete subcontracted work in the case of a crisis during construction, such as cash flow problems. Enthusiasm for the project aims to measure the level of subcontractor's willingness to be awarded (Endut, 2008).

- **Ability to solve problems**

Operations of a good organization can be seen through quick responses to actions (Arain, 2012). Thus, a primary contractor prefers to engage with a responsive and proactive subcontractor who can address unanticipated challenges and disagreements without slowing the construction process or requiring any assistance.

- **Labor and Equipment**

This criterion takes into account the number and quality of subcontractor labor. Man-hour values for unskilled and skilled workers are used as a productivity indicator when these two factors are combined. Under this criterion, construction equipment was also analyzed in terms of quantity and quality (Serdar, 2017).

2.6.1. Methods of Subcontractor Selection

A general contractor's method of selecting a subcontractor can be determined in a variety of ways, including competitive bidding, negotiation with only one subcontractor, based on bidding price, based on lowest bid, based on the decision-experience, maker's based on previous working

relationships, based on personal relationships, and selection from the host country or from other countries, to name a few. The decision-making process should also be considered, such as whether it is made by a single person, a mixed group of technical and managerial people, a few top managers, the project team, or a distinct procurement department that handles all projects.

Shash (1998), who used a questionnaire to study the subcontracting operations of 320 construction companies in Colorado, effectively summarizes modern-day construction subcontracting practice; *“the existing practice in subcontracting is such that the general contractor prepares a detailed cost estimate for the work to be performed in-house. For a designated sublet work, the contractor does not prepare a cost estimate but rather invites subcontractors to submit price quotations before a given deadline. Interested subcontractors adhere to certain rules and submit their quotations for the sublet work. The general contractor then evaluates the submitted quotations and selects one quotation to be used for bidding. Following the award of the contract, the general contractor awards the sublet work to either the subcontractor whose quotation was used in the bid or to another subcontractor”* (Shash,1998)

MBachu (2008) produced a relatively standard process flowchart for the assessment of the subcontractors' eligibility for tender invitation (prequalification) and award (selection) as shown in Figure 3.

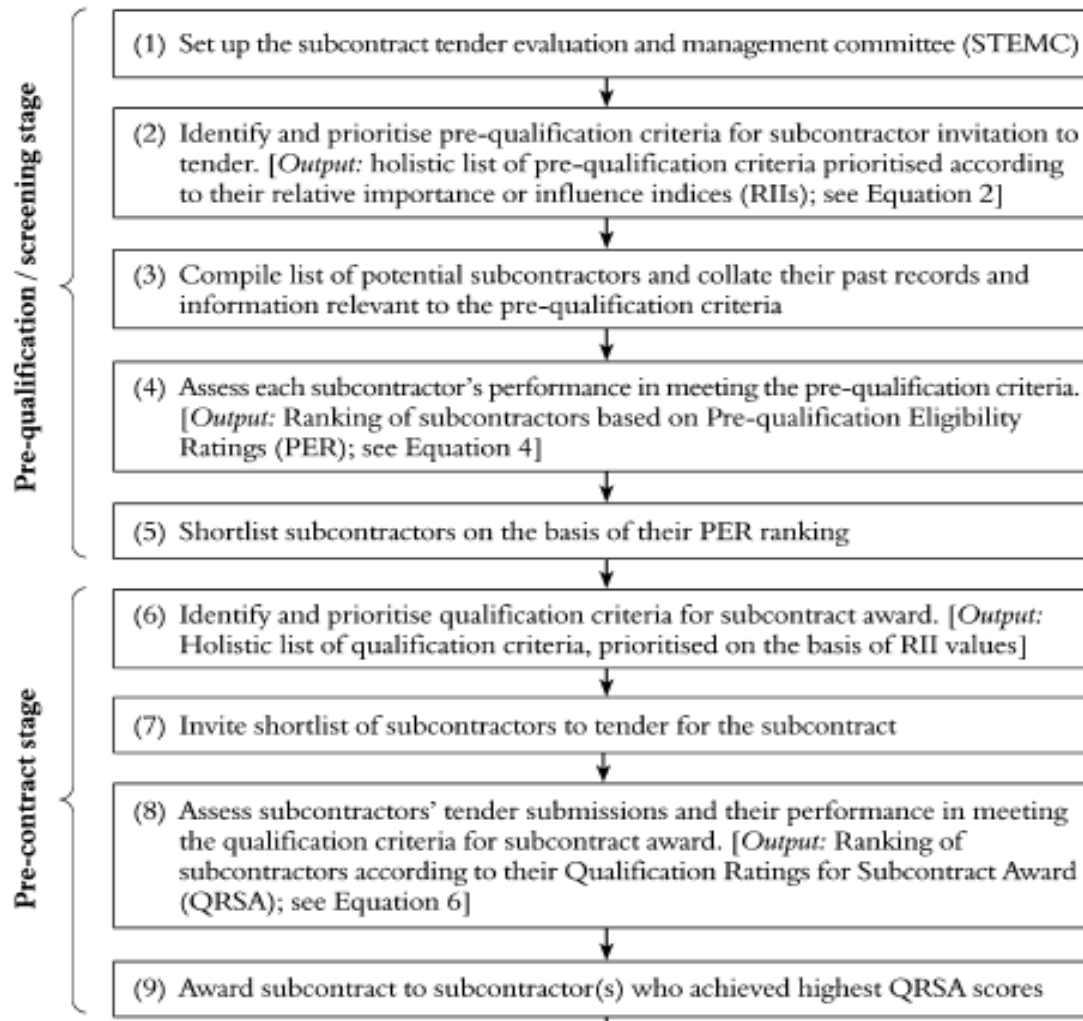


Figure 2.3 an example of a flowchart outlining a step-by-step methodology for subcontractor Selection (MBachu, 2008)

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

In this chapter of the thesis, the methodology is discussed, which comprises the research design, data sources, research population, sample size, data collection instruments, data gathering methodologies, and data processing and analysis methods. The method uses attempts to fulfill the study's goal by collecting and analyzing relevant data in order to identify significant factors in the selection of subcontractors for Addis Ababa Road construction projects.

