

**10<sup>th</sup> INTERNATIONAL ZEUGMA CONFERENCE ON  
SCIENTIFIC RESEARCH**

June 25-26, 2023/ Gaziantep, Turkey



**THE BOOK OF FULL TEXTS**

Edited by  
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Gulnaz GAFUROVA

**ISBN: 978-625-367-178-5**



**CONFERENCE ID**

**CONFERENCE TITLE**

10th INTERNATIONAL ZEUGMA CONFERENCE ON SCIENTIFIC  
RESEARCH

**DATE and PLACE**

June 25-26, 2023 / Gaziantep, Türkiye

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	<b>SESSION-1 / HALL-1</b> <b>25.06.2023 / 13:00-16:00</b> <b>Moderator: Dr. Mustafa Latif EMEK</b>	
	<b>Royal Gaziantep Hotel</b>	

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Res. Assist. Nigar Gizem ÜNAL	<i>Kirsehir Ahi Evran University</i>	THE INFLUENCE OF THE DESIRE FOR IMMORTALITY ON THE MORAL ACTIONS OF MAN
Ayşe Nur DOĞAN	<i>Marmara University</i>	A RESEARCH ON THE MEASUREMENT OF SOCIAL MEDIA LITERACY COMPETENCY OF SECONDARY STUDENTS

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	<b>Royal Gaziantep Hotel</b>	

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<b>Prof. Dr. Işıl VAR</b> Nuray GÜZELER Demet TOY	<i>Çukurova University</i>	MILKY DESSERTS AND MICROBIOLOGICAL QUALITY
<b>Kübra KORKMAZ</b> Prof. Dr. Sevgi YILMAZ	<i>Ataturk University</i>	ESTABLISHMENT OF RAIN HARVESTING GARDENS AND THEIR USE IN LANDSCAPE AREAS: DIYARBAKIR TOKI APPLICATION EXAMPLE
<b>Kübra KORKMAZ</b> Prof. Dr. Sevgi YILMAZ	<i>Ataturk University</i>	PRINCIPLES OF PLANT DESIGN THAT ARE TAKEN INTO ACCOUNT IN LANDSCAPE AREAS: A CASE STUDY ON DIYARBAKIR NATIONAL GARDEN

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Zoom Meeting ID: 859 3319 5278 / Zoom Passcode: 101101

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Lale ÇAKMAK Asst. Prof. Dr. Zeynep HASIRCI TUĞCU	<i>Karadeniz Technical University</i>	THE STANDARDS OF SMART GRID COMMUNICATION AND NETWORKING
Bulut AKAY Zeynep HASIRCI TUĞCU	<i>Karadeniz Technical University</i>	STATE OF ART AND FUTURE TRENDS IN ELECTRICAL VEHICLES AND CHARGING STATIONS
R.S. ABILOV	<i>Azerbaijan Research and Development Institute of Energy</i>	POWER PLANT ON THE KURMUK RIVER
Tolga AYDIN Asst. Prof. Dr. Ali SAYGIN	<i>Gazi University</i>	CONTROL OF ACTUATORS IN AIRCRAFT WITH MATRIX CONVERTER
İncigül UĞUR Res. Asst. Selen AVCI AZKESKİN Prof. Dr. Zerrin ALADAĞ	<i>Kocaeli University</i>	THE EFFECT OF CRITERIA WEIGHTS ON TOPSIS METHOD: AN EXAMPLE OF EDUCATION INSTITUTION LOCATION SELECTION
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Tuba DOĞAN Accos. Prof. Dr. Betül APAYDIN YILDIRIM	<i>Ataturk University</i>	THE EFFECT OF CROCIN ON OXIDATIVE STRESS IN GENTAMICIN-INDUCED NEFROTOXICITY IN RATS
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Mustafa İLERİ Asst. Prof. Mevlüt ARSLAN	<i>Van Yüzüncü Yıl University</i>	SEQUENCING AND MUTATION ANALYSIS OF EXON 10 REGION OF MITF GENE IN TURKISH VAN CATS
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Res. Ass. Dr. Hasan ŞİMŞEK Prof. Dr. Fatih Mehmet KANDEMİR	<i>Aksaray University</i>	EFFECT OF QUERCETIN ON VINCRISTINE-INDUCED GASTRIC TOXICITY IN RATS
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**Moderator:**

