



**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**ASSESSMENT OF SUB-CONTRACTING PRACTICES IN
CONSTRUCTION INDUSTRY: THE CASE OF ETHIOPIAN
CONSTRUCTION WORKS CORPORATION**

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JUNE, 2020

ADDIS ABABA ETHIOPIA

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SCHOOL OF GRADUATE STUDIES**

**DEPARTEMENT OF PROJECT MANAGEMENT
(MBA PROGRAM)**

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**A THESIS SUBMITTED TO ST. MARY’S UNIVERSITY
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DECLARATION

I declare that this thesis entitled “Assessment of Sub-Contracting Practices in Construction Industry: the case of Ethiopian Construction Works Corporation” is my original work. This thesis has not been presented for any other university and is not submitted in application of any other degree, and that all sources of material used for the thesis have been duly acknowledged.

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ENDORSEMENT

This Thesis has been submitted to St. Mary's University, School of Graduate Studies for Examination with my Approval as a University's Advisor.

Advisor

Signature

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LIST OF ACRONYMS

ECWC	Ethiopian Construction Works Corporation
EDSWC	Ethiopian Design and Supervision Works Corporation
ERA	Ethiopian Roads Authority
CIDB	Construction Industry Development Board
PBPPE	Prefabricated Building Parts Production Enterprise
FPPA	Federal Procurement and Property Agency
IJES	International Journal of Engineering and Science
CIDB	Subcontracting in the South African Construction Industry
EPC	Engineering-Procurement-Construction
IJMTER	International Journal of Modern Trends in Engineering and Research
ICB	International Competitive Bidding
JWHC	Jiangxi Water and Hydropower Construction
BOQ	Bill of Quantities
RII	Relative Importance Index
GCC	General Condition of Contract
EOT	Extension of Time

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Abstract

Subcontracting, in construction industry is an integral component of the construction industry and 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*).

Subcontractors are specialist agents in the execution of a specific job, supplying manpower, equipment, tools, and designs. Subcontractors play a significant role in ensuring the success of construction projects, as up to 90% of the total project value are entrusted to various subcontracting firms.

In Ethiopian Construction industry a significant portion of the project work have been provided to sub contractors because of the need to accomplish projects on time by main contractor, the need to look for specialists, financial problem, to mitigate delay, the need to transfer risk and many more using preset criteria.

The aim of this paper is to review the sub contracting practices in the construction industry of Ethiopian with the specific case on Ethiopian Construction Works Corporation. The study was based on a questionnaire survey of ECWC as main contractor, selected subcontractors and consultants. Information was obtained on reason for sub-contracting, sub-contractor selection criteria, issues in sub-contracting & benefits of sub-contracting taking in to account the 21 pre-identified considerations from literature review and analysis of each of them were using SPSS.

Moreover, interview with different construction department heads were conducted to triangulate the actual situation obtained by questionnaire and documentary review of selected projects have been done to obtain further information.

The results indicate that most of those construction projects transferred to subcontractors because of the need for specialists and the need to complete projects within the schedule, look for specialized services and to mitigate delays are the peak reason for subletting part of the project. Another explanation behind this is to perform some volume of work and to overtake the complexity and dynamic nature of construction project, call to transfer risk,

to get cost reduction and to obtain technology transfer were identified as the medium reasons for subletting projects.

Tender Price and financial standing of the subcontractor were identified as the critical criteria to select subcontractors whereas; Technical Qualification was the intermediate criteria set by the corporation in order opt for subcontractor. Professional Qualification and Technical knowhow were discovered as the least subcontractor selection criteria. Beside this, Methodology, Work plan, Capability of subcontractor and Number of staff (Personnel for the key positions) were identified from interview.

Payment by main contractor is identified as the pinnacle issue while Absence of formal contract document between main contractor and subcontractor, Construction insurance, Right of Ways Issue and Subcontractor bonding/retention are identified as the common issues in subcontracting. Safeguarding Adjacent Properties mainly in the project site, Extension of Intended Completion Date and Health and Safety on Sites were another issue identified from interview.

Finally, analysis of the data and interview shows that the corporation has benefited from subcontracting by sharing of financial burden and obtaining specialists, likewise timely completion of projects and Risk transfer are designated as an added benefit of subcontracting.

Keywords: Subcontracting, Construction Projects, Extension of Intended Completion Date, delays, Tender Price, Work plan, Work plan

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Subcontracting 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*).

According to *Sweet (1977)*, subcontracting is the method of construction organization under which the prime contractor is allowed to, and frequently performs, some or even much of its contract obligations through other contracting entities.

Arditi, D. and Chotibhongs, R. (2005), also defined subcontracting as a legal-economic relationship between two agents, in which the characteristic criteria are substitution and subordination. The substitution criterion means that the subcontractor executes the operation with technical and financial risks, instead of the job assignor; the subordination criterion means the subcontractor must follow the direction given by the contractor.

Nicola Costantino and Roberto Pietroforte (2002) stated those construction organizations subcontract part and parcel of their work to reduce overall construction cost, reduce direct cost, market volatility, to cope with supervision problems and reduce equipment costs. In this context, subcontracting could be seen as an organizational alternative for some of their economic activities and therefore, construction firms are decentralizing their jobs more and more, allowing subcontracting to become a basic part of their organizational work.

Building firms are organized into a consistent operating core based on their individual capabilities. Construction companies are becoming construction managers or contractor managers, transferring construction work to specialists. Subcontractors are specialists' agents in the execution of a specific job, supplying work force, besides materials, equipment, tools or designs. They respond only for the executed part of the workmanship, acting as agents of the production system of the contractor company. (*The International Journal of Engineering and Science V-6, PP70-91, 2017*).

The Journal of Simulation Modeling Practice and Theory V-15, PP137-152 (2007) described as companies must focus on specialists in their core business and therefore, the number of subcontractors is increasing and the realization of some strategic tasks can be under the responsibility of specialized subcontractors.

From this context, one can understand that there are different types of subcontracting. These are:- *Specialist subcontractors that undertake specialist services especially building or engineering services such as electrical, plumbing and heating, ventilating and air-conditioning. Generalist and specialist trade subcontractors that offer general trade or specialize on specific trades' services such as painting and brickwork – many of which are general contractors that use subcontracting as a means to get work during periods of tough competition but can and often prefer to work as main contractors. The third one is labour-only subcontractors; i.e. skilled tradesmen that provide labour-only services, while the main contractor provides the materials and supervision. Construction Industry Development Board, Subcontracting in the South African construction Industry; Opportunities for development (2013)*

Another type of subcontracting that is similar to one of the above definition is Volume subcontracting, used by the industry when an enterprise commission a subcontractor because, while technically able to carry out the operation, it is overloaded and has to obtain additional capacity from another source.

The subcontractor's typical source of work is the general contractors that assume responsibility for complete construction of the project. At any point of time, the subcontractor is providing specialty construction services to a number of general contractors with varying expertise in subcontract development, subcontractor management and relations; project management, coordination, and control; and project cash-flow reliability. (The contractor–subcontractor relationship: the general contractor's view Adnan Enshassi, School of Civil Engineering, IUG, Palestine).

The Ethiopian Construction Works Corporation (ECWC) is a state owned Construction Company engaged in infrastructure development like roads, bridges, buildings, airfields, high structure dams, irrigation canals, water supply & systems and drainages.

The Corporation has been established as a Federal Government Public Enterprise by Council of Ministers Regulation No 390/2016 on September 28/2016 by amalgamating the three former governmental enterprises known as Ethiopian Road Construction Corporation (ERCC),

Ethiopian Water Works Construction Enterprise (EWWCE) and Prefabricated Building Parts Production Enterprise (PBPPE).

According to *Harvey A. Levine, Rules for Project Success, PP4*, the corporation has been organized as to help deliver project outcomes like road, bridges, airfield, dam, canals & drainages etc

In order to get those deliverables; the corporation is structured by six different sectors. Namely:- Transport Infrastructure Construction, Water Infrastructure Construction, Dam and Irrigation Projects Management, Building Technology & Construction, Construction Equipment & Machineries Management Sector and Corporate Resource Management & Service Sectors. Out of the six sectors the last two have been support sectors responsible to shore up the rest four sectors with resources (machineries and man power) where as the four sectors were in charge of leading projects accountable to them.

Currently there are 8 road & air field construction projects and 10 road maintenance districts in transport sector, 6 Irrigation canal & Sewerage projects in Water Infrastructure Sector, 4 Dam projects in Dam & Irrigation Management sector and around 8 projects in Building Technology & Construction sector. The total capital and human resource of the corporation is around 20 billion birr and 20,000 employees.

This study will focus on the subcontracting practices in the corporation in general and those construction projects subletted to sub contractors in particular. Understanding that subcontracting is indispensable from construction industry; the result of the study might be used as a benchmark for the corporation in the process of sub-contract management.

The important reason that electrified the researcher to conduct this research is personal observation, absence of subcontractor pre-qualification manual, absence of well defined post-subcontract management system, absence of subcontractor selection criteria and in general unavailability of subcontract manual in the corporation.

Therefore, this study aims to appraise subcontracting practices in Ethiopian Construction Works Corporation (ECWC) and will recommend the obtained findings for further application.

1.2. Statement of the Problem

The construction industry has a dynamic nature and is strongly associated with the economic indicators. To successfully manage construction projects, one need to satisfy customer/stakeholder expectations, completing projects under budget, within the predefined scope and on time (*Markowitz 2007*).

Russell and McGowan (1984) stated that up to 95% of the total project value was transferred to subcontractors in Canada. In South African, subcontracting is very prevalent in the construction industry, with up to 70% of building and 30% of civil construction projects subcontracted out. Studies conducted in Japan and Singapore show similar trend. (*Reeves, K. 2002 and Woon et al. 2000*).