3.2 Research Design

The general plan or method of study that will be used to answer the research question is known as the research design. The strategy or plan for scientific enquiry is referred to as research design. It shows how the study is to be carried out, where the data comes from, what sort of data gathering techniques are used, and how the information is to be analyzed (Fellows, 1997).

To achieve the study's goal, a descriptive design with a quantitative approach will be used. The study collects data from both primary and secondary sources. The study's population included road development projects that are now under construction or have been provisionally handed over under the AACRA from 2017 to 2022.

This study looks at the criteria used to choose and evaluate suitable subcontractors, as well as the motivations for using subcontractors. The goal of this research is to solve the problem described in the previous chapters while simultaneously achieving the goals.

3.3 Sources of Data and Information

The samples will come from contractors, consultants, and the Addis Ababa Road Authority, as they are all involved in the building of Addis Ababa roadways. The study uses questionnaire as best instrument. The survey will be open to both men and women professionals who work for the aforementioned companies.

3.4 Design of the survey

3.4.1 Questionnaire design

One of the research instrument used in this research is questionnaire which will design in such a way that it ensures to address the objectives of the study. A survey questionnaire will create with the study's goal in mind, and it divides into three parts: The first section of the survey asks general questions to learn more about the respondents' professional backgrounds, such as the relevant industry sector and segment, as well as their level of experience.

The survey's second component uses Likert scale questions to rank the reasons for employing subcontracting. Respondents will be asked to rate their perceptions on a scale of 1 to 5 points in the Likert scale questions.

The criteria to consider when selecting suitable subcontractors will be outlined in the third section. Participants are asked to rate the importance of agreement of components or study variables on a five-point scale (**Very Important (5) Important (4) Moderate (3) Least Important (2) Not Important (1)**), which is then used to generate the importance index of the opinions collected.

3.5 Population and Sampling

3.5.1 Research Population

Participants in this study will be confined to road owners, consultants, and contractors working on road construction projects for the Addis Ababa city roads authority (AACRA). The specific project survey focuses on AACRA-built road projects in various areas of Addis Ababa, which may have been completed or currently under construction within the last five years (from 2017 to 2021 G.C.). Purposive sampling will be used in this study. This study will be required to investigate purposive sampling, which may best represent roadways in the city, in order to avoid biases that may develop. In this regard, some literatures support the rationale and benefits of purposive sampling, such as Walliman's (2005) assertion that "purposive sampling is a useful sampling method that allows a researcher to obtain information from a sample of the population that one believes knows the most about the subject matter". Therefore, the populations of this

research will be professional employees of owners/client, consultant and contractor of Addis Ababa city road projects.

A total of 45 questionnaires will be distributed to professionals and experts with a first degree or higher who are working on the Addis Ababa road project. They'll be the client, the consultant, and the contractor. 15 questionnaires will be distributed to each stakeholder.

3.5.2 Data Collection

The questioner approach will be used to gather information on the concerned linked project, with an emphasis on the most important reasons for subcontracting, and prioritizing subcontractor selection criteria. In addition, the questionnaire method used an existing document examination of the construction industry, with a focus on the Addis Ababa road project. So, as a primary data gathering method, questionnaires from owner, contractor, and consultant stakeholders ranging from top management to highly responsible experts will be used, and document review will be used as a secondary data collection method.

3.6. Methods of Data Analysis

Statistical techniques will utilize to assess the outcomes of the primary data source, questionnaires, and the findings uses to produce recommendations and study areas. The data will analyze using the importance index method, to rank the most important reasons for subcontracting, and prioritize subcontractor selection criteria.

The results of the major data source, questionnaires, will examine using statistical techniques, and the findings uses to develop suggestions and study areas. The statistical method is an analysis methodology that provides a broad perspective of the findings. To assess the results of some questions, a frequency distribution is utilized, which displays the frequency of observation of each response to each variable through the procedure.

3.7. Validity of the study

The research seeks to conduct those stakeholders who work for the client, consultant, and contractor in various roles by producing relevant questions in the form of a question paper. Expert input, prior knowledge, and a review of previous similar successful studies will be used to

construct those questions. Only a few, well-chosen questions are asked of those people in order to generate meaningful data for future projects.