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Muhammed Tijjani Makinde Joseph Kolawole	<i>Federal University of Technology</i>	THE EFFECTS OF UNETHICAL PROFESSIONAL PRACTICE ON CONSTRUCTION PROJECTS PERFORMANCE IN NIGERIA
Noureddine Bendenia Benadouda Mourad	<i>University of Sidi Bel Abbes</i>	STATIC AND DYNAMIC BEHAVIOR OF SANDWICH PLATE REINFORCED WITH CARBON NANOTUBES
Kamaluddeen Musa YASHI Zarma Ali WAKILI Engr. Salisu IBRAHIM Jafun ADAMU	<i>Nigerian Building and Road Research Institute</i>	MONITORING OF DINDIMA ROAD BRIDGE USING ACCELEROMETER SENSOR
Umar Aliyu GWARAM Adamu JAFUN Kamaluddeen Musa YASHI Paul Yina IDAH	<i>Nigerian Building and Road Research Institute</i>	AN INVESTIGATION INTO THE INFLUENCE OF STONE DUST ON PROPERTIES OF CONCRETE
Adamu JAFUN Abubakar Baba YERIMA Paul Yina IDAH Engr. Salisu IBRAHIM	<i>Nigerian Building and Road Research Institute</i>	PRODUCTION TECHNIQUES AND STRENGTH EVALUATION OF SANDCRETE BLOCKS IN GOMBE LGA, GOMBE STATE NIGERIA
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Dauda David Momodu Calistus Ayegba	<i>Federal University of Technology</i>	EFFECT OF SUB-CONTRACTING ON PROJECT PERFORMANCE IN THE CONSTRUCTION INDUSTRY
Subhashish Dey	<i>Gudlavalleru Engineering College</i>	E-WASTE MANAGEMENT APPLICATION FOR CONTROLLING THE ENVIRONMENTAL POLLUTION IN INDIA
Subhashish Dey	<i>Gudlavalleru Engineering College</i>	DESIGN OF WATER TREATMENT PLANT AT GUDLAVALLERU FOR RECYCLING OF WASTE WATER

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Ayşe Büşra ÇAKMAK Assoc. Prof. Fikret ALINCAK Research Assistant Doctor Mehmet VURAL	<i>Gaziantep University</i>	EVALUATION OF THE OPINIONS OF ATHLETICS TRAINERS WORKING IN THE PROVINCIAL DIRECTORATE OF YOUTH AND SPORTS ON THE BENEFITS OF THE IN-SERVICE TRAINING PROGRAM
Ayşe Büşra ÇAKMAK Assoc. Prof. Fikret ALINCAK Research Assistant Doctor Mehmet VURAL	<i>Gaziantep University</i>	INVESTIGATION OF THE HEALTHY LIFESTYLE BEHAVIORS OF INDIVIDUALS GOING TO SPORTS CENTERS IN TERMS OF DIFFERENT VARIABLES
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Lect. Ahmet DEVECİ Assoc. Prof. Dr. Fikret ALINCAK	<i>Hatay Mustafa Kemal University Gaziantep University</i>	ANALYSIS OF VARIOUS DEMOGRAPHIC VARIABLES AFFECTING THE PROFESSIONAL ATTITUDE AND PROFESSIONAL COMMITMENT OF PHYSICAL EDUCATION AND SPORTS TEACHERS
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## EFFECT OF SUB-CONTRACTING ON PROJECT PERFORMANCE IN THE CONSTRUCTION INDUSTRY

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### Abstract

The construction industry has a complex supply chain, where subcontractors play a significant role in the success of construction projects and the industry is one of the largest, fragmented and highest employer of labour in the world. Subcontractors are responsible for delivering specialized works, such as electrical, plumbing, and HVAC systems, among others, which are important for the successful completion of construction projects. Therefore, understanding the factors that affect the performance of subcontractors in the construction industry is essential for improving project execution and performance. This study examines the effect of subcontracting on project performance in the construction industry. Using Literature reviews, the study identifies several factors that impact subcontractor project performance, including project management, communication, collaboration, financial stability, and trust. The meta-analysis shows that effective management of these factors can lead to improved subcontractor performance, which is very critical for the success of construction projects. The study provides a comprehensive understanding of the key factors impacting subcontractor project performance and offers insights to assist project managers in improving their subcontractor management strategies. The findings from this study contribute to the existing literature on project performance in the construction industry and have practical implications for project management practices.