There are several parties involved in construction industry and subcontractors are of utmost importance in terms of completing different work packages. Therefore, subcontracting as an integral part of the construction industry, its importance has been increasing from time to time particularly in developing countries. There will be three main points to be addressed; the whys of subcontracting (reason for subcontracting), subcontractor selection criteria and some other issues in subcontract.

The reason that Prime Contractors look for the services of subcontractors differs from country to country in general and from project to project in particular. According to Felix Quentin et al (2017) in Kenya contractors usually sublet the works to the subcontractors to transform the risks.

As cited by Rafiq M. et al (2012), in Pakistan contractors look for the support of subcontractors to get certain benefits of cost reductions, securing access to specialized services and to share risk. The same were supported by Markowitz (2007) which stated prime contractors highly rely on the specialized services of subcontractors to reduce costs and increase efficiency on construction projects.

The need for subletting part of construction works mostly arises from the lack of expertise of main contractors to execute different levels of the construction works. 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 (*Abbasianjahrom et al., 2016*), (*Yik et al.2006*) and (*J. Mbachu, 2008*).

In other way, prime contractors hire subcontractors in order to perform some volume of work. Volume subcontracting can be used when an enterprise commission a subcontractor because, while technically able to carry out the operation, it is overloaded and has to obtain additional capacity (*Hinze, and Tracy, 1994*).

Through subcontracting, the risks of prime contractors are reduced as errors in estimating added costs caused by delays or extra workforce requirements are assumed by the subcontractors (*Loh and Ofori 2000*). Despite these potential benefits, the quality of subcontracting work deteriorates when incompetent or inexperienced subcontractors are engaged.

The complexity and dynamic nature of construction projects brings the need for subcontractor involvement to effectively execute the projects (*Choudhry and et al., 2012*).

According to the study conducted in University of Hong Kong, the most important criteria for subcontractor selection are the pre-qualification of subcontractors and tender price. Similarly, *Hartmann et al. (2009)* conducted research on selection criterion for subcontractors and investigated importance of four factors, namely the price, technical know-how, quality, and cooperation in the selection process.

However, as several researchers point out, '**lowest price wins**' mentality often sometimes leads to problems with quality and claims in terms of bringing extra cost (*Lavelle and et al., 2007*) and (*Ajay and et al., 2010*).

Arditi D. and R. Chotibhongs, (2005) claims that there are subcontracting issues emerged in subcontracting like timeliness of payment by main contractor, subcontractor bonding/retention, construction insurance, the process of selecting the subcontractor, and productivity issues.

Those issues needs to be included in contract document signed between principal contractor and subcontractor. However, most of the subcontractors did not sign formal contracts with the main contractors and that is why many issues raised after starting the work. Moreover, main contractors modify clauses in the standard conditions of contract on the special project requirements, especially clauses that deal with health and safety, claim for delay of payments which include the subcontractor's claim from the client, adjust the terms of contract to reflect the subcontractor's responsibility for unconditionally fixed contract price. For sub contractors, failure to sign formal contract document arises mostly from trust and hence they agree only

verbally. Therefore, when delay in payment has happened the general contractor follow the principle of ‘pay when paid’.

Bonding/retention is used as a method of protecting the employer from the risks of overpayment, defective work, and contractor insolvency, and as an incentive for contractor performance where as insurance is used for the coverage when defects in liability have happened. In this regard, general contractors’ performance in terms of completing projects depends on subcontractors’ performance and this depends on overall subcontracting practices (*Polat et al., 2016*).

Therefore, general contractors’ success on the project is strongly associated with the subcontractor performance on assigned tasks. Hence, selecting the right subcontractor and managing the overall things between main contractor and subcontractor has therefore an important issue.

The Ethiopian Construction Works Corporation subcontracting practices lacks all the scenarios seen in other countries. For example projects transferred to sub contractors wholly or partly have been facing the problem of clarity of subcontractor selection criteria, clarity on sub contract document, insurance, timely payment by main contractor, timely completion of projects by sub contractor, specific experience of the sub contractor, lack of follow up from the consultant side and many more.

1.3. Study Questions

The study is going to be guided by the following research questions:

- The why’s of subcontracting by Ethiopian Construction Works Corporation
- How the Ethiopian Construction Works Corporation select will be assessed
- The benefit obtained from subcontracting by Ethiopian Construction Works Corporation will also be reviewed
- Issues & challenges in the process of subcontracting by Ethiopian Construction Works Corporation will also be answered

1.4. Research Objectives

There are general and specific objectives formulated for this study.

1.4.1. General and Specific Objectives

The general objective of the study is to investigate sub contracting practices in Ethiopian Construction Works Corporation with focus on construction projects. From this, the study will focus on the following specific objectives:

- Review the why's of subcontracting by ECWC
- Prioritize the reasons for subcontracting based on their hierarchy
- Investigate subcontractors selection criteria by ECWC
- Assess the benefits obtained from subcontracting by ECWC
- List the issues and challenges faced by ECWC in the process of subcontracting

1.5. Significance of the Study

Many researches' have been conducted on Construction Project Management all over the World & Africa in general and in Ethiopia in particular. Of those researches, studies carried out in Ethiopia have not touched practices of subcontracting in construction industry in many ways. Therefore, this study will have practical significance for decision makers of the corporation at all levels for tackling active problems, will be used as a reference/benchmark for policy makers to develop different manuals, might be used as a reference material for those specializing in the area and stimulates further study.

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

The study will cover subcontracting practices of the centrally organized focal project management departments and construction projects located in different parts of the country by focusing on those projects partly or wholly sublted to subcontractors.

Actual documents of subcontracted projects and problems encountered will be reviewed. Moreover, subcontract management practices of the corporation will be assessed in this study.

1.7. Limitations of the Study

As it is known the nature of construction industry is mainly based on the schedule almost all of the ECWC leaders at head quarter and project managers might be busy as a result, some respondents might not respond to questionnaires timely and properly. The second drawback of the study goes to the availability and ease of accessing sub contract documents and this might result in time constraint might. Finally, the researcher suspects that data analysis methodology going to be used might not be fully effective.

1.8. Organization of the Thesis

This study incorporates five major chapters. The first chapter describes about back ground of the study, statement of the problem, specific questions to be answered by the study, objectives of the study (both general & specific), significance of the study, scope (as applied to this study), limitation of the research and ethical considerations.

The second chapter will try to present review of related literatures in connection with the topic of the study. In this chapter, global practices of subcontracting, the need for subcontracting, subcontractor selection criteria, benefits of subcontracting, subcontracting processes and the challenges of subcontracting have been reviewed.

The third chapter will focus on methodologies to be used in conducting the study and description of the study organization/area, research approach/design, data types and sources, target population & sample, the procedure with which samples will be determined & selected, data collection instruments & tools, data collection procedures and methods of data analysis.

The fourth chapter will deal with the result and discussion of the study using the data analysis tools. The final chapter will show the summary, conclusion and recommendation of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Theoretical Literature Review

Majority of construction projects involve a high number of project participants such as owners, Contractors, Consultants, stakeholders and sub contractors.

Steven Cohen and William Eimicke in their book entitled '*The Responsible Contract Manager Protecting the Public Interest in an Outsourced World*' defined 'Contract' as an agreement between two or more parties, especially one that is written and enforceable by law. Also *Uher et al, 2009* stated as an agreement that is legally binding. Still, *Phillip Cooper* has concluded contract as a legal instrument.

An inseparable terminology from contract is a 'subcontract' and according to *Uher et al, 2009* subcontract is a contractual agreement enforceable by law formed between a subcontractor and a prime contractor.

Subcontracting is a process of subletting trade or work packages to ordinary contractors or to specialist contractors, commonly referred to as subcontractors.

According to *Uher et al, 2009* 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.

i. Types of Subcontracting

As per the study of *Hinze, J. and Tracy, A. 1994* subcontracting can be classified as volume subcontracting and specialist subcontracting. Volume subcontracting is used when an enterprise hire a subcontractor while technically able to carry out the operation but overloaded and looking for additional help from another source.

Specialty contractors are construction "job shops", performing construction work that requires skilled labor from one or at most a few specific trades and for which they have acquired special-purpose tools and equipment as well as process know-how. (*Tommelein, I.D and Ballard, G. 1997*). Through their specialized services, sub-contractors execute specific tasks that prime contractors could not perform efficiently (*Markowitz 2007*).

In South Africa the typical subcontractor falls into one specialist, trade, general or labor-only types of subcontractors and this is a major determinant of the size, management and contracting practices and the level of skills within the subcontractor.

In contrast trade contractors carry out non-specialist work that does not require a significant amount of technical expertise, mainly in the core construction trades such as brickwork and bricklaying. These subcontractors are typically relatively new to the industry, with little business, managerial and financial skills.

Labor-only and domestic subcontractors are often past employees who have left the firm and are given first priority to supervise or carry out package works on the firm's construction projects. Such subcontractors often lack all but the core construction and supervision skills, and require close management and assistance in the purchasing and management of supplies and resources.

ii. The need for Subcontracting

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.

Beardsworth et al (1988) pointed out that organizations could see sub contracting as an alternative for some economic activities. Construction firms are decentralizing their jobs more and more, allowing subcontracting to become basic part of their work organization.

Sub-contracting is particularly popular in the construction industry, where sub-contractors perform most part of construction work (*Mansfield 1988*).

The need for subcontracting some of construction works mostly stem from the lack of expertise of main contractors to execute different levels of the construction works. 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. (*Abbasianjahromi et al.,2016*), (*Yik et al, 2006*) and (*J. Mbachu,2008*). Hence, it is essential to select subcontractors wisely based on their level of expertise and capacity to carry out the assigned tasks.

iii. Subcontractor Selection Criteria

Subcontracting on construction projects is a well-established practice ensuring contractors complete their projects on time and under budget in addition to having access to specialized services and risk sharing (*Choudhry et al., 2012*).

