ADDIS COLLEGE

The Effect of Coronavirus (Covid-19) Pandemic on Public Building Construction Projects Success in Addis Ababa City, Ethiopia

A research submitted to Addis College Department of Project Management in partial fulfillment of the requirements for award of Masters Degree in Project Management

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Declaration

I hereby declared that this thesis is my original work and that all sources of information used for the thesis have been duly acknowledged.

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Acronyms or Abbreviations

COVID = Corona Virus Infection Disease

EEA = Ethiopian Economic Area

EOT = Expansion of Time

EPHI = Ethiopia Public Health Institute

ETB = Ethiopian Birr

FIDIC = Federation Internationale Des Ingenieurs Conseils

GDP = Gross Domestic Product

GFC = Global Financial Crisis

HAJBE = Horn of Africa Journal of Business and Economics

JCC = Jobs Creation Commission

LDC = Least Developing Country

MoH = Minister of Health

MoUDC = Ministry of Urban Development and Construction

PPE = Personal Protective Equipment

SARS = Severe Acute Respiratory Syndrome

SMEs =Small and Medium Enterprise's

SPSS = Statistical Package for Social Sciences

UN = United Nation

USD = United State Dollar

VAT = Value Added Tax

WHO = World Health Organization

YTD = Year to Date

Abstract

The objective of this study is to assess the Effect of Coronavirus Pandemic on Public Building Construction Projects in Addis Ababa City. To address the major effects of the Coronavirus pandemic, the effect of Coronavirus pandemic on time and cost aspects, the effect of Coronavirus pandemic on budget allocation, and the effect of Coronavirus pandemic on material stock on public buildings construction projects in Addis Ababa of the study questions. Both descriptive and explanatory examination plan was employed with a mixed approach. This study uses both primary and secondary data i.e. questionnaire, interview and case study conduct with key contractors, consultants and clients that are associated with Addis Ababa Administrative City public building construction projects side is done and as a secondary data project documentations including journal books, reports and different articles are used. The sampling method was being utilized in a non-random testing strategy. Since the population was known and the quantity of populations is under 50 then taking the entire populace and the sort of Purposive or critical testing strategy would have utilized for choosing the public building projects. This study taking of the entire population for this study in light of the fact that the quantity of dynamic public tasks under execution in Addis Ababa city was 26 in view of the Addis Ababa region office. Then the researcher takes the entire task that was effectively executed (in the works) from the year 2008 up to 2013 E.c then the absolute examiner disseminated for 78 respondents. The all out quantities of on-going building construction projects were (49). Also, from these, (32) are being built by level one (G-1) contractors, (13) of them are being constructed by level two (G-2) contractors, and (4) of them are being constructed by other junior grades. To get a delegate test size, projects which are under construction by grade one and grade two contractors were taken as data hotspot for the review. This infers that, the total number of test project is (45). The data obtained from interviews and intensively gathered project data were analyzed in both qualitative and quantitative aspects. Qualitative data were gathered through interview from construction makes men, though; quantitative data were gathered utilizing questionnaires from construction contractors, consultants and clients at various hierarchical levels to assess the Effect of Coronavirus (Covid-19) Pandemic on Public Building Construction Projects in Addis Ababa City, Ethiopia.

Key words: Coronavirus, COVID-19, Pandemic, Effect, Contractor, Consultant, Client, Public, Building construction, Project

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

The 21st century economies are interconnected due to advancement in information and communication technology and global value chains. Several actors can be identified: workers, firms, suppliers, consumers, banks and financial intermediaries in this chain. In this web of interconnectedness if there are disruptions in any one of the links due to the disease or containment measures, the outcome could be a cascading chain of disruptions both across the world and within countries (EEA, 2020). It was identified as a new coronavirus (severe acute respiratory syndrome coronavirus 2, or SARS-CoV-2), and later named as Coronavirus Disease- 19 or COVID-19 (Qiu et al., 2020).

Nation- wide lockdowns in conjunction with behavioral changes due to the fear of the pandemic not only caused disruptions in production but also led to the largest collapse in demand for firms' good and services. Given the global nature of the crisis, its severity, and the uncertainty surrounding the recovery, many businesses, may not be able to secure fresh funding to tide themselves over until business conditions stabilize. This situation made fear is that a large number of businesses were failed. During a crisis such as COVID-19, building constructions projects dependence on bank financing and made enterprises inability to raise other sources of funds at short notice can turn a liquidity shortage for a problem. So, this is a first concern for government or policymakers everywhere (EEA, 2020).

COVID-19 negatively affected supply and demand. The pandemic induced lockdowns in China, the European Union and the United States of America, commonly known as group of three countries had major impacts on products, imports and exports which affected both big and small companies globally (Chidochashe Nicolette Ncube, 2020). As a result, enterprises are faced with a decrease in demand, supply chain disruptions, cancellation of export orders, raw material shortages and transportation disruptions. This led to a dramatic and sudden loss of demand for supplies which in turn led to a loss in revenue thus severely affecting the ability of most industries to function as a result of liquidity shortages (Chidochashe Nicolette Ncube, 2020).

The pandemic is also expected to affect more African countries. African economic growth, as per prediction by Economic Commission for Africa (ECA, 2020), decreases to 1.8 percent in the best case scenario and a contraction of 2.6 percent if the worst case happen.

In Ethiopia, with the increase in the number of people infected with COVID-19, the government declared state of emergency aiming to curb the spread of the virus in the country. The state of emergency puts restriction on travel and human mobility which caused adverse effect on economy and businesses. This effect requires more research based evidence that shows the extent to which construction industries are affected (HAJBE, 2020). Thus, the impact of COVID-19 pandemic is a wide spread growing phenomena in today's world, especially in developing countries.

Development is a key monetary area that infests most different areas since it changes different capital into created physical, financial, and social necessary framework for financial development. It incorporates the interaction by which the actual foundation is arranged, planned, obtained, assembled or made, adjusted, fixed, kept up with, and crushed. The development business contributes fundamentally to the Ethiopian economy, as proven by its portion of Gross domestic product, which is around 19.5% (MoUDC, 2020).

The area saw amazing development. There has been an expansion in interest in the development and extension of different framework projects throughout recent years (MoUDC, 2020). The business is comprised of associations and people that incorporate organizations, firms, and people who go about as specialists, prime project workers and subcontractors, material and part producers, plant and hardware providers, manufacturers, and sellers.

The business keeps up with cozy associations with clients and lenders. The Ethiopian government functions as a purchaser (client), lender, administrative power, and administrator in the development business. Ethiopia's Gross domestic product was represented by the structure and land ventures, which represented around 20.37 percent of the nation's absolute in 2019. There are at present 159 significant development projects in progress in Ethiopia and 85 extra are booked to begin in the following five years (Deloitte, 2020).

Be that as it may, foundation projects are expected to freeze because of an absence of government income and lower FDI inflows into the country in 2019/2020. The development business assumes a huge part in the turn of events, social and monetary exercises of the nation and is a base for different ventures that influence all life exercises. Then again, the development business in Ethiopia has been a gigantic speculation area lately, with a normal of 58-60% of the capital financial plan being spent on this industry. It makes occupations and pay for the populace (Amoroso, 1989). It additionally adds to government incomes by producing corporate and worker annual charges, which thusly are utilized to finance public administrations like schools and wellbeing offices (Amoroso, 2019).

In the present globalized world, the earnestness of the Clever Covid or the Coronavirus pandemic has impacted pretty much every country. Practically all business exercises are compromised by the savage Coronavirus. In view of the characteristic idea of the business activity, a few enterprises may unexpectedly thrive because of the pandemic, while others will face the hardship, despite the fact that with extensive trouble, yet the development business is certainly on some unacceptable finish of the bend. The novel Covid was found on January ninth in Wuhan territory in China and the main instance of Coronavirus was accounted for in Ethiopia on Walk 13, 2020. The cases have since raised to 10,207 cases, with 170 passing's and 5,127 recuperations starting around 20 July 2020.

Certain organizations have additionally been requested to stop activities by the Ethiopian government. The development business, then again, has not been exposed to constrained closures (Gashahun, 2020).

Ethiopia as it is developing nation is facing similar problem is regarding to the impact of COVID-Pandemic on business firms in which engaged in different business sectors. This problem is highly expanded in the country urban centers especially in Addis Ababa. Although reports are coming out from different media outlets, further evaluation is required to reveal the effect of the unprecedented pandemic on the building construction projects and provide the possible solutions. So far no study is conducted on this issue. Now, it is time to respond the mentioned gap through rapid assessment of the effect of Corona Virus on building construction projects operation and provide insight for decision makers in the sector and for researchers to conduct further study. To this end, to understand the impact of the pandemic on constructions in Ethiopia and suggest the responding public policy, this study investigates the Effect of Coronavirus (Covid-19) Pandemic in Public Building Construction Projects in Addis Ababa City, Ethiopia. Thus the study approach allows us to estimate the effect of various policy proposals on the rate of the effect, and to quantify their effects.

1.2 Statement of the Problem

Due to COVID-19 pandemic countries around the world are increasingly making a full lockdown. According to the World Trade Organization (WTO) expected the world trade to fall between 13% and 32% in 2020 as the COVID-19 pandemic disrupts normal economic activity and life around the world.

The COVID-19 crisis has had a high impact on the global economy, and obviously East Africa has not been spared from the fall-out (CDC, 2020). From the perspective of trade, because of the time lags in international trade due to logistical constraints, its impact will be staggered over many months. It is thus still premature to draw definitive conclusions based on just two or three months' trade data drawn from one country. The preliminary data, however, does reveal that the impact of the crisis on trade will be complex (Andrew Mold and Anthony Mveyange, July 2020).

The recent evidence from East Africa show that the impact of the COVID-19 crisis on business firms is still too early stage to make an assessment of the effects of the virus based on full statistical evidence. It is hard to assess the pandemic as it spreads too high, and to precisely estimate how long it will take countries to return to normal activity levels. Sub-Saharan Africa (SSA) including Ethiopia is unlikely to escape the direct and indirect effects of the pandemic and attendant global crisis while the trajectory of COVID-19 is still at its initial stages in the region (United Nations Ethiopia, 2020).

Alemayehu (2020) notices that the government's Ethiopia related latest forecast of economic growth for the coming 2020/2021 fiscal year is 8.5%. It is not clear whether the possible effects of COVID-19 pandemic taken into account in this forecast. One of the negative consequences of the pandemic in the context of Ethiopia is the closure of building construction projects and the shrinking number of jobs in both construction and service sector. According to the Jobs Creation Commission (JCC) estimates that more than 2 million youth enter the labor market every year and 14 million jobs will be required between 2020 and 2025 to absorb all new entrants to the labor market, Plan of Action for Job Creation 2020-2025, 2019. Thus, the pandemic adds strain to the already scarce urban jobs.

For instance, with a population of about 22%, the contribution of the Ethiopian cities to the GDP of the country is seen to be huge. Some academic estimates put the share of Addis alone in Ethiopian GDP as high as 35% and that all urban areas at 54% and possibly higher (Alemayehu, 2020). One of the critical drivers of construction throughout the course of recent years was the construction blast, contributing 20% to public Gross domestic product (2018/19) and giving a significant wellspring of work (UN, 2020). All out work in the area is assessed to be 2.2 million mostly containing brief and untalented specialists. As per a JCC gauge, 60% of construction undertakings would stop activity because of monetary liquidity issues.

As indicated by the review's medium gauge, 34% of this area's laborers, or 741,000 individuals, would be laid off because of the pandemic among April and June 2020 (UN, 2020). Coronavirus is altogether affecting structure projects, albeit the lawful outcomes vary by nation and agreement. Coronavirus doesn't, as a rule, make projects difficult to finish as of now. Notwithstanding, it dials them back, creating setbacks and disturbances, regardless of whether simply because supply chains have been upset ordinarily. In the construction business, the impact would be felt by impermanent specialists or everyday workers, as construction projects, particularly little and medium-sized projects would see a significant drop popular, bringing about a deficiency of day to day pay for this section. The main impacts of Coronavirus on Ethiopian construction industry, are shortage and increasing expenses of construction materials, unfamiliar cash deficiencies, decreased efficiency, work deficiencies, project delays (augmentations of time), and extra expenses (Gashahun, 2020). Subsequently, this exploration is to

evaluate the issues like loss of pay, efficiency decrease, hard money deficiency, shortage of construction material deferral of tasks, and others in construction of public building projects.

Based on the sources provided, the **gap** from previous studies that the statement of the problem identifies is the lack of information and conducted studies specifically on the effect of the Coronavirus (COVID-19) pandemic on public building construction projects in Addis Ababa regional city.

While reports were available from different media outlets, further evaluation was required to fully reveal the effect of the pandemic on building construction projects and provide possible solutions. So far, no study had been conducted on this specific issue. The research aimed to respond to this gap through a rapid assessment.

Similarly to other developing countries COVID-19 is still a wide spread problem. Even if a few studied have been conducted and there is lack of information to estimate the exact effect of COVID-19 Pandemic on business firms. With this regards, little is known about the effect of Coronavirus (COVID-19 pandemic) on building construction projects which are engaged in different in Public Building Construction Projects in Addis Ababa regional city. The information gap still exists and studies have to conduct. Thus, the gap and the questions a raised in this study will pave the way for further studies to be conducted.

1.3 Research Questions

This study addresses the following research questions.

1. What is the effect of Coronavirus pandemic on public building projects in Addis Ababa on time and cost aspects?
2. What is the effect of Coronavirus pandemic on budget allocation for construction of public building projects in the study area?
3. What is the effect of Coronavirus pandemic on material stock in the construction of public building projects in Addis Ababa?

1.4 Research Objectives

1.4.1 General Objective

This research aims to assess the Effect of Coronavirus Pandemic on Public Building Construction Projects Success in Addis Ababa City.

1.4.2 Specific Objectives

The specific objectives of the research are expressed as follows:

1. To examine the effect of Coronavirus pandemic on public building projects in Addis Ababa on time and cost aspects.
2. To investigate the effect of Coronavirus pandemic on budget allocation in public building construction projects.
3. To assess the effect of Coronavirus pandemic on material stock in the construction of public building projects in Addis Ababa.

1.5. Significance of the study

The construction area in Ethiopia isn't grown well overall, practically a wide range of construction projects in Ethiopia are poor in execution, showing that comparative construction projects would go on for the approaching numerous years. The finding of this exploration, subsequently, have its own commitment to contract organization, project execution later on as a general rule, and limiting task influences specifically.

The review would likewise advance the proposals that help how building development go on without end because of pandemic and gives clue and contribution for additional review.

The introduced research offers a comprehension of the effects of the Coronavirus pandemic on the development business. The discoveries of the work will be helpful to legislative organizations as they try to lift the unfavorable impacts experienced in the development business. Industry delegates might utilize the discoveries to recognize risk the executives endeavors that might be fitting for their associations. Analysts might utilize the discoveries to distinguish trouble spots and propose pertinent intercessions to help the endeavors of the business.

1.6 Scope of the study

The scope of the study is defined by several key aspects:

Geographical Scope:

The study was specifically conducted in Addis Ababa city, Ethiopia

Addis Ababa is the capital of Ethiopia and a major center for transportation, logistics, and commerce.

Type of Projects Studied:

The examination was restricted to building construction projects owned by an administration authority or public projects.

These projects were specifically those that were under construction during the period of the study.

The study included public building development projects in Addis Ababa from different categories, such as institutional structures, office accommodation, industrial structures, and other public building development projects. Public buildings are defined as structures owned or used by the government or the public, such as courthouses, libraries, schools, and government offices.

Time-Bounded Scope:

The study focused on public building construction projects under construction during the Coronavirus (COVID-19) pandemic.

Data was collected from projects that were actively executed (in the works) from the **Ethiopian calendar year 2008 up to 2013 E.c.** (Note: 2008-2013 E.c. roughly corresponds to 2015/2016 - 2020/2021 G.C.).

The first case of Coronavirus in Ethiopia was reported on March 13, 202013, which falls within this timeframe.

Methodological Scope:

The study employed a mixed-methods approach, combining both qualitative and quantitative research methods

The research design utilized was both descriptive and explanatory.

Primary data was collected using questionnaires, semi-structured interviews, and case studies (site observation) conducted with key stakeholders. The stakeholders included contractors, consultants, clients, and regulatory bodies involved in the construction of these public building projects in Addis Ababa city.

Secondary data was collected from project documentations, journal books, reports, and different articles.

The study used a non-random testing strategy, specifically a Purposive or critical testing strategy for selecting the public building projects.

The target population was the quantity of dynamic activities associated with the construction of public building construction projects. Based on the Addis Ababa region office, there were 26 dynamic public tasks under execution. The researcher aimed to take the entire population of these tasks executed from 2008 up to 2013 E.c. While 49 ongoing projects were noted, data was specifically taken from 45 projects being constructed by grade one and grade two contractors to get a representative sample size.

Data analysis involved both qualitative and quantitative aspects. Quantitative data was analyzed using Microsoft Excel and SPSS software. The Relative Importance Index (RII) method was used to rank the effects of Coronavirus. The Spearman (rho) rank correlation coefficient was used to compare rankings between different groups of respondents. Reliability was tested using internal consistency and Cronbach Alpha and potentially ANOVA. Validity was assessed using content validity and evaluation by experts.

1.7 Limitation of the Study

The study was limited in several ways.

Specifically, the extent of this examination was restricted to building construction projects owned by an administration authority or public projects, which were under construction.