Keywords: Construction Industry, Performance, Subcontracting

### 1.0 Introduction

#### 1.1 Overview of Subcontracting

Generally, the construction industry is considered to be labour intensive and one of the largest industries in the world. (Hossein *et al.*, 2018).

Since labour costs account for 30 to 50 percent of a project's total cost, the productivity of the labour force is one of the most important factors that affects an organization's performance overall (Mctague and Jergeas 2002). One of the main challenges facing the construction sector is related to contractors, according to Abiodun *et al.* (2017). Common contractor-related challenges, include delays in project completion or delivery, poor quality, the use of substandard materials, over expenditures, and staff safety issues such as project site accidents. There is little doubt that this has a significant detrimental impact on the industry's productivity and its contribution to GDP (Sharma and Kashiyani, 2015).

The owners/governments, major contractors, architects, consultants, subcontractors, and suppliers are just a few of the stakeholders that engage in the construction industry. Each of these parties has certain duties and responsibilities (Tan *et al.*, 2015). Nearly 70% of the entire value of building work in Hong Kong was subcontracted, according to figures from the Hong Kong government (Construction and Miscellaneous Services Statistics Section 2015). Additionally, there has been a steady increase in the tendency for construction work to be sublet to suppliers or subcontractors, despite the fact that main contractors are typically in

charge of providing, managing, and organising facilities for such suppliers or subcontractors on the construction site (Tan *et al.*, 2015).

All parties participating in public or private construction projects, including owners, consultants, contractors, subcontractors, and suppliers, want to effectively finish the project on time, within budget, with the best level of quality, and in the safest possible manner (Abiodun *et al.*, 2017). Delayed payments put the contractor in financial constrain and push back the deadline for finishing the task, (Kalibaet *al.*, 2009). Time overrun has a number of detrimental repercussions, including disputes between the owner and the contractor, high costs, missed output and income, and contract termination (Kalibaet *al.*, 2009).

To start, there is a huge demand for skills and resources to handle challenging and extensive construction projects (Chiang 2009). Additionally, by improving efficiency in construction projects management methods and relying on the efficient performance of craftsmen and specialised subcontractors, subcontracted works can lower overall costs (Hsieh 1998). Additionally, there are other justifications for subcontracting, such as risk reduction, avoiding accountability, and adaptability in dealing with workload changes (Chan *et al.* 2004; Chiang 2009). In other words, by performing their subcontracts with major contractors, subcontractors have a competitive edge in their particular trades (Yik and Lai 2008).

The purpose of this study is to evaluate the influence of subcontracting on project performance in the construction sector through a scoping literature review and meta-analysis. The study will identify areas for future research and offer suggestions for reducing the factors that influence subcontracting in the construction sector.

## 2.0 Methodology

The study adopted literature review to investigate the effect of subcontracting on project performance in the construction industry. Google scholar and research gate was explored for related articles.

### 3.1 Factors Affecting Subcontracting Performance in the Construction Industry

Subcontractors are typically impacted by four different types of factors: staff competency, tender price, qualification class, and financial capabilities. Contractors will find it helpful to be aware of the subcontractor's financial situation and project finance management procedures prior to requesting them to submit bids. Due to their precarious financial circumstances, some businesses may very easily use project payments and advance payments from contractors for other purposes, resulting in a fund deficit and progress delays for their subcontracted project (Yu Tao, 2009).

According to Harris and McCaff (2013), the resource the contractors need to ensure a seamless implementation of the construction work on site is their financial capacity. There are several components to it, including cash at hand, bank credit, overdraft, credit purchases, work-in-progress, and invoiced. Financial capacity also covers the assets needed to maintain the construction company's day-to-day operations. Planning, sourcing, and monitoring the usage of financial capacity throughout construction project are all parts of managing financial capacity. Correct finance is important throughout the construction phases, if financial capability is to be enough. Nwude (2010) noted that as poor management can reduce productivity and profit levels, it demands a positive effort from the contractor.

