

Effect of Contractor – Subcontractor Relationship on the Performance of Construction Project: A Case Study of Dire Dawa Construction Projects

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To cite this article:

Elias Defalgn Debelo, Zerihun Berhane Weldegebriel. Effect of Contractor – Subcontractor Relationship on the Performance of Construction Project: A Case Study of Dire Dawa Construction Projects. *American Journal of Civil Engineering*. Vol. 10, No. 2, 2022, pp. 31-42.

doi: 10.11648/j.ajce.20221002.11

Received: February 21, 2022; **Accepted:** April 1, 2022; **Published:** April 9, 2022

Abstract: Because of the common practice of subletting construction work into smaller packages, subcontracting has become an attractive technique in the construction business. Effective subcontractor selection and monitoring reduce the problem while also determining the performance of construction firms. The engagement of a subcontractor in a building construction project results in relationships with the main contractor, which will influence the project's success. The purpose of this study was to look at how main contractors choose subcontractors and to analyze the effect of the main contractor–subcontractor relationship on project performance. This research used a descriptive survey method to look at the underlying characteristics that influence the relationship between the main contractor and subcontractors and their effect on the performance of construction projects. The findings of the study confirmed that most contractor depends on subcontractors for the execution of their work and therefore procurement and management of subcontractors highly affects the performance of the construction project. It was also discovered that the subcontractor often performs 20 percent to 50 percent of the work. Main contractors used subcontractors primarily to offer skilled labor, lower overhead expenses, and relieve work and financial burden on themselves. The major causes of issues between the main contractor and the subcontractor include the main contractor's delay in releasing payments, the subcontractor's shortage of trained personnel, and scheduling conflicts among the subcontractors on a given project. To eliminate antagonistic relationships, the study advises a trust-based cooperative partnership that incorporates subcontractors into a partnering strategy. Furthermore, for optimal construction project performance, simpler and complete subcontract documents would improve the interaction between the main contractor and the subcontractor.

Keywords: Construction Projects, Main Contractors, Sub-contractors, Relationship, Dire Dawa

1. Introduction

1.1. Background of the Study

As it transforms varied resources into constructed physical economic and social infrastructure necessary for socio-economic development, the construction industry is a key economic sector that pervades most other industries. It refers to the process of planning, designing, procuring, constructing, producing, altering, repairing, maintaining, and

deconstructing physical infrastructure. The construction industry makes significant contributions to the Ethiopian economy, as seen by its 19.5 percent contribution to GDP. Pre-COVID-19, the country's real GDP growth was 9.0 percent in 2019 and was expected to be 6.2 percent in 2020. This prediction has been lowered to 3.2 percent in the 2020 brackets [2].

The construction industry in Ethiopia is a large investment sector; over the last few years, it has received an average of 58-60% of the capital budget, equating to 80 to

100 billion Ethiopian birrs each year. Construction will play a key role in achieving the country's economic prosperity goals [2].

The construction industry has many players who relate through contractual and operational arrangements to achieve the objective of the project. The client/employer and the contractor are the major parties in a construction contract. A construction project is granted to a general contractor, prime contractor, principal contractor, or main contractor, who subcontracts certain project activities to a specialized outside firm to boost productivity and transfer risks such as financial risks, completion risks, and quality risks [10].

For public construction projects, the Ethiopian government requires contractors to outsource at least 15% of total work to Small and Micro Enterprises (SMEs), and 10% for private construction projects [20]. However, for road projects, subcontracting is permitted up to 30% of the entire contract price (GCC Clause, 22). This is designed to increase employment prospects if minor works or tasks are completed by SMEs, according to the Public Procurement Agency's (PPA) article 27/2009 revision.

This study examines the contractual relationship between main contractors and subcontractors, as well as their effect on project performance, notably in building projects.

1.2. Statement of the Problem

From project to project, the contractual relationship between major contractors and subcontractors varies. In the execution of construction works, main contractors, sometimes known as subcontractors, played a prominent part in most projects in the construction business. Their obligations and responsibilities, on the other hand, are frequently misunderstood as a result of inadequate contractual relationships [23]. The construction industry's inadequate contractual relationship, which is plagued by disputes and misunderstandings, has harmed the industry's development [4].

With the booming of the construction industry which requires high involvement of subcontracting works, supporting research has to be conducted on the practice of subcontracting to assess its performance and make sure that it is being practiced effectively. The existence of a gap between main contractors and subcontractors advises that research be conducted to determine strategies to improve the connection between the main contractor and subcontractors to improve project performance. The performance of subcontractors, whether good or bad, has a direct impact on the industry's overall performance [17]. A construction project's success is not guaranteed by choosing the right subcontractor. During the construction stage, subcontracted work must be coordinated and monitored [15].

Furthermore, there is a limited study done in Ethiopia as well as in Dire Dawa about the relationship between main contractors and subcontractors considering its relatively new partnership. Therefore, the results of this study will enable main contractors and subcontractors to improve their efficiency in project performance in the construction industry.

1.3. Objectives of the Study

The main objective of this research is to assess the effect of the contractual relationship between main contractors and subcontractors in the construction industry on the performance of the projects. To achieve this aim, the research set the following specific objectives:

- a) To find out the major selection criteria used for the selection of subcontractors by main contractors in Dire Dawa construction projects.
- b) To investigate the main contractor-subcontractor contractual relationship concerning legal contracts in Dire Dawa construction projects.
- c) To study the effect of the contractor-subcontractor relationship on the overall performances in Dire Dawa construction projects.
- d) To recommend possible strategies that can improve the relationship between the main contractor and subcontractor for better performance of the Dire Dawa construction projects.

1.4. Research Questions

The study is structured around the following research questions:

- a) What are the common subcontractor selection criteria used by main contractors in Dire Dawa construction projects?
- b) What are the relationship challenges between main contractors and subcontractors concerning signed contract agreements in Dire Dawa construction projects?
- c) What are the effects of the contractor-subcontractor relationship on the overall performances in Dire Dawa construction projects?
- d) What strategies can be followed to improve the relationship between the main contractor and subcontractor for better performance of the Dire Dawa construction projects?

