ADDIS COLLEGE

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT

(COTM)

INVESTIGATION ON THE IMPACT OF UNEXPECTED CONSTRUCTION MATERIAL PRICE ESCALATION AND ITS EFFECT ON ADDIS ABABA CITY PUBLIC PROJECTS CONSTRUCTION

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JULY 2023 G.C

ADDIS ABABA, ETHIOPIA

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A THESIS SUBMITTED TO ADDIS COLLEGE, SCHOOL OF GRADUATE STUDIES IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF CONSTRUCTION TECHNOLOGY AND MANAGEMENT (COTM)

JULY 2023 G.C

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DECLARATION

We Undersigned, Declare That This Research Entitled “Investigation On The Impact Of Unexpected Market Price Escalation And Its Effect On Addis Ababa City Construction Industry Of Public Projects” Is my original Work, Prepared under the Guidance of the Research Advisor. All sources of materials used for the research have been duly acknowledged. We further confirm that the research has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any Master of Degree.

Name	**Signature**
Beyene Hailu	

ENDORSEMENT

This Research Has Been Submitted To Addis College, Department Of Construction Technology And Management (COTM) For Examination With My Approval As A College Advisor.

Advisor **Signature**

Belachew Asteray (ph.D)

APPROVED BY THE BOARD OF EXAMINERS

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ACKNOWLEDGEMENT

I wish to express our sincere gratitude to the Lord Almighty for giving me the courage, strength, and ability to bring this work to a final stage. Our deepest appreciation and thanks particularly goes to my advisor Mr. Belachew Asteray (Dr.). for his constructive suggestions, criticisms, and useful comments. Without this dedication, the work would not have become a reality. We also extend our appreciation to the Department Of Construction Technology And Management (COTM) for giving us this opportunity to prepare this research paper. Finally, our special thanks go to all the respondents of the Addis Abeba Sub City public project participants who took their precious time to give all the necessary information needed for this work.

ABSTRACT

This study is conducted on Prices escalation of construction materials a frequent problem in the construction industry in both developed and developing countries. Like other developing countries, Ethiopian construction projects have this problem to varying degrees. The construction sector in my research area of the Addis Ababa construction industry of public projects has also been affected by varying degrees by the problem of rising prices in the construction materials market. The main purpose of the study is to investigate the impact and effect of construction material price escalation in Addis Ababa city design and construction work office construction projects.

In this study, I used descriptive statistics and also distributed 300 questionnaires, and collected 271 for this study. and also the main finding of this study is to set strategies to solve this price escalation problem. For this study, SPSS 2026 version software is used to analyze the study. and also this study is used to solve the problem of unexpected construction material price escalation effect on Addis Ababa city design and construction work office projects. because of construction material price escalation, many public projects are exposed to cost overruns and termination, and then contractors, consultants, and public project users face big problems. The survey was conducted on the client, contractors, and consultants involved in the projects that were executed by Addis Ababa city design and construction office projects. A sample of contractors and consultants who participated in a construction industry project in Addis Ababa was evaluated to carry out the survey.

Construction material price escalation problems should be solved by the government to give attention to the public projects that are executed by Addis Ababa city design and construction works office projects by financially supporting the projects because all these projects are directly connected to public utility areas of the health center, school, recreational area, and many other critical projects. the project participants have a responsibility to adopt good work methodology complete the project within a limited period and minimize price escalation impact and effect.

Key words:-price escalation, Public construction projects, Construction material, market price.

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ACRONYMS AND ABBREVIATIONS

CI ……construction industry

COVID-19…….….Coronavirus disease 2019

DC…….Data collector

MDPI…… Multidisciplinary Digital Publishing Institute

MOWUD……ministry of work and urban development

NCDC……Natural Center for Disease Control

PI…….……..Principal Investigator

CHAPTER ONE

1.1 Background to the Study

Construction Industry (CI) and construction activities are regarded as the backbone of economic and social growth. CI and other engineering services industries play a vital role in the economic growth through the infrastructure of the country. It can be considered as a source of generating employment for thousands and millions of unskilled, semi-skilled, and skilled persons. It also plays a very important role in generating revenues in both formal and informal sectors of the economy. It adds to the foreign exchange earnings from the export of construction materials and provision of services (Khan, 2008).

Many scientific studies show that the construction industry in developing and developed countries faces the challenge of construction material price escalation. In Ethiopia and developing countries, price increases for construction projects are very high and are expected for a variety of reasons. For some reason, the monetary value of developing countries is very low compared to the monetary value of developed countries, and for others, almost all building materials are imported from developed countries. Due to these and many other issues, the price of building materials continues to rise from time to time (Dinsa, 2015).

Construction industries in Ethiopia are part of the country's development initiative. It shared a considerable amount of the country's scarce financial resources. In Ethiopia, the construction industry is the highest recipient of the government budget in terms of government development programs. Consequently, construction industries consume an average annual rate of nearly 60%, according to MoWUD,

Ethiopia is still a developing country, and there is a huge development activity yet to be undertaken. One of the key factors to ensure the desired level of economic growth in a developing country like ours is achieving a significant amount of investment by the private as well as the public sector. In this development activity, the construction industry is a front-line role player. that means this sector is the backbone of the country's economy so this sector is affected by many different factors and does not stand well. for example 2020

COVID-19 and many other factors like construction material price escalation, shortage of foreign currency, and internal instability. This and other reasons the construction sector is affected.(NCDC. (2021). COVID 2.)

Successful construction projects are those which are delivered to the required quality standards, safely, on time, and within the approved budget (Cunningham, 2013). The problem of cost overrun is very influential and it affects the other two factors, quality and time. The shortage of budget may lead to the use of underqualified materials and labor; in addition, the shortage may force the employer to look at additional budget sources which most time leads to project delay. One of the major causes of cost overrun is price escalation which is an increase in the cost of any construction elements of the original contract and base cost of a project due to the passage of time (Williams et. al., 1999). It has been known that fluctuations in materials' prices, which are volatile, are a driver of project costs. the most appropriate definition of price escalation for this study purpose is the one given by Jaeger, (1996) which states that price Escalation is the provision in a cost estimate for increases in the cost of equipment, material, labor, etc., due to continuing price changes over time. This study intends to address cost overruns mainly caused by a change in the price of construction materials & labor at the construction projects (Tarekegn, D. (2017).

Public projects in Addis Ababa that were executed by the design and construction works office were affected by construction material price escalation and exposed to many different problems that the contractors did not complete the project on time with schedule. these public projects are controlled and run by the design and construction works office and transferred to the project end user of the project. construction material price escalation on public projects of design and construction works office that executed from 2011-2015 E.C many projects were faced the construction material price escalation and exposed to many different problems. because of the price escalation of construction materials, many projects were not completed on time and the number of projects was minimized because of the shortage of budget.

To identify strategies to Improve the price escalation of construction materials and mitigate the related problems, it is very important to minimize cost overrun in the project

implementation. The appropriate management and mitigation of price escalation requires identifying the causes and effects of price escalation.

1.2 Statement of the problem

Projects are not completed within the planned time, and budget and also sometimes within specified quality. Price escalation is considered a major problem, which hinders the project's progress since it decreases the contractor's profit leading to huge losses and leaving the project in big trouble (Mossa, 2013). Mahamid and Dmaidi (2013) identified that the fluctuation of prices of materials is among the top five factors causing cost overrun in building construction projects. Rahman, Hameed Mem, & Abd. Karim (2013) also indicated that the fluctuation of prices of materials is among the top three most significant factors of cost overrun in large construction projects. The inapplicability of price adjustment clauses could also impact public projects adversely because prices are not being adjusted for most public building projects but construction materials prices suddenly spiked during the past years.

Escalation of construction material prices is a major issue for construction projects that must be completed within a set budget. Also, many projects can be terminated due to disputes between the contractor and the client of the project due to the delay of the project, contractor claim of price adjustment, and contractor claim of time extension. Escalation of construction material prices also affects project quality due to a variety of factors. This means that when building material prices soar, contractors and clients try to use cheaper and lower-quality materials because they affect the quality of their construction projects.(Alabi, B., & Fapohunda, J. (2021)

From the above problems, construction material price escalation is a major problem not only in the construction industry in Addis Ababa but also in the construction industry in developing countries such as Ethiopia, This is a serious problem. Therefore, this paper focuses on finding the impact of construction material price escalation and identifying and recommending best practices for addressing the construction material price escalation problem in the Addis Ababa city design and construction works office of public projects.

1.3 Objectives of the Study

1.3.1 General objective

To investigate the impact of unexpected construction material price escalation and its effect on Addis Ababa city public projects of design and construction work office.

1.3.2 Specific objective

- To investigate the impacts and effects of unexpected construction material price escalation in the Addis Ababa city public projects of design and construction work office.
- To identify the impact of price escalation on the (contractor, consultant, client, and suppliers) in the Addis Ababa city public projects of design and construction work office.
- To identify strategies for solving the impacts and effects of price escalation in the Addis Ababa city public projects of design and construction work office.

1.4 Research questions

- What are the impacts and effects of construction material price escalation problems on Addis Ababa city public projects of design and construction work office?
- How to investigate the impact of price escalation on the project client, contractor, consultant, and suppliers in the construction industry of Addis Ababa city public projects of design and construction work office?
- Which methods are used to improve the impacts and effects of price escalation in Addis Ababa city public projects of design and construction work office?

1.5 The scope of the study

This study was conducted in Addis Ababa city construction industry of Addis Ababa city public projects of design and construction work office; like contractors; clients and consultants. The study should be done on the contractor's participation in projects from the year 2010-2015 E.C BC and GC contractors, consultants, and clients that work in Addis Ababa city public projects of design and construction work office and the current unexpected construction material price escalation faced by contractors. The study is delimited on the sample size frame.it is to means that it does not use the overall population Further, the following conditions were assumed to be true. the population was of adequate size to provide valid and compressive questionary responses.

1.6 Limitations of the Study

There were some challenges and limitations to the study for example Physical inaccessibility was the first limitation of this study. Moreover, the limitation that the researcher faced in conducting this study was the lack of well-organized appropriate secondary data and it was very difficult to get sufficient and complete data from the record system. The other serious limitation of the study was the respondent to the equation was not willing to fill in the data at the time provided. It made the data collection very difficult and also did not return the questionnaire and interview timely because of their work or other resources, meetings, and fieldwork. The lack of clarity of qualitative information from respondents was another limitation of information.

1.7 Significance of the Study

After conducting the research, the following findings are expected and give good input to the construction sector that facing a price escalation problem. Finally, the study serves as a benchmark for further studies that take similar or related development challenges.

- investigating the impacts of unexpected construction material price escalation on Addis Ababa city public projects of the design and construction works office.
- To investigate the effects of construction material price escalation on Addis Ababa city public projects of the design and construction works office.

- To identify the impact of price escalation on the related responsible parties in the construction industry in the case of Addis Ababa city design and building works of public projects.

The outputs of the research will be used as reference material by the construction industry in the allocation of budget by focusing on those causes that lead to construction material price escalation.

The problem of price escalation, especially in the construction industry, is a worldwide phenomenon, and its ripples are normally a source of friction between clients and contractors on the issue of price escalations. If this friction is not properly handled, this could stall the progress of work and may subsequently lead to project abandonment, and the actual project will suffer with universal inflations of costs. Although the causes of project cost escalations are well known, the methodology used in handling its evaluation, especially on those aspects relating to price escalations, is very inadequate.

The unprecedented escalation of prices escalations in the construction industry has caused significant financial hardships for unprepared suppliers, subcontractors, contractors, and owners. Contract losses suffered, projects delayed, or serious disputes resulting from the efforts of construction industry players to mitigate, shift, or recoup the financial consequences of these sudden and dramatic price escalations. Yet, it is certain that profits have been lost, relations have been damaged, projects have been impacted, and construction lawyers have been called upon to look for ways to soften or shift the impact of price escalations on their unprepared construction clients.

1.8 Organization of the paper

This paper has focused on contributing knowledge to investigate the impact of price escalations & their effect on Addis Ababa city public building projects constructions. The study report is generally organized into five chapters &appendices

Chapter 1. Introduction: Composed of general information and background, which gives an overview of the investigation of the impact of Price escalation & the effect of price

escalation in the project with related problems. It also describes in detail the study objective, goal &methodology followed in this paper

Chapter 2.Literature review: Definitions, comparisons of literature review &quotes of the various related works in this area of the study mainly focusing on the methods of construction Price escalation, cause &impact of price escalations, prevention approach of price escalation purpose &uses. In addition in the case of Ethiopia, the contractual provision was made b/n parties involved.

Chapter 3. The research methodology: The basic research design was an exploratory research methodology using both primary and secondary data. This design was chosen since it enables the assessment of the magnitude, and scope of problems and facilitates the suggestion of solutions.

Chapter 4. Analysis &Discussions: This includes findings through questioners collected & analyzed the Questioners on SPSS2026 and analyses the impact of material price escalation with a possible treatment.

Chapter 5.Conclusion &Recommendations: This covers the conclusion of the study together with recommendations for minimizing the impact of material price escalation &their effects on public construction projects.

CHAPTER-TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical review of the research work that was done by various scholars in the area of price escalation of construction material and its impact and effect on the sector, This includes a theoretical review, empirical review, research gap, and conceptual framework.

2.2 Theoretical review

2.2.1 Price Escalation

Price Escalation is the increase in any element of project costs when the cost of that element is compared between two different periods (Lock, 2003). Escalation in the construction market in recent years has been extremely volatile, and this trend is expected to continue shortly due to various and diversified factors. This situation has created a great deal of uncertainty and nervousness in the construction field. The financial success of a construction project can be uncertain and at risk due to changes in escalation rates during construction (Bates, 1996). The success of a building construction project is mainly influenced by to extent of cost escalation identified and allocated to the construction project. As a significant portion of the factors that contribute to price escalation are out of control; budgeting for cost escalation is a major problem in the planning phase of projects (Dawood and Bates, 1998).