According to study conducted in the University of Hong Kong on Appraisal of Subcontractor Performance-Criteria, the most important criterion for subcontractor selection is the pre-qualification of subcontractors and tender price. Similarly, *Hartmann et al. (2009)* conducted research on selection criterion for subcontractors and investigated importance of four factors, namely the price, technical know-how, quality, and cooperation in the selection process. However, if only price is considered sub contractors might compromise quality of the project deliverables. In this regard *Ajayi & et al., 2010* and *Lavelle & et al.,2007* argued the ‘**lowest price wins**’ mentality sometimes leads to problems with quality and claims in terms of bringing extra cost.

iv. Benefits of Subcontracting

The contribution of subcontractors to the total construction process could account for 80-90% of the total value of the project. This large involvement of subcontractors can be attributed to the shift from the traditional craft base, to a greater reliance on increasingly sophisticated technology-based products. This has resulted in general contractors concentrating their effort, on managing construction site operations rather than employing direct labor to undertake construction work. It has also been attributed the increased use of subcontractors to the increased complexity of both the construction of buildings and the organizational relationship.

Subcontractors contribute significantly to the capital risk, resources, managerial effort, and business expertise supporting the largest industry in the country. (*The contractor-subcontractor relationship: the general contractor’s view Adnan Enshassi, School of Civil Engineering, IUG, Palestine*).

According to the journal of Construction Engineering and Management ‘Subcontracting Practices in the Construction Industry of Pakistan’ Dec 2012’, subcontracting on construction

projects is a common and well-established practice and contractors enlist the services of subcontractors to achieve certain objectives, including obtaining cost reductions, securing access to specialized services, and risk sharing.

Study conducted in Kenya-Nairobi area reveals that main contractors go for sub-contractors in order comply with regulations. (*The International Journal of Engineering and Science (IJES) Volume 6, Issue,8 ,PP 70-91,2017*).

V. Reason for Subcontracting

Different findings were given by Nicola Costantino and Roberto Peitroforte, (2002) as the need for reduced overhead cost, reduced overall construction cost, faster construction time and market volatility are among the reasons for subcontracting.

Findings of Construction Industry Development Board in South Africa ,(2013) reveals that reduced liability, risk sharing arrangement, higher quality & productivity and better cost control through fixed-price subcontracting were noted as reasons behind using subcontractors.

Previous studies by Adnan Enshassi, Faisal Manzoor Arain and Bassam Tayeh (2010) suggested monitoring and controlling quality control, safety management and labor management problem, on construction projects become less complicated for general contractors. Hurji Anbessie (2017) also justified that lack of in-house capacity, need for accessing external expertise/technology and financial reasons were some the reasons for subcontracting.

2.2. Empirical Literature Review

Subcontracting on construction projects is a common and well-established practice. Prime contractors sublet most portions or all of the specialized work of their projects because of overload or inability to perform specialty tasks.

Subcontracting is very prevalent in the South African construction industry, with up to 70% of building and 30% of civil construction projects subcontracted out and the most prevalent types of subcontracting are labour-only, trade contracting in the building sector and specialist subcontracting in the building and civil sectors. *CIDB, Subcontracting in the South African Construction Industry; Opportunities for Development, (2013)*

Subcontractor Selection Criteria

Study conducted by Rafiq M. et al., (2016) shows that subcontracting practices in the construction industry have not been regulated through any regulatory authority or legislative

body. From this one can see as there were no well established criteria for the selection of subcontractors, and the present registration system focuses only on prime contractors.

Study conducted by Sevilay Demirkesen and Hasan Gokberk Bayhan in Aydin University, Istanbul, Turkey concluded that subcontractor selection with choosing by advantage (CBA) method have been preferable subcontractor selection criteria especially in Engineering-Procurement-Construction (EPC) consisting of several parties, where some tasks are challenging and bring the need for collaborative structures. The result of the study concluded that nine criteria (technical capacity, level of expertise in similar works, safety, quality, reputation of subcontractor, risk, time, innovation and current workload) as a means of selecting subcontractor might be used.

Results of study by Felix Quentin Biketi et al., (2017) concluded that main contractors have been recommended to consider the skills and past experience of the subcontractor as considerable factors during their selection. Principal contractors need to consider the capabilities and reputation of the subcontractor to make certain that the selected subcontractor is capable of completing the work and achieve the best quality. Some other references signify that the necessity of supervision of subcontractors by main contractors to solve any problems on sight.

It has been noticed from the results the study conducted by Adnan Enshassi et al.,2010 that some general contractors' select subcontractors according to their previous experience with them others select subcontractors based on their reputation and this can be traced to the trend of the major contractors in the local industry in selecting the lowest bid regardless of the safety and quality of work. Other studies indicate that General contractors select subcontractors according to the complexity of the work and previous experience with subcontractors. With this in mind the study will investigate the common practices of selecting subcontractor in the case of ECWC.

Standard form of Subcontract

Many literatures indicate that instead of prolonged negotiations between contractors and subcontractors to resolve conflicts, a standard form of sub-contract can be helpful for preventing many disputes and can provide resolution for many conflicts that might arise. In this regard, B.L.Raput and Agarwal (2015) concluded that main contractors are recommended to adhere with clearly written sub-contract document to avoid disputes with their subcontractors. Sub contractors are often contractually required to assume all the obligations stipulated in the contract between owner and general contractor. However, are not afforded the opportunity to

examine it. This will lead to poor overall management of the projects, poor quality products, late project delivery and create dissatisfaction between main contractor and subcontractor as well as clients.

Standard form agreements will contain provisions that are readily understood by the contracting parties, and the allocation of risks will be more clearly outlined.

Study conducted by Adnan Enshassi et al., 2010 reveals that more than 60% of contractors use subcontract forms similar to the one between owners and contractors where as others used a simplified contract.

Study conducted by Rafiq M. and et al., 2016 indicates that there were no common practice of using standard form contracts between prime contractors and subcontractors, and the terms of the contract are primarily determined by the prime contractors, resulting in the potential exploitation of subcontractors. Nevertheless, subcontractors are exploited to a certain degree as the prime contractors have the power to refuse to give work for subcontractor in future projects.

Benefits of Subcontracting

The International Journal of Modern Trends in Engineering and Research (IJMTER), V- 2, 2015 reveals that subcontracting as an economical way of procuring specialized works for modern state-of-art buildings. Of the benefits to be gained from working with subcontractors, providing skilled labor, reducing overhead costs, enhancing competitiveness and reducing pressure on the main contractors have been identified by many researchers.

The Federal Deposit Insurance Corporation has presented that Subcontracting offers numerous benefits to both contractors and clients like Focusing on core capabilities, obtaining complementary capabilities, integrating different skills, Building direct relationships with customers, Sharing risks and rewards and allowing more opportunities for small and small disadvantaged businesses. Beside this, monitoring and controlling, quality control, safety management, and labor management problems on construction projects become less complicated for general contractors.

Study conducted by Yoke-Lian, S. Hassim, R. Muniandy, and Law Teik-Hua (2012) concluded that subcontractor has become a great subject to all the practitioners in construction industry due to the common practice of subletting construction works into smaller packages in construction industry. Effective subcontractor selection and monitoring which can minimize the problem would determine the success of construction companies. Problems of subcontractors, if ignored,

can cause an immense impact to the construction project, and can extend into the operation of the general contractor's organization. Therefore, attention shall be given to the overall practices and issues of subcontractor, which is the main participant in almost all the construction projects.

2.3. Conceptual Framework

There are at least three parties/the client, the contractor and the consultant/ in any construction work process. The roles, responsibilities and deliverables expected from of each of them have been clearly identified in any construction project management books/ contract document. The client is the owner of the project; the consultant is an engineer acting on behalf of the client to follow the operation of the project where as the contractor is the work executing part. Therefore, the role of subcontractor is to conduct parts of the works of the contractor based on the agreement made between main contractors.

To study the subcontracting practices, several factors should be put into consideration. Some of the scenarios were reason for subcontracting, subcontractor selection criteria, standard forms of subcontract document and other issues in subcontracting activity. The following diagram summarizes the conceptual framework for this study.

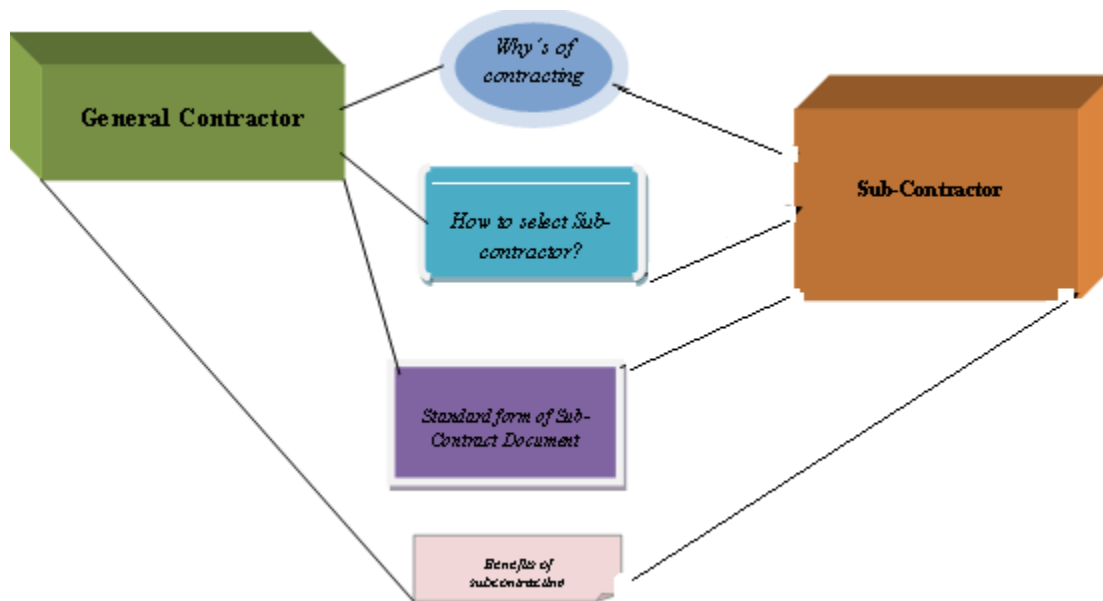


Fig.2.3. Conceptual framework (Source: Adapted from the Construction Productivity in the multilayer Subcontracting System book series, the case of Singapore)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Introduction

Research methodology is the philosophy or general principle which guides the research. (*Catherine Dawson; Introduction to Research Methods*). Moreover, Kothari (2004) stated research methodology as a way of systematically solving a research problem. Hence, this chapter describes the methodology undertaken to achieve the research objectives.