1.5. Significance of the Study

The performance of construction projects in Dire Dawa has continued to face the challenges of late completion; poor quality resulting in the collapse of buildings, stalling of projects partly due to inadequate capacity to complete by the contractor.

Subcontractors will also realize the need for mutually beneficial relationships with enhanced coordination and cooperation for better performance of projects. Employers and Consultants in the construction industry will greatly appreciate how subcontracting can improve the performance of a project and therefore seek to embrace the practice. Generally, the conclusions of the study will imply the construction business which shall affect the operations of other stakeholders in the industry.

1.6. Scopes and Limitations of the Study

This study is limited to the effects that the relationship

between contractors and subcontractors has on the achievement of set project parameters. Contractual and operational relationships are studied. While acknowledging that many factors affect project performance besides the relationship of the two parties, the study could not cover those other factors due to time and resource constraints.

In the construction industry, usually, projects of big magnitude can and do have scope for subcontracting. This research project is limited to a study of construction projects with a contractual sum of Birr Ten Million and above. This is because bigger projects which are undertaken by larger contractors provide a better more formed subcontracting approach that more readily renders itself to a study of this nature. The study focused on construction firms with physical addresses of Dire Dawa for ease of data collection.

1.7. Research Ethical Considerations

To conduct this study, the researcher took into account all ethical factors. By not seeking information that would expose the participant's identity, the study assumes that the participant's anonymity and confidentiality are kept. The data you give will only be used for academic reasons. The data are confidential and will not be transferred to third parties, according to the invitation letter, and anonymity is guaranteed. All sources of data were properly credited.

2. Literature Review

2.1. Subcontracting

2.1.1. Definition of Subcontracting

Subcontractors are any natural person, private or government entity, or a combination of the above, including its legal successors or permitted assigns who has a contract with the Contractor to carry out a part of the Work in the Contract, which includes work on the Site [20].

2.1.2. The Legal Bases for Subcontracting

Article 2610 of the Civil Code of Ethiopia defines a construction contract as "a contract of work and labor is a contract whereby one a party, the contractor, undertakes to produce a given result, under his responsibility, in consideration of a remuneration that the other party, the client, undertakes to pay him." [8].

According to the Ethiopian civil code of art. 3202 (1), where there is a contract between A and B, A may not simply decide to be replaced by C is one of the basic principles of a contract. If A wishes to transfer part of the total work to C, it must do so with the prior authorization of the contracting authorities or the party.

Subcontracting has been given recognition in the construction industry in Ethiopia under the Civil Code of Ethiopia of 1960. Art. 3201(2) provides thus:

A subcontract is a contract whereby the party having contracted with the administrative authorities substitutes a third party for himself for the performance by the latter of a

part only or of an item of the contract. (p. 534)

FIDIC 1999, Condition of Contract for Construction put express limits on the extent to which the main contractor may satisfy contractual obligations through the medium of subcontractors. For example, in the FIDIC contract, Clause 4.4 provides that 'the Contractor shall not subcontract the whole of the works [9]. The Federal Democratic Republic of Ethiopia Standard Bidding Document (SBD) For Procurement of Works for National Competitive Biddings (NCB) issued by the Public Procurement Agency (PPA) in August 2011 states that the Contractor may subcontract with the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations (G.C.C 14) [20]. The Contractor shall remain liable under the contract for all work sublet as if he had himself carried out such work according to the civil code of Ethiopia Article 3206 (2) which says "The original party shall stay liable for the works done and supplies made by the subcontractor as though they had been done or made by him."

2.1.3. Classification of Subcontractors

The following are categories of subcontractors in the construction industry namely; domestic subcontractors, nominated subcontractors, and approved subcontractors:

- i. Domestic Subcontractors - are selected and employed directly by the main contractor to perform a portion of the main contractor's work under the main contract [22]. The appointment of the subcontractor is treated as being something entirely for the benefit of the main contractor, a purely 'domestic matter' [1].
- ii. Nominated Subcontractors - are selected and employed by the client or the client's representative to enter into a contract with the main contractor to perform specialist work in the project [25].
- iii. Approved Subcontractor - subcontractors are appointed through a concerted effort of the Client and the main contractor. This type of subcontractor is often used in public sector projects and for projects based on the Form of Contract where there is no provision for nomination [5].

Subcontractors can also be classified based on their specialty and assignments to perform specific tasks on construction projects.

2.1.4. Advantages of Subcontracting

According to, Rosli et al., some of the advantages obtained when using subcontracting are: Flexibility Improves, Risk Management, Productivity Increases, Improves Product Quality, Easiness in Costs Control, and Reduction of Delays [21].

2.2. Construction Project Performance

Performance is all about meeting the needs and expectations of a project. Performance, according to Ankrah and Proverbs, is defined as increasing profitability, improving service delivery, or achieving the best results in key areas of organizational activity [3].

The success of a project depends on several factors such as project complexity, contractual arrangement, the relationship between project participants, the competency and ability of the consultants [7].

Time, cost, and quality achieved at a project completion are the widely used measures of a project's success. According to Mundie, the building construction project performance can be measured by using several key performance indicators, which are: Construction time, Speed of construction, Time variation, Unit cost, Value and profit, Health and safety, Environmental performance, Quality, Functionality, and Stakeholders' satisfaction [17].

This set of KPIs, which includes both objective and subjective measures, was created to assess the performance of a construction project.

2.3. Procurement of Subcontractors

2.3.1. Subcontractor's Selection Criteria

To ensure a successful construction project, it is critical to choose the right subcontractor. Quality of production, efficiency, the hiring of qualified members, the firm's reputation, access to the company, timely completion of work, and other aspects may be considered in the selection process. These subcontractor multi-criteria selection systems divide the factors into four categories: cost, quality, time, and adequacy [11].

According to Tayeh, the factors for the selection of subcontractor's criteria are Past Experience, Financial Strength, Organization, Structure, Participation in Tendering stages, Design Support, Communication, Environmental Protection, Safety Quality, Resources, Contractual Relation, General Obligation, Progress [24].

Price is usually a key factor of selection in the traditional system and especially in most public projects. However, in the traditional price-oriented selection approach, money is prioritized over quality, timeliness, and other critical variables in the selection of subcontractors [17].