The rise in construction material prices is an economic phenomenon that is reflected in the price increase rate calculated from the material wholesale price index and market price method data. An escalation is a change in the cost or price of a particular good or service in a particular economy over some time. The inflationary trend of the economy is reflected in rising stock prices. This is the increase in the cost of the structural elements of the original contract or the base cost of the project over time. Escalation means a change in price level caused by underlying economic conditions. (Aschalew, M., Yohanes, K., & Birara, M. (2021).

Project schedule Variance leads to a time gap where the price estimate will face unanticipated increases in inflation cost effects even when the rate of inflation is accurately predicted. Late handover of construction sites for example, sometimes may happen and substantially increase the cost of construction projects. In most international projects in Ethiopia, late site handover is a common form of claim source for compensation for contractors (Girmay, 2003).

Escalation influences the finances and reasons intense economic overrun with the aid of using the contractor. it additionally provides contingency inside the contractor`s bid and is a chief contributor to the general fee uncertainty of escalation in his soft fees from the employer. Construction paintings are done in line with the pre-showed settlement agreement. To address the surprising fee escalation, regulated provision is essential for the development settlement document. (A.L, O., U.O, A., & O.P, N. (2021).

Increased costs and missed deadlines can come from different sources for different types of projects. Customer satisfaction is impacted when project costs and schedules exceed planned targets. On the other hand, if the quality of the project does not meet the design standards, the situation will improve with less customer satisfaction, higher costs, and delayed delivery. Contractors and suppliers operating in today's volatile materials market find it difficult to quote, bid, and finance construction projects. Many companies face significant losses and reduced expected profits as contractors are tied to fixed-price construction contracts that put them at risk of rising material prices and supplier costs. When the market price of important building materials unexpectedly rises, contractors cannot escape such rises. A price increase clause should be included in the contract to prevent sudden increases in material costs. On the other hand, if the contractor does not correctly account for inflation and interest rates, the original offer will be too low and you will suffer a large loss. (Alabi, B., & Fapohunda, J. (2021)

2.2.2 Cost Escalation Factors Classification

A better understanding of cost escalation factors is achieved by understanding the forces driving each factor, or where the factors occur. This understanding allows us to design strategies to address these cost-increasing factors. The factors that influence estimates during the project development phase are essentially internal and external. Factors that the agency/owner can control to increase costs are internal, while factors that the agency/owner cannot control directly are classified as external. The order in which the factors are presented should not be considered an indicator of the level of impact. It is a factor in logical division and classification and helps to visualize how project cost estimates are affected. It is important to note that while one of the factors indicates the problem of estimating labor and material costs, most factors indicate "impacts" that affect the scope and timing of the project. (Alabi & Fapohunda, 2021)

2.2.2.1 Internal factors

Internal Factors Cost escalation factors that are directly under the control of the project sponsor/owner. While many internal factors can lead to underestimation of project costs during the development planning and design phase, seven key internal factors are well documented: bias, supply/procurement approach, and project planning. There are issues of change, engineering and construction complexity, scope changes, scope expansions, inadequate estimates, and inconsistent application of contingencies. Increased costs do not just occur during the planning and design stages of a project. Increased project costs often appear during construction. Early focus on internal factors will reduce the increase in costs at the time of bidding or during construction (Anderson et al. (2006). Internal factors that lead to underestimation of project costs during project execution are poor project management and defective planning documents. More specifically, these factors may include inconsistent application of contingent liabilities, defaults, ambiguous terms and conditions, and inconsistent contract documents. Each of these factors, individually or in combination with other factors, can significantly increase the cost of your project over time. (Anderson et al. (2006)

In the project development process of some government agencies, the legislature sets a project budget by legislation, which is based on preliminary cost estimates. If the developer's quote later exceeds the budget, the project cannot be rented. As a result, engineers and institutions feel pressured to be optimistic about quotes.(Akinci and Fischer 1998); (Brucelius et al. 1998); (Condon and Harman 2004);(Flyvbjergetal. 2002); (Hufschmidt and Gerin 1970; Pickrell 1992)

The supply/procurement approach affects risk sharing between agents/owners and builders and can increase the cost of a project if the risk is transferred to a party that cannot manage a particular risk. Which project delivery approach to decide, such as B. Design-Bid-Build, Design-Build or Build-Operate-Transfer, and procurement methodologies (eg, low bids, cost performance, or skill-based choices are project risks and Affect relocation.

Even if inflation is accurately predicted, budgetary constraints and design challenges can lead to unexpected increases in inflation costs. Agencies/owners need to be aware that there are two factors in terms of the time value of money: inflation rate and timing of spending. Many institutions and owners have fixed annual or semi-annual budgets and need to schedule projects so that project funding is available for all projects as needed. Estimators are often unaware of adjusting the timing of spending boards on infrastructure and building environment. (Booz Allen & Hamilton Inc 2003.)

The technical and structural complexity caused by the location and purpose of the project can make initial design work very difficult and can lead to problems and errors in the internal adjustment of project components. Internal coordination issues can be conflicts or issues between various areas related to project planning and design. As the project progresses, there may also be buildability issues that need to be addressed. The project is under development. If these issues are not addressed properly, the cost increase is probably (Board 2003. Big Dig: Key Facts About Cost, Range, Schedule, and Management 2003; Booz Allen & Hamilton Inc. And DRI / McGraw-Hill 1995; Callahan 1998; GAO 2003; Hufschmidt and Gerin 1970; GAO 1997, 1999, 2002; Touran et al. 1994)

scope changes that should be controlled by agent/owner management can lead to an underestimation of project costs. Such changes include changes in project construction limits, changes in the design and/or dimensions of key project elements such as adjusting the type, size, or location of project components, and other increases in project elements. there is. Booz Allen & Hamilton Inc. and DRI / McGraw-Hill 1995; Callahan 1998; Chang 2002; H.

Scope creep tends to accumulate many small scope changes to increase project costs. Although the cost impact of individual scope changes is minimal, the accumulation of these small changes is often not critical to the intended functioning of the facility, resulting in a significant cost increase over time. There is a possibility of connecting. Many of these minor changes are true necessities that are perceived as more known about the project, but other changes are often just minor additions. Projects often appear to grow naturally, from conception to design development to construction. These changes can often result from the different needs of travelers and compliance with local environmental regulations.

Poor estimates can underestimate the cost of a project. The quote document must be in a format that can be understood, reviewed, validated, and modified. The basis for a good quote is the format, procedure, and process used to determine the cost. Insufficient estimates include common errors and omissions in planning and quantity, and general inadequacy and poor performance in planning and estimation procedures and methods. Mistakes by agents/owners in managing a project are factors that can lead to cost overruns for the project. These factors include the inability of agency/owner representatives to make timely decisions and actions, the inability to provide project-related information, and the coordination of follow-up work or infrastructure and work authority. It may include the inability to explain the construction difficulties caused. (Callahan 1998; Chang 2002; Touran et al. 1994)

Ambiguous terms and conditions diminish liability and create misunderstandings between the owner the project designer and the contractor. Too little information in the project documentation can lead to cost overruns during project implementation. Forecast accuracy cannot be achieved in Callahan 1998 if the key assumptions underlying the estimate are

confused by ambiguous contractual terms. (Chang 2002; Harbuck 2004; Mackie and Preston 1998; Touran et al. 1994)

Contract document conflicts lead to errors and confusion while bidding and later during project execution, they cause change orders and rework (Callahan 1998; Chang 2002; Harbuck 2004; Mackie and Preston 1998; Touran et al. 1994).

2.2.2.2 External factors

External cost escalation factors are factors that the agency/owner has little or no direct control over. However, the agency/owner should take them into account when estimating the cost of the project. During the planning and design phase of project development, project costs can be underestimated by external factors such as local government concerns and requirements, inflation fluctuations, scale changes, scale growth, and market conditions. .. During the construction phase of a project, external factors such as local government concerns and requirements, market conditions, unforeseen events, and unforeseen circumstances can contribute to increased project costs. The potential for such incidents should be taken into account when making a quote. Again, you should consider that using each of these elements alone or in combination with other elements can significantly increase the cost of your project.

Local concerns and requirements typically include reducing the impact of the project on the surrounding community and negotiating scope changes or additions. Agency/owner action is often required to mitigate the negative impact of construction on the community and the natural environment. Actions may include but are not limited to, project design, coordination, and introduction of changes to the execution of civil engineering work. These measures are often taken to reassure residents, business owners, and environmental groups.

Local concerns and requirements can affect the cost of a project during the execution phase. Mitigation measures imposed by local governments, neighborhoods, businesses, and local and national environmental groups during the construction of the project, as well as the impacts at the planning and design stages, extend the project duration and impact inflation capacity. It may be given or paid directly.

inflationary effects are an important factor in underestimating the cost of many projects. If one project estimate is not communicated in construction costs and two projects are delayed in completion, the cost is exposed to inflation for a longer period than expected, and if the inflation rate is greater than the expected estimate, the time value of money is It can adversely affect the project. The industry has different views on how inflation should be explained in project estimates and budgets. For projects with short development and construction periods, the impact of inflation is usually small. However, projects with long development and construction periods can have unexpected inflationary effects. Boston's Big Dig cost estimate is an example of an inflationary effect. The Big Dig Estimate was first created in 1982, based on the Federal Highway Authority's guidelines in the Interstate Highway Cost Estimate Manual.

Changes in market conditions and macro environments can impact project costs, especially for large projects. In many cases, only large contractors or groups of contractors can engage in large projects or obtain deposits. The size of the project affects the competition of the project and the number of bids the agency/owner receives for the work. The risks associated with large projects are usually much greater for both owners and contractors and affect the cost of the project. Inaccurate market conditions can lead to inaccurate project cost estimates. Market conditions affect project costs in the execution phase as well as in the planning phase. Reduce the number of bidders Changes in market conditions during the construction of a project can affect labor and other relevant factors and disrupt project schedules and budgets. Booz Allen & Hamilton Inc.

Unexpected events are unexpected and are usually not under the control of the project owner. These can be events such as floods, hurricanes, tornadoes, or other weather-related incidents. These are commonly referred to as "force majeure." These actions can disrupt construction, are known to destroy work, and require extensive rework and repairs. Other unforeseen events controlled by third parties include terrorism, strikes, and changes in financial markets or commodity markets. These measures can have a devastating impact on projects and project costs (Akinci and Fischer 1998; Arditietal. 1985; Callahan 1998; Chang

2002; Hufschmidt and Gerin 1970; Merrow 1988; Sempleetal. 1994; Touranetal. the year 1994).

Unexpected situations are known to cause cost overruns. Unknown soil conditions can affect drilling, consolidation, and structural foundations. Contaminated soil may be present. Tools that are not or are often misrepresented in the drawing are often available. Various issues are simply unknown during the planning and design stages, which can increase the cost of the project if revealed during construction.

2.2.3 Reasons behind the Construction Cost boosting due to other factors

Population

In most markets, population growth shifts the demand curve outwards (Henderson, 1991). Food, clothing, and shelter are the most important consumer goods on the market. The demand for these consumer goods arises from factors that affect the consumers who purchase these goods (Henderson, 1991). As Henderson (1991) shows, as demand increases, so does the demand for raw materials for consumer goods manufacturing. Demand for construction inputs also arises from the increasing demand for construction products, which are the productive inputs of the construction industry.

Inflation rate

According to Stone (1966), the rate of decline in the value of money is the inflation rate. As Stone (1966) explains the value of money is significantly reduced, this inflation rate increases the cost of building a building and thus reduces its ability to buy it.

Fuel price increment

According to Michael (2005), rising oil prices have a negative impact on global economic growth and generally raise prices. This is because the industry is one of the key elements of a country's economy and it needs oil. Therefore, rising oil prices have a negative impact on the economies of each country.

2.2.4 The Impacts caused by price escalation in the construction industry

Fluctuation in Cost of Construction

The strong growth of the construction industry depends on the price stability of building materials. But in South Africa, this price is higher than expected. Contractors and project contractors face the serious challenge of maintaining constant cost forecasts for construction projects. The main reason for rising costs in the construction industry is poor initial project cost estimates and underestimated construction costs by volume surveyors. The author further stated that prices change so rapidly that initial budget figures become completely unrealistic.

Increase in Final Cost of Building Products

Cost variance can be determined when the final cost of a project exceeds the initial estimated cost. Lukale and Ikechukwu et al. The defined cost variance is the difference between the initial cost and the actual cost when the project is completed. From another perspective, cost variance can be simply described as the amount by which actual costs exceed the contractually agreed costs. the increase in the cost of final construction products to the end users is due to the impact of cost overruns in the delivery of public works construction projects. This inevitably leads to an increase in project costs, which is caused by an increase in the cost of construction materials. (Ikechukwu et al.2011).

Poor Quality of Workmanship

Building quality Performance is one of the characteristics of the construction industry in developed countries. The quality of work is evaluated according to the requirements of the relevant standard and marked if the performance complies with the standard. A survey conducted found significant risks to the construction industry and the national economy through the indicated development interpretation of building material costs. The authors also stated that there was a record of conflict between the principal and the contractor over the revaluation of the contract amount. Avoiding conflict has led to the use of the inadequate or

inadequate supply of materials for construction projects. This is because some contractors try to boycott disputes to be more productive in completing projects within budget.