3.8. Ethical issue

In order to ensure respect for the dignity of respondents in the study, these research respondents will be granted confidentiality in the study. Only the researcher and the supervisor will have access to their private information. In the questionnaires, participants will not be required to enter in their names. Only individuals who voluntarily agree to participate in the study will be required to reply. They will not be asked to provide any identifying information, and as a result, transcripts and the final report will not include any identifying information, such as the subjects' names, if they are not satisfied. The instruments and methods used to collect information and data will be deleted after the study is completed and a final report published. The study also aims to arrive at findings based on objective judgments drawn alone and blindly from the data collected. The scope of data analysis and interpretation of data analysis outcomes will be limited to what the data truly reveals.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS AND DISCUSSION OF THE RESULT

4.1 INTRODUCTION

The goal of this study was to identify criteria that influence subcontractor selection in Addis Ababa road construction projects. To achieve this broad goal, the study used a questionnaire to collect data from the project's primary stakeholders: the client, consultant, and contractor. The study issued 45 questionnaires, 15 each to clients, consultants, and contractors, based on the sample approach used. However, 43 (95.56 %) of the questionnaires were returned, including 14 (93.33 %) from the client, 14 (93.33 %) from consultants, and 15 (100 percent) from contractors. The results of the data analysis are presented in this chapter of the study, along with a discussion of the findings.

To present the demographics of respondents, descriptive statistics in the form of mean and frequency distribution were utilized to report sex, respondent's designation, educational background, position, and job experience.

In addition, a relative importance index analysis was conducted in order to assist in the evaluation of subcontracting practices in Addis Ababa road construction projects from two perspectives (reason for subcontracting, and criteria for selecting subcontractors). As a result, the relative importance of criterion was ranked according to Akadiri (2011).

The data examined in this way has been presented using tabulations, charts, and graphs to help the reader grasp the analysis and subsequent interpretation from what has been studied in relevant literatures thus far in a clear manner.

4.2 Statistics of Respondents

A total of 45 questionnaires were issued to the three respondent groups in the Addis Ababa road projects, with 43 of them returning them. These results in a response rate of 95.6 percent of all questionnaires distributed. Contractors received 100%, consultant 93.3 percent, and client 93.3 percent of the 45 questionnaires that were distributed.

Finally, the questionnaire survey results were coded using SPSS-16 and a Microsoft Excel spreadsheet. The overall overview of questionnaire distribution is shown in Table 4.1.

Table 4.1: Overall survey response level

Questionnaire Distributed and Returned			
Stakeholder	Questionnaire Distributed	Questionnaire Returned	% of Return Vs Distribution
Main contractor	15	15	33.33%
Consultant	15	14	31.11%
Contractor	15	14	31.11%
Total	45	43	95.56%

4.3. General Information

The study was carried out with the help of the client, consultant, and contractors. In Table 4.2, descriptive statistics such as frequency and percentages are used to provide a general description of the respondents. Gender, position, education, and work experience are among the general characteristics assessed about the respondents.

The majority of the respondents were male, as seen in Table 4.2, with 81.4 percent being male and 14.6 percent being female. In terms of educational background, data was gathered. 60.5 percent of respondents had a bachelor's degree, while 39.5 percent had a master's degree. The survey gathered information from respondents at various levels of their positions; 41.9 percent were Office Engineers, 32.6 percent were Project Managers, 16.3 percent were Site Engineers, 7.0 percent were Project Engineers, and 2.3 percent were Company Owners. The majority of the respondents have 5–10 years of project management experience, with 39.5 percent having 5–10 years of experience. Following this set of responders, 23.3 percent have experience ranging from 10 to 15 years. 23.3 percent of respondents have less than 5 years of project management experience, while 14.0 percent have more than 15 years of project management experience.

Table 4.2 Profiles' about Respondents

		Frequency	Percentage
Sex	Male	35	81.4
	Female	8	14.6
Educational Background	Bachelor Degree	26	60.5
	Masters Degree	17	39.5
Position	Project Manager	14	32.6
	Office Engineer	18	41.9
	Site Engineer	7	16.3
	Company's owner	1	2.3
	Project Engineer	3	7.0
Experience	Less than 5 years	10	23.3
	5-10 years	17	39.5
	11-15 years	10	23.3
	More than 15 years	6	14.0

Table 4.2 General Information about Respondents

4.3.1. Educational Background

From the graph 4.3 below showed the educational background of the respondents from the clients, consultants, and contractors.(85.71%), (57.14%) and (40%) of the respondents of clients, consultants, and contractors were Bachelor's Degree level respectively.14.29% of clients respondents, 42.86% of consultants respondents, and 60% of the contractor respondents were at Master's Degree level.