2.3.2. Subcontractor Selection Method

The main methods used for subcontractor selection include selective tendering, open tendering, and direct negotiation.

i. Open Competitive tendering

In the open competitive method, an advertisement is placed in the local, national and technical press by the client's professional advisers inviting interested subcontractors to submit tenders for the subcontract work [25].

ii. Open Selective tendering /Restricted tendering

This is a method of selection where several subcontractors are selected or invited to tender.

iii. Single-Sourcing/Direct Negotiation

The client or main contractor approaches the subcontractor, one or two of his choice with a view to this being the only firm that will submit a tender [25].

Generally, there is no subcontractor selection method without pitfalls. The selecting parties should aim at optimizing the selection process to obtain the most effective and efficient subcontractor at the lowest procurement costs and within a reasonable duration of time.

2.4. Strategies to Improve Contractors' Subcontractors' Relationship

Due to the prevalent practice of subletting building works into smaller packages in the construction business, subcontracting has become a fascinating subject for all construction practitioners. The performance of construction enterprises will be determined by effective subcontractor selection and monitoring that can minimize the problem [2].

Because some participants may have previously worked together on other projects, relationships are one of the most important project aspects. Mutual trust and understanding between project parties build a cooperative culture within a project [11].

The basis for the relationship between the contractor and the subcontractor is established by a contract. The contract should be fair to both parties and non-adversarial to encourage cooperation. Mutual trust is essential for a successful construction collaboration, and it must be cultivated to build a healthy project culture. Working together in harmony without unreasonably delaying or harming others is a difficult endeavor that necessitates a high level of coordination, cooperation, communication, and, on occasion, compromise [17].

A strategy and process known as a partnership is one way to reach the goal of cooperation. Partnering is a relationship-building method built on trust, honesty, and mutual respect. Subcontractor-contractor collaboration has an impact on construction performance, according to Mirawati and his colleague. It seeks to bridge a knowledge gap by addressing whether poor performance among contractors and suppliers may be greatly decreased through the use of partnering approaches. Mutual trust, communication, long-term perspectives, problem-solving, mutual objective, and equity are all characteristics of partnering. Contractors and subcontractors both benefit from the development of similar aims and objectives. Partnering is a relationship built on trust [16].

2.5. Conceptual Framework

The following conceptual framework was developed from the literature discussed in the previous sections. The conceptual framework includes the independent variable Improved subcontractor performance, moderating variable timely accomplishment with required quality and reduced cost, and the dependent variable Improved project performance.

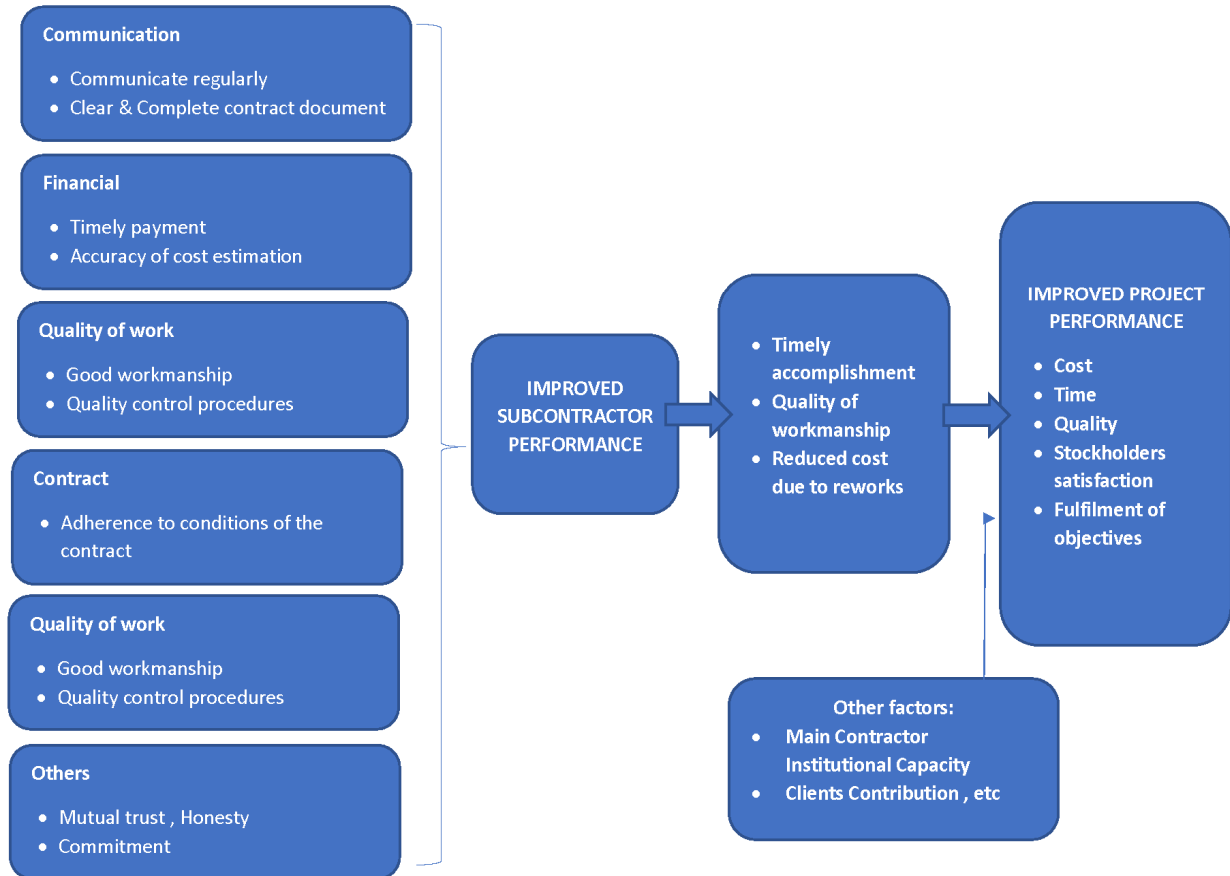


Figure 1. Conceptual Framework.

3. Research Methodology

3.1. Research Design

A research design is a plan, structure, and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is the complete scheme or program of the research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of data [14].

Both qualitative and quantitative approaches research framework will be used to achieve the objectives of this study, and a survey method is selected as the research strategy. According to Creswell, 'A survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or makes claims about the population ...' [6].