The parties issuing project contracts will choose construction firms with good financial capacity to minimise risks and guarantee project quality. The importance of having adequate financial resources for construction contractors lies in how it help them in gaining the respect of project owners during the process of bid evaluation and contributes to project implementation and risk reduction during the construction stage. For a project to be successful, the financial stability of the contractor is very important. huge losses and even

negative outcomes will be caused to project owners if a contractor has poor financial capabilities, lacks of sufficient funds to complete a contracted project, delays project completion due to fund shortages, or encounters deteriorating finances and goes bankrupt during the construction process, even project abandonments (Liu, 2008).

In a study of contracting done by Fang and wang (2000), all of the interviewees agree that they used a contractor's past experience as a guide when making their choice. Some respondents felt that the historical performance of the contractor should be given more priority than the tender price. Because unforeseen problems frequently arise in the construction stage, contractors' past experience in resolving accumulating disputes is an asset. Past experience for a construction contractor mostly consists of the scope and nature of completed jobs. This reveals the technical skills, size, nature, and reputation of contractors. Additionally, it includes the home construction experience and business knowledge of the contractors, which is a crucial measuring indication.

According to Luis and Claudio (2002), strategic level features, ultimately affect how well a contractor performs. The nature of projects and contractors is represented at the strategic level. It includes the three elements of internal connection status, initial requirements, and pre-qualification. Two of the five pre-qualification attribute indicators are characteristics of contractor experience. These are the contractor's general construction experience and experience working with project owners, respectively. The total size of project space that contractors have finished can be used to assess their overall construction experience. Particularly, the finished area of comparable projects is a sign that has drawn a lot of interest. Contractors without good experience won't be hired by project owners. Naturally, project owners choose construction companies with whom they have a cordial working relationship. Experience in collaboration can help construction contractors acquire confidence and even selection benefits. In addition, construction companies that have worked with project owners are familiar with their organisational structure and goals, corporate culture, and ways of working that facilitate contractor progress. Contractors usually choose competent subcontractors for projects to ensure reliable performance.

The type of a subcontractor's construction team has a direct effect on project quality and length and is a key factor in assessing how profitable a project will be. There isn't currently a developed market for actual subcontracting. The number of subcontractors available to contractors is limited. As a result, some unqualified construction teams have entered the subcontracting industry, which has led to an increase in project costs due to occasional quality issues, rework, repair, and even entire rebuilding and project abandonment. Additionally, some contractors have hired unqualified subcontractors to execute specific tasks in order to preserve their unique ties or save project costs, creating hidden risks of inconsistent contract performance and project failure (Liao, 2005).

Past performance and client relationships with a subcontractor are important selection factors for contractors. Contractors, for their part, frequently favour subcontractors who they have worked with in the past. Such collaborative experience can help contractors select the best subcontractors and reduce performance doubt (Burcu & Martin, 1998). According to Luis and Claudio (2002), the pre-qualification stage is crucial for both contractors and project owners when evaluating contractors and subcontractors. Contractors always consider whether subcontractors have a good experience working with them when choosing subcontractors. The amount of time spent working together with subcontractors and the number of projects they have done for the main contractor can be used to gauge this. Long-term collaboration between contractors and subcontractors promotes good understanding, lessens the problems contractors have in project management, and helps subcontractors perform effectively in terms of project durations, cost management, and safety assurance.

The past records of a construction subcontractor in terms of completing projects determine future performance and contract execution skills (Fang & Wang, 2000). Past performance includes an evaluation of the cost control, project duration guarantees, quality control, and safety performance of construction contractors in their completed projects. Jha (2006) sent surveys to Indian construction industry experts and used software analysis to determine the critical success elements for high-quality project completion. Disputes amongst the project participants were discovered to be the main reason for project quality failure. The project participants' monitoring and feedback as well as their mutual cooperation and communication were key success elements. The mutual trust between building contractors and their clients is undermined by past disagreements or confrontations with clients or other parties involved. Their capacity to share knowledge and compromise with one another is reduced (Fong & Choi, 2000).