The methodologies involved in this research are research design, identification of data types & sources, sample size determination, data collection instrument, data collection process, analysis of data.

3.1. Research Design

The research design is the plan or overall scheme of investigation, designed to provide with answers to the research question.

It involved literature review, use of structured questionnaire, review of documents from selected projects of the corporation. The literature review was conducted to extract the variables for the assessment and to have a conceptual bases on objectives the thesis.

On the other hand, the research involved both quantitative and qualitative method. The quantitative method was administered using questionnaire.

3.2. Population and Sampling Technique

3.2.1. Population

A target population is the population to which the researcher ultimately wants to generalize the results. *Amin, (2005)*.

The research was conducted on 30 construction projects of Ethiopian Construction Works Corporation. From which a total of 70 Engineers directly or indirectly engaged in Construction, Project Management, Contract Administration & Construction Department Heads at ECWC level, Clients, Consultants and Sub-Contractors were taken as a target population using purposive sampling method.

3.2.2. Sampling Technique

A simplified formula to calculate sample size as stated by Yamane (1967);

$$n = \frac{N}{1+N(e)^2}$$

Where n is the sample size, N is the population size, and e is the level of precision. When it is applied with 95% confidence level and e 5%;

The sample becomes:

$$n = 70/1+70(0.05)^2$$

$$n = 60$$

$$n = 60 + 60*10\% \text{ (to compensate for missing responses)}$$

$$n = 66$$

Therefore, the questionnaire was distributed for a total of 66 respondents using purposive sampling as stated by Saunders M., Lewis P. & Thornhill A., 2012.

3.3.Data Collection

Questionnaire is a valuable method of collecting a wide range of information from a large number of individuals, often referred to as respondents (C.N *Trueman, 2015*). Therefore, this part describes about questionnaire distribution, collection of responses from respondents (ECWC, Clients, and Consultant & Sub-contractors) and the subsequent analysis of the responses.

The questionnaire consists of the **respondents characteristics** and the **main questions** related to Reason for Sub-contracting, Sub-Contractor Selection Criteria, Issues in Sub-contracting and Benefits of Sub-Contracting.

The principal purpose is to look at reason & criteria for subcontracting and prioritize them according to relative importance level by performing relative importance index (RII) and to assess the benefits obtained from subcontracting so as to propose corrective measures which might help minimize the different issues in sun-contract management within ECWC in particular and in the industry in general.

3.4.Respondents Designation

The questionnaire was distributed for a total of 66 respondents through email by hand. The distribution was made via email for projects located far from Addis Ababa and by hand for those

near & within Addis Ababa purposely in such a way that 56% (37) were distributed for Project Managers & Work Execution Team Leaders of ECWC, 18% (12) for Contract Administration Engineers & Project Managers of Sub-Contracting firms, 15% (10) for Engineers of Consulting firms and 11% (7) for Engineers of Clients (Owners).

3.5.Types of Data and Tools/Instruments of Data Collection

The study was conducted in Ethiopian Construction Works Corporation (ECWC) engaged in construction of more than thirty/30/ Road, Air field, Canal, Sewerage, Water Supply, Dam & Irrigation and Building Construction Projects. The study focused on subcontracting practices in Ethiopian Construction Works Corporation with emphasis on construction projects subjected to sub-contractors wholly or partly.

Primary and Secondary data types have been used for the study where primary data obtained using questionnaire from Clients, ECWC (different projects subjected to sub-contract), Consultants and Sub-Contractors and by conducting interview with ECWC construction department managers at head office level. Secondary data have been obtained by conducting document review of selected projects relevant for the study.

Questionnaire Design

In order to carry out the research with desired quality, survey questionnaires consisting of different variables extracted from literatures and organized in five parts which include questions related to respondent profiles, reason for subcontracting, criteria for selecting subcontractor, subcontract related issues and benefits obtained from subcontracting.

Section-I Organizational/Personal Information

This section help the study obtain the following information:

- Name of the organization,
- Sex
- Respondents Designation (Client, ECWC, Consultant and Sub contractor)
- Educational Background and
- Relevant work experience

Section-II Questions

This section contains four categories of the variables identified from literature and believed to help conduct assessment of sub contracting practices in Ethiopian Construction Works Corporation.

The questionnaire was based on Likert scale of five ordinal measures from 1 to 5 based on the level of significance:

1- Strongly Disagree

2- Disagree

3- No Opinion

4-Agree and 5- Strongly Agree

3.6. Procedure of Data Collection

The questionnaire were then delivered to 66 different level professionals of ECWC, Client, Consultant and Subcontractors selected through e-mail in following proportions in order to obtain information from experienced professionals: 37 to ECWC; 7 to Clients; 10 to Consultants and 12 to Subcontractors. Out of the 66 questionnaires distributed, 53 were received and all duly completed and found suitable for analysis, representing a response rate of 80.30%.

3.7. Methods of Data Analysis

Descriptive statistics analysis method has been adopted based on the primary data obtained from respondents (using questionnaire from ECWC, Clients, Consultants and Subcontractors). The data is analyzed using Statistical Package for Social Sciences (SPSS); mean score together with standard deviation.

Relative importance index (RII) were analyzed to; rank the most significant reasons of subcontracting, prioritize subcontractor selection criteria, identify the most common issues in subcontracting and identify the common benefits obtained by construction industry from subcontracting.

$$RII = \sum \left(\frac{W}{A+N} \right)$$

Where

RII is the relative importance index

W is the weighting as assigned by respondent on a Likert scale of 1 to 5

A is the highest weight and

N is the total number of respondents

The RII value ranges from 0 to 1 (excluding 0); the higher the RII, the most important that parameter is and results of is ranked & tabulated.

Moreover, according to Akadiri (2011), five importance levels were transformed from RII. These are high (H) ($0.8 \leq RII \leq 1$), high-medium (H-M) ($0.6 \leq RII \leq 0.8$), medium (M) ($0.4 \leq RII \leq 0.6$), medium-low (M-L) ($0.2 \leq RII \leq 0.4$) and low (L) ($0 \leq RII \leq 0.2$).

Besides this, information obtained by interview and review of relevant document were narrated to assess subcontracting practices in the construction industry.

3.8. Reliability and Validity of the Instrument

Reliability test has been conducted using reliability coefficient to check whether the data used were reliable or not. The reliability coefficient normally ranges between 0 and 1. The closer it is to 1, the greater the internal consistency reliability of criteria in the scale. Generally, a 0.7 Cronbach's alpha value is acceptable in most social science research scenarios.

In this regard, the Cronbach's alpha of the study is 0.989 with 21 variables which shows there is high internal consistency for the data set (*Keith Tabler, 2017*).

Validity refers to the extent to which an instrument measures what is expected to measure. Data should not only to be reliable but also true and accurate. To establish the validity of the data collection instruments, the research instruments were provided to ECWC people, clients, consultants and subcontractors. In this regard, it is believed that the research questionnaire adequately addressed the important issues under study.

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

Cronbach's Alpha	N of Items
.989	21

Table 3.1 Reliability Statistics

3.9.Ethical Research Considerations

Respondents (from the four parties) were clearly oriented about the objective of the study prior to disseminating the questionnaire and appointed for interview and the very important thing noted were that respondents have not been requested about their demography. This has cleared ambiguity that may happen while providing response.

On the other hand, discussion has been conducted with the management of organization (ECWC) on the purpose of the research and agreed to use the outcomes of the study while developing ECWC's subcontract manual in near future. Finally, there are no fraudulent and related acts on respondents because of this as far as this study is concerned.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1. INTRODUCTION

This chapter illustrates about questionnaire distribution, collection of responses that were delivered and returned through email from respondents and subsequent analysis of the responses from professionals working in the industry (ECWC, Clients, Consultants and Sub-contractors) using SPSS20 and descriptive statistics.

Descriptive statistics in the form of mean and frequency distribution have been used to present demography of respondents which include sex, respondent's designation, educational background and work experience.

In other way, mean and relative importance index analysis have been carried out in order to help evaluate subcontracting practices in Ethiopian Construction Works Corporation from four perspectives (reason for subcontracting, criteria for selecting subcontractors, subcontract related issues and benefits obtained from subcontracting. Accordingly, relative importances of criteria's were ranked as per Akadiri (2011). Moreover, documentary reviews of those projects subjected to subcontracting have been reviewed.

Data analyzed in such way have been presented using tabulations, charts and graphs so as to help the reader understand in clear manner with subsequent interpretation of the analysis from what has been reviewed in related literatures so far.