3.2. The Size of Population

The population of construction firms was within the geographical boundaries of the city of Dire Dawa, and as per the total population of firms registered by the Ministry of Construction at the Federal and regional levels under various registration categories. According to sources from the Dire Dawa Contractor's Association, 70 building contractors had

offices registered in Dire Dawa.

The second population includes subcontractors that are involved in various types of work fields. Accordingly, 15 specialist subcontractors are selected.

3.3. The Sample Size

To determine the sample size for each population of contractors and subcontractors, the Kish equation was used [12].

$$n = \frac{n'}{1 + \frac{n'}{N}} \quad (1)$$

Where: -

n , = is the sample size from an infinite population, which can be calculated from this formula.

$[n' = \frac{S^2}{V^2}]$ the definitions of all variables can be defined as the following:

n = sample size from a finite population.

N = Total population (70 main contractors and 15 subcontractors).

V = Standard error of sample population equal 0.05 for the confidence level 95% was used for this study.

S^2 = Standard error variance of population elements.

$S^2 = P(1 - P)$; maximum at $P = 0.5$.

The sample size for the contractors' and subcontractors' population can be calculated from the previous equations as follows:

$$n_s = \frac{S^2}{V^2} = (0.5)^2 / (0.05)^2 = 100$$

For main contractors = $100 / [1 + (100/70)] = 41$

For sub-contractors = $100 / [1 + (100/15)] = 13$

Table 1. Summary of Research Population and Sample Size.

Task	Population		Sampling Techniques	Total Sample
	Description	Size		
Interview	Experts	Unknown	Purposive	5
Questionnaires	Contractor	70	Random	41
	Subcontractor	15	Purposive	13

3.4. Research Data Source and Collection Instruments

3.4.1. Data Sources

i. Secondary Data

The secondary data is in the form of literary sources covering relevant topics of the subject matter.

ii. Primary Data

The primary data is collected by a researcher from first-hand sources, using methods like desk study, interviews, surveys, or experiments.

3.4.2. Data Collection Instruments

i. Literature Review

Several studies were reviewed from the literature reading and taking notes from sources like academic research journals, conferences, dissertations/theses, books, and websites.

ii. Structured Survey

To obtain reliable and representative quantitative data, the Closed-ended questionnaires distribute to the contractors. The Likert scale of five ordinal measures was used to measure responses to questionnaire items.

iii. Semi-Structured Interviews

In addition to a quantitative questionnaire survey, the face-to-face qualitative expert interview was considered a better approach to make possible a direct, more in-depth interaction with the respondent's in-depth discussions [13].

3.5. Research Validity and Reliability

To test the appropriateness, validity, and reliability of the questionnaire, a pilot study for the questionnaire was conducted.

Kothari states, validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure [13].

Reliability is another important test of sound measurement. A measuring instrument is reliable if it provides consistent results. The values of Cronbach's Alpha for each field of the questionnaire and the entire questionnaire of this study were in the range of 0.7897 and 0.9044.

The pilot study was conducted in two stages, to confirm the validity and reliability of the questionnaire. The questionnaire was consulted by experts, to check the external validity (content validity) of the questionnaire, and

the distributed questionnaire was analyzed for internal validity by Pearson Correlation Coefficient and the correlation coefficient for each domain paragraph was significant at $\alpha \leq 0.05$.

3.6. Plan of Data Analysis

In this study, data was continuously analyzed using descriptive statistics; measures of central tendency using mean and frequency tables.

Analysis of the data collected through questionnaires was analyzed using quantitative analytical techniques with the help of STATA software version 15 and computer programs including a Microsoft Excel spreadsheet.

In analyzing the questionnaire percentage method and average score method are used. Multiple questions Likert scale was analyzed through relative importance index.

The relative importance index is computed as

$$RII = \frac{\sum W}{A * N} \quad (2)$$

Where:

W is the weight assigned to each factor by the respondents (ranging from 0 to 5).

A is the highest weight (i.e. 5 in this case).

N is the total number of respondents (35 in this case).

The value of the relative importance index had ranged from 0 to 1, where 1 is extremely important and 0 is unimportant.

Spearman rank correlation coefficient (ρ Rho) is a non-parametric test for measuring the difference in ranking between target groups (main contractors and subcontractors). For the calculation of (rho), the following simple formula is applied:

$$rs = 1 - \left[\frac{6 \sum d^2}{n^3 - n} \right] \quad (3)$$

Where, d = the difference in ranking between each pair of factors.

n = number of factors.

The Spearman's rank correlation for all rank calculations is checked and found that a strong correlation between the two groups with a P-value of less than the level of significance, $\alpha = 0.05$, which proves that the rank correlation is statistically significant.

4. Result and Discussions

4.1. Response Rate

A total of 54 questionnaires were distributed to contractors and subcontractors. From the total of 54 questionnaires distributed, 47 (87.04 %) were returned out of which 3 (5.56 %) were invalid and incomplete and 44 (81.48%) were analyzed.

Table 2. Response Rate.

Population (N)	Sample (n)	No. of distributed sample	No. of responses collected	No. of valid response	Response rate
85	54	54	47	44	87.04%

4.2. Respondents' Background Information

4.2.1. Respondents' Category of the Contractor

The respondents were grouped into seven major categories from BC/GC 1 to BC/GC 7.

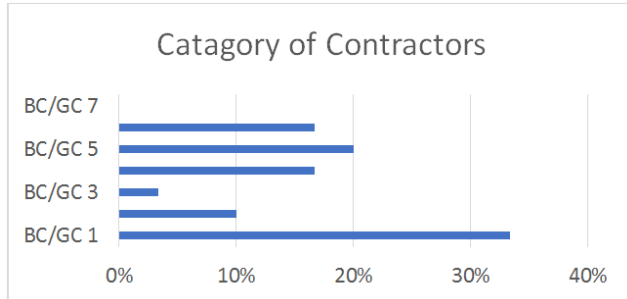


Figure 2. Frequency of Responses on Category of Contractor.