Low Volume of Construction Products

The performance of South Africa's construction industry is significantly lower than in many developed countries. Given this, it is clear that the South African construction industry faces performance-hindering challenges in all aspects of its business. These impacts have reduced the volume of construction products and end-users are suffering from governments' inability to provide adequate sustainable housing. In support of this, Windapo et al.'s Rising prices for building materials are declining the value of homes in the housing market. Such market conditions have led to a severe housing shortage. That means millions of low- and middle-income people are struggling to secure their own homes. (Windapo et al.2017)

Collapse of Building Due to Less Quality Materials

Purchasing inferior building materials may cause your building to collapse. It leads to poor construction and unexpected accidents. Dimna and Amadi et al. Note that building collapses can be caused by natural or man-made factors. Researchers said developing countries often suffer from building collapses. For example, countries like Nigeria regularly experience building collapses caused mainly by human factors. To corroborate the above examples, several studies were conducted several years ago to identify the leading causes of building damage and robberies in Nigeria. The knowledge gained showed that substandard building materials remained a major problem in building collapse, he added, due to a lack of material standards.

High Rate of Contractors' Fraudulent Practices

project inflation is common misconduct by contractors. A project area that is often inflated is the cost of building materials. This scam can occur or recur at any point in the payment chain. It is understood that the working class at the bottom of the chain can drive up costs and the percentage of work completed. In this case, these workers' profit margins on their jobs increase. Similarly, another part of the chain might attempt to exaggerate the costs of

subcontractors and suppliers, but fraudulently pocket their quotas when paying. (Nur amylia izrin mohd saim 2018)

Increase in project abandonment

Project termination is an unplanned interruption in the progress of work, especially during implementation, such as the refusal or inability to conclude a contract after a realistic period of completion (Nasar et al., 2003). Many construction projects are temporarily or indefinitely abandoned, and according to Nasar et al. (2003), many unfinished or abandoned projects are the result of financial and material crises. The wastage and high cost of construction materials are the main causes of unfinished and substandard construction that directly impact the housing supply. Aluko (2008) pointed out the environmental impacts of abandoned projects, describing impacts such as flooding, traffic congestion, air and water pollution, drug abuse, and neighborhood health hazards. Also, increased contract amounts can lead to disputes between contractors and employers, leading to abandonment cases where such projects are not used at the scheduled time and assets are tied up.

Contractual claim

According to Ali & Kamaruzzaman (2010), contractual rights arise either from deviations, extensions of time, variations, costs, or losses due to matters affecting the normal course of work. Claims also apply to certain clauses of the contract. In any good contract code, many clauses entitle both the contractor and the principal to appropriate remuneration. A typical building claim against an owner, according to Badu et al. (2012) is caused by a variety of factors, including poor project planning, scope adjustments, engineering change orders, errors and omissions, contract expediting, and expediting.

2.2.5 Effects of Price Escalation

Effects are the consequences that will be encountered when price escalation occurs on a construction project. Fetene, (2008) states that cost overruns have obvious effects on the key stakeholders in particular, and on the construction industry in general. To the client, cost overrun implies added costs over and above those initially agreed upon at the onset, resulting in less returns on investment. To the end user, the added costs are passed on as higher rental or lease costs or prices. To the professionals, cost overrun implies the inability to deliver value for money and could well tarnish their reputations and result in a loss of confidence reposed in them by clients. To the contractor, it implies loss of profit for non-completion and defamation that could jeopardize his or her chances of winning further jobs, if at fault. To the industry as a whole, cost overruns could bring about project abandonment and a drop in building activities, a bad reputation, and an inability to secure project finance or secure it at higher costs due to added risks. The study of Fetene further identified the following as the major effects of cost overruns: delays during construction, supplementary agreement, additional cost, budget shortfall, adversarial relationship between participants of the project, loss of reputation to the consultant, the consultant will be viewed as incompetent by project owners, high cost of supervision and contract administration for consultants, delayed payments to contractors, the contractor will suffer from a budget shortfall of the client and poor quality workmanship. After analyzing the conditions of EPC/Turnkey projects and the effects that may result from the specific actions of price escalation, the following effects of price escalation are selected to be considered in this study.

Delay in the Project Performance: Price escalation can result in a delay in project performance in many ways. The desk study in Ethiopian Railways Corporation has revealed that the loan agreement made between ERC and foreign creditors did not include a case of price escalation. In such conditions when price escalation happens the employer is forced to look for further loans to fill the gap. Because facilitating a loan is not a simple process a delay in project performance becomes inevitable.

High Project Cost: It is obvious that price escalation is an additional cost to a project so definitely will lead to high project costs. This is a direct effect of price escalation in a project. In another way, in the previous parts of this study, it has been mentioned that there

is a high probability for the effect of price escalation to become a cause for further complications. In the above paragraph, we have seen how price escalation could lead to delays in a project's performance. A delay in a project's performance on the other hand brings many other situations which lead to further price escalation. Through a delay price of materials and labor could escalate; fixed costs of a project remain incurring regardless of project performance; exchange rate issues and others also could have a probability to aggravate the price escalation. Those projects that have not been scrapped or significantly delayed as a result of price escalation difficulties have frequently experienced higher project costs. Contractor and supplier fears regarding potential, and future price escalation, and the absence of price escalation clauses in most construction contracts, often lead to higher contract prices and larger project costs (Pearl, 1994).

Project Financing Problem (Budget Short Fall): Where construction cost overruns arise, the lenders will not expect, and will likely not agree, to advance additional funds to the project company to help fund the overruns. A desk study in ERC has shown that a financing problem especially a lack of foreign currency has been noticed following price escalation. It has to be recalled that the financing problem could fail to pay interim payment requests which again will lead to a request for an interest payment to the employer by the contractors and consultants.

Disputes among Stakeholders: Sambasivan and Soon, (2007) discuss that disputes are insidious often resulting in time overrun, cost escalation, litigation, and complete abandonment of projects. Mohammed, (2013) explained that many construction disputes arise out of disagreement delay hardship, and expense during the construction project. Disputes in construction may be caused by one or a combination of several reasons. Most of the typical disputes are caused by factors such as unrealistic contract duration and costs, impact and ripple effects of delays, evaluation of the quality and quantity of works, differences in the interpretation of plans and specifications, unfulfilled duties, inefficiency, and disruption (Groton, 1997).

2.2.6 Effect of COVID-19 Pandemic on Price Escalation

It can be observed that the COVID-19 pandemic is directly related to several causes of recent supply chain shortages that contribute to the sharp rise in material prices. A recent study published by the Interdisciplinary Digital Publishing Institute (MDPI) asked 34 contractors across the United States about the initial impact of their observed COVID-19 pandemic on business, the most common. Some of the answers cite significant delays and shortfalls. Materials as a major issue in the industry (Alsharef). Delays in material production, in turn, reduce the overall supply of a given material (Alsharaf). According to this article, contractors linked reduced supply and higher material pricing to "the closure and reduction in the capacity of manufacturing and processing facilities that are upstream in the supply chain" (Alsharef). Problems arising from reduced supply at the beginning of the pandemic have been amplified over the last few years to create larger problems for contractors. (NCDC, 2021)

So far, research on the topic of material escalation contracts has become very general. Material escalation is not a new concept in construction. However, according to an article published by the Associated General Contractors of America, prices for various materials such as steel and wood set an unprecedented weekly rise in April 2021 (Associated).

2.2.7 Effects of Material Price Fluctuation Factors on the Performance of Contractors

Economic effects, building output effects, stakeholders' effects, and external effects have been classified as the effects of material price fluctuation factors on contractor performance.

Economic-related effects The economic-related effects of material price fluctuation factors on the performance of contractors are:

Supply and demand

More products may be launched at any time and sold at such low prices that not all may be purchased by consumers, and vice versa. As a result, volatility threatens the price of these materials as demand increases. The price factor drops dramatically as large quantities of

material are required to meet demand. This trend is directly proportional to the cost and time of construction projects under construction (Onyechi, 2010).

Energy costs

According to Oyediran (2016), increasing energy costs have a knock-on impact on most construction material manufacturing operations, as suppliers are forced to raise building material prices to compensate for the energy costs.

Raw materials and input costs

Raw material costs such as oil, gas, and electricity, as well as other factors, are the main drivers of price fluctuations in building materials such as roofing, cement, membranes, and waterproofing materials. Production costs affect products by increasing or decreasing prices and increasing or decreasing product quality (Ugochukwu, 2015).

Inflation

Inflation is defined as the general upward trend in the prices of goods and services in a particular economy. This is an indicator of how the price is rising over time. According to Rakhra and Wilson (2017), the theory behind inflation and its impact on building material prices is that there is a time lag between an increase in inflation and actual increases in building material prices.

Crude oil prices

The Bureau of Economic Research (BER) (2008) found that in Nigeria, the production price index (PPI) of various materials increased in parallel with rising diesel costs. According to Ber (2008), oil prices affect 96% of shipments, resulting in higher delivery prices for materials. It also affects 43% of products, 21% of domestic and commercial use, and 3% of electricity. As a result, when the price of oil rises, the cost of everything you buy increases, creating inflation.

Exchange rates

The extent to which exchange rate fluctuations affect the price of construction materials depends on the type and amount of materials a country imports at the time, the need to import raw materials to produce construction materials domestically, and the local production. Processed materials (copper, wood, steel, etc.) are internationally traded commodities (Khumpaisal, 2007).

Import duties

Goods and products imported into Nigeria are subject to import duties, protecting local manufacturers from customers seeking cheaper goods from abroad. Countries such as Nigeria, Malaysia, Uganda, India, Kenya, and Oman have found that import tariffs on construction materials affect the prices of construction materials by raising the prices of imported products due to imbalances between import and export quotas. (Fitner, 2011).

Interest rate

Bank interest rates are high, the foreign exchange market is unpredictable, and the country's foreign exchange reserves are severely depleted, hurting an industry that imports about 60% of its raw materials (Jagboro & Owoeye, 2004). On the other hand, Oladipo (2012) argued that many constructions and profitable real estate and residential projects across the country were shelved or abandoned due to a lack of capital or soaring borrowing costs. Higher interest rates not only increase borrowing costs but also make people more likely to save, thus reducing their spending.

Currency devaluation

Pinto et al. (2011) in their book “Fixed Price Vs. Fluctuation” identified the major cause of fluctuation in construction projects’ cost as materials price increase which he pointed out as “devaluation of naira” to be the cause and suggested price control as an obvious solution in controlling it. He expressed the view that in all his period of stay in Nigeria, he has only witnessed a case of reduced cost or price of material and part of the country in 2011, from his suggestion; one can deduce easily that the fluctuation cost is in question more of

inflation. The research conducted by Mac-Barango (2013) showed that inflation in Nigeria was largely determined by the absence of fiscal prudence on the part of the government, parallel exchange rate shocks, and outputs. Mac-Barango (2013) noted their view and concluded that the backward- and forward-looking expectations, industrial output, net export, current money supply, and changes in exchange rates were key determinants for inflation.

2.2.8. Strategies for Minimising the Adverse Effects of Price Fluctuation.

Even if price movements cannot be accurately predicted, their impact can be minimized. According to Ramachandra (2010), measures to minimize the negative impact of material price volatility on contractors include keeping information up-to-date, reducing design time, and contracting smaller contracts at more manageable prices. For example, splitting into larger contracts. Fischtner (2011) reduces headcount reductions for contractors by reducing overall design, procurement, and construction time, applying corrective actions early, and using a procurement process that understands project requirements and needs. We have found that it can mitigate severe impacts. Given the severity and scale of volatility that has hampered the growth of the Nigerian construction industry, project owners may offer payment protection to contractors (Ogbu, 2018). This allows contractors to establish legal mortgages and provides strong support to prevent timely cash payments from untrustworthy owners (Ramachanda, 2010). According to Kashimu (2012), various strategies have been identified, including Good leadership skills, minimal volatility, good planning, and timely documentation. (OMEDE, 2021)

Adoption of value engineering concept

The first is to apply the principles of value engineering. This involves thoroughly examining each feature and removing or changing anything that increases the cost of the project without improving the project's functionality. Through careful consideration of pricing, material availability, construction techniques, procurement costs, planning and scheduling, cost-benefit ratios, and other cost-influencing products, increased total project costs can be realized (IbnHomaid, 2002).

Comprehensive and error-free designs and specifications

To avoid delays due to lack of details or misunderstandings by the contractor, to provide accurate and comprehensive design and specifications, accurate design and specifications help the contractor to keep the expected delivery quality on track. We provide blueprints of all the parts required for Geoff (2008) to construct buildings while saving time and keeping costs within the final contract amount.

Reducing site waste

Reduce on-site waste by developing and implementing effective materials policies and controls. According to Kasimu (2012), cost-reducing steps include accurately determining project specifications and characteristics before commencement and ensuring member commitment, skills, and responsibility to prepare the project team to perform at its best. It includes approving and approving the skills and responsibilities that prepare the project team to do their best work. If the project is in progress, use contract clauses that prohibit major changes to keep the project on track.

Effective human resource management

Effective human resource management entails effective motivation and project tracking, which includes determining which areas or paths are dead ends and taking corrective action as soon as possible Idoro & Jolaiya (2010).

Improved financial utilization of contractors

The contractor must locate and buy products that are likely to cause delays or run out of stock. Furthermore, the best defense against shocks is careful planning and continuous review of cash flows. Companies should also measure their profitability about their goals regularly (Mojekwu et al., 2013).