4.2. ANALYSIS OF CASES OF PROJECTS SUBJECTED TO SUB -CONTRACTING

In Ethiopian Construction Works Corporation, it is a common practice to sub-contract part and parcel of the project as it is engaged in infrastructure development like roads, bridges, buildings, airfields, high structure irrigation dams and canals, water supply and drainages systems. Document reviews of selected projects subjected to sub-contracting were done as a case study and narration of each projects described as follows;

4.2.1. Kong-Begundi-Wonbera Road Construction Project

This project (Km85+000-105+000) is located in Western part of Ethiopia connecting Oromia, Amhara and Benishangul Gumuz national regional states and it is the main road network to GERD from those regions. The client of this project is Ethiopian Roads Authority, the consultant is NICH Consulting Engineers PLC and the main contractor is ECWC.

Due to the continuous rainfall especially in Wonbera area, parts of the road have been eroded by heavy flood and damaged belongings (plants, houses and animals) of the neighboring farmers and the local government requested the project to replace properties for the beneficiaries. The issue was sent to the client (ERA) and the main contractor (ECWC) for settlement. To solve the problem the main contractor has agreed to pay the damaged property by conducting a hydrology design to be verified by separate professionals to identify the root cause of the problem. Subsequently, ECWC (the main contractor) hired a hydrology design verification specialist as sub-contractor.

Review of the relevant document (tender document and contract document) shows that the reason for sub-contracting this project is the need for specialist in hydrology area. The tender document shows that from seven invited specialist firms nominated by the client (ERA), Zewudie Eskinder Engineers PLC was selected as a subcontractor passing the following evaluation criteria:

- Qualifications and competence of the key professional staff engaged in the area
- Adequacy of the proposal methodology and work plan in responding to the terms of Reference
- Specific experience of the sub-contractor relevant to the assignment

Even though the sub-contract work has not been finished yet, some issues were happened in between sub-contractor and main contractor so far. These are

- Subcontractor insurance and bonding
- Amendment of the contract document because of re-schedule of the work plan
- As lump sum contract is concerned, the sub-contractor has faced Payment issue
- Right of entry to land (access to damaged property area).

Therefore, the main reason behind all the above issues is absence of formal sub-contract standard document between main contractor and subcontractor.

4.2.2. Kuraz Sugar Development Project

This project is located in South Omo, Southern Part of the country. The client of this project is FDRE Sugar Corporation, the consultant is Ethiopian Design & Supervision Works Corporation (EDSWC) and the main contractor is ECWC.

The project has been launched as country's sugar development program and it is part of construction of the five sugar factories along Omo River under Design and Build mode of contract.

After completing the first phase of the project, ECWC has planned to transfer the diversion of the river for specialized sub-contractors on International Competitive Bidding (ICB). Accordingly, of the five bidders purchased the bidding document, Jiangxi Water and Hydropower Construction Ethiopia Co.Ltd has won qualifying the pre-set criteria (**Professional Qualifications & Capability, Technical Qualifications, Competence, Experience & Financial Standing**) and entered in to the contract agreement. The main reason for sub-contracting part of the project (Construction of Diversion Weir) is the need for skilled contractors in hydropower construction because of socio-economic activities in the area.

There are several issues observed up on reviewing the contract documents. For example the signing of the contract has been pended for about one year by the Federal Attorney General for suspect of fraudulent activity during the tender award and this has led the main contractor to the litigation case which later handled by discussion. This has also led to the claim for price adjustment by sub-contractor.

The second issue noted from the document is the sub-contractor bonding issue. As Jiangxi Water and Hydropower Construction Ethiopia Co.Ltd (JWHC) is an overseas company engaged in construction of water and related activities, the type of performance bond and advance guarantee bond that is submitted should be bank/insurance guarantee counter guaranteed by local banks or insurance companies. To this end, JWHC has faced problem of furnishing the bond from Chinese financial companies. After many correspondences and discussion, the main contractor has agreed the bond to be furnished from local banks with the intervention of Embassy of the Peoples Republic of China (PRC) in Addis Ababa.

The third issue noted down was the advance payment by the main contractor (ECWC). As there is a serious cash flow problem in Ethiopian Construction Works Corporation because of leading several and complex projects, the subcontractor has also faced financial shortage and delay in implementation of tasks. The other problem is the complaint rose from the community and stakeholders resulted from delayance the project especially in downstream area. Generally, the above issues were the result of integrity in Federal Government level, Lack of clear standard sub-contract document, Experience of the main contractor in managing sub-contractors.

4.2.3. Megech Dam Construction Project

This Project is situated in Northern part of Amhara Regional State situated about 700 km from Addis Ababa. The owner of the project is Ministry of Water and Energy, the consultant is EDSWC and the main contractor is ECWC.

The purpose of the project is to assist benefit farmers in Northern part of Amhara region with modern farming including irrigation, fishery and cereal farming in dry season which helps increase the socio-economic activities of the country at large. With this regard, the client has forced the main contractor to finalize the project before the deadline and this becomes the initiation to transfer part of the project (Fill works of Fine Filter, Coarse Filter, Shell, Rock and Riprap work) for competent sub-contractors.

The Sub-contract work has been floated to invite capable contractors under ICB modality. Accordingly, five contractors were registered and evaluated both technically and financially with the following criteria

- Professional Qualifications and Capability of Bidders (Number of staff and Personnel for the key positions)
- Technical Qualifications, Competence, and Experience of Bidders (General experience, Specific experience, History of non-performing contracts, Pending litigation, Equipment for the implementation of the contract)
- Financial Standing of the Bidder (Historical Financial Performance, Average Annual Turnover, Financial Resources)
- Adequacy of Technical Proposal in responding to the Schedule of Requirements
- Specific experience of the Bidder relevant to the Schedule of Requirements

- Qualifications and competence of the key professional staff engaged in the works

As seen from the tender document, bidders considered for financial stage were those scored greater than 70% in technical evaluation and here lowest price wins mentality were applied. At last BEAEKA General Business PLC was found to be the winner of the contract as a sub-contractor. Consequently, sight handover has been conducted in the presence of the concerned parties and the subcontractor has commenced the work by mobilizing all the necessary resources to the sight.

During the document review, the project has been in progress and the researcher has observed the following issues have been underway:

- The main contractor is unable to pay advance payment the agreement
- Lack of confidence from Consultant
- As there is overlapping work in the project, failure to clearly demark the work transferred to subcontractor has been observed.
- As the project has left with several calendar days, it is subjected to additional issues

Documentary review shows that the above issue has happened due to not moving in line with the contract agreement and full trust on main contractor by sub-contractor. Moreover, the right of sub-contractor has not been stipulated in the contract document as far as General Condition of Contract (GCC) is concerned.

4.2.4. Prime Minister Office Building Project (Interior design work)

This project is a four storey building and part of the main palace renovation project owned by office of the prime minister. The main contractor is ECWC and the consultant is EDSWC building construction supervision sector. It is intended to provide speech for local and international guests and offices purposes with international standard auditorium with quality interior design. Five competent sub-contractors of interior design were invited to submit their offer and Yordanos Interior Design was selected to conduct the sub-contract work.

As it is known, construction is a complex process requiring several technologies with multi skilled professionals. In building construction like palace project, the requirements are too many

requiring precision work. With this in mind, the intention for sub-contracting interior design portion of the building was the need for specialists in the area.

Documentary review indicates that the quality of material mentioned in the Bill of Quantities (BOQ) were difficult to get and the sub-contractor claimed for review of material quality. Thus, the main contractor presented the issue to the client and the consultant however the owner has refused the claim and insisted the main contractor to look the same material somewhere else in the world. Finally, the sub-contractor has got interior work done in United States of America with similar design & material and placed an order in one of the China and get the work done well. This shows the specialist subcontractors need to look every part of the main contract including the quality of materials stipulated in the BOQ before entering in agreement.

4.2.5. Awash River Bridge Construction Project (Geotechnical Investigation)

Awash bridge construction project is located in Afar Regional state and is part of Dullecha-Awash Arba-Ankober Road Construction Project. The owner of the project is ERA, the consultant is EDSWC Transport Design & Supervision Sector where the main contractor is ECWC.

Constructions of bridges need intensive care with emphasis in the Geotechnical investigation part. To deal with this issue, ECWC, as a main contractor has planned to let the Geotechnical investigation work to experienced firms on NCB procurement modality. Accordingly, four bidders were noted to respond to the invitation and Gondwana Engineering PLC was awarded to conduct the work passing all technical and financial criteria set the tender document.

Meanwhile, ECWC has pended the process as it has faced right of ways issue in the project area. ECWC has presented the case to the client/ERA/ and make the client handle the issue. This took about several calendar days of the project. The problem was solved after about one year. Then, the client wrote letter to the main contractor that justifies the issue was solved and let the main contractor prolong the project subsequently the main contractor has requested the willingness of Gondwana Engineering PLC for the project & replied his acceptance with official letter.

However, after about two weeks time Gondwana Engineering PLC has submitted letter that he has declined from signing the contract with ECWC since it took too much time to conclude the contract case. The same was notified the client that the winner has refrained to sign the contract.

ERA on the other hand, has collected the technical document of the second winner (Core Consulting Engineers PLC) the approved and sent back to ECWC. ECWC has contacted winner Core Consulting Engineers PLC and signed a contract. Therefore, Core Consulting Engineers PLC becomes the Sub-Contractor for Geotechnical Investigation of Awash river bridge construction project.

As per the documentary review there are several issues in this sub-contract process:

- Timely completion of project was altered
- Right of ways issue
- Cost escalation has happened because of the lateness
- Subsequent projects have been delayed
- Stakeholders have been waiting for the project completion and etc

4.3. Results

4.3.1 Respondents' Characteristics

i. Experience of Respondents

As shown in fig.4.3.2 (bar-chart), 47.2% (25 respondents) have work experience of more than 15 years, 34% (18 respondents) have work experience of 11-15 years and the rest 18.9% (10 respondents) have work experience of 6-10 years.