4.2.2. Respondents' Position in the Organization

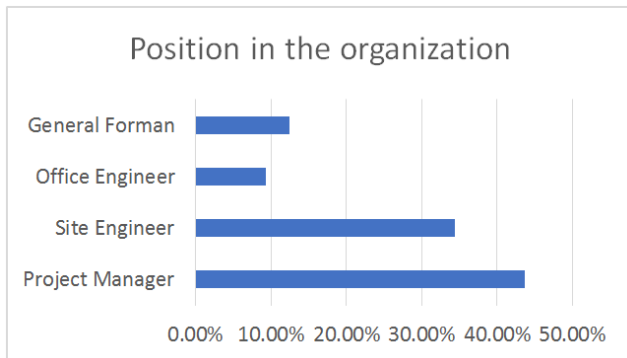


Figure 3. Frequency of Responses on Position in the organization.

4.2.3. Respondents' Years of Experience

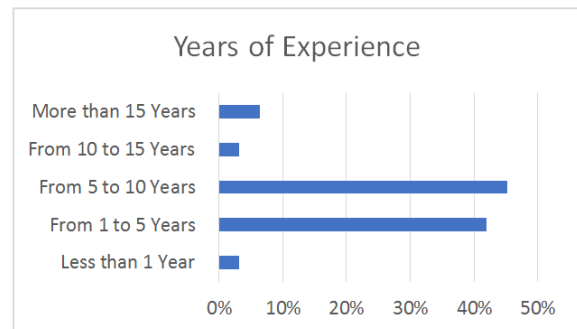


Figure 4. Frequency of Responses on Years of experience.

4.2.4. Respondents' Firm Average Percentage of Work Usually Subcontracted

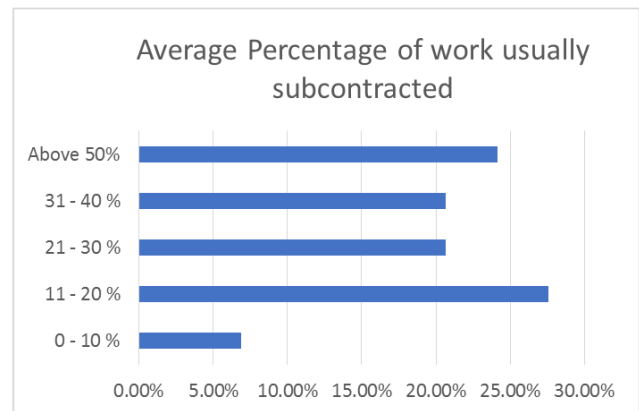


Figure 5. The frequency of Average work is usually subcontracted.

Table 3. Finding on Preference on Selection Criteria for subcontractors.

No	Selection Criteria for Subcontractors	Contractor		SubContractor		All	
		RII	Rank	RII	Rank	RII	Rank
1	Past relationship with the main contractor	0.863	4	0.833	6	0.855	4
2	Specific activity according to the nature of the project	0.819	7	0.850	4	0.827	6
3	Reputation of the subcontractor	0.844	5	0.800	8	0.832	5
4	Bid price	0.800	10	0.783	9	0.795	10
5	Financial capability	0.806	8	0.683	11	0.773	9
6	Technical capability	0.894	1	0.933	1	0.905	1
7	Safety consciousness	0.750	11	0.783	9	0.759	7
8	Quality Consciousness	0.875	2	0.850	4	0.868	2
9	Time consciousness	0.869	3	0.867	3	0.868	3
10	Equipment consciousness	0.806	8	0.833	6	0.814	8
11	Compliance with statutory/legal requirements	0.844	5	0.917	2	0.818	11

4.3. Finding and Discussion

4.3.1. Selection of Subcontractors

Regarding the selection of subcontractors, it is worth noting that the selection process is key due to the nature of the main contractor-subcontractor relationship being project-based. A total of eleven selection factors were

identified from various literature sources and presented to the respondents. Table 3 below provides the results of a questionnaire survey that illustrates respondents' opinions on issues linked to subcontractor selection ranked by relative importance index from highest to lowest for each selection criteria.

The results show that the following three characteristics are significant to main contractors when selecting subcontractors.

The most significant selection factors are the subcontractor's technical skill, followed by the subcontractor's quality and time consciousness, in that order.

The subcontractor's previous relationship is also a good predictor of its performance and technical ability, making it a better choice. Main contractors, according to the respondent, typically require subcontractors who deliver work on time and to the required quality. Almost everyone in the interview agrees on this criterion.

The interviewee's responses also reveal that it is quite common that the subcontractor which offers the least price is the main contractor's first option.

4.3.2. Contractor Subcontractors Relationships

Regarding factors affecting Contractor Subcontractors Relationships, a total of thirteen critical factors were identified from various literature sources and presented to the respondents.

Table 4. Finding on Preference on factors affecting contractor & subcontractors' relationship.

No	Relationship challenges between main contractors and subcontractors	Contractor		Subcontractor		All	
		RII	Rank	RII	Rank	RII	Rank
1	Lack of communication	0.750	7	0.800	6	0.764	7
2	Multi-layer subcontracting	0.725	9	0.800	6	0.745	9
3	Lack of Collaboration/team work/	0.744	8	0.800	6	0.759	8
4	Lack of Trust	0.706	11	0.817	5	0.736	11
5	Delay by the main contractor in providing the necessary drawings & material	0.769	4	0.850	4	0.791	4
6	Failure to provide proper security for the site and plant	0.656	13	0.667	13	0.659	13
7	Scheduling conflicts among the subcontractors	0.775	3	0.933	1	0.818	3
8	Shortage of skilled labour with the sub-contractor	0.806	2	0.867	2	0.823	2
9	Instructions are given by the client to the subcontractor directly without notifying the main contractor	0.688	12	0.733	10	0.700	12
10	Delay in releasing payments	0.869	1	0.867	2	0.868	1
11	Ambiguities in contract documents	0.756	6	0.750	9	0.755	6
12	Unclear payment terms	0.763	5	0.700	12	0.745	5
13	Non-adherence to the conditions of the contract	0.725	9	0.717	11	0.723	10

The above results reveal that the top three factors affecting the relationship between main contractors and subcontractors concerning signed contract agreements in Dire Dawa construction projects are delay in releasing of payments by the main contractor, shortage of skilled labor with the subcontractor, and Scheduling conflicts among the subcontractors in a given project respectively.