Figure 4.1 academic back ground of respondent

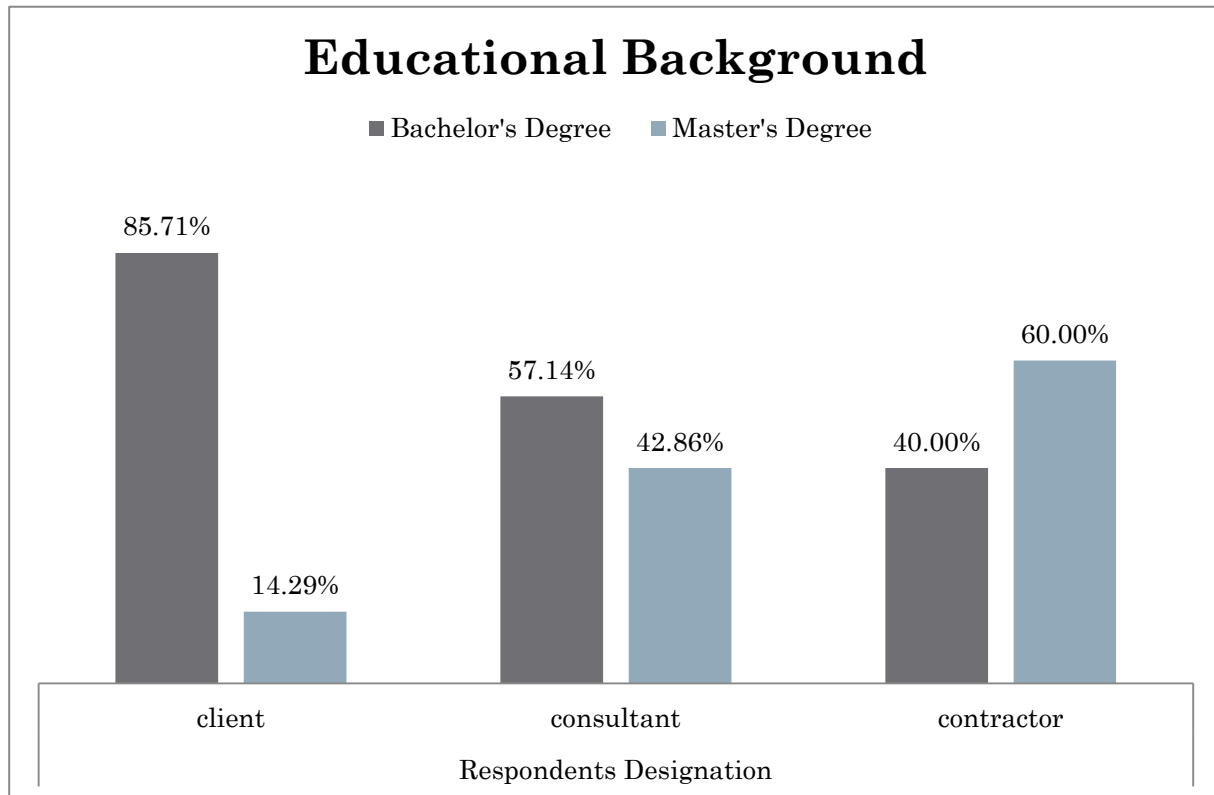


Figure 4.1 Educational Background Figure

4.3.2. Role of Respondents in the Company

According to the position of the person filling out the questionnaire, 64.29 percent of consultants and 35.71 percent of contractors were project managers, 78.57 percent, 21.43 percent, and 28.57 percent of clients, consultants, and contractors were office engineers, respectively. Site engineers made up 7.14 percent of consultant respondents and 42.86 percent of contractor respondents. Company owners made up 7.14 percent of consultant responses, while project engineers made up 21.43 percent of client respondents. (See Figure 4.2.)

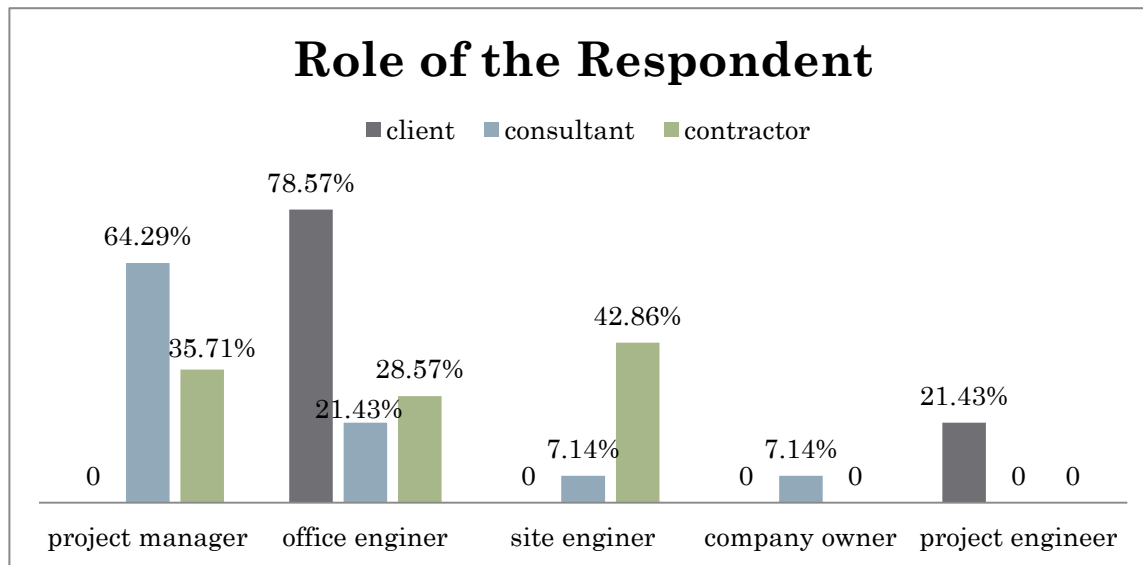


Figure 4.2 Role of the respondents on their firm

4.3.3. Work Experience

In figure 4.3 below, It is shown that 35.7% client, 7.1% of consultant and 26.7% of respondents from the sample have experience less than 5 Years, 36.23% from the sample have experience less than 5 years. 64.3%, 28.6% and 26.7% of clients, consultants, and contractors respondents were experienced between 5-10 years respectively, 42.9%, and 26.7% from the respondents of consultants and contractor have experience between 11-15 years correspondently. In the other hand 21.4% and 20.0 % of the respondent from the consultant, and contractor have experience more than 15 years.