This restriction meant the study was confined to:

Public building development projects in Addis Ababa city.

Projects from different categories, including institutional structures, office accommodation, industrial structures, and other public building development projects.

The participants involved in the study were limited to contractors, consultants, clients, and regulatory bodies involved in the construction of these public building projects in Addis Ababa city.

The reason stated for these limitations was the constraint of analyst time and monetary asset.

1.8 Definitions of concepts and Key Terms

Coronavirus: is an infectious disease caused by the SARS-CoV-2 virus.

Pandemic: is a disease outbreak that spreads across countries or continents.

Effect: is a change which is a result or consequence of an action or other cause.

Construction: refers to any project that involves coming up with a design for a structure at a certain location, and then putting together all the different elements to build that structure. Construction projects fall into three broad categories: Buildings and houses, Public works, & Industrial projects.

Public building: refer to structures that are owned or used by the government or the public, such as courthouses, libraries, schools, and government offices.

Project: is a combination of set objectives to be accomplished within a fixed period. They are an excellent opportunity to organize your business and non-business goals efficiently.

1.9 Organization of Study

This research paper is organized into five chapters. The first chapter deals with the introduction part which encompasses background of the study, statement of the problem, research questions, research objectives, significance of the study, scope of the study, definitions of concepts &key terms and

organization of the study. The second chapter deals with the review of related literature. Chapter three focused on the research methodology whereas the fourth chapter presented the result analysis and discussion of the data. Finally, conclusions and recommendations were presented under the fifth chapter.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

INTRODUCTION

According to, world health organization (WHO, 2020) Coronavirus disease (COVID-19) is an infections caused by a newly discovered Coronavirus. Most of the people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However; people who are those older and those living with medical problem like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and reduce transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands with soap or by using an alcohol based sanitizer frequently and by not touching your face. As well as by using face mask because the COVID-19 virus spreads primarily through droplet when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette.

COVID-19 has been declared a "public health emergency of international concern" by the World Health Organization (WHO, 11 June 2020).This global pandemic has led to market failure in most countries around the world and a decline in global economic growth prospects (World Bank blog, 2020). In addition to the effects of the Global Financial Crisis (GFC), the restriction in movement on account of social distancing has further restricted the availability of labor and transport, leading to shut down in various dependent sectors of the global economy (WTO press release, 2020). What we understand from this crisis the worst affected countries will be the most vulnerable least-developed countries (LDCs) that remain over on international trade in goods and services.

The first Corona virus pandemic case was observed in Addis Ababa Ethiopia on 13 March 2020. By 2 August, more than 437,319 laboratory tests had been carried out of which 18,706 were positive (4% of all tests) (MoH and EPHI, 2020). The overwhelming majority of these positive tests have been in the capital, Addis Ababa. By 2 August, there had been 310 deaths in Ethiopia attributed to the virus. The first policy measures to limit the spread of the virus in Ethiopia were declared on 16 March, just three days after the first confirmed case. The Ethiopia government was closed schools, banned all public gatherings and sporting activities, and encouraged physical distancing. Travelers from abroad countries were put into a mandatory quarantine, bars were closed until further notice, and travel through land borders was prohibited. Several regional state governments imposed restrictions on public transportation and other vehicle movement between cities and rural areas.

According to Ethio-development booklet (2020), states about the effect of Coronavirus pandemic on the Ethiopian construction industry. The booklet states construction area is for the most part influenced by the Coronavirus pandemic close to the travel industry and transport area. in this booklet, Ethiopian structural specialist's leader Architect Yonas said that construction covers 70% capital of the nation and sets out work open doors next farming. He sees that since Ethiopia follows Laboure based development in which there is sharing of construction materials and apparatuses it requires taking consideration.

According to Wubshet Shekela (2020) said that Coronavirus decreases efficiency by 40%.and the pay of workers, gifted works, experts, construction material makers, providers, and machine leaseholders would be diminished in various Percent. Dr. Wubshet likewise added that the pandemic causes an unexpected effect on monetary associations and project workers. Thus, this might diminish the country's efficiency construction by 60% and open positions of residents by 40%.

According to Damtew Wolde (2021) likewise said that the pandemic effects adversely on the general agreement of contractors.it causes a lack of work and asset supply. In this way, the two players of the construction area ought to convey the obligation.

2.1 Theoretical Literature Review

Definition and Concept

1. Effect: In the context of this study, "Effect" refers to a change which is a result or consequence of an action or other cause. The study aims to assess the effects of the Coronavirus pandemic on various aspects of public building construction projects, including time and cost, budget allocation, and material stock. The study identifies both adverse effects3... and positive effects (opportunities) resulting from the pandemic. These effects are measured and analyzed through questionnaires, interviews, and case studies.

2. **Coronavirus Pandemic:** According to the sources, Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered Coronavirus. It was identified as a new coronavirus (severe acute respiratory syndrome coronavirus , or SARS-CoV-2), and later named as Coronavirus Disease-19 or COVID-19. A "Pandemic" is defined as a disease outbreak that spreads across countries or continents. The World Health Organization (WHO) declared COVID-19 a "public health emergency of international concern". The first case in Ethiopia was reported on March 13, 2020 [See conversation history], and the Ethiopian government declared a state of emergency to curb its spread, restricting travel and human mobility, which adversely affected the economy and businesses, including the construction industry.

3. **Public Building Construction Projects:** Within this study, "Construction" refers to any project that involves coming up with a design for a structure at a certain location, and then putting together all the different elements to build that structure. Construction projects can fall into categories like Buildings and houses, Public works, and Industrial projects. A "Public building" specifically refers to structures that are owned or used by the government or the public, such as courthouses, libraries, schools, and government offices. A "Project" is a combination of set objectives to be accomplished within a fixed period

2.1.1 Effect of Coronavirus Pandemic in Different Sectors

Effect on Ethiopia's economy; with very nearly 110 million individuals, Ethiopia is Africa's second most crowded country. Pre-Coronavirus, the country's genuine Gross domestic product development was anticipated to be 6.2 percent in 2020, up from 9.0 percent in 2019. This forecast has now been brought down to 3.2 percent in 2020. This is generally because of: store network Disturbance and debilitated worldwide interest, which has confined the inflow of natural substances and completed items for assembling and exchanging; A sharp ascent in expansion as homegrown food costs rise consistently (inferable from a sharp decrease in reap as a result of the grasshopper infestation);A sharp decrease in the travel industry as the Corona pandemic stops explorer's with lodging inhabitance rate diminished to around 2% and scratch-offs on appointments for the following 3-6 months; and Huge employment misfortunes Ethiopia's Work Creation Bonus has assessed between 700,000-2 million positions are probably going to be lost in 2020 relying upon the seriousness of the infection on Ethiopia's economy (Deloitte, 2020).

2.1.2 Effect on Construction and Real Estate Sectors

In 2020, Ethiopia's construction and land enterprises together contributed around 20.37 percent of the nation's Gross domestic product. There are 159 significant development extends in progress in Ethiopia starting around 2019 and one more 85 set to start ahead inside the following five years. Foundation projects are projected to deteriorate because of a lack in government income assortments and lower FDI inflows into the country. After the political decision is over in 2022, capital tasks, for example, railroad and street building are supposed to get once more (Deloitte, 2020).

Due to the Coronavirus pandemic, industry construction is supposed to shrink by 17 to 26 percent, and the development area is supposed to contribute a 9.9 percent lessening to Ethiopia's Gross domestic product as the nation battles to contain the infection's spread. Besides, as the nation enters a highly sensitive situation, laborers' pay is projected to drop by USD 23.3 million every month (WHO, 2020).

As we realize that the construction area in Ethiopia isn't grown well overall, practically a wide range of construction projects in Ethiopia are at a baby stage, showing that comparable development tasks will go on for the approaching numerous years. The pandemic's projected consequence is a drop in foundation financing, as moneylenders can't support building projects due to the vulnerability encompassing undertaking fulfillment (calvin T., 2020).

2.1.3 Effect on Airline Sector

Ethiopia's aircraft industry utilizes over 1.1 million individuals and contributes 5.4 percent of the nation's Gross domestic product, as most would consider being normal to be around USD 4.2 billion of every 2019. Ethiopian Carriers reported that it was just working at 10% of its ability and had proactively lost USD 550 million among January and mid-April 2020. During a similar stretch of time, traveler traffic in the area dropped by 2.5 million (Wubshet, 2020).

As a component of its expense cutting endeavors, the carrier has halted trips to north of 80 objections and as of late placed a few specialists on leave and suspended insignificant representatives. Ethiopian Carriers keeps on encountering misfortunes as the pandemic spreads, with the main part of its planes grounded. The aircraft, then again, is utilizing its enormous armada and objective organizations to move freight all over the planet, fundamentally clinical guide and some commodity freight (Damtew, 2021).

2.1.4 Effect on Tourism and Hospitality Sector

Ethiopia's travel industry developed at the quickest rate on the planet in 2018, because of the nation's rising flight area and the formation of Addis Ababa as an energetic and developing local center. The travel industry income ascends to USD 3.6 billion of every 2019, up from USD 3.5 billion out of 2018. The area represents 5% of Ethiopia's Gross domestic product and recruits 2.2 million specialists or 8.3% of the nation's absolute labor force (MoUDC, 2020).

Because of retractions on appointments for the following 3-6 months because of expanded travel limitations internationally, Ethiopia's lodging inhabitance has dropped to around 2% from a normal of 60% starting from the beginning of the pandemic. As per gauges, the greater part of the 2.2 million individuals working in the area are in danger of losing their positions because of the area's nearby connections to the remainder of the economy. Starting projections anticipated a 6% ascent in appearances from 1 million out of 2019 to 1.1 million in2020, as well as a 5.3 percent expansion in receipts from USD 3.6 billion out of 2019 to USD 3.8 billion out of 2020. Thus, these projections will end up being too hopeful as the business overall experience significant work misfortunes and profit declines (MoH and EPHI, 2020).

2.1.5 Effect on Manufacturing

In 2019, the manufacturing area contributed 4% of Ethiopia's Gross domestic product and utilized 13% of the absolute labor force. The beginning of the Coronavirus pandemic disturbed Ethiopia's stockpile chains, influencing the tasks of different makers and ventures that have seen request and creation action fall.

Ethiopia's assembling area, which has been a critical driver of development lately, is projected to contract by something like half because of the Coronavirus pandemic. Besides, with a halfway lockdown set up, the assembling area is projected to lose USD 13.3 million in the month to month pay of laborers. Starting from the start of April, Hawassa Modern Park, one of the country's seven completely working modern parks, has shut everything down 45% of its tasks. Hawassa Modern Park utilizes around 35,000 individuals in direct creation (MoUDC, 2020).

2.1.6 Effect on Agribusiness Sector

Agribusiness, which represents 33.3 percent of Ethiopia's Gross domestic product, is the foundation of the nation's economy. The business represented around 60% of the nation's commodities and 70% of all out positions. Ethiopia's rural area is figure to shrink by 1.6 percent in 2020 because of a deficiency of horticultural creation because of grasshopper pervasion and a lessening in trades because of the Coronavirus pandemic. Except for gold products, Ethiopia's commodities are solely farming merchandise, with the agriculture sub-area representing USD280 million of every 2019 and utilizing more than 150,000 specialists. As the area climates the Coronavirus storm, the greater part of these individuals are presently in danger of losing their positions. Ethiopian horticultural products were only 20% of their typical volume in April 2020, bringing about a YTD loss of USD 132 million. With a fractional lockdown currently set up in Ethiopia, month to month specialist pay is supposed to come around USD 5.7 million. Because of the Coronavirus pandemic, expanded travel limitations and diminished learning experiences for key exchanging accomplices North America and Europe would keep on restricting interest for Ethiopia's espresso and agricultural commodities temporarily (Damtew, 2021).

2.2 Empirical Literature Review

2.2.1 Government Mediation Measures

Different avoidance steps have been executed to slow the spread of the infection. The public authority encourages people in general to: wash hands consistently, stay away from contact with others, keep social separation, guarantee respiratory cleanliness, put dependence on solid and forward-thinking data

about the pandemic, wear veils and guarantee segregation after contamination or when in doubt of disease. Notwithstanding friendly and wellbeing related activities, the Public authority of Ethiopia has executed financial intercessions to protect the economy (UN, 2020).

2.2.2 Government Fiscal Initiatives

The Ethiopian National Bank would give ETB 15 billion to private banks to assist them with giving obligation help, credit rescheduling, and new advances to their clients. To limit face to face cash dealing with, the Public Bank of Ethiopia expanded how much cash that people can travel through versatile banking. Banks give unfamiliar cash to merchants for the most part that import items and info materials for the avoidance of Coronavirus. The Ethiopian National Bank has eliminated the base cost for blossom sends out in the agriculture business. Ethiopia has reported an ETB 5 billion (USD 154 million) medical services bundle.

The public authority supported a USD 54.9 million credit from the Africa Place for Infectious prevention and Counteraction, to handle the infection. Importation of provisions and hardware for the anticipation and regulation of Coronavirus is charge deductible. VAT returns will be facilitated by the Service of Income to assist organizations with income (MoUDC, 2020).

2.2.3 Early Effects of Coronavirus on the Construction Industry

The Coronavirus pandemic has caused critical unsettling influences and troubles in various nations and enterprises. The structure business, as different areas like carriers, banking, and cafés, has been impacted in various ways. The ongoing article zeroed in on classifying the early effects of the pandemic as recorded by construction partners through interviews with SMEs. As indicated by the consequences of the review, the structure business has confronted different adverse results. Stock conveyance delays, material deficiencies, work license delays, lower creation rates, income issues, project suspension, value accelerations, and potential contentions and debates were among them (Alsharef et al., 2021).

2.2.4 New Opportunities as a Result of the Coronavirus Pandemic

In spite of the different deterrents, the pandemic finished in various new open doors in the structure business. Lower loan costs set out open doors, as did an ascent popular in the clinical, transportation, and private areas, as well as the potential chance to recruit qualified representatives (Demisew et al., 2021).

2.2.5 Efforts to Manage the Challenges of the Coronavirus Pandemic

The concentrate additionally revealed substantial advances taken to determine the Coronavirus pandemic's danger in building locales. Security estimates included expecting staff to wear masks, upholding social removing rules, carrying out Coronavirus related wellbeing preparing, and advancing work-from-home projects. Laying out a team accused of giving Coronavirus related rules, proactive moves toward limit the gamble of postponements, support endeavors to lay out building tasks as required, and using legislative help projects to keep up with organizations and the labor force were among the other gamble the executives drives taken to battle the pandemic's belongings (Ayalew et al., 2021).

2.2.6 Contractual clauses used in practice and their effect on the contractual allocation of risks

There are a few common standard agreement provisions utilized by and by that predict a particular portion of legally binding dangers. In the construction business, for instance, contracts are frequently finished up under FIDIC rules, which predict explicit power majeure provisions as well as specific opportunities for contract variation. The constructor is qualified for a period expansion under the FIDIC Yellow Book 2017 in the event that the consummation of the work is deferred because of unforeseeable deficiencies in the stock of staff or products (or boss provided materials, if any) brought about by pandemics or legislative demonstrations. Moreover, pandemics and public travel limitations are in many cases delegated takes a chance with that are not safeguarded by insurance policies (John N., 2020).

2.2.6.1 Can Coronavirus Considered as Power Majeure Occasion in construction Industry?

Since Power Majeure occasion alludes to the event of an occasion outside the sensible control of the gatherings, and which keeps that party from playing out its commitments as anticipated under the agreement. The party ought to present a case easing the parties from Force majeure occasion in a great time, to survey or consider the moves toward take in an agreement to alleviate or lessen potential impacts of Coronavirus upon your labor force and the capacity to perform contracts, Steps ought to be set up by the parties in shielding their positions as a result of the developing circumstance like Coronavirus and Power Majeure arrangement in an agreement understanding ought to be survey in other to moderate Coronavirus challenges presents in the agreement. In this manner, it was reasoned that Coronavirus significantly affects the construction industry in Nigeria as it has upset site work, influence Bill of Amounts, influence project fruition, influence Law of agreement, and consequently is equipped for causing Force Majeure occasion in Nigeria construction industry (Kabiru and Yahaya, 2020).

The civil code of Ethiopia portrays that Power Majeure remains on two support points as demonstrated in Article 1792 (1). The principal support point is the occasion's un-predictability by the contracting parties which the ongoing pandemic fulfills. However, it is just half of the prerequisites. The other half of the prerequisites is that the occasion ought to forestall one of the contracting parties totally from playing out its commitments. The ongoing pandemic could unfavorably affect projects however has not forestalled one of the contracting parties from playing out its commitments.

2.2.7 Supply chain of the construction sector

The supply network in the construction business is the assortment of different elements mindful and adding to deliver an item. The inventory network of the construction business can be one of a kind contrasted with the commonplace inventory network of another industry where a solitary item could be efficiently manufactured. Conversely, every item in the construction business is unique and fabricated once. The items incorporate different foundations going from structures, streets, passages, water and sewerage pipe organizations, harbors, extensions, and dams. The greater parts of the constructed foundations are excessively mind boggling and require numerous abilities and skill for the effective conveyance of the completed item. A solitary association or an individual doesn't have the entire specialized and monetary limit expected to convey an item. One association may be capable in planning however wouldn't almost certainly have the labor force or the gear expected for the development. Likewise, a project worker would have the ability to fabricate the item however probably won't have satisfactory supplies of materials or means to buy the materials expected for development. In this manner, every one of the elements with various limits consolidates, in a perfect world legally, to construct and convey the contracted works (Eric, 2020).