A common paradigm for choosing subcontractors was proposed by Hatush and Skitmore (1997). They discovered through their research that a building contractor's previous client relationships have an impact on its corporate reputation and, to some extent, how well it performs in this area affects whether it is chosen by tendering businesses.

The bidders' corporate capabilities in management, market flexibility, cost management, and technical skills are fully embodied in the bid quotation. Although not the main factor, it is nevertheless a determinant factor for winning bids (Cheng *et al.*, 2014). Subcontractor price has historically served as a good indicator of the issues that matter most to contractors when they are soliciting bids. According to their research, Hatush and Skitmore (1997) came to the conclusion that the major factor that all clients care about in the total evaluation process is the tender price. Clients find a reduced tender price more attractive than the other factors (Fong and Chio, 2000).

Construction contractors are forced to reduce their quotations and profit in order to win bids, when contractors use tender processes where no minimum price is specified and the reasonable low price wins the bidding. Contractors should note the likelihood that the construction company winning the bid and its project managers may have a negative attitude towards the project as a result of its low profit after receiving a rather cheap subcontracting fee. This is detrimental to a contractor's ability to execute projects (Yu Tao, 2006). Contractors may come across important risks, poor output, and low marginal utilities during project construction after receiving a low quote from subcontractors. Subcontractors must reduce their bids to win contracts. A cash flow problem could come from this (Kenneth, 2009). Subcontractors may eventually request higher fees or increase the time of project completion. Practical studies have shown that project delays and overbudget costs are common in the construction industry (Abdul-Rahman, 1998). Overspending is most common among contractors, who may experience a financial problem as a result. Contractors must consider both the quotation and the subcontractors' cost guarantees when selecting their subcontractors (Akintan & Morledge, 2013). To improve their chances of being hired, many subcontractors frequently had to reduce the prices on their quotes. In this case, a contractor can cut expenses by reducing procurement costs. However, as a result, subcontractors are limited to looking for methods to cut expenses and investment while still barely reaching project requirements in order to turn in a profit. This could eventually lead to a decline in project quality. According to Laryea (2017), tender issuers frequently choose the bidder with the lowest tender price in the final round of bidding. It has long been debatable practice to prioritise pricing over all other considerations. Construction projects are not just one more category of common consumer goods, according to those who are opposed to using price as a key selection criteria. Instead, these projects involve time expenses, project quality, and numerous construction-related hazards. In a study on how to choose project contractors, Wang *et al.* (2006) noted that in an ideal world, contractors should adopt the principle of reasonable low quotation winning

the bid and choose the bidder with the lowest quotation out of all of the bidders, as long as that quotation does not fall below a specific cost figure. Table 1 shows the factors affecting main-contractor and sub-contractor relationship.

S/N	Factors	Authors
1	Long business relationship	El-Abbasyet <i>et al.</i> (2013)
2	Open communication	Clough <i>et al.</i> (2015)
3	Effective coordination	Aagaard <i>et al.</i> (2015)
4	Dispute/problem resolution	El-Abbasyet <i>et al.</i> (2013)
5	Mutual trust	Chalker <i>et al.</i> (2016); Manu <i>et al.</i> (2015)
6	Delay of payment to subcontractors	Clough <i>et al.</i> (2015)
7	Nature and conditions of contract	Schaufelberger and Holm (2002)
8	Company culture	Walker (2015)
9	Selection method of subcontractors	Araujo <i>et al.</i> (2015); Ulubeyli and Kazaz (2016)
10	Main contractors' authoritative	Manu <i>et al.</i> (2015); Wood and Ellis (2005)
11	Risk sharing (protect profit margin of both)	Feng <i>et al.</i> (2015); Kululanga and Kuotcha (2010)
12	Knowledge sharing	Wu and Tang (2015)
13	Early involvement of subcontractors	White and Marasini (2014)
14	Private communication	White and Marasini (2014)
15	Information technology support and facilitation	White and Marasini (2014)
16	Environment, health, and safety	Feng <i>et al.</i> (2015); Manu (2013)
17	Prospects of future collaboration	Aagaard <i>et al.</i> (2015)