According to the interviewee, there is always disagreement that leads to disputes and conflict between main contractors and subcontractors. The primary reasons for the problem as per the respondents are late payments to the subcontractors. The delay may arise from the contractor's financial problem or the unclear mode of payment and misunderstanding of the method of measurement. Another problem is the unwillingness of the main contractor to pay the requested payment by the subcontractor in due time. Main contractors are reluctant to pay their subcontractors for finished work until he receives the payment for the work from the employer.

According to the respondents, this delay and lack of payment cause financial hardship for the subcontractor, which can affect the profitability and subcontractor performance of the project, lead to project abandonment, affect trust between the subcontractor and the main contractor, and create negative impacts on the main contractor and subcontractor contractual relationships in general, causing both parties to become distrustful in all business dealings.

When it came to signed contracts between main contractors and subcontractors, respondents said that subcontractors began working after the written contract was signed. However,

the contract agreements between these two parties are usually customized and lack the necessary information for the project's efficient execution. Due to a misunderstanding of the quantity of work completed and the technique of measurement, this leads to a conflict in the middle or after the task is completed, as well as a breach of contract. The dispute that arises between the main contractor and subcontractor has usually settled amicably.

Despite the numerous issues that arise between main contractors and subcontractors, subcontracting is an important tool for main contractors to attain their performance objectives. Subcontractors assist main contractors in overcoming issues such as the requirement for specialized knowledge, a lack of resources, and financial constraints. The interviewees also indicate that the reason for subcontracting is to share the risks, to deploy specialized skilled manpower, to get expertise advantages and time and cost advantages.

4.3.3. Effects of Contractor Subcontractor's Relationships on Performance of the Project

Regarding factors affecting Contractor Subcontractors Relationships, a total of eleven critical factors were identified from various literature sources and presented to the respondents.

The figure above shows that performance on site is a factor affecting the main contractor subcontractor relationship and ranked first on the performance of construction projects while communication and commitment to works come next respectively.

Table 5. Finding on Effect of contractor -subcontractor relationships on the overall performance of the project.

No	Effect on the overall performance of the project that arises from contractor-subcontractor relationships.	Contractor		SubContractor		All	
		RII	Rank	RII	Rank	RII	Rank
	Positive effect						
1	Productivity increases	0.919	1	0.883	2	0.909	1
2	Improvement of flexibility	0.875	3	0.850	3	0.868	3
3	Improves the product's quality	0.894	2	0.900	1	0.895	2
4	Easiness in costs control	0.844	5	0.833	5	0.841	5
5	Reduction of delays	0.863	4	0.850	3	0.859	4
6	Elimination of sub-used labour and equipment maintenance	0.800	6	0.767	6	0.791	6
	Negative effect						
1	Time overrun in terms of delay	0.844	1	0.833	1	0.841	1
2	Cost over run	0.831	2	0.800	3	0.823	2
3	Poor project quality	0.806	3	0.817	2	0.809	3
4	Disputes/conflict between different project parties	0.794	4	0.717	5	0.773	4
5	Suspension of the work or contract termination	0.775	5	0.750	4	0.768	5

The above results reveal that the top three positive effects on the overall performance of the project that arise from contractor subcontractor relationships are Productivity increases, Improves the product's quality, and Improvement of flexibility respectively.

Subcontracting has several benefits for the project's overall

performance, but it also has drawbacks. The first negative effect of subcontracting, according to this study, is time overrun in terms of delay. Cost overrun and Poor project quality was also negative arising from poor contractual relationships between the parties.

Table 6. Finding Strategies that can improve the relationship between the main contractor and subcontractor.

No	Strategies that can improve the relationship between the main contractor and subcontractor.	Contractor		Subcontractor		All	
		RII	Rank	RII	Rank	RII	Rank
1	Effective communication, the flow of information, and regular meetings.	0.925	1	0.883	7	0.957	1
2	Selection of experienced subcontractors.	0.844	8	0.883	7	0.895	8
3	Legal contracts, regulations, and dispute resolution clauses before work are started.	0.856	6	0.950	1	0.924	4
4	Timely provision of the necessary requirements, payments and drawings	0.888	3	0.950	1	0.948	2
5	Avoid interference of the client between the main contractor & subcontractor.	0.819	11	0.800	11	0.852	11
6	The main contractor should take all the risks of the project and the subcontractor workers	0.688	13	0.717	13	0.729	13
7	Subcontracts should contain a detailed scope of work.	0.869	4	0.850	9	0.905	7
8	The terms of the contract have to be specified clearly.	0.894	2	0.933	4	0.948	2
9	The contract should contain well-drafted payment clauses and terms.	0.838	9	0.900	6	0.895	8
10	Payments should make according to the fixed payment schedule in the agreement.	0.831	10	0.833	10	0.871	10
11	Make late payment fees as a part of payment terms	0.694	12	0.767	12	0.748	12
12	Developing trust between parties	0.850	7	0.950	1	0.919	6
13	Proper documentation of invoices and other supporting documents	0.863	5	0.933	4	0.924	4

4.3.4. Strategies That Can Improve the Relationship Between the Main Contractor and Subcontractor

The above results reveal that the top three factors related to Strategies that can improve the relationship between the main contractor and subcontractor are Effective communication, Timely provision of the requirements, payments and drawings and Terms of contract has to be specified respectively.

According to the respondent's responses during the interview, to improve main contractors' and subcontractors' work relationship concerning a legal contract and productivity improvements, the respondents say that the Contract document should be detailed and specific enough and the contract should also state separately the responsibility and duty of both parties. A clear contract document resolves the dispute. The contract between them should be in written format and the Contract document should include minimum requirements concerning quality of work.

Providing incentives and training to workers, paying

progress payments on time, and Selecting skilled workmanship will improve productivity between them. Approved by the employer or consultant of the selected subcontractor also Improves the contractual relationship between the main contractor and Sub Contractors.