The building industry is answerable for the construction of the two labor and products. Construction tasks in a project can be isolated into two classifications: upstream and downstream. Before the structure cycle, the upstream assignments are the preparation and configuration stage. Upstream activities are overwhelmingly described by utilities. The construction cycle of downstream tasks is described by the creation of a substantial decent. The downstream of the store network is fundamentally characterized by Contracting, subcontracting, and material inventory network (Aish, 2020).

2.2.8 Disruption in Global Supply Chain

Since the construction business relies upon imports for material stockpile, any effect on the worldwide store network can be reflected in the neighborhood inventory network. Thus, the effect on the worldwide production network because of Coronavirus is investigated in this segment. The disturbance in the worldwide store network could be impacted by requirements on the accessibility of work and materials.

Because of limitations forced by numerous nations across the globe, the specialists had not had the option to get to the offices and thus, the creation business had been stopped. Staff engaged with the upstream and at the point of interaction of upstream and downstream of the store network had the option to proceed with telecommute however work might have been eased back. Imperatives on the accessibility of laborers can straightforwardly influence the accessibility of materials (Ayalew et al., 2021).

A survey of the Coronavirus Pandemic Construction Industry Nation Reports of the part nations of the Global Organization of Asian and Western Pacific Project workers' Affiliations shows that the production network in the construction business of a few part nations had been impacted by Coronavirus. The party affiliations that had expressly detailed disturbances in the construction business supply chains of their separate nations are Manufacturers Relationship of India, Construction Relationship of Korea, Alliance of Project workers' Relationship of Nepal, Abroad Construction Relationship of Japan and Singapore Workers for hire Affiliation, Thai Project workers Affiliation, Taiwan General Project workers Affiliation (Aishath, 2020)

Products are moved all over the planet utilizing airship cargo and ocean cargo. The vast majority of the building materials are moved utilizing ocean cargo. Consequently, the effect of Coronavirus on the worldwide store network can be shown by any adjustment of the worldwide ocean cargo exercises. Compartment throughput mirrors the limit of a port. Consequently, month to month varieties in compartment throughput of the ports across the world can be utilized to measure and demonstrate the likely effect on supply anchors because of coordinated factors (Amoroso, 2019).

2.2.9 Variable Distinguishing Proof

An exhaustive writing survey was done to distinguish the impact of the Coronavirus pandemic in building construction projects and perceived by various scientists and experts in this field of study.

As per (Gashahun, 2020) coming up next are the significant effects of Coronavirus on the Ethiopian construction industry are:

Shortage and rising construction material expenses, Hard cash deficiencies, Diminished efficiency, Work deficiencies, Project delays (time augmentation), and Causing extra expense. As indicated by (Alsharef et al., 2021) the construction area has had a ton of unfortunate results because of the pandemic. These included: Material conveyance delays, Material deficiency, Allowing delays, Diminished creation rates, Income issues, Project suspension, Cost accelerations and Likely contentions and questions. Also, as indicated by (Aishath, 2020) It tends to be contended that the Coronavirus

pestilence adversely affects the building construction industry. How significant effect was spread include: The suspension of chips away at locales for a long time, Loss of income, Breaks in the stock of materials, Loss of business, Deficiency of laborers and Deficiency of unfamiliar trade Disturbances in the worldwide production network Homegrown production network interruptions and Creation Interruptions. As per (Gamil and Alhagar, 2020) found the most prevailing influencing factors are: The suspension of undertakings, Work impact and employment cutback, Time invade, Cost invade, and Monetary outcomes Endurance, Vulnerability Arranged and booked occasions are upset, Travel preclusions and limitations on development at work, Materials deficiencies to help progressing projects, as well as cost vacillations, Influence on the current achieved exercises. As indicated by (Alsharef et al. 2021) regardless of the quantity of difficulties, a few new open doors were knowledgeable about the construction business because of the pandemic. These included open doors that came about because of: Diminished loan fees; Request expansion in the clinical, transportation, and private areas, The capacity to enroll talented specialists and Leading Inward Surveys and Working on Existing Frameworks As indicated by (Ogunnusi et al., 2020) the positive encounters incorporate: The organization of specialized instruments and the upgrade of their utilization; Figuring out how to re-coordinate Work Plan; The advantage of having mass things on location; Advance generally to design; Empower cooperation and chance evaluation; Think about work area the board and plan; Think about extra private defensive equipment and social separating Plan for unexpected situations and Incorporation of possibility to cover such occasions; Increment off-site working (i.e., off-site construction or utilization of precast components.

2.3 Research Gap Analysis

The primary research gap identified by the study is the lack of information and conducted studies specifically assessing the effect of the Coronavirus (COVID-19) pandemic on public building construction projects in Addis Ababa regional city.

Here's a breakdown of the gap:

While reports about the pandemic's effects were available through various media outlets, and some studies touched upon the economic impacts of COVID-19 on business firms more generally, a detailed evaluation was required to fully reveal the effects on building construction projects.

Specifically, the sources state that so far, no study had been conducted on this specific issue. Little was known about the pandemic's effect on building construction projects engaged in public building construction in Addis Ababa regional city.

This existing information gap needed studies to be conducted.

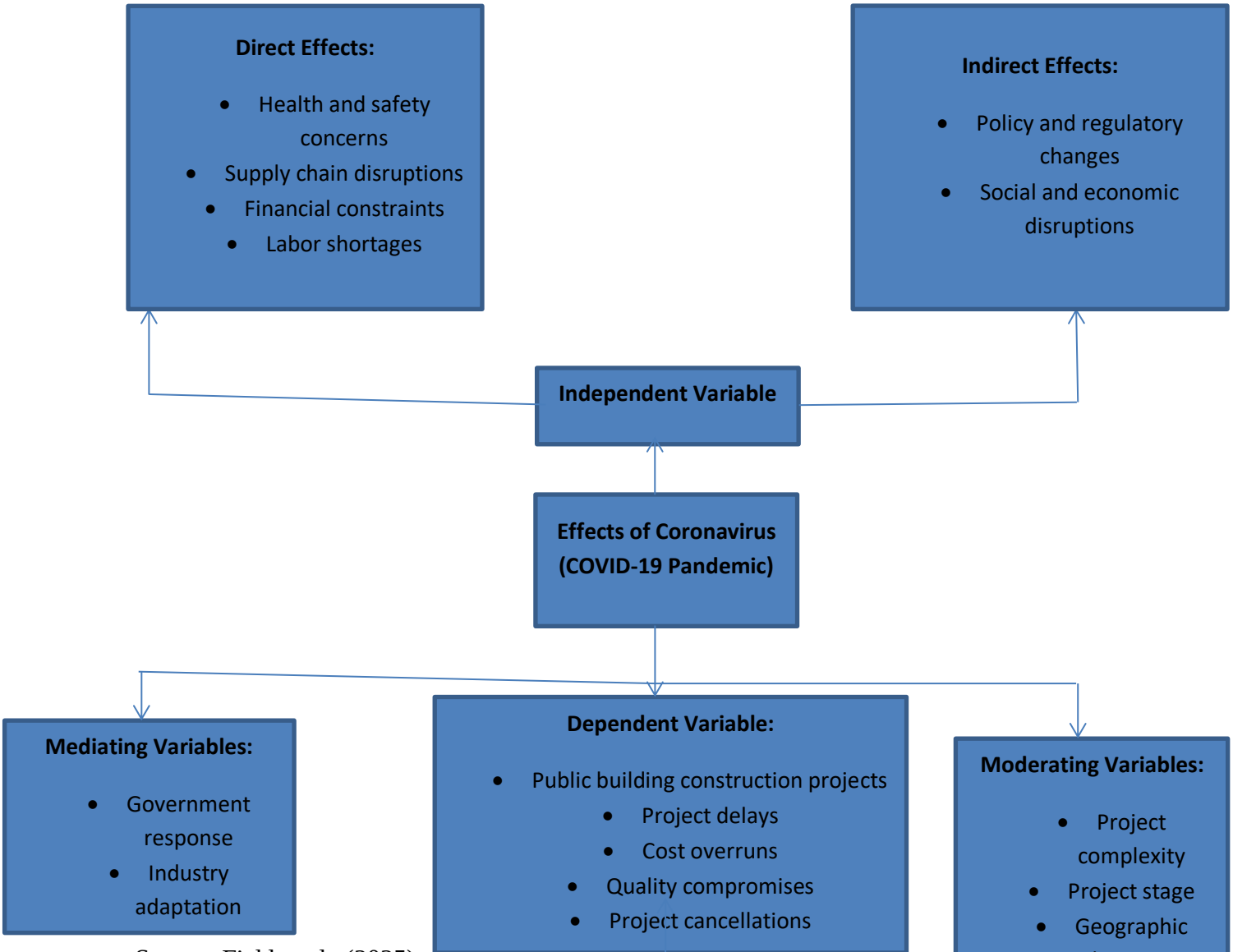
The research aimed to directly respond to this noted gap by providing a rapid assessment of the effect of the Coronavirus on building construction projects' operation.

Essentially, despite the widespread impact of the pandemic and the importance of the construction industry, there was a critical lack of focused research on how COVID-19 specifically affected public building construction projects within the context of Addis Ababa, necessitating this study to understand the impact and provide insights for decision-makers and future research.

2.4 Conceptual Framework

The conceptual framework for this study is based on the understanding that the COVID-19 pandemic has disrupted various sectors, including the construction industry. It posits that the pandemic has exerted direct and indirect influences on public building construction projects in Addis Ababa.

Figure 2.1: Conceptual Frameworks



Source: Field study (2025)

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

This section makes sense of the strategies utilized and records the ways and methods used to carry out the analysis. It gives brief data about the examination strategy, research plan, population and test size, different ways to deal with information assortment or information social affair, and information investigation. The technique is a system for deciding how issues will be researched, what information will be gotten utilizing which strategies, and how this information will be assessed to arrive at resolutions and foster suggestions. The effect of the Coronavirus epidemic on public building projects in Addis Ababa is the subject of this study. It is anticipated that the assessment of the effect of the Coronavirus pandemic may help to a reduction, possible elimination of the effect, and improvement in the overall performance of public building projects.

3.2 Study Area

Addis Ababa, Ethiopia

Addis Ababa is the capital of Ethiopia and one of the largest cities on the African continent, with a few million people of various origins and occupations currently living there. Addis Ababa is located in the very central part of the country and it is a key center of transportation, logistics, and commerce. The city is home to numerous international enterprises and organizations, thus it plays an important role in the international business arena as a great and favorable place for investments, starting and developing a private business, and establishing any kind of enterprise or venture. The city has plenty of landmarks, including various places of interest related to arts, education, architecture, shopping, and entertainment.

Figure 3.1: Location of Addis Ababa city

Source: Google map (2024)

1.3. Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2014). The research design for the study on the effect of the Coronavirus (COVID-19 pandemic) on public building construction projects in Addis Ababa City employs both qualitative and quantitative methodologies. Reasons for using this design: It allows for a comprehensive understanding of the complex effect of COVID-19 on public building construction projects. Quantitative methods enable statistical analysis of measurable variables. Qualitative methods provide in-depth insights into the subjective experiences and perceptions of stakeholders.

3.4. Sample Technique and Sample Size Determination

3.4.1. Target population

The number of dynamic public tasks under execution in Addis Ababa city was stated to be **26**, based on the Addis Ababa region office. The study aimed to take the entire population of these active tasks that were effectively executed (in the works) from 2008 up to 2013 E.c. While another count noted 49 ongoing projects, data was specifically taken from 45 projects being constructed by grade one and grade two contractors to get a representative sample size. However, the target *population* itself is described as the active public building construction projects.

The study then gathered data from contractors, consultants, clients, and regulatory bodies who were involved in the construction of these public building projects in Addis Ababa city. These individuals represented the stakeholders from which data was collected, but the target *population* was the projects themselves.

3.4.2. Sampling Technique

Sampling is the most common way of picking a set number of subjects from a specific populace to act as a delegate test of that population. As a general rule, there were two sorts of testing strategies: Probability or random sampling and Non-probability or non-random sampling (Taherdoost, 2018a). The examining method was being utilized in a non-random testing strategy. Since the populace was known and the quantity of populaces is under 50 then taking the entire populace and the sort of Purposive or critical testing strategy would have utilized for choosing the public building projects. Purposive or critical examining is a methodology wherein explicit circumstances, individuals, or occasions were deliberately decided to offer fundamental data that can't be assembled through different means (Maxwell, 1996). It is where the analyst remembers cases or members for the example since they accept that they warrant incorporation (Taherdoost, 2018a).

3.4.3. Sample Size Determination

Sample size alludes to the quantity of things to be select from the universe to comprise an example. It was a significant issue before a specialist went to the assortment of information. The size of the example ought to be ideal, and this ideal example is one, which would fulfill the standards of productivity, representativeness, dependability, and adaptability. In concluding the size of the example, it was important to decide the ideal accuracy as likewise an OK certainty level for the gauge, and thus a 95% certainty level used to compute the example size (Kish, 2018). Notwithstanding, for tiny populaces (50 or less), the specialist needs practically the whole populace to accomplish precision.

The study planned to distribute questionnaires to a total of **78 respondents**

This number was determined by selecting one client, one consultant, and one contractor for each of the 26 selected public building projects. These individuals were chosen based on their direct exposure to the selected project activities. The actual number of respondents who completed and returned the questionnaires was **63**, resulting in an 81% response rate. These 63 respondents consisted of **9 clients, 20 consultants, and 34 contractors**.

This study taking of the entire population for this study in light of the fact that the quantity of dynamic public tasks under execution in Addis Ababa city was 26 in view of the Addis Ababa region office. Then

the researcher takes the entire task that was effectively executed (in the works) from the year 2008 up to 2013 E.c then the absolute examiner disseminated for 78 respondents.

In summary, while the target population of active projects was stated as (with an aim to study all), the data for the main survey analysis appears to have been drawn from 45 projects constructed by grade one and two contractors. The planned sample size for the individual respondents completing questionnaires was **78**, with **63** actually participating9. Case studies involved a sample of **four projects**

3.5. Sources and Types of Data

To accomplish the planned goal and to address the examination inquiries of the review, various wellsprings of information would have utilized. As primary information, a questionnaire, semi-structured interview, and site observation sources would have utilized. To gather secondary information literature writing, video meeting, chronicled archives have been utilized.

3.6 Data Collection Instruments

In gathering the vital information, self-controlled surveys and interviews would have utilized. Primary information would have gathered through questionnaires and interviews, while secondary information was gathered through authentic archives/writing (a report, zoom conversations, explores, reading material). For information assortment in this review, the significant partners and administrative bodies would have taken part. Then the research will takes the example for 26 projects and for each undertaking one client, one consultant, and one contractor for hire for each project with a complete example of 78 examples have taken. These populaces were chosen relying upon their immediate openness to the chose 26 public building project activities.

Questionnaire

A questionnaire is a bunch of inquiries that are posed of individuals to assemble genuinely significant data on a particular subject. Questionnaires become a significant apparatus for offering expressions about unambiguous gatherings or whole populaces when they are accurately evolved and led. In planning the questionnaire, the goals of the review would have first settled. This was to help in figuring out what inquiries to pose and how to ask them.

A reasonable questionnaire would be ready to accomplish the target of the review. The questionnaire would have organized in light of the targets set previously. Open and close- ended questions were planned by permitting them to add different factors from their involvement with the finish of each segment. On a five-point ordinal measure scale, respondents were asked to rate the inquiries.

Interview

The informal interviews would have used to satisfy any lacking parts of data from the examiner in the recorded archives and surveys. An informal interview is a meeting that held in an informal setting, like over espresso or lunch. The interviewees would be any concerned body (partner) accessible at the association office who has been engaged with the construction of public building projects when of report investigation. To embrace this interview first blueprint the directing inquiries and the particular inquiries oversee bit by bit to inspect partner's perspectives on the effect of the pandemic.

Case study

Furthermore, directing a questionnaire review on the chose 26 undertakings, this examination would likewise utilize some contextual analyses on non-randomly chosen projects for distinguishing and surveying the effect of the pandemic in their projects. A case analysis is an ideal philosophy that would have utilized in the undertakings when an all-encompassing, top to bottom examination would have required. Case analyses underscore itemized logical investigation of a set number of conditions and their connections and will generally be particular. In doing the contextual investigation, information, for example, an advancement report of the continuous projects will be gathered. To have data on the expressed effects, information was extricated from the project guarantee letters, payment certificates, activity plans, and month to month progress reports. In light of the ongoing advancement and state of their building performance the recognized effects would be examined.

3.6.1. Data measurement

To have the option to choose the fitting strategy for examination, the degree of estimation should be perceived. For each kind of estimation, a proper technique can be applied and not others. In this exploration work, Likert scales would have utilized. Ordinal scales are positioning or rating information that typically use whole numbers in climbing or slipping request. The numbers alloted (1, 2, 3, 4, 5) don't demonstrate that the stretch between scales is equivalent, nor do they show outright amounts. They are only mathematical marks.

In view of the Likert scale the scientist has the accompanying rating scale for estimating the level (seriousness) of adverse consequence, as (E.E = Extremely Effected (5), V.E =Very Effected (4); M.E.= Modestly Effected (3); S.E. = Somewhat Effected (2); N.E. = Not Effected (1)) and for estimating the degree of meaning of positive effect (opportunity) as (V.H. = Very Huge (5), E.H. = Exceptionally huge (4), RC.= Respectably Critical (3), S.H. = Somewhat huge (2), N.H. = Not huge (1)) and evaluated in light of scale 1 up to 5 separately.