Improved contract procedure

Improved contract procedures are also thought to lessen the impact of market fluctuations, particularly price increases, on construction contractors (Nwachukwu et al., 2014):

- ✓ **Contract award time**: Contract award and change order processes should be free of excessive administrative constraints.
- ✓ **Keeping current information**: Update control information regularly with current prices, indexes, and patterns.
- ✓ **Design time**: To reduce total project time, expedite engineering/design activities.
- ✓ **Subdivide contracts**: The overall risk is minimized by splitting a huge risky endeavor into many smaller ones at manageable and predictable costs.
- ✓ **Payment**: If payments are overdue, contractors can suffer greatly due to inflation and high-interest rates. As a result, payments to contractors must be made quickly (Stukhart, 2012).
- ✓ **Innovative contracting**: Procurement procedures that reduce the total design, procurement, and construction time should be used. Such methods may involve starting work with a partial design and working on a reimbursement basis using pre-qualified contractors, but fixed quantities and prices later. negotiated (Stukhart, 2012).

2.3 Empirical review

This section deals with the study empirically reviewed related to the topics. These are studies related to investigating the impact of material price escalation and its effect on construction projects of Addis Ababa city public projects.

It has been discussed that as a result of the complex nature of the construction industry and the volatile surrounding environment price escalation is an almost inevitable event. Following this fact, many researchers have been conducting different research to identify the possible causes and effects of price escalation in different sectors of the construction industry. This part of the study tries to present different findings of the researchers regarding the causes and effects of price escalation in the construction industry.

Eshofonie, (2008) has revealed a total of 40 causes of cost overruns with the top few causes being the following: incorrect planning, wrong method of estimation, contract management, fluctuation of prices of materials, previous experience of the contractor, absence of construction cost data, additional cost and project financing. Eshofonie has further identified four effects of cost overruns which are company or firm liability to insolvency and liability of the companies or firms to bad debt; underutilization of man-power resources, plants, and equipment; increased project cost due to extension of time: Longer project duration means that more resources will need to be allocated to the project, which then increases the project costs and project abandonment.

The study of Baloyi and Bekker, (2011) on the other hand revealed that increases in material cost, inaccurate material estimates, shortage of skilled labor, client's late contract award, project complexity, increase in labor cost, inaccurate quantity take-off, the difference between the selected bid and the consultants' estimate, change orders by the client during construction and shortage of manpower.

Rahman, Memon and Abd.Karim, (2013) identified the following as the top ten causes of cost overruns in large construction projects: the fluctuation of prices of material, cash flow, and financial difficulties faced by the contractor, poor site management and supervision, lack of experience, schedule delay, inadequate planning and scheduling, incompetent subcontractors, mistakes and errors in design, frequent design changes and poor financial control on site. These causes are indeed a general cost overrun in the construction industry. This study has a main focus on price escalation i.e. a change in price-causing factors specifically.

When coming to the Ethiopian case, a research work by Fetene, (2008) which is made on completed public building construction projects in Ethiopia has identified that 67 out of 70 public building construction projects suffered cost overrun. The rate of cost overrun ranges from a minimum of 0% to a maximum of 126% of the contract amount for individual projects. As per the study, from identified 39 causes of cost overrun in the Ethiopian case the most important were found to be inflation or increase in the cost of construction materials, poor planning and coordination, change orders due to enhancement required by

clients, and excess quantity during construction. Fetene further explained that the most common effects of cost overrun identified by his research were a delay, supplementary agreement, adversarial relations among stakeholders, and a budget shortfall of project owners. Fetene also concludes that cost overrun does not affect only those parties that are involved directly in the construction of a project, but its effects pass to the construction industry as a whole and consequently to the national economy of the country.

2.3.1 Consequential Effects of Material Price Fluctuation on construction Project performance.

According to Smith (2017), every project is a dream to completion, so for most project plans the phenomenon of headcount reductions remained a feared but inevitable disruption. Volatility is the result of inflation, he added, and that inflation is a global economic problem that ignores all theories and policies designed to curb it. It has been shown that some clients abandoned the project because both increased costs significantly. Contract amount escalations can come from multiple sources, including fluctuations. According to a study reported by Akinsiku & Akinsulire (2012), contract cost overruns and the concomitant contract termination problem in Nigeria averaged 113.68% and reached alarming levels ranging from 6.67% to 674.65%. This is even worse for government contracts, with a reported average increase in contract value of 186.37%.

He further completed a study on the "difference between initial contract value and final contract value for construction projects" and showed that the main cause of contract overruns was a decrease, accounting for 26.98% of this increase. According to the Department of Commerce's U.S. Census Commission. (2005) estimated construction costs at seasonally adjusted annual rates. While construction costs of €1,108.5 billion, up 6.1% from last year's rate, have increased significantly, if not excessively, construction costs have not shown similarly measured stability.

External forces have also led to tremendous growth rates in a wide range of integral construction raw and service materials. This situation is said to make long-term cost forecasting more difficult than ever. In his paper, Long (2017) sees the economy humanly

suffering from volatility when going through periods of continuous rising and falling prices for goods and services. pointed out. However, price adjustments up or down are subject to different lengths of delay. Authorities may deliberately keep prices low in the short term or when demand is too great to be satisfied at current prices. Abandoned projects, increased construction costs, increased completion times, use of inferior materials, and diminished contractor earnings are all a result of construction cost fluctuations (Gambo & Ashen, 2012). (OMEDE, 2021)

2.3.2 Research Gap

Escalation of construction material prices is a major issue for construction projects that must be completed within a set budget. Also, many projects can be terminated due to disputes between the contractor and the customer due to changes in the work of the project. On the other hand, many projects are affected by on-time delivery due to this issue. Rising building material prices also affect project quality due to a variety of factors. This means that when construction material prices escalate, contractors and clients try to use cheaper and lower-quality materials because they affect the quality of their construction projects.(Alabi, B., & Fapohunda, J. (2021)

From the above problems, escalating construction material prices are a major problem not only in the construction industry in Addis Ababa but also in the construction industry in developing countries such as Ethiopia, This is a serious problem. Therefore, this thesis is used to fill the gap of public projects facing construction material price escalation and also there is a lack of any in-depth assessment of the topic.so, it is used as a reference material for public projects that are affected by price escalation, on the other hand, opens positive input for another study to related paper workers to solve the problem of construction material price escalation and identify and recommend best practices for addressing the construction material price increase problem in the construction industry in Addis Ababa city design and construction works public projects

2.4 Conceptual framework

A conceptual framework is a diagrammatical presentation of the independent and dependent variables and their relationship among themselves, McGaghie, Bordage, et. al. (2001).

The conceptual model shown in this study shows independent and dependent variables that mean impacts that cause construction material price escalation and its effects. construction material price escalation is the independent variable and dependent variables are that cause price escalation.

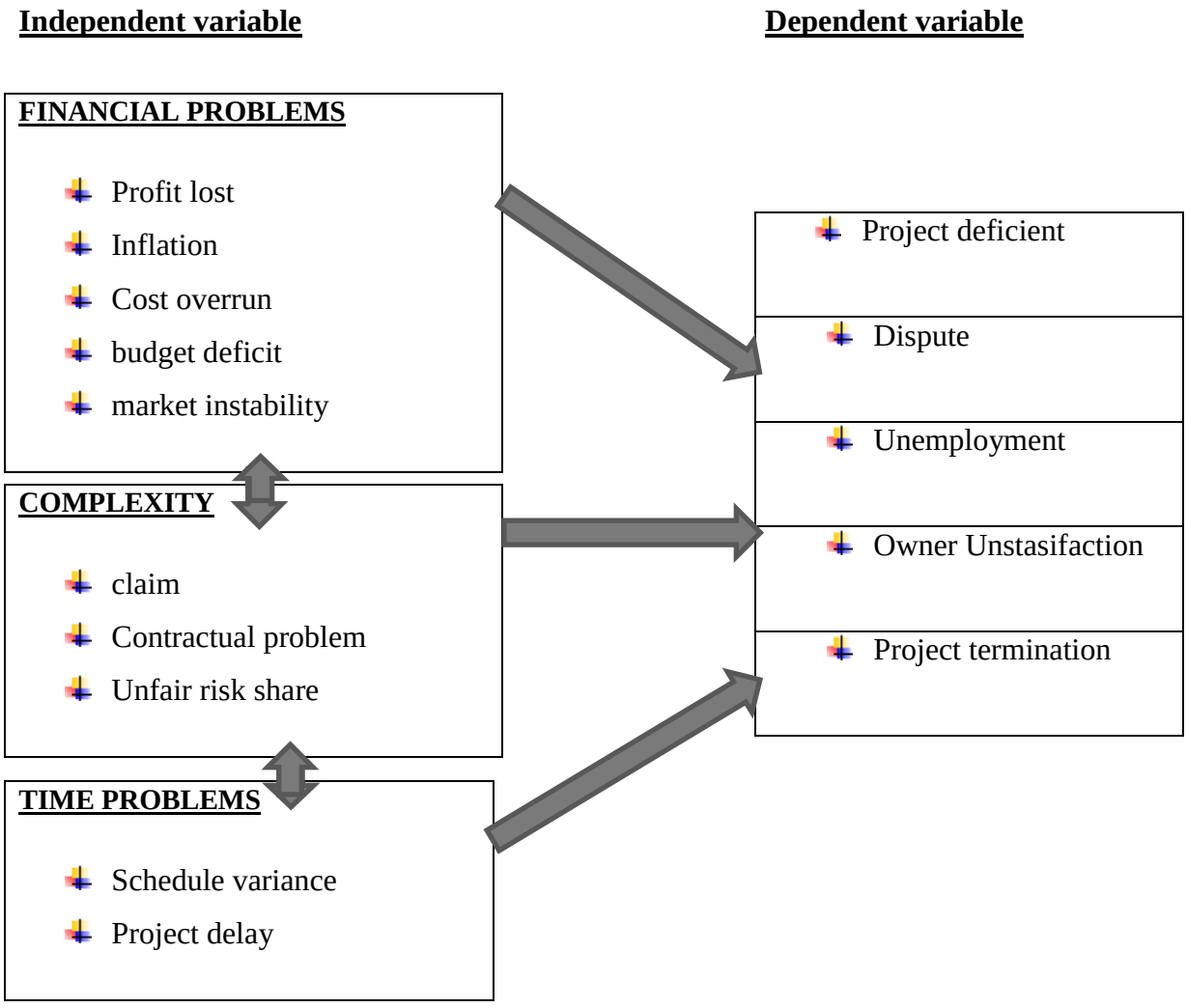


Figure 1 Conceptual Framework

Source: developed by the researcher

CHAPTER- THREE
RESEARCH METHODOLOGY

3.1 Description of Study Area

The research was conducted in the Addis Ababa city Design and construction work office public projects that were executed by contractors, consultants, and also the client of the projects.

Figure 2 Addis Abeba City map

3.2 Research design

Descriptive and analytical study designs were used to investigate the impacts of unexpected material price escalation and its effect on Addis Ababa city public projects. The descriptive design presents both qualitative and quantitative. The analytical tool was used for identifying the relationship between variables using SPSS version 26. The study is based on the use of structured questionnaires (see Appendix I). The questionnaire reached individuals in person as well as sent via e-mail and telegram due to minimizing the time of distribution. This helped to minimize the effect of time-related changes that may introduce biases on the response of the study subject. This approach is used as it is a satisfactory tool for collecting data for the sample population to investigate the topic under study.

A descriptive and analytical survey design was used in this study. It was attempted to collect data from the relevant population (client, consulting firms, and contractors) to evaluate the insight of different stakeholders on the issues of construction material price escalation affected groups, ranking of project material price escalation variables and causes leading to construction material price escalation in Addis Ababa city design and construction work office public projects.

3.3 Research Approach

Researchers mostly use the quantitative approach to collect, organize, and analyze the data and also case studies used to obtain findings; therefore it involves testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The qualitative approach is one in which the instruments producing data from statistics are used.

In this study, the researcher used a quantitative approach to collect and analyze the findings. A research question was created for data collection to investigate the impacts of unexpected construction material price escalation and its effect on public projects of design and construction works. Close-ended Likert-style questionnaires were used to gather information and it was summarized and analyzed to explain and reflect on the population.

3.4 Sources of Data

To find the necessary data, the study considered the quantitative and qualitative types of data. Concerning sources of data, both primary and secondary sources and also case studies were used to generate valuable and relevant data.

I. Primary Sources

To realize the target, the study used a well-designed questionnaire as the best instrument. This was completed by the managers or employers of the institution. Besides, face-to-face interviews with the supporting owner, contractor, consultant, and other regulatory bodies/and the relevant managers who head the different departments in the selected sectors.

The interview method of data collection is preferred due to its high response rate. That is it gives the two people concerned an opportunity to interact and get details on the questions and answers. Through interviews, clarification of issues is easily achievable leading to the accuracy of data from the respondents.

II. Secondary Sources

Secondary data from files, pamphlets, office manuals, circulars, and policy papers were used to provide additional information where appropriate. Besides, a variety of books, published and/or unpublished government documents, websites, reports, and newsletters were reviewed to make the study fruitful.

The research will be conducted first by identifying the causes of construction material price escalation through a literature review and desk study on selected construction project report documents from the findings questionnaire will be developed and distributed to different contractors, consultants, and clients of Addis Ababa city construction industry.

The study used the data sources to produce the following basic documents: respondents' documents and archival documents. The main data collection instruments are questionnaires and document analysis.

3.5 Sampling Design

3.5.1 Population

The population for this research was contractors, consultants, and clients who participated in the Addis Ababa city construction industry sub-city public projects.