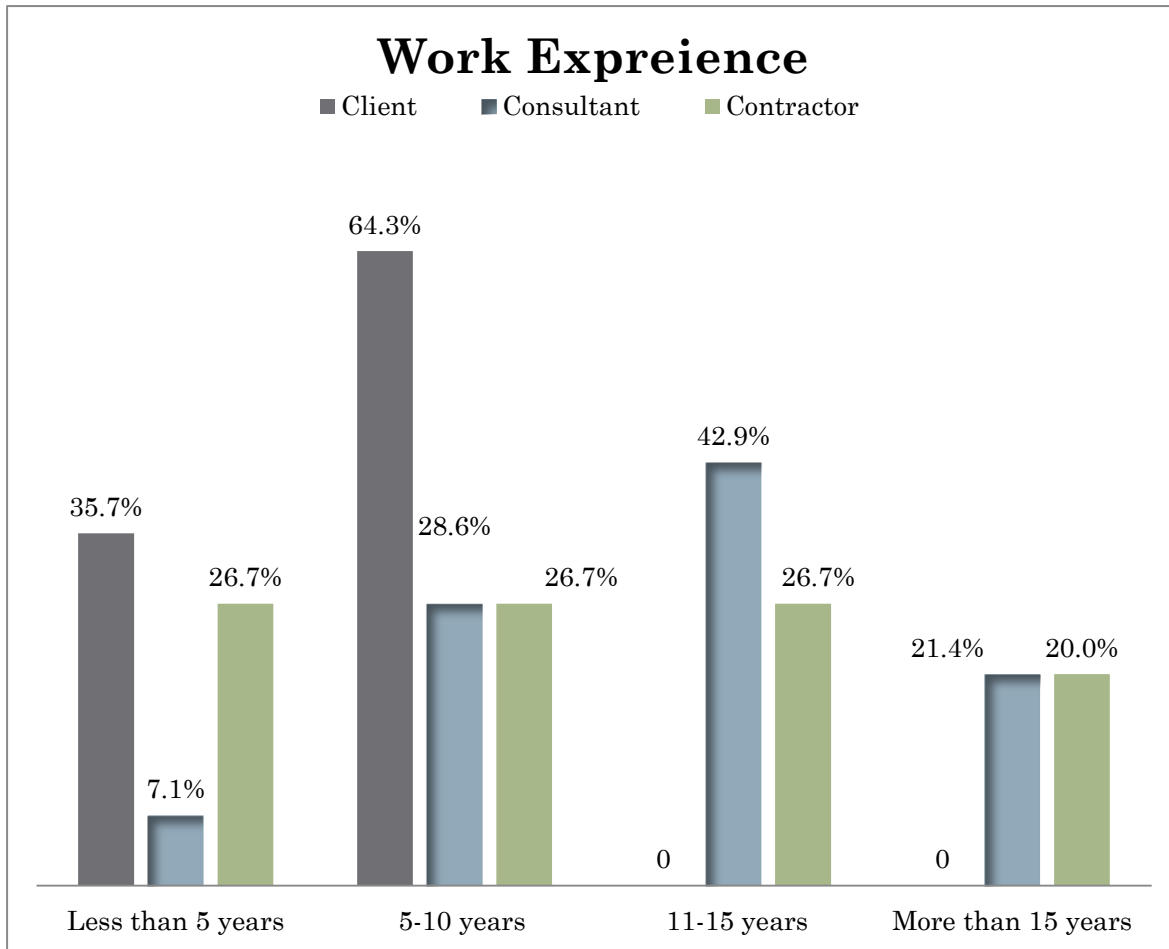


Figure 4.3 Experiences of Respondents

4.4. Analysis of Main body of Survey Results

This sub-topic is intended to present the analysis results of important aspects of subcontracting practices (reason for subcontracting, and subcontractor selection criteria) while taking into account the 21 pre-identified considerations from the literature review and analysis of each of them as shown below.

4.4.1. Reasoning for Subcontracting

Respondents were asked why the company transfers a portion of its work to a subcontractor; the reasons cited included risk transfer, cost savings, the need for specialized services, compensating for a lack of expertise, the need for others to perform a certain volume of work, mitigating delays, overcoming the complexity and dynamic nature of construction projects, lowering training costs, and finally encouraging enterprise. The responders were asked to write down the

following parameters: 1. Not Important, 2. Least Important, 3. Moderate, 4. Important, 5. Very Important. Table 4.4.1 presents the results of this question.

Ranking were done by using the importance index factor and the result of the relative importance index was calculated as below.

$$RII = \Sigma W / AN$$

$$RII = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{A * N} \dots \dots \dots \text{Equation 4.1.}$$

$$A * N$$

Where RII is the Relative Importance Index of each factor for each group of respondents;

W is the weighting given to each factor by the respondents (ranging from 1 to 5);

N is the total number of respondents.