4.4. Interpretation and Discussion

The following three characteristics are vital to the main contractors when selecting subcontractors. In this study, the first most important quality that adds to a subcontractor's attractiveness is technical capability. During the project, subcontractors with technical knowledge anticipate and solve various challenges, which include the identification and use of acceptable working procedures for successfully handling machinery and technical equipment. This result is identical to that of prior studies in Bahirdar, City [25]. Quality Consciousness was the second main criterion in selecting subcontractors. The main contractor's primary purpose is to

produce high-quality work, which can be accomplished by adhering to quality standards and technical specifications. The results fall in line with Tayeh [24]. Another main criterion is time consciousness. This may be because main contractors know the subcontractor's performance in terms of quality, on-time delivery of work, and reasonable pricing. In addition to the three main factors, a past relationship with the main contractor is also a basic factor in the selection of the subcontractor. In contrast, the expert's opinion on the most common selection criteria of subcontractors is the lowest bid price, a long-term relationship with the main contractor, and recommendations from other contractors.

Regarding factors affecting Contractor Subcontractor Relationships, delay in contract progress payment was ranked first. When payments are delayed, the subcontractor will face a financial shortage in accomplishing his responsibility to perform the work as per the required standard. These findings are consistent with those of Okunlola and Mudzvokorwa, who evaluated this element as very essential in producing conflict between main contractors and subcontractors [18, 19]. The shortage of skilled labor with the sub-contractor was the main factor affecting the relationship. Laborers are an essential resource for finishing a construction project. Skilled laborers, in addition to experienced professionals, are essential for the successful completion of the project. Productivity is harmed by a lack of labor experience, and low productivity leads to issues between the main contractor and the subcontractor. This result is in line with Kasahun [11]. The third factor that affects the relationship between contractor and subcontractor is scheduling conflicts among the subcontractors. To reach the estimated completion time for respective jobs, main contractors and subcontractors should schedule their work packages simultaneously. This will likely lessen the tension between the two groups by reducing the total project delay, which is crucial to the main contractor. This result is in line with that of Yemisirach [25].

Regarding factors affecting Contractor Subcontractor Relationships, the results reveal that the top three positive effects on the overall performance of the project that arise from contractor subcontractor relationships are Productivity increases, Improves the product's quality, and Improvement of flexibility respectively. Subcontracting has several good effects, the most important of which is an increase in productivity. The primary benefit of subcontractors is that they increase the main contractor's productivity while also maximizing profit. Subcontractors can produce higher productivity than the company's labor force since they are more experienced and capable of completing specialized work assignments more effectively. This is soon followed by improving the quality of the product and increasing flexibility. Improving flexibility implies relieving the main contractor of job pressure, allowing the main contractor to participate in a variety of projects.

Subcontracting has several benefits for the project's overall performance, but it also has drawbacks. The first negative effect of subcontracting, according to this study, is time overrun in terms of delay. Time overrun refers to the amount

of time it takes to complete a construction project after the anticipated completion date, as a result of both internal and external factors. Okunlola O S. also observed that a tense relationship between contractors and subcontractors might lead to time overruns, but this can be avoided if both parties have mutual trust and understanding [19]. Cost overrun is the second negative side of subcontracting. The difference between the initial estimated or planned cost and the final cost after the project is known as cost overrun. Poor project quality is the third negative side of subcontracting. This result is in line with Yemisrach [25].

The top three elements connected to Strategies that can strengthen the relationship between the main contractor and subcontractor, according to the study, are Effective communication, Timely provision of the requirements, payments, and drawings, and Specification of Terms of the Contract. The primary characteristics associated with improvement methods were effective communication, the flow of information, and regular meetings. The second and third aspects were also mentioned as being related to communication. This demonstrates the importance of communication in the interaction between major contractors and subcontractors. Communication regularly, completion and clearance of contract paperwork, timely communication of information, and communication when an issue arises. Poor communication lack of timely information on site can cause strain in the relationship between the main contractor and the subcontractor. These results agree with Mudzvokorwa [18].

5. Conclusion and Recommendations

5.1. Conclusions

The research established a relationship between contractors and subcontractors. It was revealed by the survey results that almost all of the contractors subcontracted out works at one time. From this, the researcher concludes that subcontracting is an inevitable tool of contracting by main contractors and that a significant portion of the works (20-50%) is subcontracted. This considerable amount of involvement of subcontractors was attributed to the increase in size and complexity of buildings that have specialized requirements.

The engagement of the subcontractor is key in ensuring that the best is selected for the works. Considering bid price as a predominant basis for selection leads to poor performance.

The researcher concludes, based on the study's findings, that subcontracting is a widely used technique among main contractors for the following reasons:

- 1) Risk management - Contractors mainly control financial risks through the engagement of subcontractors who also assist in the financing of the project.
- 2) Human resource management - Construction projects are seasonal. Once the project is completed, a contractor may stay for a while without having another project therefore due to the uncertainty or unpredictability of when another project comes up, main contractors prefer

to subcontract the works to those who may have the capacity to handle it instead of having employees.

- 3) Financial management - For financial reasons Subcontracting serves as a cost-cutting strategy, it is seen to reduce overheads since specialized trades are not required full time hence contractor does not employ workers directly.
- 4) Technical Capability - Increase technical capacity due to the provision of specialized services or technology that a contractor may not possess. Business opportunities are also increasing due to increased capacity.

Failure to receive payment on time puts the contractual relationship in higher danger. Poor working relationships between the main contractor and the subcontractor can lead to contract frustration and non-performance. As a result, it has been demonstrated that relationships between the main contractor and subcontractors have a significant impact on the performance of building projects. Properly drafted and managed contract is a key for productivity and improvement of flexibility. Poor contract document leads to poor working and/or contractual relationships which results in poor performance of projects in way of delay in completion, non-adherence to the project budget, and poor-quality product. Therefore, the research shows that the contractor-subcontractor relationship affects the performance of the construction project. In conclusion, all the study objectives were achieved.

5.2. Recommendations

Main contractors are recommended to utilize a well-thought-out criterion for selecting subcontractors Apart from price, there should be a decent mix of subcontractor selection factors. Select subcontractors according to commitment to quality standards, previous experience, long-term relationship by working together, the reputation of the sub-contractor, specialty in a certain type of work, and capabilities in terms of labor. The appropriate selection of a subcontractor allows the main contractor to transfer risk and accomplish the subcontracted scope of work faster and cheaply while still meeting quality standards.