3.7 Data Analysis

In this examination, both descriptive and inferential measurements will be utilized for the investigation of information gathered from different sources. The overall significance record technique (RII) strategy for investigation will be executed to rank the effects of Coronavirus on the construction area. The reactions are investigated utilizing the Microsoft Succeed programming bundle and SPSS programming. The review gave a positioning of the factors in view of their level of effect. The overall significance list strategy (RII) for every potential effect is processed utilizing the accompanying articulations.

$RII = \sum W/A*N$ ……. [3.1]

Where: RII is relative importance index

W is the weight given to each factor by the respondents and ranges from 1 to 5

A = the highest weight = 5

N = the total number of respondents

The Spearman (rho) rank correlation coefficient is used to compare the rankings of two classes of respondents who scored for different factors (i.e., clients with consultants, clients with contractors, and consultants with contractors).

For any class of ranking, The Spearman (rho) rank correlation coefficient is calculated as follows:

$$\textbf{Rho (pcal)} = \frac{1 - 6x (\sum di^2)}{Nx (N^2 - 1)} \textbf{…… [3.2]}$$

Where: Rho (pcal) is Spearman's rank correlation coefficient;

di is the difference in ranking between each pair of factors; and

N is the number of factors (variables).

The Spearman (rho) rank correlation coefficient can be anywhere between -1 and +1.

A +1correlation coefficient indicates perfect positive correlation, 0 indicates no correlation, and -1 indicates perfect negative correlation.

3.8. Reliability and Validity Test

3.8.1 Reliability Test

Reliability alludes to consistency. Reliability is a proportion of how much an examination instrument gives reliable outcomes after rehashed preliminaries (Tiberius, Mwania, and Mwinzi, 2019). For a survey to be substantial, it should be solid. While answering a survey, respondents can reliably decipher an inquiry in one manner when it implies something different. Subsequently, despite the fact that the

inquiry is precise, it is unessential in light of the fact that it needs inner validity and hence wouldn't permit the examination question to be responded to. Accordingly, Reliability is worried about the strength of the survey and, specifically, whether it would create reliable discoveries at various times and under various circumstances, for example, with various examples or, on account of a questioner directed poll, with various questioners. In view of this the specialist establishes the crobancha's alpha of subscale for the pilot study was seen as 0.915 (for adverse consequences of a pandemic), .698 (for positive effect (chance) of a pandemic), and .912 (for a wide range of effect things) all were found over the base OK edge r=.671. Magnificent dependability (0.90 or more), solid unwavering quality (0.70-0.90), moderate unwavering quality (0.50-0.70), and unfortunate dependability (0.50 and underneath) are the four limits proposed by Hinton et al. (2004). The consequence of this paper will have phenomenal unwavering quality. Hence, thing all out insights were having registered for the last review without erasing anything. Furthermore, to keep up with the inside consistency of the things, the dependability investigation was being directed after the information was being gathered from all example respondents. Additionally, the unwavering quality of the things was over the base adequate level.

The analysis of variance /ANOVA/ is also used to check the reliability of variables used (See Appendix A). The unstandardized beta coefficient (β) tells us the unique contribution of each factor to the model. A high beta value (β) and a small p-value (<0.05) indicate the predictor variable has made a statistically significant contribution to the model. On the other hand, a small beta value (β) and a high p-value (p >0.05) indicate the predictor variable has little or no significant contribution to the model (George and Mallery, 2021).

3.8.2 Validity Test

The validity test decides how well an instrument estimates what it has expected to quantify. In different terms, Validity manages how inquiries in the questions were ready as far as being clear and not dubious. Among the various approaches to testing the legitimacy of the questionnaire, the substance validity test would need to be used for this exploration work. Hence, content validity alludes to the degree to which an estimating instrument gives sufficient inclusion of the point or items under study. Content validity is characterized as "how much things in an instrument address the substance universe to which the instrument will be summed up" (Straub and Gefen, 2019). The most common way of deciding substance validity starts with a review of the writing, trailed by an assessment by proficient specialists or boards. Likewise, the scientist evaluated the validity of the instrument with experts or specialists concerning the face validity on the off chance that its substance just looks pertinent to the individual stepping through the examination. The face validity appraisal remembers the questionnaire’s appearance for terms of reasonability, intelligibility, plan and organizing exactness, and the clearness of the language utilized

(Taherdoost, 2018b). This has done to approve the degree that estimation instrument things were applicable and agent of the objective build. At long last, the consultant, the center boss of this exploration took a gander at it, and afterward the instrument has conveyed according to the counsel. The judgment of what is 'sufficient inclusion' would have made through the cautious meaning of the examination through the writing audit.

At long last, the scientist led the validity of inquiries and answers in view of parson's relationship coefficient. In view of this as demonstrated from Supplement and the parson's connection coefficient shows somewhere in the range of 0 and 1 it shows a positive relationship and in the event that the connection between the factors was under 0 the connection was terrible or negative, in light of this the scientist tracked down a positive connection With the exception of two items in the questionnaire.

Here's a justification for the validity test:

1. ***Purpose of Validity:*** The sources state that a validity test determines how well an instrument measures what it has expected to quantify. It specifically addresses how questions in the questionnaire were prepared in terms of being clear and not dubious. For a survey to be substantial (valid), it must also be solid (reliable).
2. ***Method Used: Content Validity:*** Among various approaches, the study utilized the content validity test for this research work.
3. ***Definition of Content Validity:*** Content validity refers to the degree to which a measuring instrument provides sufficient inclusion of the topic or items under study. It is also defined as "how much items in an instrument address the substance universe to which the instrument will be summed up".
4. ***Process of Establishing Content Validity:*** The process for determining content validity involved several steps:

It begins with a **review of the literature** (implicitly, this is where potential effects and opportunities of the pandemic were identified).

This is followed by an assessment by proficient specialists or boards.

The researcher evaluated the validity of the instrument with experts or specialists.

This evaluation included checking **face validity**, which assessed the questionnaire's appearance in terms of **reasonability, intelligibility, plan and organizing exactness, and the clearness of the language utilized**.

The goal of this assessment was to approve the degree that estimation instrument things were applicable and agent of the objective build.

Finally, the **consultant**, described as the "center boss of this exploration," reviewed the instrument, and it was distributed according to their counsel4.

The determination of what constitutes "sufficient inclusion" was made through the cautious meaning of the examination through the writing audit.

5. ***Additional Validity Check (Pearson's Correlation):*** The scientist also conducted a validity check of the questions and answers based on **parson's relationship coefficient** (likely referring to Pearson's correlation coefficient)4. This analysis found a **positive relationship** between variables, except for two items in the questionnaire4.

3.9. Ethical consideration

As to moral contemplations, the accompanying issues were having managed: There was requesting consent from the chiefs from the example public construction projects, and a letter of consent was having taken from the division seat. Additionally, the specialist safeguarded the privacy of all members by guaranteeing that not a solitary one of them would compose the name in the information. The motivation behind the review has pre-educated the members and Members regarding the review were educated as filling the survey depended on willfulness; they can pull out on the off chance that they can't take part in that frame of mind whenever. Informed members, as their reactions were being utilized exclusively for research purposes than different issues, their privacy has won, and the exploration would be accounted for genuinely and ideally. Likewise, every one of the sources the specialist has utilized recognized and referred to true to form.

CHAPTER FOUR

2. RESULTS AND DISCUSSIONS

4.1 Introduction

This section analyses the data gathered using questionnaires, Case analyses, and interviews. In the past section, the techniques, which utilized in this research study, were having examined. The gathered data from the questionnaires were tabulated and analyzed by their positioning on the Relative Index (RI). Interviews from chosen respondents are introduced, along with observations from the case investigation. In this part, the information from the questionnaires, Case analysis, and interviews would have introduced and a discussion of the discoveries conveyed to reach up different determinations to the problem statement and objectives.

4.2 Analysis of Data from the Questionnaires

This section principally concerns the introduction of the consequences of the review in light of the gathered data utilizing questionnaire. To make it understood, the introduction of the outcomes was be coordinated in accordance with the fundamental questions.

4.2.1 Response Rate

The respondents were grouped into three significant gatherings in particular client, consultant, and contractor. The returns from the three gatherings are arranged in Table 4.1 which shows a typical reaction rate. Out of 78 designated reactions, just 63 (81%) of them finished and returned the questionnaire. 63 questionnaires from 9 clients, 20 consultants, and 34 contractors were gotten.

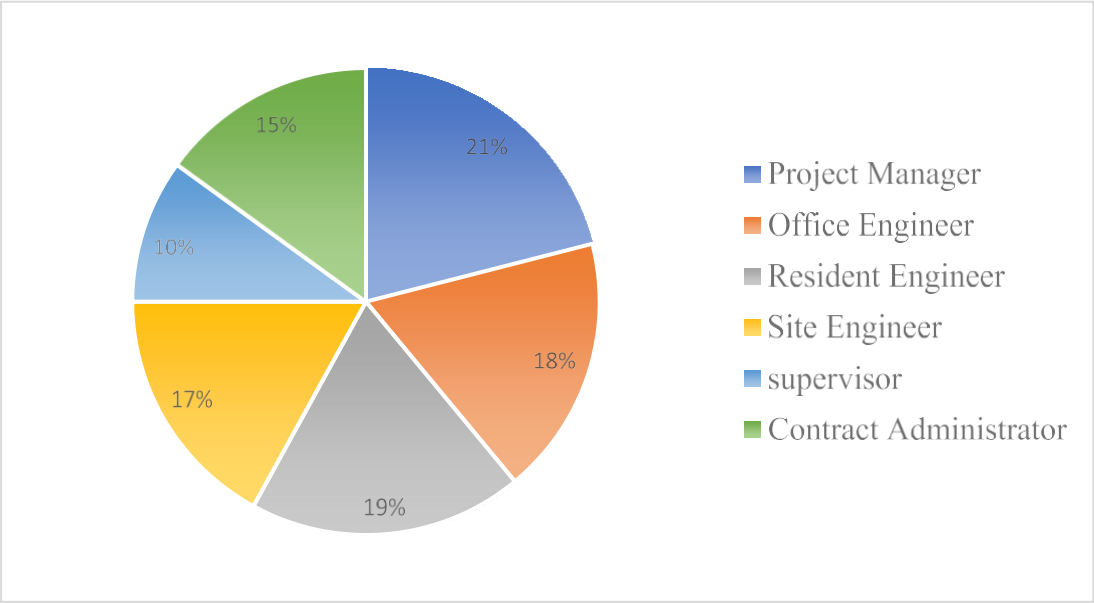
Table 4.1: Questionnaire returned back

Group	Number of Questionnaires Dispersed	Number of Questionnaires Returned Back	Response Rate (%)
Client	11	9	82
Consultant	26	20	77
Contractor	41	34	83
Total	78	63	81

Source: field study, (2025)

4.2.2 Respondents' Background

Among the 63 reactions got 21% of them were project managers,18% were office engineers,19% were resident engineers,17% were site engineers,10% were supervisors and 15% were contract administrators. Figure 4.1 shows the creation of respondents by their position in their association.



Source: field study, (2025)

Figure 4.1: Position of respondents

4.2.3 Respondents' Experience

Every one of the respondents has various degrees of work experience in building projects. Extents of the respondents as far as the quantity of long periods of contribution in building projects are organized in Table 4.2. It was seen that around one-half of the respondents from the clients have between five to a decade of years involvement. Around one-half of the respondents from the consultants have likewise between five to a decade years of involvement. What's more, larger parts of the respondents from the contractors have less than five years of involvement.

Table 4.2: Respondents' experience

Experience in Building Projects	Client	Consultant	Contractor	Total
Less than 5 years	3	2	14	19

5 to 10 years	5	13	11	29
10 years and above	1	5	9	15
% Of respondent	14.3%	31.7%	54%	100%

4.2.4 Findings from the Questionnaires

In the questionnaire overview, the respondents were approached to rate the level of commitment of the factors drawn from the writing literature. Besides, the respondents were likewise approached to add different factors or factors that added to the causes and effects as well as proposals that they saw as being important. The reactions were examined utilizing the Microsoft Excel software and the reliability of the content was checked by SPSS software.

From the (34) adverse consequences of Coronavirus pandemic in the construction business recognized from the literature review, seven (7) effects are grouped to time-related effect, nine (9) effects are grouped to cost-related effect, six (6) effects are grouped to material stock connected with effect, six (6) effects are grouped to guarantee related effect and the rest six (6) effects are grouped into different effects. Also, Nine (9) positive effects (chance) of the Coronavirus pandemic in the construction business particularly out in the public building projects were utilized in the questionnaire review.

The analysis was partitioned into three groups the clients' perspective, the consultant's perspective, and the contractor’s perspective, and a connection test was finished between the groups. A positioning framework utilizing the relative index (RI) strategy was determined to track down the main component for each part. The value of RI goes from 0.5 to 1. The value 0.5 addresses the least strength and the value 1 addressing the greatest strength. The accompanying table shows the rate examination of the respondents about fundamental data on the effect of the Coronavirus (COVID-19) pandemic on Public Building Construction Projects in Addis Ababa City, Ethiopia.

Table 4.3 Respondents analysis to Essential Information about the effect of pandemic

Item	Frequency	Percentage
Claim Due to covid-19		
Yes	41	65.1%
No	22	34.9%
Change to contract document due to Pandemic		
Yes	25	39.7%
No	38	60.3%
Change to project budget due to pandemic		
Yes	30	47.6%
No	33	52.4%
Delay due to covid-19 Pandemic		
YES	48	76.2%
No	15	23.8%
Cost overrun due to Pandemic		

YES	34	54.0%
No	29	46.0%

Source: field study, (2025)

As displayed in Table 4.3, from the complete respondents, 65.1% expressed that there was a claim due to Coronavirus (COVID-19) pandemic in their particular public building and 34.9% said that no claims what's more, for the inquiry raised is there any change to contract 60.3% of respondents responded to that there is no change to contract arrangement of public buildings because of pandemic however 39.7% of respondents expressed that there is a change to agreement.47.6% of respondents agree that there is a change to extend financial budget because of pandemic yet 52.4% of respondents did not.76.2% of respondents accept that Coronavirus pandemic reasons for delay of public building projects yet 23.8% of respondents did not agree. What's more, 54% of respondents accept that the Coronavirus - 19 pandemic foundations for cost over in broad daylight building construction however 46% of respondents disagreed.

4.2.4.1 Negative Effects of Coronavirus (Covid-19) Pandemic on Public Building Projects in Addis Ababa City

The seriousness of the negative effects was recognized by utilizing a 5-point Likert scale, namely Not = 1; Slight = 2; Moderate = 3, Sever = 4; and Extreme = 5. The effect of pandemic was ranked by comparing their relative index.

1. Time-Related Effects

The three construction parties have alternate points of view about the effect of the pandemic on public building construction. Under this segment, we will see the analysis of the three parties' reaction on time-related effect.

I. Client perspective

As we can see from table 4.4, it was feasible to rank the time-related effect by looking at their RII. As per the client's point of view, Laborers may not show up at the site timely because of transportation (RII=0.822), Delay in delivery (i.e., materials, equipment, and documents, and so forth) (RII=0.8), and Low efficiency of laborers (RII=0.778) were the most incredibly positioning time-related effects and effect on the current achieved activities (0.667) was the most un-positioned time-related effect.

Table 4.4: Seriousness of time-related effect according to client's perspective

No	Negative Effects	Total	RII	Rank
I	Time-Related Effect			
1	Laborers may not arrive at the site timely due to transportation	9	0.822	1
2	Delay in delivery (i.e., materials, equipment, and documents, etc.)	9	0.800	2
3	Low efficiency of workers	9	0.778	3
4	Time overrun	9	0.756	4
5	Contractors may not able to deploy as many employees as required by the schedule due to the requirements of physical distancing	9	0.733	5
6	Increase Idle Hours & Machinery	9	0.711	6
7	Effects on the existing accomplished activities	9	0.667	7

Source: field study, (2025)

II. Consultants' perspective

As displayed in Table 4.5, respondents of this group give the most ridiculously rank for Time overwhelm (0.96), Contractors may not ready to convey however many representatives as expected by the timetable because of the prerequisites of physical distancing (0.86) and Increment Inactive Hours and Machinery (0.84) and consultants likewise rank Effect on the current achieved activities (0.58) as a client basically rank for the time-related effect of the pandemic.

Table 4.5: Seriousness of time-related effect according to consultant's perspective

No	Negative Effects	Total	RII	Rank
I	Time-Related Effect			
1	Time overrun	20	0.960	1
2	Contractors may not able to deploy as many employees as required by the schedule due to the requirements of physical distancing	20	0.860	2
3	Increase Idle Hours & Machinery	20	0.840	3
4	Delay in delivery (i.e., materials, equipment, and documents, etc.)	20	0.820	4
5	Laborers may not arrive at the site timely due to transportation	20	0.800	5
6	Low Efficiency of workers	20	0.660	6
7	Effects on the existing accomplished activities	20	0.580	7

Source: field study, (2025)

III. Contractor's perspective

As displayed in Table 4.6, respondents of this gathering give the most incredibly rank for Low efficiency of laborers (0.794), Delay in delivery or Postpone in conveyance (i.e., materials, equipment, and records, and so on) (0.753), and Increment Inactive Hours and Machinery (0.741) and the effect on existing achieved activities (0.588) was the most un-positioned time-related effect. As we can see the positions of the two players, we can say that all construction parties agree that the effect on existing achieved activities is least and contractor and experts agree that the effect on Postpone in conveyance (i.e., materials, hardware, and documents, and so on) and Increment Inactive Hours and Machineries is high.