The RII value goes from 0 to 1, with 0 being the most extreme value. It can be shown that the greater the RII score, the more essential the sustainable criteria were, and vice versa. The transformation matrix suggested by Chen et al. (2010) is used to compare RII with the relevant importance level. According to him, the following are the RII-derived importance levels:

Table 4.3: Importance Level from RII

High (H)	$0.8 < RII < 1.0$
High-Medium (H-M)	$0.6 < RII < 0.8$
Medium (M)	$0.4 < RII < 0.6$
Medium-Low (M-L)	$0.2 < RII < 0.4$
Low (L)	$0.0 < RII < 0.2$

Table 4.3: Importance Level from RII

Table 4.4 Relative Importance Level of Reason for Sub-Contracting

Reasons for employing subcontracting	Respondents Designation								
	Client		Consultant		Contractor		Overall		Relative Importance Level
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
To look for specialized services	0.90	1	0.99	1	0.97	2	0.95	1	High
To reduced delay	0.74	5	0.94	2	1.00	1	0.90	2	High
To obtain technology transfer	0.86	2	0.84	5	0.80	5	0.83	3	High
To perform some volume of work	0.76	4	0.89	3	0.83	4	0.82	4	High
To compensate lack of expertise	0.67	7	0.74	6	0.93	3	0.79	5	High-Medium
To overtake the complexity and dynamic nature of construction project	0.80	3	0.86	4	0.71	7	0.79	5	High-Medium
Encourage enterprise	0.74	5	0.63	7	0.65	8	0.67	7	High-Medium
To get cost reduction	0.51	10	0.60	8	0.79	6	0.64	8	High-Medium
To transfer risk	0.67	7	0.29	10	0.61	9	0.53	9	Moderate
Reduce training cost	0.57	9	0.51	9	0.45	10	0.51	10	Moderate

Table 4.4 Relative Importance Level of Reason for Sub-Contracting

The response reveals that the relative importance of the need to look for specialized services (RII=0.95) was ranked first, followed by looking for technology transfer (RII=0.83) and performing some volume of work (RII=0.82). The results are rated as having a High Relative Importance Level. While the prime contractors are technically capable of carrying out the operation, they are overburdened and must gain more capacity to alleviate the overall project's obstruction, according to Hinze, J. and Tracy, A. (1994).

The relative importance level of to compensate lack of expertise, to overtake the complexity and dynamic nature of construction project, to encourage enterprise, and to get cost reduction was rated as “High-Medium” with RII value of (0.79),(0.79),(0.67), and (0.64) correspondingly.

Choudhry and et al., 2012) agreed, stating that the complexity and dynamic nature of construction projects necessitates the involvement of subcontractors in order to effectively execute projects.

Relative importance levels of criteria such as "to transfer risk" and "to obtain cost reduction" were graded as "Medium" with RII values of (0.53) and (0.51), respectively.

4.4.2. Sub-Contractor Selection Criteria

Table 4.5 ranking of selection criteria

Sub-Contractor Selection Criteria	Respondents Designation								
	Client		Consultant		Contractor		Overall		Relative Importance Level
	RII	Rank	RII	Rank	RII	Rank	RII	Rank	
Experience in similar projects	0.96	1	0.96	2	0.97	2	0.96	1	High
Quality performance in previous projects	0.93	3	0.96	2	0.97	2	0.95	2	High
Specialty in certain type of work	0.96	1	0.84	16	1.00	1	0.93	3	High
Current workload and commitment	0.91	4	0.89	12	0.92	5	0.91	4	High
Evidence of adequate resources/ materials, equipment and machinery	0.80	12	0.90	10	0.97	2	0.89	5	High
Possession of qualified, skilled and strong workmanship	0.87	6	0.99	1	0.80	8	0.88	6	High
Regular and effective communication with main contractor	0.86	7	0.94	6	0.83	6	0.87	7	High
Leadership qualities and ability to manage own workmanship	0.84	9	0.96	2	0.77	13	0.86	8	High
History of contract completion	0.91	4	0.87	15	0.77	13	0.85	9	High
Commitment to do remedial works (correcting defects)	0.79	14	0.96	2	0.77	13	0.84	10	High
Ability to work efficiently with other subcontractors	0.77	15	0.89	12	0.80	8	0.82	11	High

Compliance of the subcontractor's submitted schedule with the project's overall schedule	0.80	12	0.91	7	0.72	19	0.81	12	High
Financial strength	0.83	11	0.77	20	0.80	8	0.80	13	High
Owners acceptance of the subcontractor	0.84	9	0.76	21	0.79	12	0.80	14	High
Reference from previous employers	0.86	7	0.74	22	0.77	13	0.79	15	High-Medium
Care to works done by others subcontractors	0.70	22	0.89	12	0.77	13	0.79	16	High-Medium
Commitment to the provided prices after awarding	0.73	17	0.91	7	0.72	19	0.79	16	High-Medium
Efficient resource management and waste minimization	0.71	20	0.79	19	0.80	8	0.77	18	High-Medium
Presentation of a solid execution plan in subcontractor's proposal	0.73	17	0.91	7	0.63	21	0.75	19	High-Medium
Not partnering the works to another subcontractor	0.67	23	0.81	17	0.73	18	0.74	20	High-Medium
Existence of proper organizational structure	0.73	17	0.81	17	0.63	21	0.72	21	High-Medium
Bidding for the lowest price	0.74	16	0.59	23	0.83	6	0.72	21	High-Medium
Regular payments for his employees	0.67	23	0.90	10	0.55	24	0.70	23	High-Medium
Health and safety records	0.71	20	0.57	24	0.63	21	0.64	24	Moderate

Table: 4.5 ranking of selection criteria

The most ("High") important fourteen picking factors ranked by parties have been organized and presented, as shown in table (4.5) above. As a result, for better explanation, the five most important reasons in the total results are boldfaced. "Experience on similar projects" was rated as the most essential selection criteria by the client, and the second most important by the

consultant and contractor. The consultant and contractor rated "quality performance in previous projects" as the second most important selection criteria, however the client ranked third. "Specialty in a specific type of job" was likewise ranked first by the client and contractor, and 16th by the consultant, although it came in third overall. "Current workload and commitment" was the other important selection factor, which came in fourth place in the overall ranking. It ranked 4th by client, 12th by consultant, and 5th by contractor. "Evidence of adequate resources/ materials, equipment and machinery" this is another important factor that selected at 5th places, but the clients gave 12th places, the consultant gave it 10th places and contractor gave it 5th places.