Fig.4.3.1(ii). Work Experience of Respondents

ii. Questionnaire Response Rate

S/N	Group	Questionnaire Delivered	Questionnaire Responded	Response Rate
1	ECWC	37	28	53%
2	Client	7	6	11%
3	Consultant	10	9	17%
4	Sub-Contractor	12	10	19%
Overall Response		66	53	80.3%

Table.4.3.1(iii) Questionnaire Response Rate

As shown in table 4.3.3 above, out of the 66 questionnaires distributed, a total of 53 responses were received. However, (19.70%)13 people did not returned the questionnaire so the response rate becomes 80.3% comprising of 53% (28) from ECWC, 19% (10) from Sub-contractors, 17% (9) from Consultants and 11% (6) from Clients.

4.3.2. Analysis of Main body of Survey Results

This sub-topic is intended to present about the analysis results of important aspects of sub-contracting practices (reason for sub-contracting, sub-contractor selection criteria, issues in sub-contracting & benefits of sub-contracting) taking in to account the 21 pre-identified considerations from literature review and analysis of each of them were shown in detail as below.

i. Reason for Sub-Contracting

Respondents were asked about their opinion why the corporation transfers part and parcel of its work for sub contractor; mainly from transfer of risk, getting cost reduction, the need for specialized services, to compensate lack of expertise, the need for performing portion the work by others, to mitigate delay, to obtain technology transfer or to overtake the complexity and dynamic nature of construction project. The respondents were requested to note each parameter as follow: 1. Strongly Disagree 2. Disagree 3. No Opinion 4. Agree 5. Strongly Agree. Table 4.3.2 presents the results of this question.

Table 4.3.2(i) Relative Importance Level of Reason for Sub-Contracting							
Reason for Sub-Contracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
To compensate lack of expertise	53	4.453	0.798	5	0.891	1	H
To look for specialized services	53	4.359	0.942	5	0.872	2	H
To mitigate delay	53	4.226	1.050	5	0.845	3	H
To perform some volume of work	53	3.925	1.222	5	0.785	4	H-M

Table 4.3.2(i) Relative Importance Level of Reason for Sub-Contracting							
To overtake the complexity and dynamic nature of construction project	53	3.566	1.352	5	0.713	5	H-M
To transfer risk	53	2.906	1.572	5	0.581	6	M
To get cost reduction	53	2.585	1.512	5	0.517	7	M
To obtain technology transfer	53	2.000	1.301	5	0.400	8	M

The response divulges that the relative importance of the need to compensate lack of expertise (RII=0.891) was ranked as the top reason for transferring part and parcel of the corporation's work to subcontractors followed by looking for specialized services (RII=0.872) and to mitigate delay (RII=0.845). The outcomes of which are graded as **High Relative Importance Level**. This result complies with the work of *Hinze, J. and Tracy, A. 1994* prime contractors while technically able to carry out the operation, it is overloaded and has to obtain additional capacity in order to alleviate impediment of the overall project.

The relative importance level of "to perform some volume of work" and "to overtake the complexity & dynamic nature of construction project" was rated as "**High-Medium**" with RII value of 0.785 and 0.713 correspondingly. The same were supported by *Choudhry and et al., 2012*) describing the complexity and dynamic nature of construction projects brings the need for subcontractor involvement to effectively execute projects.

On the other hand, the relative importance level of parameters like "to transfer risk", "to get cost reduction" and "to obtain technology transfer" were rated as Relative Importance Level of "**Medium**" with RII value of 0.581, 0.517 and 0.400 respectively. This was supported by *Studies Loh and Ofori 2000* that risks of prime contractors are reduced as errors in estimating added costs caused by delays or extra workforce requirements are assumed by the subcontractors.

ii. Sub-Contractor Selection Criteria

The second question that respondent's requested was the criteria that the corporation employ to select subcontractors from five perspectives identified as Professional Qualification, Technical qualification, Financial standing of the subcontractor, Tender Price (lowest price wins mentality) and Technical Knowhow. Accordingly, reactions of respondents were noted down on the table 4.3.2(ii)

Table 4.3.2(ii) Relative Importance Level of Sub-Contractor Selection Criteria							
Sub-Contractor Selection Criteria	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Tender Price (lowest price wins mentality)	53	4.321	1.034	5	0.864	1	H
Financial standing of the subcontractor	53	4.113	1.171	5	0.823	2	H
Technical qualification	53	3.377	1.376	5	0.675	3	H-M
Professional Qualification	53	2.981	1.500	5	0.596	4	M
Technical knowhow	53	2.453	1.309	5	0.491	5	M

From Table 4.3.2(ii) one can observe that “Tender Price-lowest price wins mentality” (RII=0.864) that is exercised by the corporation is noted to be the most important criteria followed by “Financial standing of the subcontractor” (RII=0.823) with **High relative importance level. This coincides with the** study conducted in University of Hong Kong “*Appraisal of Subcontractor Performance – Criteria and their Importance*” that the most important criteria for subcontractor selection are the pre-qualification of subcontractors and tender price. Moreover, research conducted by *Hartmann et al. (2009)* on selection criterion for subcontractors identified the same factors. However, the result deviated from studies by *Lavelle and et al., 2007 & Ajay and et al., 2010* that ‘**lowest price wins**’ mentality often sometimes leads to problems with quality and claims in terms of bringing extra cost similarly “Technical Qualification of the bidder” (R=0.675) ranked third with **High-Medium Relative Importance Level.**

The other two decisive factors known as “Professional Qualification” and “Technical knowhow” were ordered to be fourth & fifth with RII value of 0.596 & 0.491 respectively and rated as relative importance level of “**Medium**”.

iii. Issues in Sub-Contracting

In this regard, there were five issues in subcontracting have been identified formerly during review of related literature and respondents were invited to rate these issues using a five level Likert Scale with 1 Strongly Disagree, 2 Disagree, 3 No Opinion, 4 Agree and 5 Strongly Agree notations. Table 4.3.2(iii) presents the response on issues in sub contracting in the case of ECWC.

Table 4.3.2(iii) Relative Importance Level of Issues in Sub-contracting							
Issues in Subcontracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Payment by main contractor	53	4.057	1.216	5	0.811	1	H
Absence of formal contract document between main contractor and subcontractor	53	3.925	1.253	5	0.785	2	H-M
Construction insurance	53	3.849	1.167	5	0.770	3	H-M
Right of Ways Issues	53	3.698	1.409	5	0.740	4	H-M
Subcontractor bonding/retention	53	3.226	1.540	5	0.645	5	H-M

Accordingly, they identified “Payment by main contractor” the peak issue of subcontracting in the corporation with relative importance index of 0.811 and rated as **High Relative Importance Level**. The result highly agreed with the study by *Arditi D. and R. Chotibhongs, (2005)* that claimed for issues emerged in subcontracting like timeliness of payment by main contractor, subcontractor bonding/retention, construction insurance and etc.

Relative Importance Index of “Absence of formal contract document between main contractor and subcontractor”, “Construction insurance”, “Right of Ways Issues” and “Subcontractor bonding/retention” were noted to be 0.785, 0.770, 0.740 and 0.645 respectively and evaluated as **High-Medium Relative Importance Level**. In conformity with this, *Polat and et al., 2016* identified that other issue like right of ways issue affects general contractors’ performance on the project and makes general contractors liable for the failure. Construction insurance needs to be included in the contract document as a moderating strategy.

iv. Perceived Benefits of Sub-Contracting

There are three aspects of benefits of subcontracting have been identified from literature review and respondents were asked to rate each criteria from their know-how while working with Ethiopian Construction Works Corporation on five scale Likert Scale 1 Strongly Disagree, 2 Disagree, 3 No Opinion, 4 Agree and 5 Strongly Agree.

Table 4.3.2(iv) Relative Importance Level of Benefits of Sub-Contracting							
Benefits of Sub-Contracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Sharing of financial burden	53	4.019	1.065	5	0.804	1	H
To obtain specialists	53	4.019	1.135	5	0.804	1	H
Timely completion of projects	53	3.604	1.335	5	0.721	3	H-M

Consequently, their responses were analyzed for mean and relative importance index and results of which were ranked. Based on the analysis, “Sharing of financial burden” & “To obtain specialists” were ranked the top benefits that ECWC has acquired from subcontracting with relative importance index of 0.804 (each) corresponding to **High Relative Importance Level**. This is in adequacy with findings of many researchers (*Abbasianjahrom and et al., 2016*), (*Yik and et al.2006*) and (*J. Mbachu, 2008*) who acknowledge that main contractors prefer to complete project tasks with the help of other parties due to mitigating dispensable costs, escaping from uncertainty and financial burden.

Whereas the third criteria called “Timely completion of projects” was analyzed and graded to score relative importance index of 0.721 which corresponds to **“High-Medium”** Relative Importance Level.

4.3.3. Results from Qualitative Interview

The purpose of this qualitative interview was to triangulate results of data collected by questionnaire. Synopsis of Interview with ECWC Construction Managers was summarized as below and they did not simply emerged but pre-determined during identifying problem statements. The first issue raised was about the rationale behind subcontracting part of projects;

As it is known, construction projects are among the complex projects requiring multi-skilled professionals and different types of inputs. In order to accomplish these projects, the corporation performs most of the work packages by its own work force however the corporation transfers some work packages to specialists and specialized sub-contractors. For Example

- Design of some Engineering works in Design and Build contracts (Hydrological Design Verification)
- Looking for Specialist professionals and subcontractors as part of risk aversion strategy
- The need for other contractor because of time constraint in order to complete the whole deliverables (road, dam, irrigation canal, airfield and building)
- The need for laboratory tests (Soil and Geotechnical Investigation)
- As ECWC is developmental organization of the government, clients urge the corporation to finish projects that are important for the community (water supply and road rehabilitation projects)
- ECWC transfers part of the project to subcontractors to share financial burden and in doing so part of the projects task is completed without the need of advance payment. As a result, the corporation will get time to collect payment from clients and lessen financial burden.