The survey sample is drawn from construction industry stakeholders (clients (project owners), contractors, and consultants) and selected according to their direct exposure to construction activities. Those lists were obtained from the projects executed by Addis Ababa City Design and Construction Work Office project worker contractors and the samples were randomly selected from the project worker's contractor and consultants who executed the project in Addis Ababa City Design and Construction Works office projects executed from

2010-2015 E.C. Consultants and Contractors were selected based on the qualification that stated in the competence of compliance. In my study area of Addis Abeba City design and construction office project participants of contractors grade GC/BC 7 and above and also the consultants that participated in the project of Addis Ababa City design and construction work from small-level consultants to grade 1 consultants. Those lists were obtained from the projects of Addis Ababa city design and construction work project participants and Randomly selected from the projects executed by Addis Ababa city design and construction works public project. A desk study will examine construction projects with a contract value of 5 million birrs and above.

3.5.2 Sample size and sampling technique

According to Trochim (2005), sampling is the process of selecting units. The sample size is the minimum sample size you need to estimate the true population proportion with the required margin of error and confidence level.

The technique for drawing samples from the population is known as sampling. The random sampling method is the sampling technique adopted in this research because it is the fundamental method of probability sampling.

This method uses the principles of randomization, which is a procedure of giving every subject in the population an equal opportunity to be selected from the institution. The sample size selected here is considered large enough to allow for the precision, confidence, and generalizability of the research findings. A simple random sampling method was used in this study because it is considered the simplest, most convenient, and bias-free selection method. The following formula was used for the calculation of the sample size since it was relevant to studies where a probability sampling method was used (Watson, 2001).

the questionnaire was distributed to the project owners of the Addis Ababa city design and construction works office, contractors, and consultants. To get information from contractors and consultants sample of contractors and consultants participated in the Addis Ababa city construction industry public projects.

Sample formula = n = N/1 + N (e) 2

Where n = desired sample size

N size of the population

e= Limit of error tolerance which was assumed to be 5 % (0.0 5); confidence limit.

Computing with the above formula, the number of questionnaires to be administered was obtained

N=1,187 projects that are selected from the design and construction work office executed from 2010-2015 E.C

e=0.05

sample=n=N/1+N(e)2

n=1,187/1+1,187(0.05)2

n=1,187/3.9675=300

3.6 Method of data collection

The study will be conducted using both primary and secondary sources of data collection. Data used in the research are both primary and secondary sources of data collection.

The instrument used to collect data was a questionnaire. This tool was selected to get more in-depth quantitative and qualitative data from the study participants. The tool was used to assess the knowledge and attitude of the participating parties about price escalation and its effect on public projects in Addis Ababa city.

For this research, a Likert scale with 5 grades is preferred to allow a wider opinion range for the respondents. Primary data were collected mainly through self-administered structured questionnaires using a 5-point Likert scale model with response categories ranging from very high effect to no effect.

The questionnaire was developed based on the objectives of the study set and a review of related literature on material price escalation. The main reason for using a questionnaire was to get reliable data within a short period. To supplement responses provided via questionnaire as well as to provide an answer for the how part of the research question, qualitative data was gathered from the aforesaid directors through purposive sampling technique.

The survey was pre-tested with a group of fifteen people for inputs and comments before the actual data collection. Overview and clarifications on the purpose and how to fill the questionnaire were given to respondents so that the questionnaire can be clearly understood and the outcome can be clearer.

3.7 Questionnaires

3.7.1 Questionnaire Design

The layout of the questionnaire was kept very simple to encourage meaningful participation by the respondents. The questions were kept as concise as possible with care taken to the actual wording and phrasing of the questions. The reason for the appearance and layout of the questionnaire is of great importance in any survey where the questionnaire is to be completed by the respondent. The literature in the study should be used as a guideline for the development of the questions in the questionnaire. The questions that will be used in the questionnaire are five-point Likert scale-type questions. The type of scale used to measure the items on the instrument is a continuous scale.

Respondent documentation was collected using questionnaires from clients (project owners), contractors, and consultants. There are two basic types of survey questions to choose from: open-ended and non-answered. This survey includes both open and closed surveys. The documents examined were primarily from completed projects, with contract documents, project reports, letters of correspondence, and proof of payment scrutinized. These were of great importance for identifying recurring issues related to price increases in the building construction sector in Addis Ababa. It also helped us assess how cost overrun issues arise and how they are documented.

Owing to a large number of public agencies that own construction projects and a large number of contracting and consulting companies that undertake work for public agencies a survey by questionnaire was found appropriate in addition to the desk study. The questionnaire was carefully designed in light of getting a high response rate from respondents.

Likert scales are important for knowing a respondent's feelings and attitudes towards something. Respondents are asked to indicate how well their feelings match the question or statement using a rating scale. Identified variables for cost overruns in building construction projects. Respondents are asked to agree on these variables that impact price escalation. Accordingly, the respondents choose one of the following based on their feelings.

0- very low

1- low

2- medium

3- high

4- very high

3.8 Methods of data analysis

This is the further transformation of the processed data to look for patterns and relationships between and/or among data groups by using descriptive and inferential (statistical) analysis. The Statistical Package for Social Science (SPSS) version 26 was used to analyze the data obtained from primary sources. Specifically, descriptive statistics (mean, standard deviation, and charts)) were taken from this tool.

3.9 Data Processing and Presentation

The method of data processing in this study was the manual and mean, mode, median, standard deviation, skewness, standard error skewness, and variance of computerized systems of SPSS version 2026. In the data processing procedure editing, coding,

classification, and tabulation of the collected data were used. Data processing has two phases namely: data clean-up and data reduction. During data clean-up, the collected raw data was edited to detect anomalies, errors, and omissions in responses and to check that the questions were answered accurately and uniformly.

The process of assigning numerical or other symbols came next which was used to reduce responses into a limited number of categories or classes. After this, the processes of classification or arranging large volumes of raw data into classes or groups based on common characteristics were applied. Data having common characteristics were placed together and in this way, the entered data were divided into several groups. Finally, tabulation and pie, and bar charts were used to summarize the raw data and displayed in the form of tabulation for further analysis.

3.10 Ethical consideration

The study protocol will be reviewed and an approved official letter will be written from Addis College

The researcher will adhere to research ethical standards regarding honesty, impartiality, and willingness to accept the respondents' fallibility, respect for their dignity, respect for freedom and right to participate, and respect for an individual's privacy. Researchers will prevent the use and dissemination of information that could harm individual research subjects and should not allow becoming dependent on informants, or Plagiarism of others' text, material, ideas, and research results. It will be explained to the respondents that participation in the study will be voluntary and private information should be protected.

3.11 Reliability

Reliability means measuring consistency in producing similar results on different but comparable occasions. If research is said to be reliable that means if it is replicated, similar or identical results will be shown. In this test, Reliability was assessed using Cronbach 's α; it is the most commonly used test to determine the internal consistency of an instrument. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. It is considered to be a measure of scale reliability. A "high" value for

alpha does not imply that the measure is unidimensional. Based on Roberta and Alison Cronbach ‘s α result is a number between 0 and 1. An acceptable reliability score is 0.7 or higher. Questionnaires were distributed to some contractors, consultants, and clients that can represent the whole group at an acceptable level. Therefore, according to the results, the questionnaire was well organized, clearly prepared, and easy to complete, and then it was returned to the researcher.

Table 1 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.946	0.946	11

Source: Own computation based on data collected (SPSS 2026 result)

The data obtained from the respondents to the questionnaire that Cronbach's Alpha value is 0.946 so it is precise to 1 and its reliability result is very good.

Table 2 Item Statistics

	Mean	Std. Deviation	N
What are the impacts profit lose	4.40	.670	50
What are the impacts of conflict rise	4.00	.452	50
What are the impacts of contractual problem	4.08	.528	50
What are the impacts of schedule delay	4.40	.670	50

What are the impacts of inflation	4.12	.558	50
What are the impacts claim	4.32	.653	50
What are the impacts of cost overrun	4.42	.673	50
What are the impacts of lakfirquot	4.10	.544	50
What are the impacts of market instability	4.12	.558	50
what are the impacts of budget defect	4.12	.961	50
What are the impacts of unfarriskshare	4.22	.616	50

Source: Own computation based on data collected (SPSS 2026 result)

The above result shows that the respondents of this paper answered high and very high which means that the mean and standard deviation value is good. so that from the sample of 50 respondents the the values of mean and standard deviation show good results.

Table 3 Overal Agreement

		Asymptotic			Asymptotic 95% Confidence Interval	
	Kappa	Standard Error	z	Sig.	Lower Bound	Upper Bound
Overall Agreement	.140	.038	3.672	.000	.138	.143

A. Sample data contains 50 effective subjects and 5 raters.

Source: Own computation based on data collected (SPSS 2026 result)

The above result shows that sig. is 0 and it is the sample is statistically significant also asymptotic confidence interval value is different from 0, which means the upper and the lower bounds are 0.138 and 0.143 not including 0. Because of that it statistically significant. the p-value is less than 0.05 so it also shows 95% statistical significance.

3.12 Validity

Validity and reliability are qualities that are essential to the effectiveness of any data-gathering procedure. Validity refers to whether the researcher's conclusion is true or correct and corresponds to the actual state of the world. Whereas, reliability indicates the accuracy or precision of the measuring instrument (Ghose, 2014). Validity means the ability of the research method to find accurate reality. If the research is said to be valid then it means that what was intended to be measured has been measured accurately. Validity is quite important if the researcher is doing in-depth studies on individuals, small groups, or situations.

As a process, validation involves collecting and analyzing data to assess the accuracy of an instrument. There are numerous statistical tests and measures to assess the validity of quantitative instruments, which generally involve **pilot testing**. The validity of this research is calculated by sending a questionnaire to the respondents in the case of Addis Ababa city

public projects' price escalation effects. The higher official of the company is also interviewed. The required results according to the pilot test conclude the research is found through the interview and the response of the employees. The study includes the employees of the company.

3.13 Writing of the Research

The research mainly consists of four parts. These are the research introduction, the literature review portion, the research methodology and analysis, and finally the conclusion and recommendation. The research plan has already been prepared. The literature survey part required the longest search period. During this time, various documents were collected, and tested for research purposes, and relevant information was recorded. In the end, all the notes I wrote down were linked into one document. Differences in perceptions among authors were noted. The final research part is written after analyzing all the main documents and other supplementary documents to test the actual situation of the construction industry because of the research objectives. Finally Conclusions and recommendations.

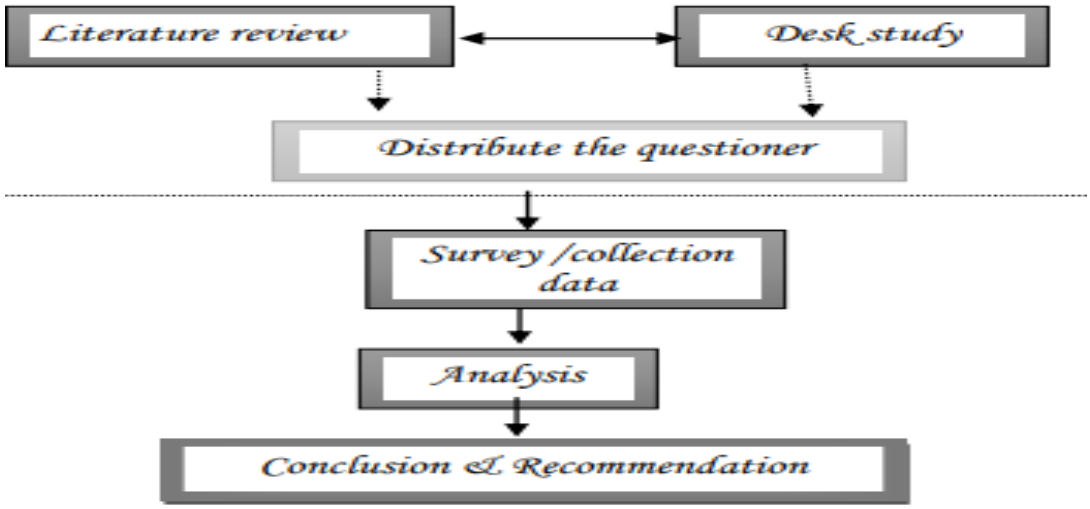


Figure 3 Research Layout

CHAPTER-FOUR
RESULT AND DISCUSSION

4.1 Demographic Characteristics of The Respondents

Demographic characteristics including sex, age, educational background, current position, work experience, and response toward all variables are summarized using frequencies and percentages.

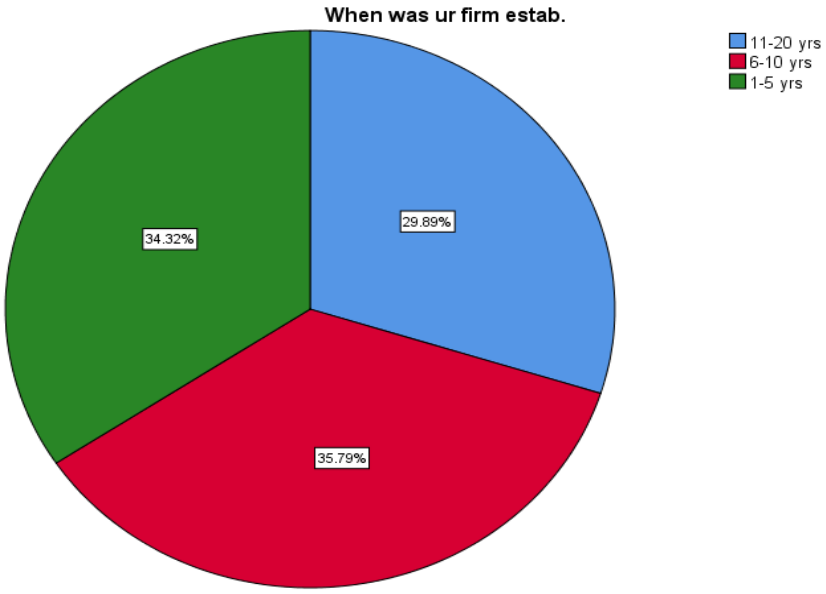
4.1.1 Age Of The Organization

The age of the organization indicates the experience and degree of reliability of the information provided by the respondents as regards the issue sought by the study which is the effect of construction material price escalation.