Table 4.6: Seriousness of time-related effect from contractor's perspective

No	Negative Effects	Total	RII	Rank
I	Time-Related Effect			
1	Low efficiency of workers	34	0.794	1
2	Delay in delivery (i.e., materials, equipment, and documents, etc.)	34	0.753	2
3	Increase Idle Hours & Machinery	34	0.741	3
4	Contractors may not able to deploy as many employees as required by the schedule due to the requirements of physical distancing	34	0.712	4
5	Time overrun	34	0.712	5
6	Laborers may not arrive at the site timely due to transportation	34	0.659	6
7	Effects on the existing accomplished activities	34	0.588	7

Source: field study, (2025)

The Spearman correlation coefficient is determined utilizing Equation 3.2 and arranged as displayed in Table 4.7.

Table 4.7: Summary of relationship test on the positioning of the time-related effect of pandemic

Respondents	$Rho(\rho cal) = 1 - \frac{6x(\sum di)^2}{n \times (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	0	No association b/n ranks
Consultant Vs Contractor	0.286	Weak +ve Association
Client Vs Contractor	0.107	Weak +ve association

Source: field study, (2025)

From the connection table above, it tends to be presumed that there is no relationship between the perspectives of the respondents in client and consultant. However, the respondents of consultant and client have weak relations with the contractor about the time-related effect of the pandemic (the other two parties week by week agree with the contractor).

IV. Overall Responses

As planted in Table 4.8, it was feasible to rank the time-related effect of the pandemic by consolidating the reactions, everything being equal. Thusly, this table shows that respondents of the multitude of parties give the most incredibly rank for Time overwhelm (0.797), Postpone in conveyance (i.e., materials, equipment, and reports, and so on) (0.781), and Increment Inactive Hours and Machinery (0.768) and effect on the current achieved activities (0.597) was the most un-positioned time-related effect of Coronavirus (COVID- 19) pandemic on a public building in Addis Ababa city.

Table 4.8: Seriousness of time-related effect for the overall response

No	Negative Effects	Total	RII	Rank
I	Time-Related Effect 0.74			
1	Time overrun	63	0.797	1
2	Delay in delivery (i.e., materials, equipment, and documents, etc.)	63	0.781	2
3	Increase Idle Hours & Machinery	63	0.768	3
4	Contractors may not able to deploy as many employees as required by the schedule due to the requirements of physical distancing	63	0.762	4
5	Low efficiency of workers	63	0.749	5
6	Laborers may not arrive at the site timely due to transportation	63	0.727	6
7	Effects on the existing accomplished Activities	63	0.597	7

Source: field study, (2025)

1. Cost- Related Effects

The three construction parties have alternate points of view about the effect of the pandemic on public building construction. Under this segment, we will see the analysis of the three parties' reaction on cost-related effect.

I. Client perspective

Table 4.9 shows positioning the cost- related effect by looking at their RII was conceivable. As per the client's viewpoint, failure to pay wages and bank loan (RII=0.889), Heightening and expansion of material costs (RII=0.867), and Income deficiency (RII=0.822) were the most over the top positioned cost-related effects and Extra expense because of new Wellbeing and Wellbeing prerequisites, PPEs (0.6) was the most un-positioned cost-related effect.

Table 4.9: Seriousness of cost-related effect from client's perspective

No	Negative Effects	Total	RII	Rank
II	Cost Related Effect			
1	Failure to pay wages and bank loan	9	0.889	1
2	Heightening and expansion of material costs	9	0.867	2
3	Income deficiency	9	0.822	3
4	Financial effect (Delay in payments to contractor)	9	0.778	4
5	Increase expenses due to idleness of resources like equipment, machinery, and tools, human resources	9	0.733	5
6	Cost overruns	9	0.711	6
7	Additional cost emanated from changes of the law restricting the activities	9	0.689	7
8	Virtual related expense/internet and computer expense for communication	9	0.622	8
9	Extra expense because of new Wellbeing and Wellbeing prerequisites, PPEs	9	0.600	9

Source: field study, (2025)

II. Consultants' perspective

As displayed in Table 4.10, respondents of this group give the most over the top position for cost overwhelm (0.98), Virtual related expense/internet and computer expense for communication (0.86), Heightening and expansion of material costs (0.84), and Extra expense because of new Wellbeing and Wellbeing prerequisites, PPEs (0.84). Consultants likewise rank Extra expense emanated from changes of the law limiting the activities (0.58) essentially rank for the expense related effect of the pandemic

Table 4.10: Seriousness of cost-related effect from consultant's perspective

No	Negative Effects	Total	RII	Rank
II	Cost Related Effect			
1	Cost overruns	20	0.980	1
2	Virtual related expense/internet and computer expense for communication	20	0.860	2
3	Heightening and expansion of material costs	20	0.840	3
4	Extra expense because of new Wellbeing and Wellbeing prerequisites, PPEs	20	0.840	3
5	Failure to pay wages and Bank Loan	20	0.800	4
6	Income deficiency	20	0.720	5
7	Financial effect (Delay in payments to contractor)	20	0.680	6
8	Increase expenses due to idleness of resources like equipment, machinery, and tools, human Resources	20	0.660	7
9	Additional cost emanated from changes of the law restricting the activities	20	0.580	8

Source: field study, (2025)

III. Contractors' perspective

As displayed in Table 4.11, respondents of this group give the most over the top position for Heightening and expansion of material costs (0.876), Income deficiency (0.806) and Cost overruns (0.753), and Virtual related expense/internet and computer expense for communication (0.529) was the most un-positioned cost-related effect.

Table 4.11: Seriousness of cost-related effect from contractor's perspective

No	Negative Effects	Total	RII	Rank
II	Cost Related Effect			
1	Heightening and expansion of material costs	34	0.876	1
2	Income deficiency	34	0.806	2
3	Cost overruns	34	0.753	3
4	Financial effect (Delay in payments to contractor)	34	0.747	4
5	Failure to pay wages and Bank Loan	34	0.676	5
6	Increase expenses due to idleness of resources like equipment, machinery, and tools, human resources	34	0.676	5
7	Additional cost due to new Safety and Health requirements, PPEs	34	0.629	6
8	Additional cost emanated from changes of the law restricting the activities	34	0.541	7
9	Virtual related expense/internet and computer expense for communication	34	0.529	8

Source: field study, (2025)

The Spearman relationship coefficient is determined utilizing Equation 3.4 and organized as displayed in Table 4.12.

Table 4.12: Summary of connection test on the positioning of the cost related effect of pandemic

Respondents	Rho(ρ_{cal}) = 1 – $\frac{6x(\sum d_i\ 2)}{n \times (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	-0.171	Weak -ve correlation
Consultant Vs Contractor	0.688	strong +ve correlation
Client Vs Contractor	0.133	Weak +ve correlation

Source: field study, (2025)

From the connection table above, it tends to be reasoned that there is a negatively weak relationship between the respondents in client and consultant which implies that the respondents view isn't connected. However, the respondents of consultant and contractor have areas of strength for a relationship (both strongly settle on the cost related effects) and clients likewise have a weak positive connection with the contractor about the cost related effect of the pandemic.

IV. Overall Responses

Table 4.13, shows that the cost related effect of the pandemic by joining the reactions of all respondents in view of its RII. Consequently, this table shows that respondents of the relative multitude of parties give the absolute most position for Heightening and expansion of material costs (0.863), Cost overruns (0.819), and Income deficiency (0.781). Extra expense emanated from changes of the law restricting the activities (0.575) were the most un-positioned the cost related effect of the Coronavirus (COVID- 19) pandemic on a public building in Addis Ababa city.

Table 4.13: Seriousness of cost-related effect for the overall response

No	Negative Effects	Total	RII	Rank
II	Cost Related Effect 0.726			
1	Heightening and expansion of material costs	63	0.863	1
2	Cost overruns	63	0.819	2
3	Income deficiency	63	0.781	3
4	Failure to pay wages and Bank Loan	63	0.746	4
5	Financial effect (Delay in payments to contractor)	63	0.730	5
6	Additional cost due to new Safety and Health requirements, PPEs	63	0.692	6
7	Increase expenses due to idleness of resources like equipment, machinery, and tools, human resources	63	0.679	7
8	Virtual related expense/internet and computer expense for communication	63	0.648	8
9	Additional cost emanated from changes of the law restricting the activities	63	0.575	9

Source: field study, (2025)

2. Material Stock Related Effects

The three construction parties have alternate points of view about the effect of the pandemic on public building construction. Under this segment, we will see the analysis of the three parties' reaction on material stock related effect.

I. Client Perspective

From Table 4.14, we can comprehend that the position for the material stock related effect is finished by contrasting their RII. As indicated by the client's point of view, Production Disruptions (0.911), foreign currency/LC disruptions (0.889), and Worldwide production network disturbances (0.867) were the most incredibly positioning time-related effect. Increase in Demand from Local Suppliers and Manufacturers (0.733) was the most un-positioned material stock network related effect.

Table 4.14: Seriousness of material stock related effect from client's perspective

No	Negative Effects	Total	RII	Rank
III	Material Stock Related Effect			
1	Production Disruptions	9	0.911	1
2	Foreign currency/LC disruptions	9	0.889	2
3	Worldwide production network disturbances	9	0.867	3
4	Domestic supply chain disruptions	9	0.800	4
5	Deficiency of materials to help running project	9	0.778	5
6	Increase in Demand from Local Suppliers and Manufacturers	9	0.733	6

Source: field study, (2025)

II. Consultants' perspective

As displayed in Table 4.15, respondents of this group give the most incredibly rank for Worldwide store network disturbances (0.98), Deficiency of materials to help running project (0.82), and foreign currency/LC disruptions (0.80) in light of their RII an incentive for material stock network related effect. Consultants likewise rank Increase in Demand from Local Suppliers and Manufacturers (0.64) essentially rank for material stock related effect of the pandemic.

Table 4.15: Seriousness of material stock related effect from consultant's perspective

No	Negative Effects	Total	RII	Rank
III	Material Stock Related Effect			
1	Worldwide production network disturbances	20	0.980	1
2	Deficiency of materials to help running project	20	0.820	2
3	Foreign currency/LC disruptions	20	0.800	3
4	Domestic supply chain disruptions	20	0.740	4
5	Production Disruptions	20	0.660	5
6	Increase in Demand from Local Suppliers and Manufacturers	20	0.640	6

Source: field study, (2025)

III. Contractors' perspective

As shown in Table 4.16, respondents of this group give the highest rank for foreign currency/LC disruptions (0.906), Global supply chain disruptions (0.853), and Shortage of materials to support running projects (0.759). An increase in Demand from Local Suppliers and Manufacturers (0.582) was the least ranked material-related impact. As we can see the highest ranks of both consultant and contractor, we can say that foreign currency/LC disruptions, Global supply chain disruptions, and Shortage of materials to support running projects are the most material supply-related impact of the pandemic.

Table 4.16: Seriousness of material stock related effect from contractor's perspective

No	Negative Effects	Total	RII	Rank
III	Material Stock Related Effect			
1	Foreign currency/LC disruptions	34	0.906	1

2	Worldwide production network disturbances	34	0.853	2
3	Deficiency of materials to help running project	34	0.759	3
4	Domestic supply chain disruptions	34	0.712	4
5	Production Disruptions	34	0.700	5
6	Increase in Demand from Local Suppliers and Manufacturers	34	0.582	6

Source: field study, (2025)

The Spearman relationship coefficient is determined utilizing Equation 3.2 and arranged as displayed below in Table 4.17.

Table 4.17: Summary of relationship test on the positioning of material stock related effect of pandemic

Respondents	$Rho(\rho_{cal}) = 1 - \frac{6x(\sum d_i)}{n \times (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	0.143	Weak +ve correlation
Consultant Vs Contractor	0.371	Good +ve Correlation
Client Vs Contractor	0.829	Strong +ve correlation

Source: field study, (2025)

From the relationship table above, it very well may be reasoned that there is a positive powerless connection between the respondents in client and expert. What's more, the respondents of consultant and contractor have great positive relationship and furthermore clients have areas of strength for a connection (strongly agreed) with the contractor about material stock related effect of the pandemic.

IV. Overall Responses

As displayed in Table 4.18, it was feasible to rank the material stock related effect of the pandemic by consolidating the reactions of all respondents in light of the RII an incentive for each. Thusly, this table shows that respondents of the relative multitude of parties give the most noteworthy position for worldwide production network disturbances (0.895), foreign currency/LC disruptions (0.870), and Deficiency of materials to help running projects (0.781).

What's more, Increase in Demand from Local Suppliers and Manufacturers (0.622) was the most un-positioned material stock related effect of the Coronavirus (COVID - 19) pandemic on a public building in Addis Ababa city.

Table 4.18: Seriousness of material stock related effect for the overall response

No	Negative Effects	Total	RII	Rank
III	Material Stock Related Effect 0.77			
1	Worldwide production network disturbances	63	0.895	1
2	Foreign currency/LC disruptions	63	0.870	2
3	Deficiency of materials to help running project	63	0.781	3
4	Domestic supply chain disruptions	63	0.733	4
5	Production Disruptions	63	0.717	5
6	Increase in Demand from Local Suppliers and Manufacturers	63	0.622	6

Source: field study, (2025)

3. Claim Related Effects

The three construction parties have alternate points of view about the effect of the pandemic on public building construction. Under this segment, we will see the analysis of the three parties' reaction on claim related effect.

I. Client Perspective

Table 4.19 shows the position of factors of claim related effects of the pandemic in view of their RII value. As indicated by the client's point of view, the expansion of time (EOT) (0.867), interruption of arranging and booking (0.778) and suspension of projects (0.756) were the most noteworthy positioned claim related effects. Furthermore, payment emerging out of difficulty with no lawful remedy (0.667) was the most un-positioned claim related effect.

Table 4.19: Seriousness of claim related effect from client's perspective

No	Negative Effects	Total	RII	Rank
IV	Claim Related Effect			
1	Expansion of time (EOT)	9	0.867	1
2	Interruption of arranging and booking	9	0.778	2
3	Suspension of projects	9	0.756	3
4	Restriction of movement on the work and travel bans	9	0.689	4
5	Expected Increase in Disputes, Litigation, and Claims	9	0.644	5
6	Payment emerging out of difficulty with no lawful remedy	9	0.556	6

Source: field study, (2025)

II. Consultants' perspective

As displayed in Table 4.20, respondents of these parties give the most elevated rank for Suspension of projects (0.98), Interruption of Arranging and booking (0.92), and Expansion of Time (EOT) (0.88). Likewise rank Expected Increase in Disputes, Litigation, and Claims (0.52) and payment emerging Out of Difficulty with No Lawful remedy (0.52) essentially rank for the claim related effect of the pandemic.

Table 4.20: Seriousness of claim related effect from consultant's perspective

No	Negative Effects	Total	RII	Rank
IV	Claim Related Effect			
1	Suspension of projects	20	0.980	1
2	Interruption of Arranging and booking	20	0.920	2
3	Expansion of Time (EOT)	20	0.880	3
4	Restriction of movement on the work and travel bans	20	0.680	4
5	Payment emerging Out of Difficulty with No Lawful remedy	20	0.520	5
6	Expected Increase in Disputes, Litigation, and Claims	20	0.520	5

Source: field study, (2025)

III. Contractors' perspective

As displayed in Table 4.21, respondents of this group give the most over the top position for Expansion of Time (EOT) (0.776), Interruption of Arranging and booking (0.724), and Restriction of movement on the work and travel bans (0.659). An expected increase in disputes, litigation, and claims (0.524), and

Payment Emerging out of Difficulty with No Lawful remedy (0.524) was the most un-positioned claim related effect. Hence, all parties agree that expansion of time, suspension of projects, and interruption of arranging and booking are the exceptionally affected claim related effects of the Coronavirus (COVID-19) pandemic.

Table 4.21: Seriousness of claim related effect from contractor's perspective

No	Negative Effects	Total	RII	Rank
IV	Claim Related Effect			
1	Expansion of Time (EOT)	34	0.776	1
2	Interruption of Arranging and booking	34	0.724	2
3	Restriction of movement on the work and travel bans	34	0.659	3
4	Suspension of projects	34	0.541	4
5	Payment Emerging out of Difficulty with No Lawful remedy	34	0.524	5
6	Expected Increase in Disputes, Litigation, and Claims	34	0.524	6

Source: field study, (2025)

The Spearman connection co

efficient is determined utilizing Equation 3.2 and organized as displayed in Table 4.22.

Table 4.22: Summary of connection test on the positioning of claim related effect of pandemic

Respondents	Rho(ρ_{cal}) = $1 - \frac{6x\ (\sum di)}{n\ x\ (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	0.743	Strong +ve Correlation
Consultant Vs Contractor	0.886	Strong +ve Correlation
Client Vs Contractor	0.571	Strong +ve Correlation

From the relationship table, it very well may be reasoned that there is major areas of strength for a connection between the perspectives of respondents of each party. This implies that the majority of the respondents have a similar perception about claim related effect of the pandemic.