The second and third interview was about sub-contractor selection criteria and the concerned body for preparation of those criteria. In this regard, managers responded that the following criteria for selection of subcontractor and consultant have been in and those were set by technical expertise (usually Civil, Hydraulics and Irrigation Engineers) from the relevant department

- Technical Qualification
- Competence
- Methodology
- Work plan
- Professional Qualifications
- Capability of subcontractor
- Number of staff (Personnel for the key positions)
- Experience of subcontractor (General, Specific, History of non-performing contracts, Pending litigation and Equipment for the implementation of the contract)
- Financial Standing of subcontractor (Historical Financial Performance, Average Annual Turnover, Financial Resources)
- The Consultant offering the lowest evaluated price

Moreover, for works and consultant, the bid and contract document were prepared by respective department. However, there have not been STD subcontract document even in Federal Procurement and Property Agency (FPPA). Therefore, the General Condition of contract (GCC) for main contractor is in use for subcontract works.

The fourth point touched in the course of the interview was about the issues commonly raised between ECWC and that of subcontractor and the following concerns were raised

- Delayed Payment issues to subcontractors (Advance Payment, Interim Payment and Direct Payments)
- Insurance
- Retention Monies
- Right of Ways Issues
- Absence of formal contract document between main contractor and subcontractor
- Safeguarding Adjacent Properties (this is mainly in the project site)
- Extension of Intended Completion Date and
- Health and Safety on Sites

The fifth question raised for interviewee was regarding the advantage and disadvantage of letting part and parcel of construction work for subcontractors. With respect to this issue interviewee

have responded that transferring part of the project work for subcontractors is more advantageous especially from perspective of

- ❖ Risk transfer by subcontracting for specialists
- ❖ Relief of Financial burden for some period of time
- ❖ Enabled to complete Projects on time and quality wise and etc

Finally, interviewees were asked about the outstanding problems in sub-contact management that are not solved yet and replied that financial problem takes the apex issue followed by absence of formal Standard Subcontract Document in the country in general and in ECWC in particular. The Standard Subcontract Document will solve all issues among contractor-subcontractor and contractor-consultant and even contractor-client relationships.

CHAPTER FIVE

SUMMARY, CONCLUSION & RECOMMENDATION

5.1. Summary

Subcontracting practices in construction industry with emphasis on Ethiopian Construction Works Corporation has been assessed by performing documentary review of selected projects subjected for subcontract, analysis of response of questionnaire using descriptive statistics method have been carried out & the outcomes were tabulated and interview have been carried out with selected construction managers & results of which were presented.

Evidence from review of project documents subjected for subcontract (1 road construction, 2 dam & irrigation, 1 building and 1 bridge construction project) point out that part of those construction projects transferred to subcontractors because of the need for specialists and the need to complete projects within the schedule.

Analysis of the responses of the questionnaire shows that to compensate lack of expertise, to look for specialized services and to mitigate delays are the peak reason for subletting part of the project. Another explanation behind transferring part and parcel of the projects is to perform some volume of work and to overtake the complexity and dynamic nature of construction project. Moreover, call to transfer risk, to get cost reduction and to obtain technology transfer were identified as the medium reasons for subletting projects.

Tender Price and financial standing of the subcontractor were identified as the critical criteria to select subcontractors whereas; Technical Qualification was the intermediate criteria set by the corporation in order opt for subcontractor. Professional Qualification and Technical knowhow were discovered as the least subcontractor selection criteria. Beside this, Methodology, Work plan, Capability of subcontractor and Number of staff (Personnel for the key positions) were identified from interview.

The other subtopic dealt with were the issues in subcontracting. Accordingly, Payment by main contractor is identified as the pinnacle issue while Absence of formal contract document between main contractor and subcontractor, Construction insurance, Right of Ways Issue and Subcontractor bonding/retention are identified as the common issues in subcontracting.

Safeguarding Adjacent Properties mainly in the project site, Extension of Intended Completion Date and Health and Safety on Sites were another issue identified from interview.

Finally, analysis of the data and interview shows that the corporation has benefited from subcontracting by sharing of financial burden and obtaining specialists, likewise timely completion of projects and Risk transfer are designated as an added benefit of subcontracting.

5.2. Conclusion

As several studies pointed out, the complex & dynamic nature of construction projects brings the need for subcontractors' involvement and Main Contractors' success on completing these projects is strongly associated with subcontractors' performance. With this regard, as ECWC's projects are more technically complex and demanding to be subcontracted out. The research has been achieved by performing review of different literatures and reason for subcontracting; subcontractors selection criteria, issues in subcontracting and benefits gained from subcontracting have been identified.

The study exhibits underlying facts for looking subcontractors by the corporation and found that the need to complete projects within schedule (in terms of urgency), with good quality (in terms of expertise), with in the pre defined scope (in terms of specialization of work), & as per the set cost (in terms of budget reduction) which are the iron triangle in project management concept. Providing specialty works to specialist subcontractors who are best competent to perform, especially where ECWC, as main contractor, does not have the required competence to execute the work will help to deal with uncertainties/risks/ resulting from delays.

According to result obtained from the research, the corporation transfers part and parcel of its construction project because of the following reasons (according their priority complex);

1st. the need to compensate lack of expertise

2nd. the need for specialized services

3rd. the need to mitigate delays

4th. the need to perform some volume of work by other subcontractors

5th. the need to overtake the complexity and dynamic nature of construction project

6th. the need to transfer risk

7th. the need to get cost reduction

8th.the need to obtain technology transfer

The study indicates that the corporation reduces risk arising from complexity of technology and facilitates the production/delivery of quality work through the use of specialist subcontractors with the necessary knowledge and skills in specialized trades. To do so, the corporation follows “Tender Price and financial standing of the subcontractor” as main criteria to select subcontractors which later brought the notion of “pay when paid” among clients, main contractor and subcontractors.

However, studies in other countries indicates that Technical Qualification, Professional Qualification & Technical knowhow need to be the most important criteria to select subcontractors followed by Capability, Methodology, Work plan, and Number of Staff for the key personnel in the project were prevalent criteria to go for subcontractors in construction industry.

Secondary data (documentary reviews of sample subcontracted projects) have been conducted to meet the objectives of the research. Accordingly, all projects subjected to subcontract were noted to be transferred to subcontractors primarily because of the need for specialist; however the criteria to select these specialist subcontractors rely mostly on tender price.

The study proves to say that Clients, ECWC, and subcontractors acknowledge that subcontractors face issues like Payment by main contractor, delayance of subsequent projects, insurance & bonding, amendment of the contract document because of re-schedule of the work plan, clear demarcation of work packages, right of ways issue, cost escalation, right of entry to work sight and stakeholders have been waiting for the project completion have been some the several issues noted during review of these documents (secondary data). Moreover, absence of formal contract document between main contractor and subcontractor, Safeguarding adjacent properties mainly in the project site and Health & Safety on sites were identified as additional issues in subcontracting.

The study also reveals that ECWC, as a main contractor, has benefited from subcontracting by sharing of financial burden and obtaining specialists, likewise timely completion of projects and Risk transfer are designated as an added benefit of subcontracting. Overall, subcontracting allows the construction industry to deliver projects within scheduled time, with predefined scope, satisfy clients by performing with better quality, reduce operating costs, technology transfer incorporating design skills, construction techniques, materials or equipment techniques and

capacities, business systems, production systems, and procurement systems and thereby enhance competitiveness.

5.3. Recommendations

Subsequent to findings of the research, below recommendations are proposed;

- There is no standard form contract between prime contractors and subcontractors, and the terms of the contract are primarily determined by the prime contractors, resulting in several issues among the four parties (Main Contractor, Subcontractor, Client and Consultant). However, a number of problems can be avoided by using a standard form of contract like standard subcontractor selection criteria, mechanisms to resolve different issues in subcontracting (payment by main contractor, design problem, schedule limitations and the like). Some contractors have their own lookalike forms of contract that appear to be standard form agreements, but they contain onerous and one sided provisions. For that reason, Standard Forms of Contract needs to be developed by concerned regulatory organ so as to help main contractors manage all subcontractors at equal footing.
- As subcontractors are hired to perform specialty works, main contractors' needs to focus on subcontractors' technical and professional skill to select subcontractors rather than price. This will help prime contractors satisfy project owners.
- Prime contractor-Subcontractor relationships have a high potential for skill/knowledge transfer but other countries experience suggests that this rarely happens without deliberate effort of the main contractor. In most instances the knowledge transfer process is however incidental, un-structured and implicit. Therefore, skill/knowledge and technology transfer needs to be embedded in contract agreements between Prime Contractor and Subcontractor.
- As there are no infrastructure platforms for technical and professional training of subcontractors for construction industry in the country, most of the time only international companies engage in subcontract work requiring special skill/knowledge. So, regulatory bodies/policy makers need to arrange the platform so as to help develop local subcontractors in every aspect.

- Subcontracting practices in the construction industry are not being regulated through any regulatory authority or statutory body. There are no established criteria for the selection of subcontractors, and the present registration system focuses only on prime contractors and this leads to selection of improper subcontractor. Therefore, regulatory also needs to engage in this area.
- As construction industry is associated with macro-level economy indicators, general industry-wide factors including lack of working capital and local skill capacity development program needs to be worked out at macro level.