**Table 1: Identified Factors Affecting Main Contractor–Subcontractor Relationships**

### 3.2 Discussion

In the construction business, subcontracting plays a big role in successful projects completion. Given the volume of work they complete, the value of subcontracting in the construction sector cannot be overstated. Even while subcontracting has disadvantages, the benefits far outweigh the drawbacks. Utilizing subcontractors in a project not only accelerates completion but also reduces costs, improves quality and safety, and increases productivity. Some subcontractors specialise in certain fields, such as electrical, plumbing, roof design and construction, finishing, and many others, where they are more trustworthy and skilled at carrying out duties. Subcontracting is crucial since it is typically nearly impossible for construction companies to have experts for all the jobs required to be finished in a full project. Despite the fact that the necessity for subcontracting typically emerges when a contractor is given a substantial contract to fulfil yet the contractor is not reasonably able to complete the work. Similar to this, when a specific operation needs to be carried out but the contractor organisation lacks the necessary competence, a subcontracting firm will need to subcontract in order to successfully perform the task.

Although the subcontractors are required to carry out the assignment allocated to them properly, some variables still prevent them from performing well and completing the mission. These elements have an impact on the project's overall performance. This component should be the main requirement for screening the bidders, just like in the case of the financial capacity of subcontractors bidding for a certain job. If a subcontractor is eventually given a job, they may find it difficult to carry it out correctly if they don't have sufficient financial

resources and support. Other significant elements that can impair a subcontractor's overall project performance if given a work should be fairly weighed against each bidder.

#### **4.0 Conclusion, Recommendation, and Future Studies Direction**

##### **4.1 Conclusion**

In conclusion, subcontracting have serious effect on project performance in the construction industry. The performance of subcontractors in the construction industry is influenced by several factors. The scoping literature review and meta-analysis from this study have revealed that factors such as experience, expertise, communication, financial stability, project management, and contractual arrangements significantly impact the performance of subcontractors and project. The study has also highlighted the need for better communication and collaboration among stakeholders in the construction industry to enhance the performance of subcontractors. Further research is necessary to identify additional factors that affect subcontractor performance, and to develop strategies to overcome these challenges. Overall, the findings of this study are essential for industry professionals to improve the quality and efficiency of construction projects, and ultimately to provide better value to clients.

##### **4.2 Recommendation**

1. Establish good communication channels: To ensure effective communication and coordination between contractors and subcontractors in construction industry, it is recommended that clear communication channels are established right from the start of the project. This can be achieved by having regular meetings and discussions between all stakeholders involved in the project.
2. Prioritize trust and cooperation: for a project to be successful trust and cooperation is required between contractors and subcontractors. Building a good relationship based on mutual respect and understanding can help to reduce dispute and improve project performance.
3. Develop clear contracts: A clear and concise contract can help to establish the scope of work, time duration, payment condition, and other important contract details. This can help to minimise misunderstandings and disputes that may arise during the project.
4. Evaluate subcontractor's performance: It is important to regularly assess the performance of subcontractors to ensure that they are meeting expectations and delivering quality work. This can be done through regular site visits, monitoring of progress, and feedback from other stakeholders.
5. Provide adequate training and support: Subcontractors may lack the necessary skills and knowledge to carry out specific job on the project. Providing training and support can help to improve their performance and increase the quality of the project executed.
6. Emphasize safety and compliance: Safety and compliance are important factors that can affect the success of the project. It is important to ensure that all subcontractors are aware of the safety regulations and are compliant with them.
7. Use technology to improve performance and meet deadline: Technology can help to streamline processes and improve project performance. Utilizing project management software, scheduling tools, and other technological solutions can help to improve communication and collaboration between contractors and subcontractors and other stakeholders in a project.

##### **4.3 Future Studies Direction**

Based on the study on "effect of subcontracting on project Performance in the Construction Industry" a potential future study could focus on the role of communication and collaboration between subcontractors and their project managers or clients. This study could investigate the various forms of communication and collaboration that are used in the industry, such as face-to-face meetings, digital communication tools, and project management software.

The study could explore how these forms of communication and collaboration affects the performance of subcontractors, and how they can be optimized to improve project performance. For example, the study could investigate the use of building information modelling (BIM) and other digital tools to enhance collaboration and communication between subcontractors and project team.

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