IV. Overall Responses

As displayed in Table 4.23, it was feasible to rank the time-related effect of the pandemic by joining the reactions, everything being equal. Accordingly, this table shows that respondents of the multitude of parties give the absolute most position for Expansion of Time (EOT) (0.822), Interruption of Arranging and booking (0.794), and Suspension of projects (0.711). Payment emerging out of difficulty with no lawful remedy (0.527) was the most un-positioned claim-related of the Coronavirus (COVID-19) pandemic on public building in Addis Ababa City.

Table 4.23: Seriousness of claim related effect for the overall response

No	Negative Effects	Total	RII	Rank
IV	Claim Related Effect 0.677			
1	Expansion of Time (EOT)	63	0.822	1
2	Interruption of Arranging and booking	63	0.794	2
3	Suspension of projects	63	0.711	3
4	Restriction of movement on the work and travel Bans	63	0.670	4
5	Expected Increase in Disputes, Litigation, and Claims	63	0.540	5
6	Payment Emerging out of Difficulty with No Lawful remedy	63	0.527	6

4. Other Effects

The three construction parties have alternate points of view about the effect of the pandemic on public building construction. Under this segment, we will see the analysis of the three parties' reaction on different effects.

V. Client perspective

From Table 4.24 the factors gathered in different effects are additionally positioned in view of the RII value. As per the client's point of view, Decrease of new investments in the construction business (RII=0.911), Income decrease (RII=0.889), and expansion in joblessness (RII=0.867) were the most elevated positioned different effects of the pandemic. Furthermore, Vulnerability of survival (0.622) was the most un-positioned time-related effect of the pandemic Coronavirus (COVID-19).

Table 4.24: Seriousness of other effects of a pandemic for client perspective

No	Negative Effects	Total	RII	Rank
V	Other Effects			
1	Decrease of new investments in the construction business	9	0.911	1
2	Income reduction	9	0.889	2
3	Expansion in joblessness	9	0.867	3
4	Transition to Work from Home for Non-Site Personnel	9	0.800	4
5	Labor effect and job losing (labor force deficiency)	9	0.778	5
6	Vulnerability of survival	9	0.622	6

VI. Consultants' perspective

As displayed in Table 4.25, respondents of this gathering give the absolute most position for Labor effect and job losing (labor force deficiency) (0.88), the vulnerability of survival (0.86), and decrease of new investments in the construction business (0.66). What's more, transition to work from home for non-site personnel (0.54) the un-rank for the time-related effect of the Coronavirus (COVID-19) pandemic.

Table 4.25: Seriousness of other effects of a pandemic for consultant's perspective

No	Negative Effects	Total	RII	Rank
V	Other effects			
1	Labor effect and job losing (labor force deficiency)	20	0.880	

				1
2	Vulnerability of survival	20	0.860	2
3	Decrease of new investments in the construction business	20	0.660	3
4	Income decrease	20	0.640	4
5	Expansion in joblessness	20	0.620	5
6	Transition to Work from Home for Non-Site Personnel	20	0.540	6

VII. Contractors' perspective

As displayed in Table 4.26, respondents of this gathering give the most noteworthy position for Expansion in joblessness (0.824), Income decrease (0.776), and Vulnerability of survival (0.747). Furthermore, Transition to Work from Home for Non-Site Personnel (0.629) was the most un-positioned different effects of the Coronavirus (COVID-19) pandemic.

Table 4.26: Seriousness of other effects of a pandemic for contractor's perspective

No	Negative Effects	Total	RII	Rank
V	Other effects			
1	Expansion in joblessness	34	0.824	1
2	Income decrease	34	0.776	2
3	Vulnerability of survival	34	0.747	3
4	Labor effect and job losing (labor force deficiency)	34	0.741	4

5	Decrease of new investments in the construction business	34	0.665	5
6	Transition to Work from Home for Non-Site Personnel	34	0.629	6

The Spearman relationship coefficient is determined utilizing Equation 3.2 and arranged as displayed below in Table 4.27.

Table 4.27: Summary of relationship test on the positioning of different effects of the pandemic

Respondents	$Rho(\rho cal) = 1 - \frac{6x(\sum di)}{n \times (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	-0.371	Good -veCorrelation
Consultant Vs Contractor	0.029	Very weak +ve correlation
Client Vs Contractor	0.029	Very weak +ve correlation

From the relationship table above, it tends to be presumed that there is a weak connection between the parties about different effects of the pandemic (the two parties disagreed).

VIII. Overall Responses

As planted in Table: 4.28, positioning the other effect of the pandemic by joining the reactions of all respondents were conceivable. Subsequently, this table shows that respondents of the relative multitude of parties give the most noteworthy position for Labor effect and employment losing (labor force deficiency) (0.79), Vulnerability of survival (0.765), Expansion in joblessness (0.765), and Income decrease (0.749). Furthermore, Transition to Work from Home for Non-Site Personnel (0.625) was the most un-positioned different effects of the Coronavirus (COVID-19) pandemic on a public building in Addis Ababa city.

Table 4.28: Seriousness of other effects of a pandemic for the overall response

No	Negative Effects	Total	RII	Rank
V	Other effects 0.732			
1	Labor effect and job losing (labor force deficiency)	63	0.790	1
2	Vulnerability of survival	63	0.765	2
3	Expansion in joblessness	63	0.765	2
4	Income decrease	63	0.749	3
5	Decrease of new investments in the construction business	63	0.698	4
6	Transition to Work from Home for Non-Site Personnel	63	0.625	5

IX. Major negative effects of a COVID-19 pandemic for Overall responses

It is great to realize which effect of the Coronavirus (COVID-19) pandemic affected most over the others. To do so we want to figure the typical RII of the general reactions for each effect and afterward we will rank in light of their particular RII value from the most significant effect on the most un-significant effect. As we can see from table 4.29 Material Stock Related Effect, Time Related Effect, Other effects, Cost Related Effect, and guarantee related influences are the significant effects of the Coronavirus (COVID-19) pandemic in broad daylight building construction projects in Addis Ababa city separately.

X. Major negative effects of a COVID-19 pandemic for Overall responses

It is great to realize which effect of the Coronavirus (COVID-19) pandemic affected most over the others. To do so we want to figure the typical RII of the general reactions for each effect and afterward we will rank in light of their particular RII value from the most significant effect on the most un-significant effect. As we can see from table 4.29 Material Stock Related Effect, Time Related Effect, Other effects, Cost Related Effect, and guarantee related influences are the significant effects of the Coronavirus (COVID-19) pandemic in broad daylight building construction projects in Addis Ababa city separately.

Table 4.29: Seriousness of major effect of a pandemic for the overall response

No	Negative Impacts	Average RII	Rank
1	Material Stock Related Impact	0.770	1
2	Time-Related Impact	0.740	2
3	Other impacts	0.732	3
4	Cost Related Impact	0.726	4
5	Claim Related Impact	0.677	5

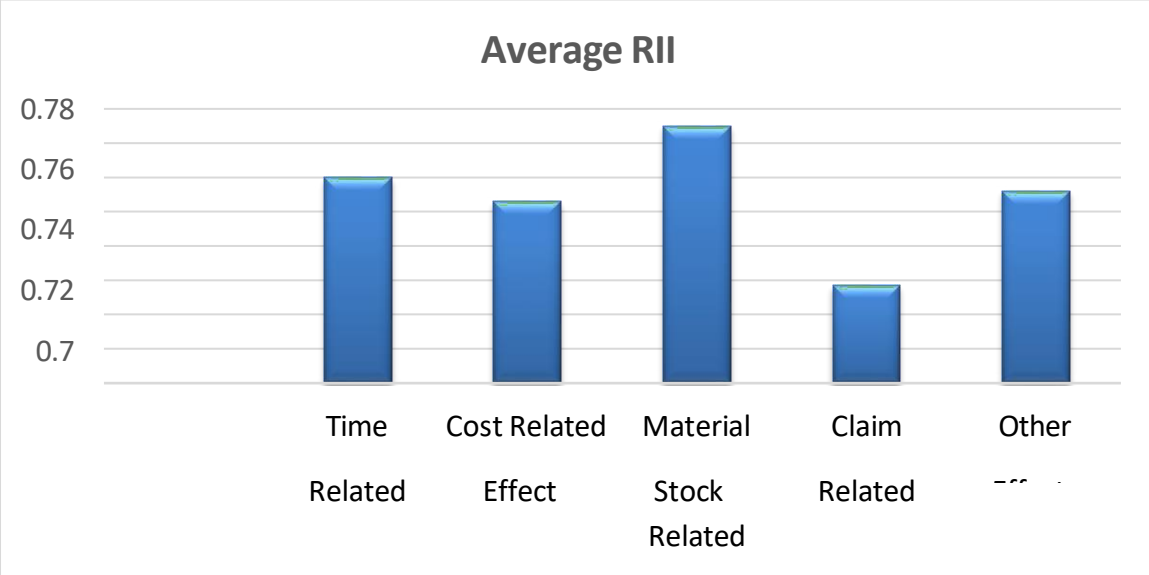


Figure: 4.2 Rank for Major effects of the pandemic

4.2.4.2 Positive Effects (opportunities) Of COVID-19 Pandemic on Public Building construction Projects in Addis Ababa City

The degree of significance of opportunities were distinguished by utilizing a 5-point Likert scale, namely Not = 1; Slight = 2; Moderate = 3, very = 4; and Extreme = 5. The effect of pandemic was positioned by contrasting their general significance index.

I. Client perspective

Table 4.30, additionally shows the position for the opportunity of the pandemic by contrasting their RII. As per the client's viewpoint, Conducting Interior Surveys and Working on Existing Frameworks (Work update) (RII=0.80), Potential chance to develop virtual other options (E-construction) (RII=0.778) and plan for unanticipated conditions and incorporation of possibility to cover such events (RII=0.733) were the most noteworthy positions of chance of the pandemic. Furthermore, energize cooperation and hazard evaluation (0.533) was the most un-positioned for a positive effect of the pandemic.

Table 4.30: Degree of significance of opportunity of the pandemic from client's perspective

No	Positive Effect (opportunity)	Total	RII	Rank
1	Conducting Interior Surveys and Working on Existing Frameworks (Work update)	9	0.800	1
2	Potential chance to develop virtual other options (E-construction)	9	0.778	2
3	Plan for unanticipated conditions and incorporation of possibility to cover such events	9	0.733	3
4	Capacity to Get Loans at Low-Interest Rates	9	0.711	4
5	Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety related change)	9	0.689	5
6	Demand Increase for Transportation, Residential, Fast-Track Medical, and Other Projects	9	0.689	5

7	Recruitment of Skilled Workers	9	0.667	6
8	Increase off-site working (i.e., off-site construction or use of precast elements)	9	0.556	7
9	Energize cooperation and hazard evaluation	9	0.533	8

II. Consultants' perspective

As displayed in Table 4.31, respondents of this gathering offer the most ridiculously rank for Potential chance to develop virtual other options (E-construction) (0.92), Capacity to Get Loans at Low-Interest Rates (0.88) and plan for unanticipated conditions and incorporation of possibility to cover such events (0.86). Consultants also rank Recruitment of Skilled Workers (0.580) essentially rank for an opportunity of the pandemic.

Table 4.31: Degree of significance of opportunity of the pandemic from consultant's perspective

No	Positive Effect (opportunity)	Total	RII	Rank
1	Potential chance to develop virtual other options (E-construction)	20	0.920	1
2	Capacity to Get Loans at Low-Interest Rates	20	0.880	2
3	Plan for unanticipated conditions and incorporation of possibility to cover such events	20	0.860	3
4	Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety-related change)	20	0.800	4

5	Conducting Interior Surveys and Working on Existing Frameworks (Work update)	20	0.780	5
6	Energize cooperation and hazard evaluation	20	0.780	5
7	increase off-site working (i.e., off-site construction or use of precast elements)	20	0.620	6
8	Demand Increase for Transportation, Residential, Fast-Track Medical, and Other Projects	20	0.580	7
9	Recruitment of Skilled Workers	20	0.500	8

III. Contractors' perspective

As displayed in Table 4.32, respondents of this gathering give the most incredibly rank for Improve the health and safety agenda (0.794),energize cooperation and hazard evaluation (0.771), conducting Interior Surveys and Working on Existing Frameworks (Work update) (0.735). Recruitment of Skilled Workers (0.518) was the most un-positioned positive effect (opportunity) of the pandemic.

Table 4.32: Degree of significance of opportunity of the pandemic from contractor's perspective

No	Positive Effect (opportunity)	Total	RII	Rank
1	Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety-related change)	34	0.794	1
2	Energize cooperation and hazard evaluation	34	0.771	2

3	Conducting Interior Surveys and Working on Existing Frameworks (Work update)	34	0.735	3
4	Plan for unanticipated conditions and incorporation of possibility to cover such events	34	0.735	3
5	Capacity to Get Loans at Low-Interest Rates	34	0.718	4
6	Potential chance to develop virtual other options (E-construction)	34	0.665	5
7	Demand Increase for Transportation, Residential, Fast-Track Medical, and Other Projects	34	0.635	6
8	increase off-site working (i.e., off-site construction or use of precast elements)	34	0.529	7
9	Recruitment of Skilled Workers	34	0.518	8

The Spearman connection coefficient is determined utilizing Equation 3.2 and arranged as displayed below in Table 4.33.

Table 4.33: Summary of connection test on the positioning of opportunity of pandemic

Respondents	$Rho(\rho_{cal}) = 1 - \frac{6x(\sum di)^2}{n \times (n^2 - 1)}$	Relation of the respondents
Client Vs Consultant	0.575	Strong +ve Correlation
Consultant Vs Contractor	0.175	weak +ve correlation
Client Vs Contractor	0.488	Good +ve Correlation

From the connection table above, it tends to be presumed that there are major areas of strength for a relationship among client and consultant. What's more, contractors have a decent certain connection with the client and a weak positive relationship with the consultant about the open door effects of the pandemic.

IV. Overall Responses

As planted in Table 4.34 below, it was feasible to rank the positive effect (opportunity) of the pandemic by consolidating the reactions, everything being equal. Hence, this table shows that respondents of the multitude of parties give the most noteworthy position for Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety- related change) (0.781), Plan for unanticipated conditions and incorporation of possibility to cover such events (0.775) and Capacity to Get Loans at Low-Interest Rates (0.768). What's more, recruitment of skilled worker (0.533) was the most un-positioned positive effect (opportunity) of the Coronavirus (COVID- 19) pandemic on a public building in Addis Ababa city.

Table 4.34: Degree of significance of opportunity of a pandemic for the overall response

No	Positive Effect (opportunity)	Total	RII	Rank
1	Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety related change)	63	0.781	1
2	Plan for unanticipated conditions and incorporation of possibility to cover such events	63	0.775	2
3	Capacity to Get Loans at Low-Interest Rates	63	0.768	3
4	Conducting Interior Surveys and Working on Existing Frameworks (work update)	63	0.759	4
5	Potential chance to develop virtual other options (E-construction)	63	0.762	5
6	Energize cooperation and hazard evaluation	63	0.740	6
7	Demand Increase for Transportation, Residential, Fast-Track Medical, and Other Projects	63	0.625	7
8	increase off-site working (i.e., off-site construction or use of precast elements)	63	0.562	8
9	Recruitment of Skilled Workers	63	0.533	9

4.3 Discussion of Findings

This part presents the discussion of the discoveries from the questionnaires, the negative effect and positive effect (opportunity) of the Coronavirus (COVID-19) pandemic on public building construction projects in Addis Ababa city would be discussed. The discussion here is the general questionnaire reaction of the relative multitude of parties in the construction business.

4.31 Effect of the Coronavirus (COVID-19) Pandemic on Public Building Projects

From the questionnaires, the negative effects of the pandemic on public building construction projects were grouped into five classes. That is time-related, cost-related, material stock related, claim related, and other effects. What's more, the effects were positioned in rising order and the most regular ones were recognized.

4.3.1.1Time and Cost Related Effect of the Pandemic on a Public Building

A. Time-related effect

The subsequent significant effect of the Coronavirus pandemic is time-related. As positioned on questionnaires reaction already in Table 4.8 obviously the principal most time-related effects of the pandemic are Time overrun, Delay in delivery (i.e., materials, hardware, and documents, and so on), and Increase Idle Hours & Machinery. What's more, the other effect that effects time was the decrease of efficiency this was because of the social distancing of workers and limitations by the public authority. A portion of the workers could have gone to their homes at sites or really like to remain at their homes causing deficiencies of work at the site. This at last could have created a setback for plans.

B. Cost related impact

The fourth significant effect of the Coronavirus pandemic is cost-related effect; As positioned on the questionnaire's reaction already in Table 4.13 Accordingly, the significant cost related effects of the Coronavirus (COVID-19) pandemic were Heightening and expansion of material costs, cost overruns, and Income deficiency. Expansion of material costs of an asset like the expense of concrete were 250 ETB before Coronavirus and presently its wealth to 700 ETB which is 280% of cost heightening and fuel cost increments from 19 to 23 ETB. Extra above expenses of project workers increment because of individual defensive hardware's transport administration inclusion.

Gamil and Alhagar 2020 found that the most predominant affecting variables are the suspension of ventures, work effect, and employment misfortune, time overrun, cost overrun, and monetary effect. As per Gashahun 2020, The main effects of Coronavirus on the Ethiopian construction industry, are foreign currency deficiencies, diminished efficiency, shortage and increasing expenses of development materials, work deficiencies, project delays (extensions of time), and extra expenses. Consequently we can say that time and cost are the most effects of the pandemic on public building construction.