This study thus had to investigate the composition of the respondents in terms of age brackets to understand the company life of experience on the field.

Table 4 Age of The Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11-20 yrs	81	29.9	29.9	29.9
	6-10 yrs	97	35.8	35.8	65.7
	1-5 yrs	93	34.3	34.3	100.0
	Total	271	100.0	100.0	



Source: Own computation based on data collected (SPSS 26 result)

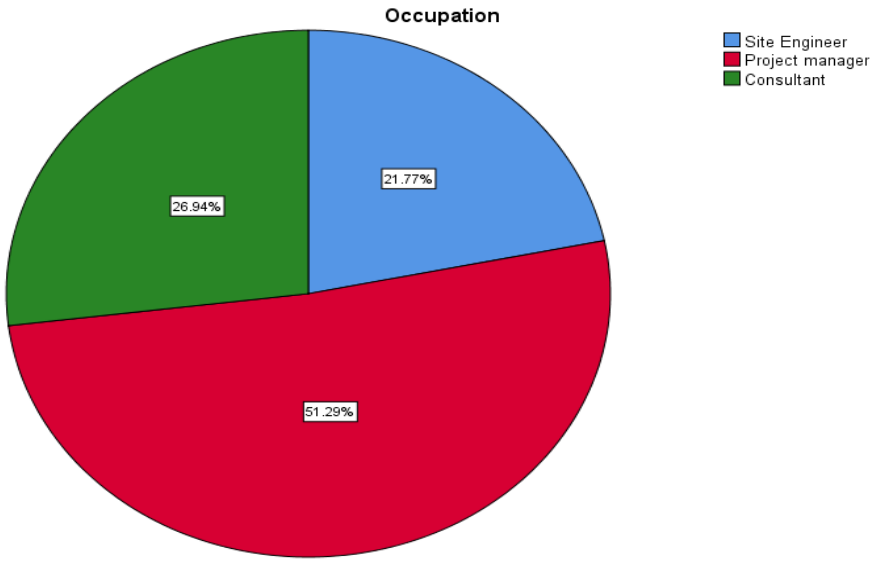
The organization of this equation is the respondent's year of establishment from 11-20 years of work company participation in this paper is 29.9 % but from the years 6-10 is 35.8 % and also the years 1-5 is 34.3 %.In this case, 6-10 years of established contractors are more participants than the respondent.

4.1.2. Occupation Of The Respondent

The respondent is responsible for the company and specifies the position of the person in the construction company.

Table 5 Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Site Engineer	59	21.8	21.8	21.8
	Project manager	139	51.3	51.3	73.1
	Consultant	73	26.9	26.9	100.0
	Total	271	100.0	100.0	



Source: Own computation based on data collected (SPSS 26 result)

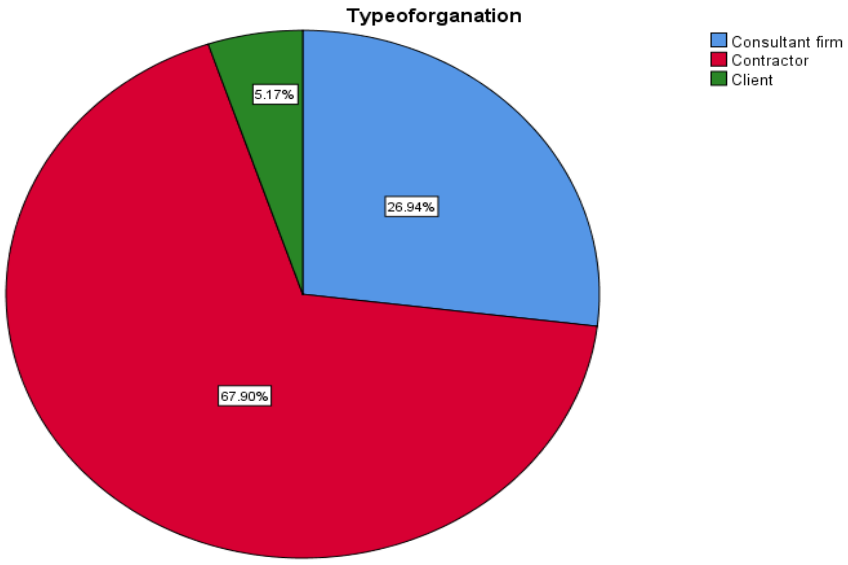
The occupation of the respondent participant of site engineers in this total number of 271 respondents is 21.8%, on the other hand, the participant of project managers is 51.3%, and also the participant of a consultant is 26.9%. the participant of the project manager of the project is more than the other respondent in this paper.

4.1.3 Type Of Organization

The respondent of this paper has worked in the company of a contractor, consultant, or on the side of a client.

Table 6 Type of organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Consultant firm	73	26.9	26.9	26.9
	Contractor	184	67.9	67.9	94.8
	Client	14	5.2	5.2	100.0
	Total	271	100.0	100.0	



Source: Own computation based on data collected (SPSS 26 result)

The organization that participates to respond for this equation are contractors, consultants, and clients of the projects. the participation of consultant firms is 26.9 % but also the participation of contractors is 67.9%, on the other hand, the participation of clients in this equation is 5.2% from the total equation of 271 respondents.

4.2 Analysis And Interpretation Of Collected Data

The following are the analysis and interpretation of the collected data. This phase transforms the data collected into credible evidence about the impacts and effects of unexpected construction material price escalation. It starts by organizing the data for analysis (data preparation), then describes the data, and finally interprets the data by assessing the findings.

In the quantitative data survey questionnaires on a five-point Likert scale were used for gathering primary data about price escalation and its impact and effects on the construction industry. The questionnaires ranged from very low to very high, at all to very much, very poor to excellent, and very low to very high).

In the quantitative data, the researcher tried to group similar responses into categories and identified common patterns that can help derive meaning from what may seem unrelated responses.

A total number of 300 questionnaires were distributed to gather pertinent information concerning construction material price escalation. Except for 29 questionnaires, the rest 271 were returned which is acceptable. All the completed and returned questionnaires were correctly completed.

4.2.1 The Impacts Of Construction Material Price Escalation In Addis Ababa City Design and Construction Work Public Projects

The researcher has tried to analyze the impacts and effects of construction material price escalation on the construction industry based on the gap observed by the respondents and in settling aims and objectives as the following sub-sections depict.

Table 7 Statistics that show the impact of construction material price escalation

		profit lose 1	conflict rise 2	contractual problem 3	schedule 4	inflation 5	claim 6	cost overrun 7	lack firm quote 8	market instability 9	budget defect 10	Unfair risks 11
N	Valid	271	271	271	271	271	271	271	271	271	271	271
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		4.37	3.96	4.00	4.38	4.08	4.26	4.38	4.04	4.05	4.01	4.15
Median		4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Mode		5	4	4	5	4	4	5	4	4	4	4
Std. Deviation		.665	.411	.513	.666	.534	.634	.666	.543	.503	.915	.578
Variance		.442	.169	.263	.443	.285	.401	.443	.295	.253	.837	.334
Skewness		-.590	-.265	.006	-.601	.079	-.280	-.601	.027	.092	-.848	-.015
Std. Error of Skewness		.148	.148	.148	.148	.148	.148	.148	.148	.148	.148	.148
Range		2	2	2	2	2	2	2	2	2	3	2
Minimum		3	3	3	3	3	3	3	3	3	2	3
Maximum		5	5	5	5	5	5	5	5	5	5	5
Percentiles	25	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	50	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	75	5.00	4.00	4.00	5.00	4.00	5.00	5.00	4.00	4.00	5.00	5.00

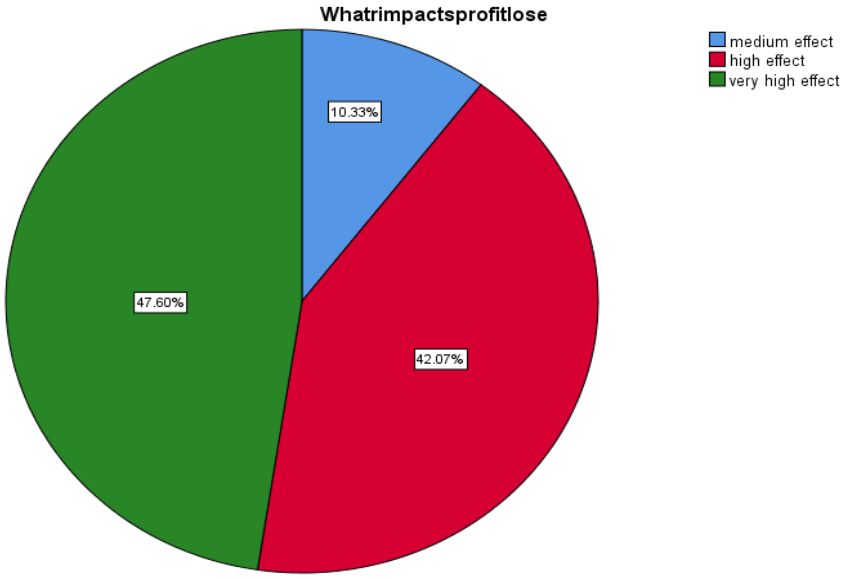
Source: Own computation based on data collected (SPSS 26 result)

From the result of the respondent's response the maximum value of the independent mean of 4.38 and the minimum value is 3.96 which shows that the respondent gave a high and very high point. the value of median and mode also shows the maximum value of 5 and 4 which means it shows a high value impact of construction material price escalation. also, the standard deviation value shows good and then the skewness tells us the direction of outliers. in a positive skew, the tail of a distribution curve is longer on the right side and the negative skew also shows the tail is longer on the left side. In this study, the tail is long to the left side which means the outliers of the distribution curve are further out towards the left. standard error of skewness can be used as a test of normality, the value should be between -2 and 2 if it is more than this on both the right and left side it is said to be the standard error of skewness. because of that, there is no standard error of skewness.

Table 8 Impacts of Profit Lost

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	114	42.1	42.1	52.4
	very high effect	129	47.6	47.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

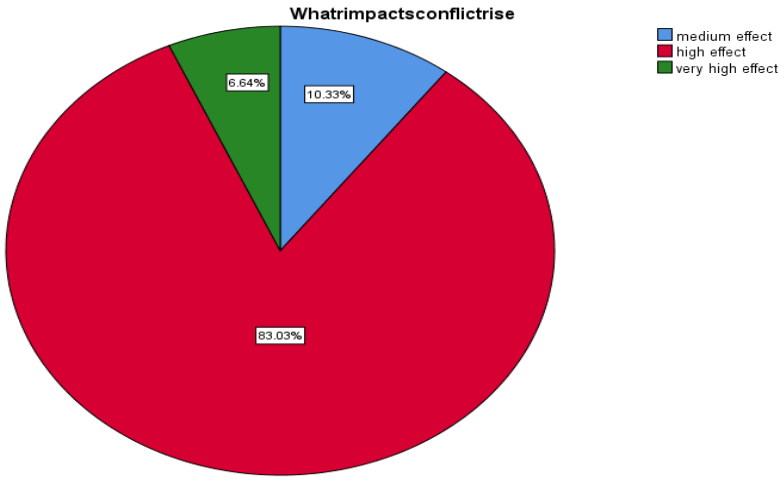


The respondents to this questionnaire responded profit loss has, a very high effect of 47.6%, a high effect of 42.1%, and a medium effect is 10.3% So the respondents answered show profit loss is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 9 Impacts of conflict rise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	225	83.0	83.0	93.4
	very high effect	18	6.6	6.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

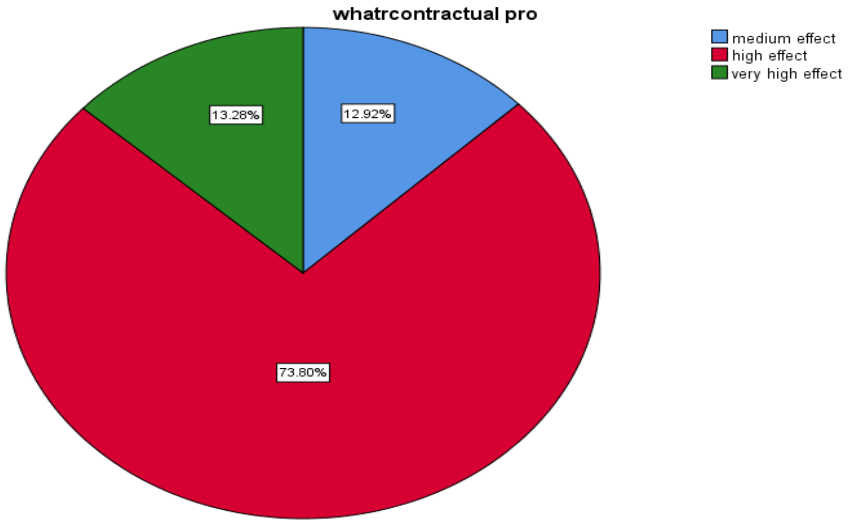


The respondents to this questionnaire responded conflict rise has, a very high effect of 6.6%, a high effect of 83.0%, and also a medium effect is 10.3% So the respondents answered that conflict rise is caused by the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 10 Impacts of contractual problem

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	35	12.9	12.9	12.9
	high effect	200	73.8	73.8	86.7
	very high effect	36	13.3	13.3	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