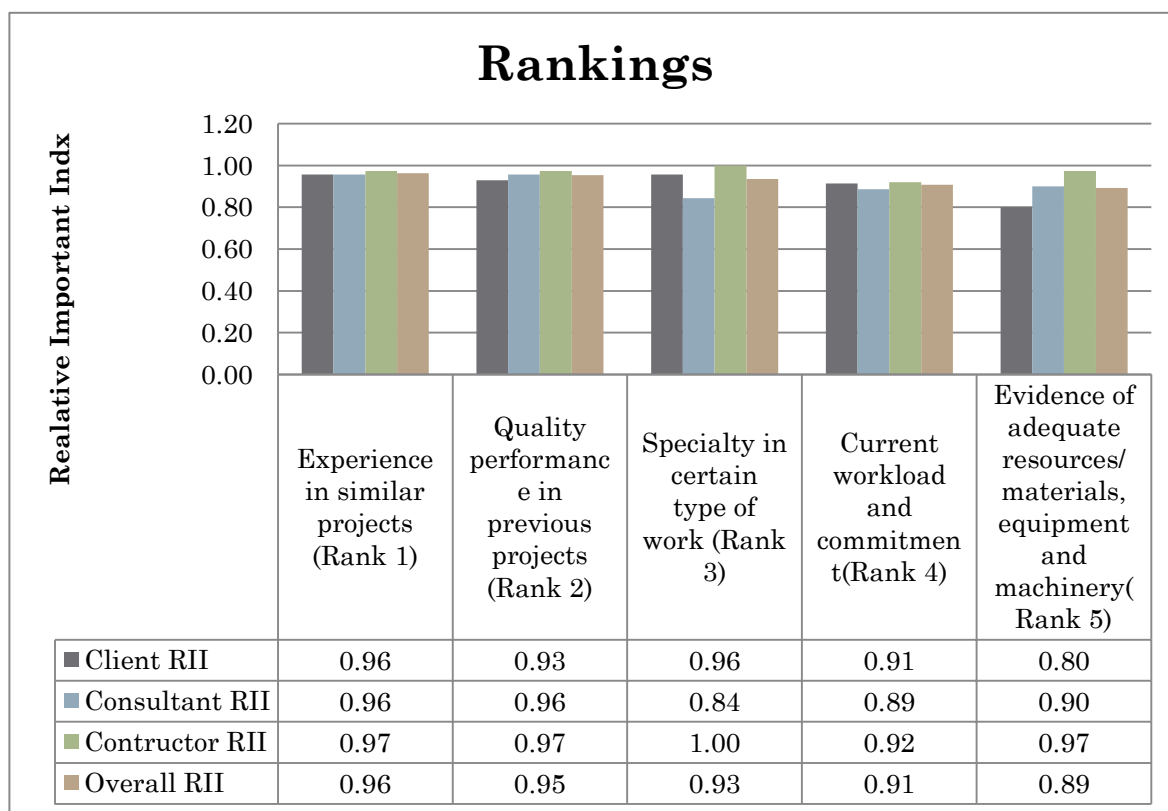


Figure 4.4 Top 5 RII and ranking of each party respondent

“Possession of qualified, skilled and strong workmanship”, “Regular and effective communication with main contractor”, “Leadership qualities and ability to manage own workmanship”, “History of contract completion”, and “Commitment to do remedial works” were overall rank with 6th place up to 10th place.

The results showed fourteen factors were ranked **High Relative Importance Level**; nine factors score **High-Medium Relative Importance Level**, and one selecting criteria ranked **Medium level**.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Introduction

Taking into account the data, analysis, and discussions, this chapter includes conclusions and recommendations that are pertinent to the research objectives. The study's findings reveal the most common reasons for engaging subcontractors in Addis Ababa road building projects, as well as criteria for choosing subcontractors. The review's recommendations can assist primary contractors and subcontractors improve their working relationships and resolve incompetence-related disputes and conflicts in the construction industry. It also makes suggestions for future research on the nature of party relationships.

5.2 Conclusions

According to various studies, the complex and dynamic nature of construction projects necessitates the involvement of subcontractors, and the success of Main Contractors in completing these projects is highly linked to subcontractors' performance.

This study focused on contractors working on road projects in Addis Ababa, with the goal of determining the factors that influence the primary contractor's decision to subcontract, as well as criteria for selecting suitable subcontractors. From the literature and prior studies, 10 and 24 factors for subcontracting reasoning and criteria for selecting suitable subcontractors were gathered. The factors were then rated by computing the RII for each factor, which was done by 15 respondents from contractors, 14 respondents from consultants, and 14 respondents from clients. Based on the study's objectives and findings, the following conclusions are worth drawn.

The results of the survey suggest that looking for specialist services, reducing delays, obtaining technology transfer, and performing a certain volume of work are all highly crucial reasons for subletting a portion of the project. Another rationale for subletting projects is to compensate for a lack of experience, to overcome the complexity and dynamic character of construction projects, to encourage enterprise, and to achieve cost savings. The medium key motivations for subletting projects were found as transferring risk and lowering training costs.