Lastly, further study should be carried out on subcontracting practices in construction industry talking account project management code of conduct and ethics, stakeholder and the communication components of project management.

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Appendices

Appendix A:

ST MARRY UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF PROJECT MANAGEMENT

Short Description about the Questionnaire:

This questionnaire is intended to gather relevant information needed to conduct research entitled ‘**ASSESSMENT OF SUB-CONTRACTING PRACTICES IN CONSTRUCTION INDUSTRY: THE CASE OF ETHIOPIAN CONSTRUCTION WORKS CORPORATION**’.

Aim of the Questionnaire:

This questionnaire is developed to assess sub-contracting practices in Ethiopian Construction Works Corporation.

General Guidelines:

The following questions are designed to assess information on current sub-contracting practices of ECWC that are related with reason for sub-contracting, sub-contractor selection criteria and how is done in ECWC, issues in sub-contracting and the benefits obtained from sub-contracting.

Please read each question carefully and provide your response by putting a “√” mark. Please use **remark** section to write your additional opinion and back side of the paper if the space provided is not sufficient.

You are kindly requested to give the only relevant information for the research questions and there is no need of writing your name and address. The information that you provide will be kept confidential. Moreover, accuracy, honesty and fairness of your response will have a great impact the outcomes of the research.

Section I: Organizational/Personal Information

1. Name of the Organization _____

2. Sex:

Female

Male

3. Respondents Designation

Client

ECWC

Consultant

Subcontractor

4. Educational Background

Bachelor's Degree

Masters Degree

PhD

5. Relevant work experience:

1-5 Years

6-10 Years

11-15 Years

>15 Year

Section II: Questions

Please indicate your response by ticking the appropriate boxes with the following likert scale grading

1-Strongly disagree

2- Disagree

3- No Opinion

4-Agree and

5- Strongly Agree

S/N	Parameters	Likert Scale Rank				
		1	2	3	4	5
I.	Reason for Sub-contracting					
1.1.	To transfer risk					
1.2.	To get cost reduction					
1.3.	To look for specialized services					
1.4.	To compensate lack of expertise					
1.5.	To perform some volume of work					
1.6.	To mitigate delay					
1.7.	To obtain technology transfer					

S/N	Parameters	Likert Scale Rank				
		1	2	3	4	5
1.8.	To overtake the complexity and dynamic nature of construction project					
II. Sub-Contractor Selection Criteria						
2.1.	Professional Qualification					
2.2.	Technical qualification					
2.3.	Financial standing of the subcontractor					
2.4.	Tender Price (lowest price wins mentality)					
2.5.	Technical know how					
III. Issues in Sub-contracting						
3.1.	Payment by main contractor					
3.2.	Subcontractor bonding/retention					
3.3.	Construction insurance					
3.4.	Right of Ways Issues					
3.5.	Absence of formal contract document between main contractor and subcontractor					
IV. Benefits of Sub-Contracting						
4.1.	Timely completion of projects					
4.2.	Sharing of financial burden					
4.3.	To obtain specialists					

N.B:- Please don't hesitate to add any additional comments (if any).

Additional Comments (if any):-

Appendix B:

ST MARRY UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF PROJECT MANAGEMENT
INTERVIEW QUESTIONS
(for managers of ECWC)

Introduction:

Interviewer: My Name is Ermias Demtse, M.A. candidate in Project Management at St Marry University School of Graduate Studies and this is to get a piece of information about the sub-contracting practices of Ethiopian Construction Works Corporation.

Interviewee: Needs to answer the following Interview Questions.

Questions:

1. What is the main reason for the corporation to sublet part and parcel of main work for subcontractors?
2. As a construction manager, what are the main sub-contractor selection criteria? And who will set those criteria's?
3. Who will prepare the bid and contract documents for sub-contract works?
4. What are the main issues in sub-contract management?
5. Did the corporation advantageous or disadvantageous in letting others perform parts of the main work?
If advantageous, from what perspective?
If not, how?
6. Generally, what do you think is the problems in sub-contact management that are not solved yet?

Appendix C: Relative Importance Level

Sub-Contractor Selection Criteria	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Tender Price (lowest price wins mentality)	53	4.321	1.034	5	0.864	1	H
Financial standing of the subcontractor	53	4.113	1.171	5	0.823	2	H
Technical qualification	53	3.377	1.376	5	0.675	3	H-M
Professional Qualification	53	2.981	1.500	5	0.596	4	M
Technical know how	53	2.453	1.309	5	0.491	5	M
Reason for Sub-Contracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
To compensate lack of expertise	53	4.453	0.798	5	0.891	1	H
To look for specialized services	53	4.359	0.942	5	0.872	2	H
To mitigate delay	53	4.226	1.050	5	0.845	3	H
To perform some volume of work	53	3.925	1.222	5	0.785	4	H-M
To overtake the complexity and dynamic nature of construction project	53	3.566	1.352	5	0.713	5	H-M
To transfer risk	53	2.906	1.572	5	0.581	6	M
To get cost reduction	53	2.585	1.512	5	0.517	7	M
To obtain technology transfer	53	2.000	1.301	5	0.400	8	M
Issues in Subcontracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Payment by main contractor	53	4.057	1.216	5	0.811	1	H
Absence of formal contract document between main contractor and subcontractor	53	3.925	1.253	5	0.785	2	H-M
Construction insurance	53	3.849	1.167	5	0.770	3	H-M
Right of Ways Issues	53	3.698	1.409	5	0.740	4	H-M
Subcontractor bonding/retention	53	3.226	1.540	5	0.645	5	H-M

Benefits of Sub-Contracting	N	Mean	Std. Deviation	A	RII	Rank	Relative Importance Level
Sharing of financial burden	53	4.019	1.065	5	0.804	1	H
To obtain specialists	53	4.019	1.135	5	0.804	1	H
Timely completion of projects	53	3.604	1.335	5	0.721	3	H-M

Appendix D: ECWC Projects Subjected to Sub-Contracting

S/N	Name of Project	Location	Type of sub-contract	Sub-Contractor
1	Kong Begundi Wonbera Road Construction Project	Benishangul Gumuz	Hydrology Design Verification	Zewudie Eskinder Engineering
2	Dima Raad Bridge Road Construction Project	Gambella	Traffic Sign and Road Marking Work	
3	Jinka Mender Road Construction Project	SNNP - Jinka	Drainage and Earth Work	
4	Adama Awash Mille Lot3 Asphalt Overlay Project	Afar - Dubti	Road Marking Work	
5	Shire Airfield Construction Project	Tigray - Shire	Fence Construction	
6	Awash Bridge Construction Project	Afar - Awash Arba	Geotechnical Investigation Work	Core Consulting Engineers
7	Re-Placement of Equipment Maintenance & Production Center	Addis Ababa	Design Work	
8	Geotechnical Investigation of Four Bridges Over Tendaho River	Afar - Tendaho	Geotechnical Investigation Work	Ethiopian Construction Design & Supervision Works Corporation
9	Arjo Dedessa Dam & Irrigation Project	Oromia - Nonoo Qumba	Earth work,Rock fill and Riprap Work	Not Known yet
10	Megech Dam and Irrigation Project	Amhara - North Gonder	Earth work,Rock fill and Riprap Work	BEAEKA General Bussiness
11	Megech Dam and Irrigation Project	>>	Dam Instrumentation Supply & fix Work	Not Known yet
12	Kessem Dam and Irrigation Project	Afar - Kessem	Intake Tower and Related Structures	JIANGXI WATER & HYDRO CONSTRUCTION PROJECT
13	Kessem Dam and Irrigation Project	>>	Dam Instrumentation Supply & fix	Not Known yet
14	Kessem Dam and Irrigation Project	>>	Consultancy Service for Dam Safety	Not Known yet
15	Kuraz Sugar Development Project	SNNP - Hanna Kuraz	Rock Excavation work	Abbevilion Construction
16	Kuraz Weir Design and Build Project	>>	Deversion Weir	CHINA ZIANGXI CO.LTD
17	Consultancy Service for Kuraz Weir Design and Build Project	>>	Consultancy Service	SMEC INTERNATIONAL PVT.LTD.CO.
18	Upper Guder-Fato Dam and Irrigation Project	Oromia - West Shewa	Dam Instrumentation Supply & fix	Not Known yet
19	Public Service Bus Depot Construction Project	Addis Ababa	Design Review	Yohannes Abbay Construction
20	Design Review for Arjo Dedessa Dam & Irrigation Project	Oromia - Nonoo Qumba	Design Review	Ethiopian Construction Design & Supervision Works Corporation
21	Design Review for Kuraz Dam & Irrigation Project	SNNP - Hanna Kuraz	Design Review	Tigray Water Works Enterprise
22	Design Review for Wolkaiyt Sugar Development Irrigation Project	Amhara - Gonder	Design Review	Not Known yet
23	Prime Minister Office Building Project	Addis Ababa	Interior Design and Electrical Work	
24	Attonery General Office Building Renovation Project	Addis Ababa	Interior Design Work	Yordanos Interior Design
25	Attonery General Office Building Renovation Project	Addis Ababa	Carpentry and Joinery Work	
26	National Bank Building Project	Addis Ababa	Aluminium and Interior Design Work	
27	Meles Zenawi Leadership Academy Building Project	Addis Ababa	Electrical Work	
28	Eslamic Affairs Office Building Project	Addis Ababa	Electrical Work	
29	Addis Ababa City Adminstration Laboratory Center Construction Project	Addis Ababa	Soil Excavation and Earthwork	Not Known yet
30	Kilinto Cattle Market Construction Project	Addis Ababa	Soil Excavation and Earthwork	Not Known yet