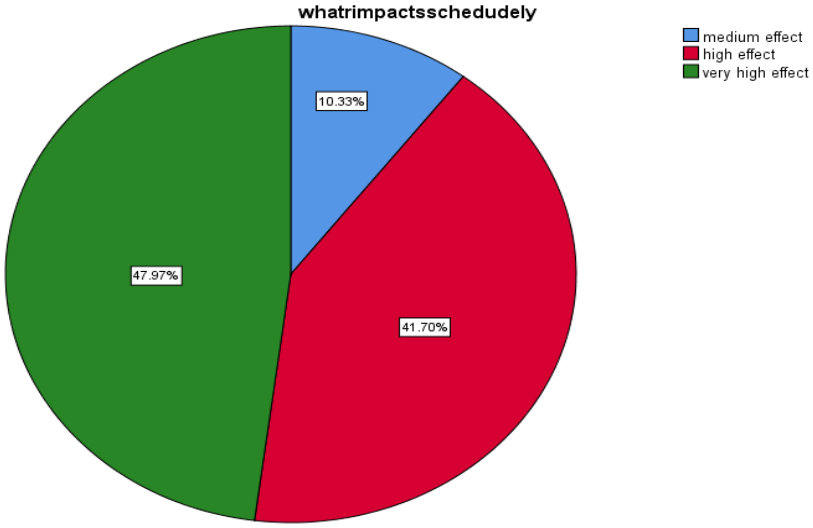


The respondents to this questionnaire responded contractual problems have, a very high effect of 13.3%, a high effect of 73.8%, and a medium effect is 12.9% So the respondents answered show contractual problems are the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 11 Impacts of schedule delay

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	113	41.7	41.7	52.0
	very high effect	130	48.0	48.0	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

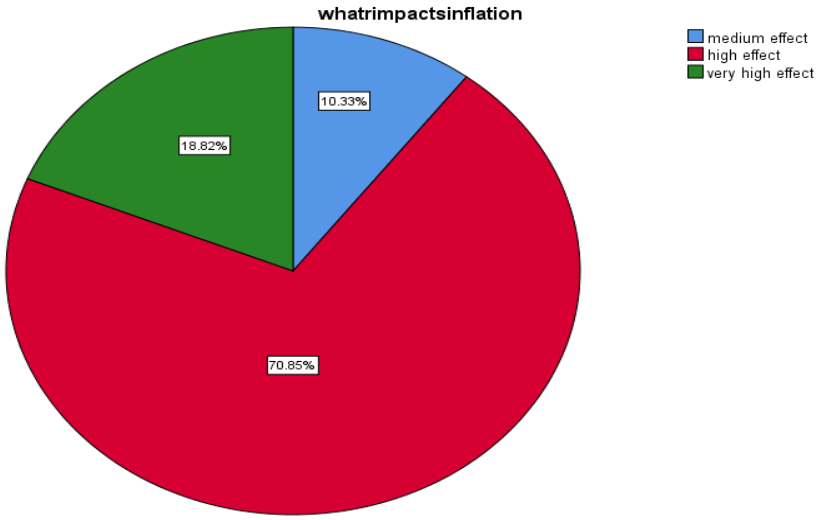


The respondents to this questionnaire responded schedule delay has, a very high effect 48.0%, a high effect 41.7%, and a medium effect 10.3% So the respondents answered that schedule delay is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 12 Impacts of inflation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	192	70.8	70.8	81.2
	very high effect	51	18.8	18.8	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

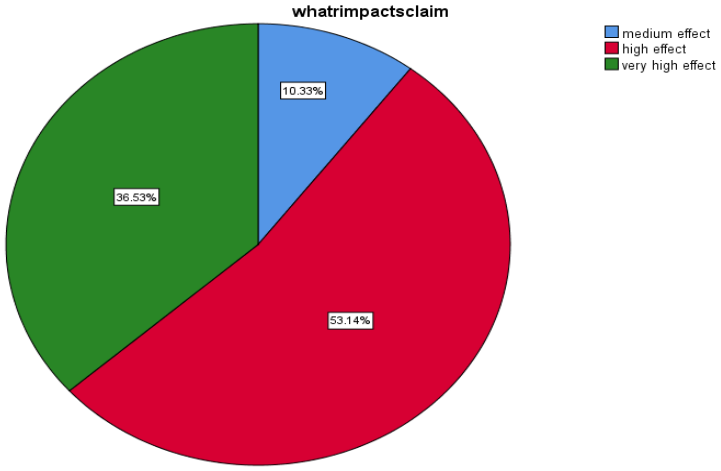


The respondents to this questionnaire responded inflation has, a very high effect of 18.8%, a high effect of 70.8%, and a medium effect is 10.3% So the respondent answered that inflation is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 13 Impacts of a Claim

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	144	53.1	53.1	63.5
	very high effect	99	36.5	36.5	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

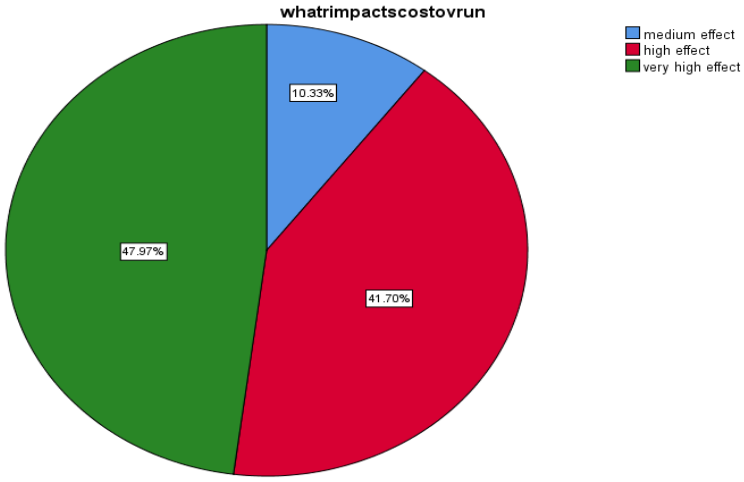


The respondents to this questionnaire responded claim has, a very high effect 36.5%, a high effect 53.1%, and a medium effect 10.3% So the respondents answered the claim is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 14 Impacts of Cost overrun

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	113	41.7	41.7	52.0
	very high effect	130	48.0	48.0	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

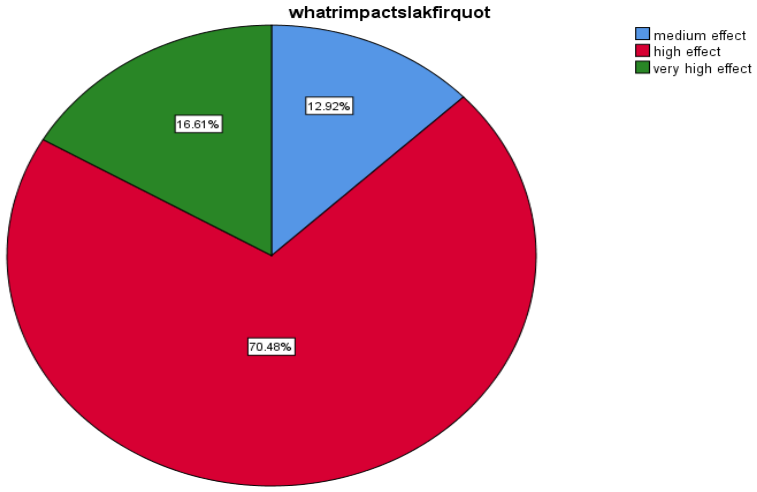


The respondents to this questionnaire responded cost overrun has, a very high effect of 48.0%, a high effect of 41.7%, and a medium effect is 10.3% So the respondents answered show cost overrun is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 15 Impacts of a lack of firm quote

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	35	12.9	12.9	12.9
	high effect	191	70.5	70.5	83.4
	very high effect	45	16.6	16.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

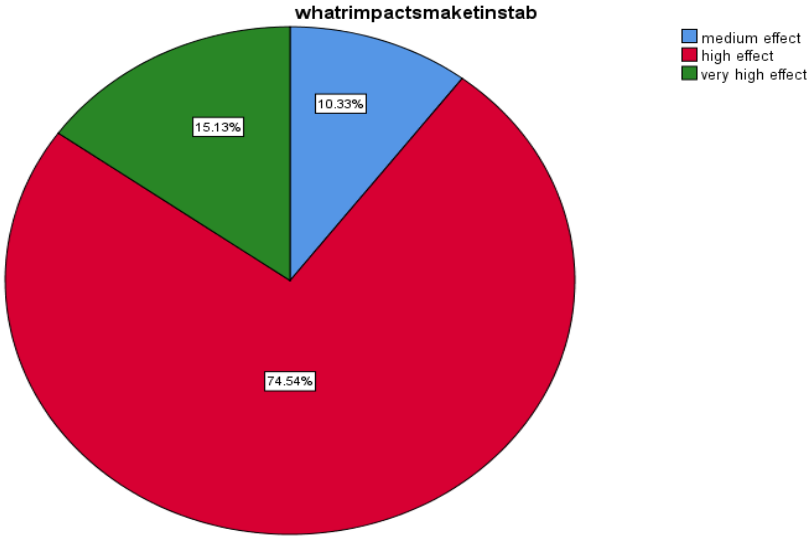


The respondents to this questionnaire responded firm quote has, a very high effect of 16.6%, a high effect of 70.5%, and also a medium effect is 12.9% So the respondents answered show the contractual problem is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 16 Impacts of market instability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	202	74.5	74.5	84.9
	very high effect	41	15.1	15.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

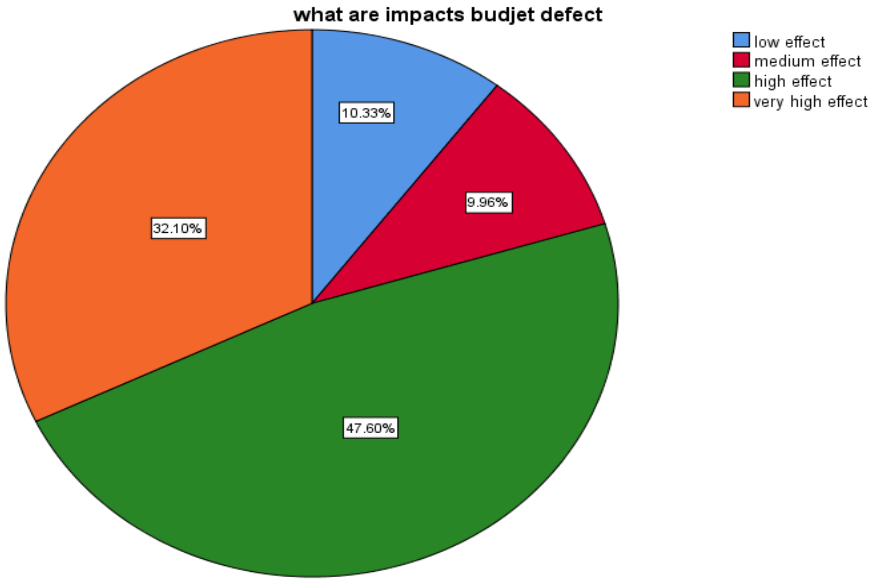


The respondents to this questionnaire responded market instability has, a very high effect of 15.1%, a high effect of 74.5%, and a medium effect is 10.3% So the respondents answered that market instability is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 17 Impacts of budget defect

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low effect	28	10.3	10.3	10.3
	medium effect	27	10.0	10.0	20.3
	high effect	129	47.6	47.6	67.9
	very high effect	87	32.1	32.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

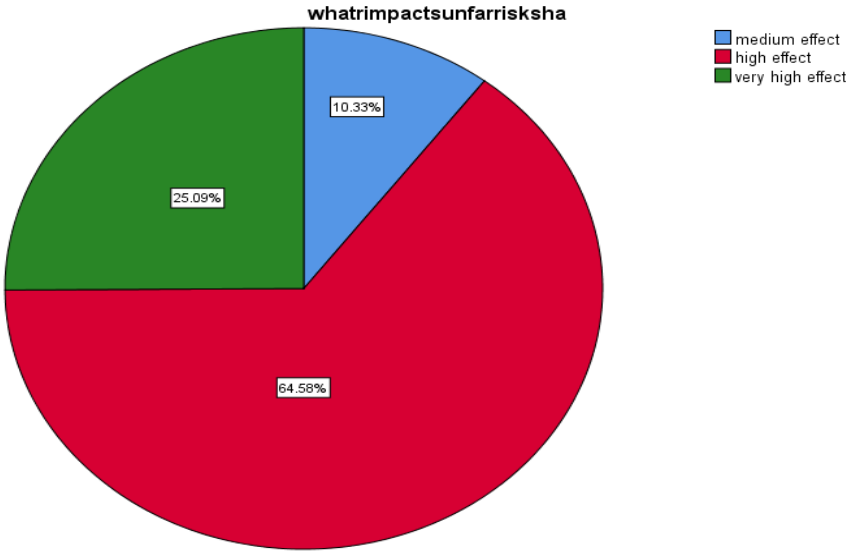


The respondents to this questionnaire responded that budget defect has, a very high effect of 32.1%, a high effect of 47.6%, a medium effect is 10.0%, and also a low effect of 10.3% .so that the respondent answered that budget defect is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

Table 18 Impacts of unfair risk share

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	175	64.6	64.6	74.9
	very high effect	68	25.1	25.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)



The respondent to this equation responded unfair risk share has, a very high effect of 25.1%, a high effect of 64.6%, and also a medium effect is 10.3% So the respondent answered show unfair risk share is the impact of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city of public projects executed by design and building works office.