On the other hand, fourteen of the 24 criteria used to choose suitable subcontractors were the most important. These include: Experience in similar projects; Quality performance in previous projects; Specialty in certain type of work; Current workload and commitment; Evidence of adequate resources/ materials, equipment and machinery; Possession of qualified, skilled and strong workmanship; Regular and effective communication with main contractor; Leadership qualities and ability to manage own workmanship; History of contract completion; Commitment to do remedial works (correcting defects); Ability to work efficiently with other subcontractors; Compliance of the subcontractor's submitted schedule with the project's overall schedule; Financial strength; and the subcontractor's subsequent approval by the owners..

5.3 Recommendations

As per various studies, the complex and dynamic nature of construction projects necessitates the involvement of subcontractors, and the success of Main Contractors in completing these projects is highly linked to subcontractors' performance. Then, for good project performance, proper project team selection is critical. Because subcontractors are one of the team members that play a critical role in a building project, main contractors should pay close attention to subcontractor selection criteria. Therefore main contractors should critically consider the parameters such as Experience in similar projects; Quality performance in previous projects; Specialty in certain type of work; Current workload and commitment; Evidence of adequate resources/ materials, equipment and machinery; Possession of qualified, skilled and strong workmanship; Regular and effective communication with main contractor; Leadership qualities and ability to manage own workmanship; History of contract completion ; Commitment to do remedial works (correcting defects); Ability to work efficiently with other subcontractors; Compliance of the subcontractor's submitted schedule with the project's overall schedule; Financial strength; and Owners acceptance of the subcontractor.

Finally, the construction sector needs to undertake significant adjustments to improve project performance, particularly in the traditional subcontracting method. This can be accomplished by conducting additional research in relevant fields. The study focused on the selection criteria for subcontractors in Addis Ababa road projects. Following that, research on the performance of other subcontractors on road and construction projects in general will make a significant

contribution to the sector's and country's development. A well-designed selection criterion for picking subcontractors is necessary for major contractors, according to this study.

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APPENDIXES

Appendix A: Questionnaire

Addis Ababa University School of Commerce

Department of Project Management

Post Graduate Program

Dear Sir / Madam

This questionnaire is prepared for academic study (MA) conducted by a student at Addis Ababa University School of Commerce, Department of Project Management.

I kindly request your cooperation to fill the required information in the attached questionnaire that aims to identify Critical Factors of Subcontractor Evaluation and Selection in the Case of Addis Ababa Road Projects. All the data gathered will be held confidential.

Thank you in advance for your time and kind cooperation.

GirmachewMamushet (Mobile.0929002926 Or 0911349738)

General instruction and information

Part I contains questions regarding the respondents' general demographic traits, while parts II and III contain questions directly connected to the study's aims. Please try to answer all of the questions and express your view by selecting the proper number for the five-point scale question that best matches the intended questions.

You are respectfully requested to provide only the information necessary to answer the study questions; your name and address are not required. The information you enter will be kept strictly private. Furthermore, the accuracy, honesty, and impartiality of your response will have a significant impact on the research's outcomes.

Section I: Organizational/Personal Information

1- Name of the Company (Optional) _____

2-Sex

☐

Male

☐

Female

3- Respondents Designation

☐ Client ☐ Consultant ☐ Contractor

4- Educational Background

☐ Bachelors Degree ☐ Master's Degree

5- Position/Role of the respondent in the company

☐ Project Office ☐ Site Company's ☐ Manager ☐ Engineer ☐ Engineer ☐ Owner

☐ Project Engineer

6-Years of Experience of the respondent

☐ Less than 5 years ☐ 5-10 years ☐ 11-15years ☐ more than 15 years'

Section II: Reasoning for Subcontracting.

S.N	Reasons for employing subcontracting	Not Important (1)	Least Important (2)	Moderate (3)	Important (4)	Very Important (5)
1	To transfer risk					
2	To get cost reduction					
3	To look for specialized services					
4	To compensate lack of expertise					
5	To perform some volume of work					
6	To reduced delay					
7	To obtain technology transfer					
8	To overtake the complexity and dynamic nature of construction project					
9	Reduce training cost					
10	Encourage enterprise					

Section III: Factors used by main contractors for selection of suitable Subcontractors.

S.N	Factors used by main contractors for selection of suitable Subcontractors	Not Important (1)	Least Important (2)	Moderate (3)	Important (4)	Very Important (5)
1	Experience in similar projects					
2	Quality performance in previous projects					
3	Possession of qualified, skilled and strong workmanship					
4	Compliance of the subcontractor's submitted schedule with the project's overall schedule					
5	Evidence of adequate resources/ materials, equipment and machinery					
6	Leadership qualities and ability to manage own workmanship					
7	Reference from previous employers					
8	Health and safety records					
9	Bidding for the lowest price					
10	Financial strength					
11	Current workload and commitment					
12	Owners acceptance of the subcontractor					
13	Regular payments for his employees					
14	Efficient resource management and waste minimization					
15	Ability to work efficiently with other subcontractors					
16	Regular and effective communication with main					
17	Presentation of a solid execution plan in subcontractor's proposal					
18	History of contract completion					
19	Specialty in certain type of work					
20	Care to works done by others subcontractors					
21	Commitment to do remedial works (correcting defects)					
22	Existence of proper organizational structure					
23	Commitment to the provided prices after awarding					
24	Not partnering the works to another subcontractor					