4.3.1.2 Material Stock and Claim Related Effect of the Pandemic on a Public Building

A. Material stock related effect

The main significant effect of the Coronavirus (COVID-19) pandemic is material stock. As positioned on questionnaires reaction beforehand in Table 4.18 under material stock network effects the most regular ones are Disturbances in the worldwide production network, foreign/LC interruptions, and there is a deficiency of materials to help running project. Disturbances in the construction asset store network because of trouble in preparing materials, especially concrete, steel, aluminum, and their items. On account of the Coronavirus (COVID - 19) pandemic, Ethiopian imports for the construction business have been ended from significant nations (China, Turkey, Japan, UAE, UK, USA, Italy, South Africa, and India) because of the lockdown of these nations.

Preparation of neighborhood construction materials like sand, wood, stone, rock, and so forth, and imported materials (particularly the completing materials) probably won't be smooth to contractors because of regional lockdowns and global market interruptions because of lockdowns of nations. This could have created setbacks for construction and extra expenses.

B. Claim related effect

The fifth significant effect of the Coronavirus pandemic is claim related, As positioned on questionnaires reaction already in Table 4.23 under claim related effects the most regular ones are Expansion of Time (EOT), Interruption of arranging and booking, and Suspension of projects.

Claims might incorporate time claims, cash claims, or both. Despite the prerequisites of agreement explicit evaluations, the contractor might be compelled to the startling postponement and in certain areas as previously mentioned and to extra costs. It is simpler to concede Expansion of Time (EOT) in view of the legally binding arrangements and legitimate appraisal. Evaluation of the monetary cases is delicate and troublesome because of the following factors:

1. It will be challenging to contractors to prove their claims by invoking proper statements (They may not get suitable provisions supporting their claims).

2. The Client has not distributed an extra spending plan for the additional costs brought about. Moreover, the Pandemic is an unanticipated event for the Client also. Plus, both contracting parties endure similarly by the unexpected situation and in this manner; the contractor might be mentioned to retain the extra costs as previously mentioned.

3. If the project is a public one, the client is the Public authority. The Public authority as we as a whole know is battling to keep up the economy from breakdown. Such sort of startling extra costs will without a doubt be an extra weight to it. All residents including firms are supposed to help the Public authority.

As per Alsharef et al. 2021, the construction area has had a ton of unfortunate results because of the pandemic. Project suspension, valuing heightening, Material delivery delays, material deficiencies, allowing delays, diminished creation rates, income issues, and possible contentions and debates were among them. Furthermore, as per Dr. Aishath 2020, obviously the building business has been unfavorably affected because of the Coronavirus (COVID-19) pandemic. How significant effect was spread remembers the suspension of works for sites for quite a long time, loss of income, breaks in the stock of materials, and loss of business, lack of laborers, and deficiency of foreign trade. As we can see from the over two literary works material production network and claim related effects are additionally the other significant effects of the Coronavirus (COVID-19) pandemic on public building construction.

4.3.1.3 Other Effects of the Pandemic on a Public Building

The third significant effect of the Coronavirus (COVID-19) pandemic included other effects, As positioned on questionnaires reaction already in Table 4.28 Labor effect and job losing (labor force deficiency), Vulnerability of survival, an Expansion in joblessness, and Income reduction are the most elevated different effects of the pandemic. Because of limitation on development works was missing from their work and lose their pay and lose their employment. At the point when contractors are compelled to upset and suspend projects consultants and provider's pay additionally diminished by implication. In the building business, there has been a decrease in new projects. Beside Coronavirus, this has brought about a large number of extra cases and passings, as well as inescapable interruption and tension both culturally and financially.

As per Gamil and Alhagar 2020, time overrun cost overrun, monetary issues project suspension, work effect, and employment misfortune was viewed as the most recognizable effects of Coronavirus. Also,

as indicated by Dr. Aishath 2020, the construction area has been antagonistically affected because of the Coronavirus pandemic. The significant effect was spread remember the suspension of works for sites for quite a long time, loss of income, breaks in the stock of materials, and loss of business, lack of laborers, deficiency of foreign trade. In view of the over two writing employment cutback, loss of income, loss of business, lack of labor force are different effects of the Coronavirus pandemic.

4.3.2 Positive Effect (opportunity) of the COVID-19 Pandemic on Public Building Projects

As the Coronavirus pandemic affects the public building construction industry it has likewise its chance for this area. The discoveries from the surveys in table 4.34 show that the pandemic offers the most noteworthy chance Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety related change), Plan for unanticipated conditions and incorporation of possibility to cover such events and Capacity to Get Loans at Low-Interest Rates. As indicated by respondents of the survey, the pandemic likewise goes over with great chance for Conducting Interior Surveys and Working on Existing Frameworks (work update), Potential chance to develop virtual other options (E-construction), and Energize cooperation and hazard evaluation.

Imparting orally or by SMS isn't sufficient. It ought to be upheld by records, for example, a letter, request change solicitation, or grievance notice by means of email or other virtual entertainment. Running against the norm, because of this epidemic, the construction area has been compelled to take on new computerized innovation, and we ought to hope to see a greater amount of this later on. The reception of new advancements later on that will create different advantages and increment our effectiveness. Working from a distance with a decent computerized foundation can be basic for originators, consultants, instructors, and understudies; be that as it may, it is more trying for enormous scope construction laborers.

Utilizing programming like Zoom, Skype, and Microsoft Groups permits staff on given construction projects to be more adaptable. Not exclusively are these techniques all the more harmless to the ecosystem; however they are likewise more effective and exhaustive for introductions, conversations, and issue arrangements. Printed versions of records and drawings might be supplanted by the utilization of computerized duplicates soon. One more open door as we have found in the examination permits all construction parties to reconsider their arrangement and welcome them to direct take a chance with examination for unexpected circumstances.

As indicated by Alsharef et al. 2021, notwithstanding the quantity of difficulties, a few new open doors were knowledgeable about the construction business because of the pandemic. These included open doors that came about because of lower loan interest; Demand Increase for

Transportation, Residential, Fast-Track Medical, and other projects, and recruitment of Skilled Workers; and Conducting Interior Surveys and Working on Existing Frameworks (work update).

4.4 Analysis of Data from the Case Study

To choose the case investigation, the researcher originally evaluated the entire project and by time concerning the effect of the pandemic and distinguished the main Four projects among the absolute 26 projects and taking into account the researcher gets sufficient data on the project status, project control mechanism, claims raise because of pandemic (like an expansion of time EOT), accessibility of recorded information, ability of project partners and the reality of the issue.

A case investigation has been gathered from four public building construction projects from Addis Ababa city that have been under execution from the year 2008 E.C. to 2013 E.C. The information has been gathered from authentic documents, Discussion with members on the project site, and month to month progress report from contractors and consultants. The general profiles of the projects, for example, project area, beginning date, completion date, contract period, contract amount, contractor, consultant, building purpose, building level, and project status, were remembered for the case investigations. The case analyses' discoveries are the effect of Coronavirus (COVID-19) pandemics on a public building. The table shows the consequences of the chose case analyses.

Table 4.35: List of selected public building projects

Project Code	Project Name	Contract Amount (Birr) with VAT	Duration (cal.day)	Claim due to pandemic
Project A	ANRS Leader ship Academy	283,875,465.37	870	EOT
Project B	Finance & Economy G+6 office building	68,310,558.56	900	EOT
Project C	Lot -VI Assembly Hall, Administration Building & Staff Lounge	190,314,545.35	540	
Project D	ABWCE Main Bureau building B+G+7	154,419,546.50	1400	EOT

4.4.1 Project A

Location……. Addis Ababa Beginning

Date…..…….06/11/2009 E.C

Completion date According to contract…. 21/03/2012 E.C

Contract period……. 870 calendar Days

Contract amount including 15% VAT….. 283,875,465.37

Contractor…. ABWCE

Consultant… ANRS RBDCSWE

Building purpose….. Workshop and Dormitory

Building height……. G+4, G+6

Project status…… 90%

Project Average monthly progress (Before pandemic)….. 1.09%

Project Average monthly progress (After pandemic)…… 0.5%

In this project, the project is not completed according to its contract period. In this project when we compare the physical progress of the project for the consecutive three months before March 2012 (i.e., the month that pandemic enters in Ethiopia) and after the pandemic occurs in the country, the progress after the pandemic is much lower than before the pandemic. In addition to this, the contractor faces the problem of Material delivery and payment issue. The contractor requests the time extension claim due to lockdown for 15 days because of pandemic and the consultant and client also approves it. in this project, the contractor covers all the expenses for sanitizers, masks, and PPE for both laborers, project staff, and consultants. The contractor doesn't claim payment issues for the extra costs of covid -19 pandemic prevention materials and tools. The contractor faces material price Escalation (like cement, rebar, fuel, and finishing material) due to pandemics. There is no any kind of budget change due to the pandemic in this project.

4.4.2 Project B

Location……. Addis Ababa-03

Beginning date……. 06/June/2017 E.C

Completion date According to contract….. 14/Dec/2019 E.C

Contract period……. 900 calendar Days

Contract amount including 15% VAT…… 68,310,558.56

Contractor…. AWWCE

Consultant… ANRS RBDCSWE

Building purpose….. Office accommodation

Building height…… G+6

Project status……. 95%

Project Average monthly progress (Before pandemic)….. 0.8%

Project Average monthly progress (After pandemic)……. 1.5

In this project, the project is not completed according to its contract period. In this project when we compare the physical progress of the project for the consecutive three months before March 2012 (i.e., the month that pandemic enters in Ethiopia) and after the pandemic occurs in the country, the progress after the pandemic is higher than before the pandemic. This is because the contractor has enough material before and helps the project to achieve in a better way. The contractor requests the time extension claim due to lockdown for 15 days because of pandemic and the consultant and client also approves it.

In this project, the contractor covers all the expenses for sanitizers, masks, and PPE for both laborers, project staff, and consultants. The contractor doesn't claim payment issues for the extra costs of covid-19 pandemic prevention materials and tools. The contractor faces material price Escalation (like cement, rebar, fuel, and finishing material) due to pandemics. in this project, during the lockdown, the contractor pays for idle rental machinery, and project staffs become idle this increases the overhead cost of the project. There is no budget change due to the pandemic in this project. The finishing materials ordered for this project were in delay due to lockdowns and foreign currency shortage.

4.4.3 Project C

Location……. Addis Ababa

Beginning date…….. 10/10/2010 E.C

Completion date According to contract….. 29/03/2012 E.C

Contract period……. 540 calendar Days

Contract amount including 15% VAT…… 190,314,545.35

Contractor…. Berhan Tobiaw B.C

Consultant…. BD

Building purpose….. Staff lounge &Administration building

Building height…..… G+1, G+3

Project status……. 37.25%

Project Average monthly progress (Before pandemic)….. 1.27%

Project Average monthly progress (After pandemic)…… 0.0%

In this project also, the project is not completed according to its contract period. In this project when we compare the physical progress of the project for the consecutive three months before March 2012 (i.e., the month that pandemic enters in Ethiopia) and after the pandemic occurs in the country, the progress after the pandemic is much lower than

before the pandemic even this project performance was weak due to payment delays by the client, the contractor cannot pay payments for labors and the materials delivered. In addition to this, the contractor faces the problem of Material delivery and financial problem.

The contractor uses the covid-19 pandemic as an opportunity for the suspension of the project.in these projects, the client has no problem in giving an extension of time for the contractor since they know their payment delays on the contractor. This project is not active currently only consultant, security, and admin of contractor available. The contractor covers all the expenses for sanitizers, masks, and PPE for both laborers, project staff, and consultants. The contractor doesn't claim payment for the extra costs of covid -19 pandemic prevention materials and tools. The contractor faces material price Escalation (like cement, rebar, fuel, and finishing material) due to pandemics. There is no budget change due to the pandemic in this project.

4.4.4 Project D

Location……. Addis Ababa Beginning date. 16/11/2008 E.C

Completion date According to contract…. 20/08/2012 E.C

Contract period…….. 1400 calendar Days

Contract amount including 15% VAT…… 154,419,546.50

Contractor….. ABWCE

Consultant…. YTH

Building purpose….. Head office

Building height……. B+G+7

Project status……. 91.4%

Project Average monthly progress (Before pandemic)….. 0.16%

Project Average monthly progress (After pandemic) ……3.06%

In this project also, the project is not completed according to its contract period. In this project when we compare the physical progress of the project for the consecutive three months before march 2012 (i.e. the month that pandemic enters in Ethiopia) and after the pandemic occurs in the country, the progress after the pandemic is better than before the pandemic this is because the project holds the materials required before the pandemic is happening in our country. In this project nine (9) personnel's i.e., 3 officers and 6 daily labors were infected by the pandemic and the project was closed for more than a month. During the lockdown the project pays more than 200,000birr for daily labors, guards, store persons, and staffs (project managers, site engineers, office engineers, Forman's, electricians, mechanics, plumbers.) paid without work this increases project cost and overhead cost of head office.in this project, a nurse was employed to the project to control the spread of the pandemic and reported regularly together with the physical report of the project.

Additional budget was allocated for health and safety regarding the pandemic, for providing masks, sanitizers, soaps, alcohols, disinfectants, etc. during the lockdown the machinery and equipment become idle this also increases the overhead of the project. A time extension of 15 days was also granted in this project. Material supply was not a problem in this project because they do have experience of ordering materials from foreign countries one year ahead of construction because of the delay of the Lc process. This saves the contractor from the extra cost of materials price escalation due to the pandemic. In this project also there is no budget change due to the pandemic.

Table 4.36: Summary of the effect of the pandemic from the case study

Project	Effects of the pandemic on public building	opportunities
Project A	Time overruns Delay in delivery of materials Additional cost due to new Safety and Health requirements, PPEs Escalation and inflation of material prices Extension of Time (EOT)	Opportunity to improve on virtual alternatives Improve the health and safety agenda

Project B	Increase Idle Hours & Machinery Additional cost due to new Safety and Health requirements, PPEs Escalation and inflation of material prices Extension of Time (EOT) Foreign currency/LC disruptions	Opportunity to improve on virtual alternatives Improve the health and safety agenda
Project C	Suspension of projects Interruption of Planning and scheduling Increase of unemployment	Improve the health and safety agenda
Project D	Increase Idle Hours man powers & Machinery Additional cost due to new Safety and Health requirements, PPEs Extension of Time (EOT) Suspension of projects	Risk planning Opportunity to improve on virtual alternatives Improve the health and safety agenda

4.4.5 Findings from the Case Study

The case investigation was applied to four chose public building project contract reports. The agreement documents were enormous with information, data, contract, bills of amounts, and drawings. The concentrated on documents were signed, stamped, and authoritative records at regulation. In this part of the examination, the discoveries of the study were having talked about with the backing of the support writing review, which was work out under chapter two. Subsequently, the discussion was directed in accordance with the four essential examination questions that the research based.

4.4.5.1 Effects of the Pandemic on Public Building Construction

The case analysis discoveries showed that ten (10) of regular effects of the pandemic on public buildings in answer the principal objective. For all situation studies' there is an expense overrun and time overrun of the projects this accomplishes the second unbiased of the exploration.

And all case investigations showed that there is value heightening of construction materials (concrete, rebar, fuel, completing materials, electrical and mechanical materials) this the combined effect of worldwide and local supply network disturbance and foreign currency deficiency and practically all projects claim for a period expansion for the lockdown due to Coronavirus this accomplishes the third level headed of the examination. And afterward as we can see from the case analysis there is no spending plan shift or change in public buildings due to the Coronavirus (COVID-19) pandemic this likewise answers the fourth level headed of the examination. Every one of the effects was at that point the space of the factors recognized from the literature review.

4.5 Analysis of Data from the Interview

These interviews were made between chosen construction industry experts who are at present engaged with public building projects focusing on their perceptions on the effect of the pandemic in their building projects. In complete three group interviews were embraced, specifically with a senior project supervisor and follow-up group leader from the clients' group, a senior contractor executive from the consultants', and a senior project manager from the contractor's group. The interview pointed toward finding the effects of the Coronavirus (COVID-19) pandemic on public building projects and looking for suggestions to limit their event.

A. Summary of Contractor's Interview

While analyzing the interview led with the contractor, it is notice that the Coronavirus pandemic effects the building construction altogether. The pandemic reasons for the material stock lack, cost heightening for construction materials, risk for works at work, increment of expenses for inactive machine-hours, additional day to day wage payment for works during the lockdown, decrease for efficiency because of the separating, to follow the conventions of construction minister and health minister there was the decrease in the quantity of travelers in transport, thusly, extra help vehicle was required, the businesses of the contractor will be paid without yield this likewise increment the above cost of contractor.

For the projects which are in completion, it is challenging to import and buy completing materials, electrical, mechanical, and spare parts are troublesome because of the absence of foreign cash and lockdowns of nations to battle the spread of pandemic this creates setback and cost overrun of projects. The questioners likewise notice that they just case for time expansion yet not remuneration payment, this is on the grounds that not to harsh the relationship with the clients. Since a large portion of the public building projects are delivered to the contractor by negotiation.

When analyzing the interview conducted with the contractor, it is mention that the COVID-19 pandemic impacts the building construction significantly. The pandemic causes for the material supply shortage, price escalation for construction materials, risk for labors at work, increase of costs for idle machine-hours, extra daily wage payment for labors during the lockdown, reduction for productivity due to the distancing, to follow the protocols of construction minister and health minister there was the reduction in the number of passengers in transport, therefore, additional service car was required, the employers of the contractor will be paid without output this also increase the overhead cost of contractors.