Subcontractors should be integrated into the partnering strategy by main contractors. The goal of partnering is to decrease the hostile relationships that are reported to be common in the industry and have thwarted earlier initiatives to encourage better integration and cooperation amongst contractual partners. Construction partnering entails a commitment on the part of the parties (contractor and subcontractor) to improve communications and avoid disputes by working together on a project-by-project basis to achieve shared and common goals and objectives. As a result, the established necessity for main contractor-subcontractor partnering must be represented in the subcontractor selection criteria and the selection process itself. Incorporating all essential partners and instilling a common sense of project purpose, commitment to teamwork, and problem-solving is also congruent with the broader philosophy of partnering.

It is recommended that subcontractors employ adequately

trained technical people with relevant project expertise, as well as arrange all materials and equipment essential for the project's effective completion. Subcontractors should successfully communicate and coordinate with the contractor's professionals about their common aim at the project site, and follow their directions to avoid any issues.

The employer shall make timely payments to the Contractor following the terms and conditions of the signed Contract in consideration of the Works done by the Contractor under the signed Contract. Delays in payment for the contractor by the employer can lead to delays in payment for the subcontractor by the main contractor, resulting in a sour contractual relationship.

5.3. Research Limitations

The study population was limited to Dire Dawa construction projects exclusively due to time and accessibility constraints, and the sample size employed was also constrained.

5.4. Further Recommendations for Future Research

In future studies, the sample size should be increased to include more projects to accurately reflect the relationship between contractors and their subcontractors.

In addition, this research might be developed by establishing a system to classify the subcontractors and developing a model for evaluating, selecting, and managing subcontractors in the construction project.

References

- [1] Abdullahi, A. H. (2014). Review of Subcontracting Practice in the Construction Industry. *Journal of Environmental Sciences and Resource Management*, pp. 85-96.
- [2] Abebe D. G. (2020). Assessment on Impact of Covid-19 on Ethiopian Construction Industry. *International Journal of Engineering Science and Computing, Volume 10 Issue No. 7*, pp. 26889- 26894.
- [3] Ankrah, N A and Proverbs, D (2005) A framework for measuring construction project performance: overcoming key challenges of performance measurement. In: *Khosrowshahi, F (Ed.), 21st Annual ARCOM Conference, 7-9 September 2005, SOAS, University of London. Association of Researchers in Construction Management, Vol. 2, 959-69.*
- [4] Arain, T. E. (2012). Major causes of problems between contractors and subcontractors in the Gaza Strip. *Journal of Financial Management of Property and Construction*, 98-112.
- [5] Cartlidge, (2017), *Quantity surveyors' pocketbook*, (3rd ed.), Routledge Taylor & Francis Group, New York.
- [6] Creswell J, (2009). *Research Design Qualitative, Quantitative, and Mixed methods approach*. (3rd ed.). California, USA: Sage Publications.
- [7] Egwunatum, S. (2017). A review of construction project performance estimators. *MOJ Civil Eng.*; 3 (4): 326–328.
- [8] The Emperor of Ethiopia the Civil Code of Ethiopia, (1960).

- [9] FIDIC Condition of Contract for Construction, (1999).
- [10] Henok, A. H. (2018). Determination of Subcontracting Performance in Road Construction Projects: Case of Addis Ababa Road Projects. *Journal of Scientific Engineering and Research (IJSER)*, 1-17.
- [11] Kasahun H, (2019). Study on The Relationship Between Main Contractors and Sub Contractors in Public Building Construction Projects in Bahir Dar. MSC thesis in Construction Technology and Management, Business Administration, Bahir Dar Institute of Technology.
- [12] Kish, L. (1965). Factor analysis of interface problems among construction parties. *Journal of Business & Industrial Marketing*, pp. 60-71.
- [13] Kothari C., (2004). *Research Methodology: Methods and Techniques* (2nd ed.). New Delhi, India: New Age International.
- [14] Kumar R. (2011). *Research Methodology- A step by step guide for beginners* (3rd ed), Sage Publications Ltd, London.
- [15] Lew Yoke-Lian, S. Hassim, R. Muniandy, and Law Teik-Hua, (2012), Review of Subcontracting Practice in Construction Industry, *IACSIT International Journal of Engineering and Technology*, Vol. 4, No. 4, August 2012.
- [16] Mirawati N. A., Othman S. N., and Risyawati M. I. (2015). Supplier-Contractor Partnering Impact on Construction Performance: A Study on Malaysian Construction Industry, *Journal of Economics, Business and Management*, Vol. 3, No. 1, January 2015.
- [17] Mundie (2012), A study on the impact of contractor – subcontractor relationship on the performance of the construction project: A Case study on the Kenyan construction Industry.
- [18] Mudzvokorwa (2017), Improving the main contractor-subcontractor relationship through partnering on construction projects, *PM World Journal*, Vol. VI, Issue II.
- [19] Ojo Stephen Okunlola. (2015). The Effect of Contractor-Subcontractor Relationship on Construction Duration in Nigeria. *International Journal of Civil Engineering and Construction Science*, Vol. 2, No. 3, 16-23.
- [20] Public procurement agency (PPA) (2006), Standard bid document for procurement of works, Addis Ababa.
- [21] Rosli, N. M., Mustaffa, N. E., & Tajul Ariffin, H. L. (2018). *A Review of Domestic Subcontract in Construction Industry. Regional Conference on Science, Technology and Social Sciences (RCSTSS 2016)*, 499–506.
- [22] Smith, AJ (2017), *Estimating, tendering and bidding for construction: Theory and practice*, Basingstoke, London: Macmillan Press Ltd.
- [23] Shimelis, G. O. (2018). Timely delivery and control mechanisms of 40/60 saving houses projects in Addis Ababa. MSC thesis in Business Administration, Addis Ababa Science, and Technology University.
- [24] Tayeh, A. (2019). The Relationship between Contractors and Their Subcontractors in the Gaza Strip. MSC Thesis, University of Gaza.
- [25] Yemisirach, S (2020, December). Study on Contractual Relationship between Main Contractors and Subcontractors and Their Impacts on Main Contractors Competitiveness in 20/80 Bole Arabsa Condominiums. Ababa. MSC thesis in Construction Technology and Management, Addis Ababa Institute of Technology.