For the projects which are in completion, it is difficult to import and purchase finishing materials, electrical, mechanical, and spare parts are difficult due to the lack of foreign currency and lockdowns of countries to combat the spread of pandemic this causes delay and cost overrun of projects. The interviewers also mention that they only claim for time extension but not compensation payment, this is because not to rough the relationship with the clients. Since most of the public building projects are delivered to the contractor by negotiation.

B. Analysis of Interview by the consultants

In light of the assessment of project managers, the construction area by its temperament requires the contribution of numerous workers together and sharing of construction tools and materials. Be that as it may, the Coronavirus pandemic might make construction hard to continue. Despite the fact that the pandemic doesn't make the construction area stop however there was a complete lockdown for a considerable length of time here in Addis Ababa because of the great contamination pace of the pandemic. This causes cutback of employment for everyday works, delay for projects, cost overrun.

After the lockdown, the construction area continues as expected with contemplations of conventions of the health minister. Accordingly, the adjustment of regulations by the construction minister might affect the contractor in a roundabout way. Loss of efficiency, additional administrations, additional expense for security, sanitizers, veils, and intensity actually taking a look at devices. The time expansions claims gave by the contractor to the lockdown were endorsed and questioners expressed that there is no case for cost pay as opposed to time expansion. Furthermore, there is no likewise lawful ground in a state of agreement or understanding for such sort of remunerations. Questioners likewise expressed that since there is a lockdown of nations will be there ASAP, worldwide inventory network disturbances, creation interruptions and this makes it hard for contractor to stock materials to projects on time. The questioners additionally notice that there is no variety or financial plan change on public building projects because of this pandemic.

C. The Clients and Regulatory Body Interview

In light of the interview finished with the client and administrative body, the pandemic comes to all areas, to all partners; to all laborers of construction similarly without segregation this makes the idea of pandemic not the same as different illnesses. The questioners said that the building construction industry was declining in execution and there were not any more new projects before the pandemic because of the expectation of the public authority to finish the suspended projects. Hence, the presence of the Coronavirus pandemic adds one more migraine to the building construction area by making the gamble for laborer force, cost overrun, time overrun, cost heightening, disturbance of material inventory, joblessness, and delay of projects and this again makes contractors not deliver projects on time and task proprietors additionally not get administration on the timetable. The interviewee likewise expressed that there is no financial plan change to the projects due to the Coronavirus (COVID-19) pandemic.

Interviewees additionally said that the time expansion claim was given for the lockdown during the pandemic. In any case, compensation claim isn't normal by contractors this generally due to the contractors utilize settlement ahead of time of the particular project for another project. This may in light of the fact that a monetary issue for that specific project this likewise create setback for the project. Thusly, contractors feel baffled with remuneration claims rather they demand time expansions. The public authority will permit a value change in accordance with make up at the cost heightening due to the Coronavirus pandemic.

4.6 Mitigation Strategies

From the interviewees, case analysis, and questionnaire led the accompanying ideas are given to save and endure the building construction industry with the pandemic.

1. Clients and contractors close their agreements with sincere intentions. One of the parties shouldn't look for unjustifiable benefit over the other. Hence, the two contracting parties ought to intently talk about and settle on the extra time and cost issues exuded from the Pandemic in light of the suggestions of the consultant.

2. Considering that the Pandemic is a public danger, Consultants and Contractors might have to ingest their extra costs. The extra costs they caused might be viewed as by the Public authority as a gift to the Public authority to battle the Pandemic. This will be a milestone for them in releasing their social obligations. Certificate of acknowledgment ought to be given by the Public authority to the organizations.

3. Risk investigation - consider various situations to decide how your projects can unfold. Incorporate market factors, for example, disturbances to the production network; likely indebtedness and providers, merchants, subcontractors, and contractors; and postpones in getting grants. Assess the expenses and advantages of the project stops against slowdowns. Focus on reactions and relief activities in light of the probability and effect of dangers showing themselves. Consistently audit risk enrolls and considers likely dangers and alleviation measures by and large.

4. Strengthen authoritative arrangements: How would we proceed to fabricate and staying away from interruptions from suits/clashes and claims ought to be replied.

5. Resource preparation - survey asset plans across the project partners (proprietor, project manager, architect, engineer, contractor, a subcontractor) and recognize present and future fundamental assets expected for the project. Get refreshing of project association diagrams and observing of work circumstances of assets on a regular business.

6. Budget and income: survey spending plan accessibility and possibility use, the monetary outcomes of lockdown, exceptional and anticipated delayed client payments, specially appointed seller or contractor preparation, advance prerequisites, expanded medical care expenses, and wellbeing standards ought to be finished.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter Five of this thesis provides a conclusion and recommendations based on the research conducted on the effect of the Coronavirus pandemic on public building construction projects in Addis Ababa City. This chapter summarizes the major findings from the data collected through questionnaires, case studies, and interviews. It also provides recommendations to mitigate the adverse effects of the pandemic and improve the resilience of the construction industry

5.1.1 Summary of major findings

Chapter Five of the research on the effects of the COVID-19 pandemic on public building construction projects in Addis Ababa City will include a summary of the study's major findings. Based on analysis of questionnaires, observations, case studies, and interviews, some conclusions can be drawn.

Key findings from the research may include:

• **Material Stock Related Impact:** The study identifies this as the most significant negative impact of the pandemic.

• **Time-Related Impact:** Ranked as the second most significant negative effect.

• **Other impacts:** Ranked as the third most significant negative impact, this includes job losses, and income reduction.

• **Cost Related Impact:** This is the fourth major effect of the pandemic.

• **Claim Related Impact:** This was also identified as a major effect.

• **No budget change:** The research found that there was no budget reallocation for public building projects because of the Coronavirus pandemic

5.2 CONCLUSION

Chapter Five of this thesis concludes the research on the effect of the Coronavirus (COVID-19) pandemic on public building construction projects in Addis Ababa City. The study used questionnaires, observations, case analyses, and informal interviews. The following conclusions are drawn based on the research objectives:

• The study found that the most significant adverse effects of the COVID-19 pandemic included material stock related impact, time-related impact, other impacts (such as job losses and income reduction), cost related impact, and claim related impact.

• Material Stock Related Impact was the primary concern. Projects faced challenges related to production disruptions, foreign currency/LC disruptions and global supply chain disturbances.

• The research also showed that the pandemic led to time overruns because of factors such as labor shortages and delays in the delivery of materials.

• Cost overruns in public building projects were caused by material price escalation and income deficiency.

• The study identified labor effect and job losing, vulnerability of survival, expansion in joblessness, and income reduction as some of the other major effects of the pandemic.

• The research indicated that there was no budget change to public building projects due to the Coronavirus pandemic.

5.3 RECOMMENDATIONS

On the whole, the consequences of this study distinguished both the positive and negative effect of the pandemic public building construction, the relief techniques to limit the level of misfortune or effect. In view of the above discoveries and end, the accompanying recommendations have made:

The materials imported from far off nations will be begun to make in our country to stay away from the deferrals because of worldwide material production network disturbances and lockdowns of the nations.

A safety and wellbeing office should be laid out to control the pandemic in construction projects. This team gives preparing for all staffs and works and follow, report and make a move likewise.

Since a large portion of the building construction industry is work based, it should be smarter to encourage machine base to keep away from contacts and decrease the effects of the pandemic.

It should be smarter to satisfy help and get by in a camp for day to day works at a particular project for a restricted period to keep away from above costs because of transportation and lessen the spread of the pandemic.

Contractors should be give transportation services to their employees as previously mentioned.

The contractor should not fire any of its employees during the time of the state of emergency.

The Resident Engineer should to set up a Site Journal in discussion with the Client and contractor's (Project Manager) which should be utilized for the enrollment of postpone factors and extra expenses caused exclusively because of the ongoing pandemic.

Assign a representative for each project so he might sit down and examine in a type of gatherings with the Engineer's representatives and the contractor's Undertaking Director on week after week basis (or any chance to be settled on) the effects of the Coronavirus Pandemic on the deferral of the project and any extra costs caused in view of the information enrolled on the site journal and united by the Resident Engineer.

Creating E-construction frameworks; assists with keeping away from contacts with papers, archives and reports, this additionally incorporates virtual correspondence through skype, zoom, email, and message. A framework like enterprise resource planning (ERP) is likewise indispensable that empowers mentioning, moving, and giving of all assets without direct contact of record which works on the web and disconnected of web.

Every one of the partners should consent to consider and consolidate the pandemic occasion in legally binding documents to settle the cases connected with the pandemic.

The administrative body or the MoUDC should be plan a forum for conversations among the Ethiopian Counseling Engineers and Designers Affiliation and the Ethiopian Project workers Affiliation and different partners to intently investigate the matter.

Further examinations should be done in various streams of construction areas like private buildings, road, dams, bridges, water systems, rail routes, and so on the specialists in the future will likewise incorporate providers, traders, and manufacturers for the strength of the review.

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APPENDIX I

ADDIS COLLEGE

COLLEGE OF POST GRADUATE STUDIES

ADDIS COLLEGE GRADUATE PROGRAM

MASTER'S OF PROJECT MANAGEMENT

Dear Sir/Madam

Dear respondent: My name is Mr. Alex Ababu, pursuing a Master's Degree in Project Management at ADDIS COLLEGE. The research is entitled as **"The Effect of Coronavirus (Covid-19) Pandemic on Public Building Construction Projects in Addis Ababa City, Ethiopia"** for the partial fulfillment of academic requirement. This questionnaire is designed to collect primary data for this study only and your genuine responses to the questionnaires are highly demanded on which the success is depending on. I kindly request you to spend a few minutes of your valuable time to answer the questions.

If you need any explanations or description concerning the study and the questions provided, don't hesitate to reach me through the mobile phone number: +251 920200303 or email: alexchina130@gmail.com Please note that the information you are providing will be treated with utmost confidentiality.

With best regard!!

SECTION A: General Information

1. Name of organization:

   Project start date: ……

2. State respondent organization/company type.

☐ Client ☐ Contractor ☐ Consultant

3. Highest level of education;

Diploma ☐ BSc ☐ MSc ☐ PhD ☐

4. Role of a participant in the organization:

Owner of organization ☐ Project manager ☐ Site Engineer ☐ Office Engineer ☐

Resident Engineer ☐ Site Supervisor ☐ Other _____

5. Relevant working experience (Years):

1-5Yrs ☐ 5-10Yrs ☐ 11-15Yrs ☐ >15Yrs ☐

6. Your building type

Residential ☐ Office ☐ Commercial ☐ Institutional ☐

7. How much is the contract amount of the project (in Birr)?

<20 Million ☐ 20-50 Million ☐ 50-100 Million ☐ >100 Million ☐

8. The contract duration of the project (in Months)?

< 6 months ☐ 6-12 Months ☐ 12-18 months ☐ > 18 Months ☐

SECTION B: Essential information about the effect of pandemic

1. Is there any claim that you raise in your project due to the COVID-19 pandemic?

Yes ☐ No ☐

If your answer is yes please mention 1……

2……

3……

2. Is there any change to your project contract agreement due to the COVID-19 pandemic?

Yes ☐ No ☐

3. Is there any change to your project budget due to the COVID-19 pandemic?

Yes ☐ No ☐

4. Have you faced, or do you believe you will face issues relating to delays in your work due to the COVID-19 pandemic?

Yes ☐ No ☐

5. Following from the above, do you believe these delays will cause a cost increase due to the COVID-19 pandemic?

Yes ☐ No ☐

6. How would you describe the nature of any building material supply issues you have experienced since the Covid-19 crisis started?

……

……

7. What is your mitigation method to control the COVID-19 pandemic in your project?

……

……

8. What will be your recommendation to survive with the COVID-19 pandemic in the construction industry?

……

SECTION C: THE MAJOR EFFECTS OF COVID-19 PANDEMIC IN PUBLIC BUILDING CONSTRUCTION IN ADDIS ABABA

Please indicate the significance of each effect by ticking the appropriate boxes. Add any remarks relating to each effect on the last column e.g., as to the reasons, the critical effect, or the solutions.

E.E. = Extremely Effected (5); V.E. = Very Effected (4); M.E. = Moderately Effected (3); S.E. = Slightly Effected (2); N.E. = Not Effected (1)

No	Effects	N.E. (1)	S.E. (2)	M.E. (3)	V.E (4)	E.E. (5)	Additional comment (If any)
I	**Time Related Effect**						
1	Time overrun						
2	Effects on the existing accomplished activities						
3	Low efficiency of workers						
4	Increase Idle Hours & Machinery						
5	Laborers may not arrive at the site timely due to transportation						
6	Contractors may not able to deploy as many employees as required by the schedule due to the requirements of physical distancing						
7	Delay in delivery (i.e., materials, equipment, and documents, etc.)						
II	**Cost Related Effect**						
8	Cost overruns						
9	Financial effect (Delay in payments to contractor)						
10	Income deficiency						
11	Failure to pay wages and bank loan						
12	Heightening and expansion of material costs						
No	**Effects**	**N.E. (1)**	**S.E. (2)**	**M.E. (3)**	**V.E (4)**	**E.E. (5)**	**Additional comment (If any)**
13	Virtual related expense/internet and computer expense for communication						
14	Extra expense because of new Wellbeing and Wellbeing prerequisites, PPEs						

15	Increase expenses due to idleness of resources like equipment, machinery, and tools, human resources						
16	Additional cost emanated from changes of the law restricting the activities						
III	**Material Stock Related Effect**						
17	Deficiency of materials to help running project						
18	Worldwide production network disturbances						
19	Domestic stock chain disruptions						
20	Foreign currency/LC disruptions						
21	Production Disruptions						
22	Increase in Demand from Local Suppliers and Manufacturers						
IV	**Claim Related Effect**						
23	Suspension of projects						
24	Interruption of arranging and booking						
25	Restriction of movement on the work and travel bans						
26	Expansion of time (EOT)						
27	Payment emerging out of difficulty with no lawful remedy						
28	Expected Increase in Disputes, Litigation, and Claims						
V	**Other Effects**						
29	Labor effect and job losing (labor force deficiency)						
30	Vulnerability of survival						
No	**Effects**	**N.I. (1)**	**S.I. (2)**	**M.I. (3)**	**V.I (4)**	**E.I. (5)**	**Additional comment (If any)**
31	Decrease of new investments in the construction business						
32	Transition to Work from Home for Non-Site Personnel						
33	Expansion in joblessness						
34	Income decrease						
	Please specify Below if any other effect	**N.I (1)**	**S.I. (2)**	**M.I. (3)**	**V.I (4)**	**E.I. (5)**	**Additional comment (If any)**
35							
36							

37							
38							
39							
40							

SECTION D: NEW OPPORTUNITIES THAT WERE EXPERIENCED IN THE PUBLIC BUILDING CONSTRUCTION INDUSTRY AS A RESULT OF THE PANDEMIC IN ADDIS ABABA

E.S. = Extremely Significant (5); V.S. = Very Significant (4);

M.S.= Moderately Significant (3); S.S. = Slightly Significant (2);

N.S. = Not significant (1)

No	Positive Effect (opportunity)	N.S (1)	S.S. (2)	M.S. (3)	V.S (4)	E.S. (5)	Additional comment (If any)
1	Capacity to Get Loans at Low-Interest Rates						
2	Demand Increase for Transportation, Residential, Fast-Track Medical, and Other Projects						
3	Recruitment of Skilled Workers						
4	Conducting Interior Surveys and Working on Existing Frameworks (Work update)						
5	Improve the health and safety agenda (The sector has been able to respond rapidly to health and safety-related change)						
6	Energize cooperation and hazard evaluation						
7	Potential chance to develop virtual other options (E-construction)						
8	Plan for unanticipated conditions and incorporation of possibility to cover such events						
9	Increase off-site working (i.e., off-site construction or use of precast elements)						
	Please specify Below if any other opportunity	**N.S. (1)**	**S.S. (2)**	**M.S. (3)**	**V.S (4)**	**E.S. (5)**	**Additional comment (If any)**
10							
11							
12							
13							
14							
15							

----- The End -----

Please kindly check that no points are escaped and Thank You

APPENDIX 2: Case Study (Observation Checklists)

Project: …….

Client: ……...

Consultant: ……

Contractor: ……

Contract Amount (Initial): ……

Variation (Addition and Omission): ……

Revised Contract Amount: ……..

Initial Contract Time: …….

Additional Time (time extension): …….

Additional Time for payment delay: ……

Total Contract Time: …….

Physical plan vs achievement (progress) before pandemic …….……

Physical plan vs achievement (progress) after pandemic ……..

Any claim in the time of pandemic…….

Additional costs due to pandemic (PPE, sanitizers….) …….

Overhead costs due to pandemic……..

Material Price Escalation due to Pandemic…….

Any budget change due to pandemic……

APPENDIX 3: Interview Questions

1. How do you describe the effect of the COVID-19 pandemic on your building project?

_____

_____

2.As a designer/contractor is there any claim that you rise in your project due to the COVID-19 pandemic?

_____

_____

3. Is there any change to your project budget due to the COVID-19 pandemic?

_____

_____

4. Have you faced, or do you believe you will face issues relating to delays in your work due to the COVID-19 pandemic?

_____

_____.

5. Do you believe these delays will cause a cost increase due to the COVID-19 pandemic?

_____

_____.

6. How would you describe the nature of any building material supply issues you have experienced since the COVID-19 crisis started?

_____

_____

7. What mitigation methods do you recommend for the building construction sector to survive with the COVID-19 pandemic?