4.3 Major impact faced party by price escalation in the construction industry of the Addis Ababa city Design and construction work office public projects.

		contractor	consultant	end users.	regulatory body.	supplier
N	Valid	271	271	271	271	271
	Missing	0	0	0	0	0
Mean		4.58	3.28	3.65	3.72	3.08
Median		5.00	3.00	4.00	4.00	3.00

Mode	5	3	4	4	3
Std. Deviation	.672	.794	.477	.580	.593
Variance	.451	.631	.227	.336	.352
Skewness	-1.340	.268	-.647	.120	-.024
Std. Error of Skewness	.148	.148	.148	.148	.148
Range	2	3	1	2	2
Minimum	3	2	3	3	2
Maximum	5	5	4	5	4

Table 19 Statistics of Majorly impacted parties by price escalation

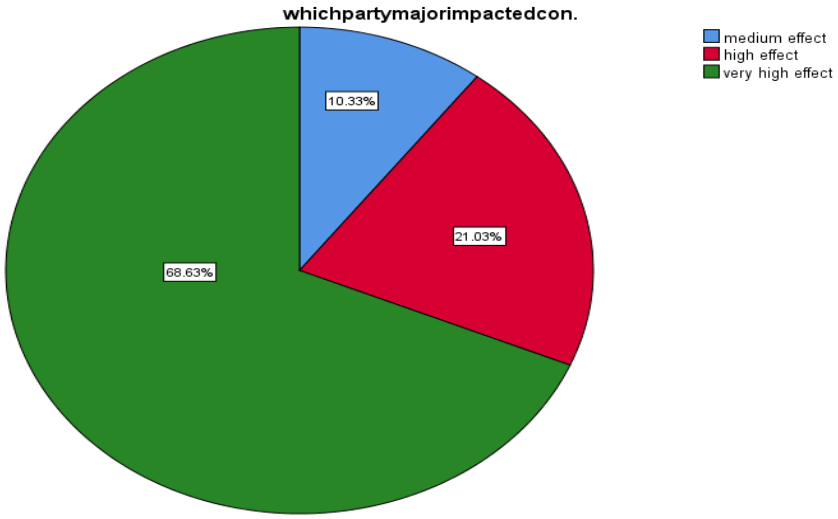
Source: Own computation based on data collected (SPSS 26 result)

From the result of the respondent's response the maximum value of the responsible party mean of 4.58 and the minimum value is 3.08 which shows that the respondent gave a high and very high point. the values of median and mode maximum and minimum also show the maximum value of 5 and 3 which means it shows a high-value impact of construction material price escalation. also, the standard deviation value shows good and then the skewness tells us the direction of outliers. in a positive skew, the tail of a distribution curve is longer on the right side and the negative skew also shows the tail is longer on the left side. In this study, the tail is long to the left side which means the outliers of the distribution curve are further out towards the left. standard error of skewness can be used as a test of normality, the value should be between -2 and 2 if it is more than this on both the right and left side it is said to be the standard error of skewness. because of that, there is no standard error of skewness.

Table 20 Impacts on the contractor.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	28	10.3	10.3	10.3
	high effect	57	21.0	21.0	31.4
	very high effect	186	68.6	68.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

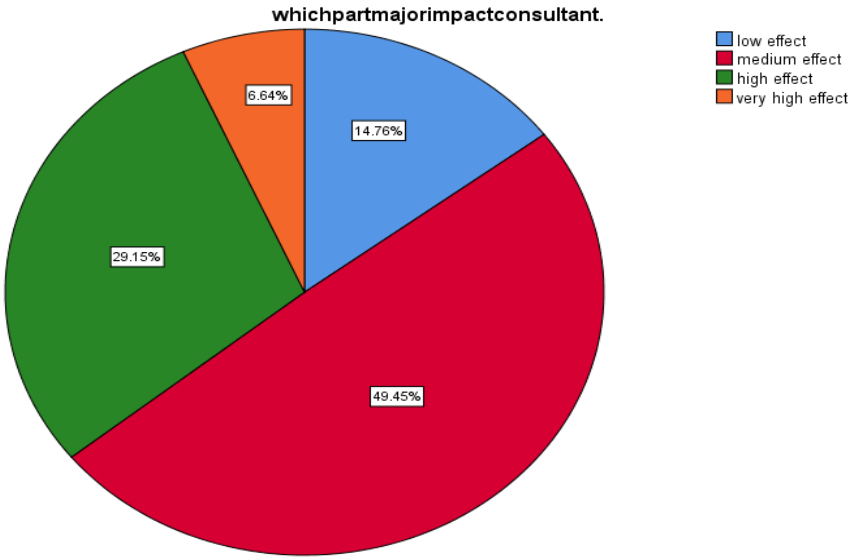


The response to this questionnaire gives that the impacts of construction material price escalation majorly affect the contractor with, a very high impact of 68.6%, a high impact of 21.0%, and also a medium impact of 10.3%.so that the contractors are affected by construction material price in the Addis Ababa sub-city public projects.

Table 21 Impacts on the consultant.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low effect	40	14.8	14.8	14.8
	medium effect	134	49.4	49.4	64.2
	high effect	79	29.2	29.2	93.4
	very high effect	18	6.6	6.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

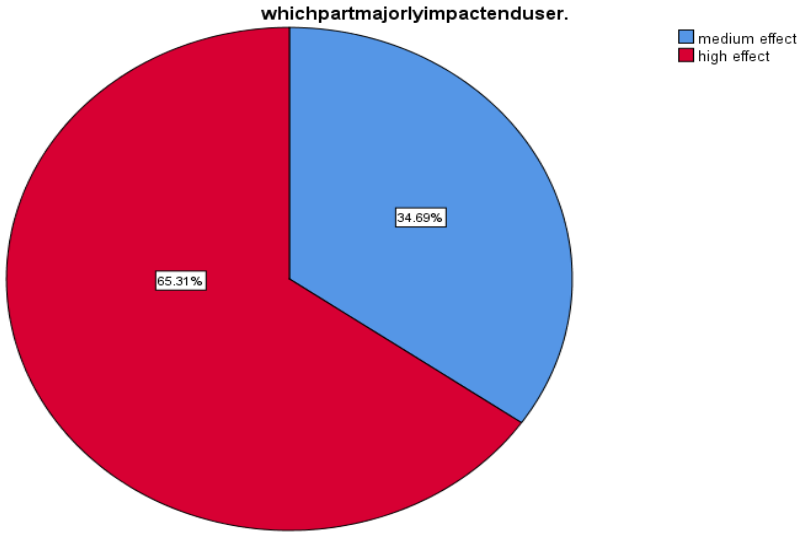


The response to this questionnaire gives that the impacts of construction material price escalation majorly affect the consultant with, a very high impact of 6.6%, a high impact of 29.2%, and also a medium impact of 49.4%.so that the consultants are affected by construction material price in the Addis Ababa sub-city public projects.

Table 22 Impacts on the end user.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	94	34.7	34.7	34.7
	high effect	177	65.3	65.3	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

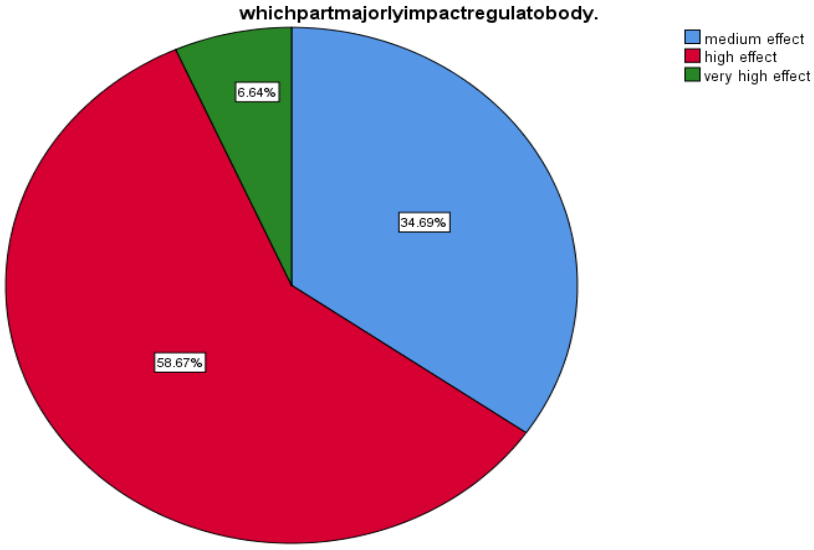


The response of the respondents to this questionnaire gives that the impacts of construction material price escalation majorly affect the end user with, a high impact of 65.3%, and also a medium impact of 34.7%.so that the end user affected by construction material price in the Addis Ababa sub-city public projects.

Table 23 Impacts on the Regulatory Bodies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	94	34.7	34.7	34.7
	high effect	159	58.7	58.7	93.4
	very high effect	18	6.6	6.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

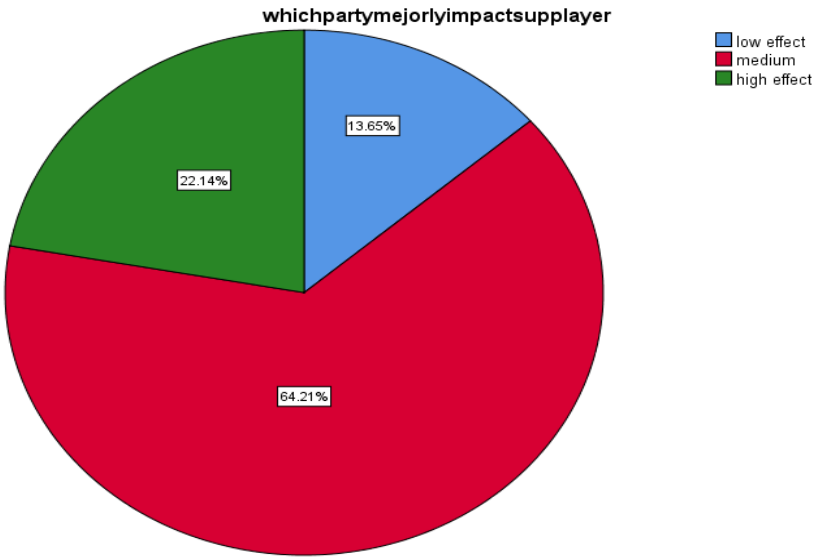


The response of the respondents to this questionnaire gives that the impacts of construction material price escalation majorly affect the regulatory body with, a very high impact of 6.6% a high impact of 58.7%, and a medium impact of 34.7%.so that the regulatory body affected by construction material price in the Addis Ababa sub-city public projects.

Table 24 Impacts on the Supplier

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low effect	37	13.7	13.7	13.7
	medium	174	64.2	64.2	77.9
	high effect	60	22.1	22.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)



The response of the respondents to this questionnaire gives that the impacts of construction material price escalation majorly affect the supplier with, a high impact of 22.1%, a medium impact of 64.2%, and a low impact of 13.7% of the end user affected by construction material price in the Addis Ababa sub-city public projects.

4.4 Effects of construction material price escalation in the Addis Ababa city public projects executed by design and construction works.

In this study, the other aim was to investigate the effect of construction material price escalation on projects of design and construction work office.

Table 25 Effects of Construction Material Price Escalation

		Termination	Project deficit	dispute	Worker unemploy	Owner unsatisfaction
N	Valid	271	271	271	271	271
	Missing	0	0	0	0	0
Mean		4.37	4.39	4.06	4.26	3.99
Median		4.00	4.00	4.00	4.00	4.00
Mode		5	4	4	4	4
Std. Deviation		.659	.490	.633	.439	.451
Variance		.435	.240	.401	.192	.204
Skewness		-.576	.433	-.044	1.111	-.048
Std. Error of Skewness		.148	.148	.148	.148	.148
Range		2	1	2	1	2
Minimum		3	4	3	4	3
Maximum		5	5	5	5	5

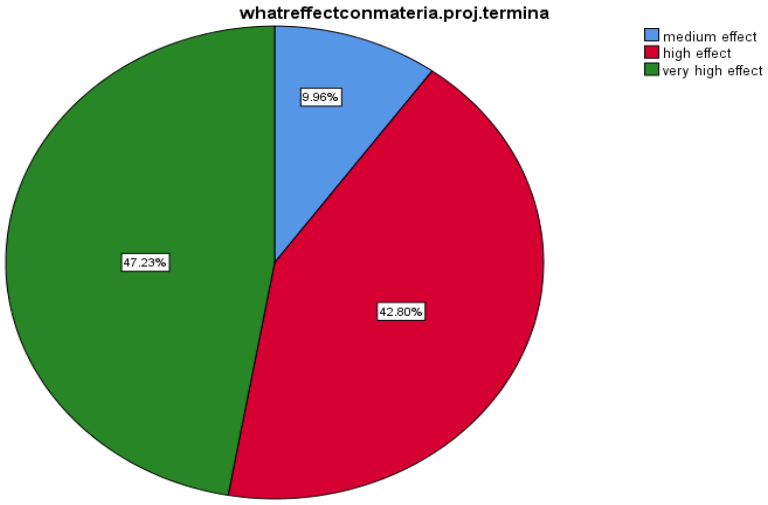
Source: Own computation based on data collected (SPSS 26 result)

From the result of the SPSS 2026 the above table shows that dependent variables(termination, project deficit, dispute, worker unemployment, owner unsatisfaction) the mean value of (4.37,4.39,4.06,4.26,3.99) From the result of the table the highest mean value is project deficit, termination, worker unemployment dispute and owner unsatisfaction. the median value shows that 4 is near the highest value 5 and it shows the effect of construction material price escalation is very high. and the mode value also shows that it has a very high effect. the values of median and mode maximum and minimum also show the maximum value of 4 and 5 the minimum value is 4 and 4 which means it shows a high-value impact of construction material price escalation. also, the standard deviation value shows good and then the skewness tells us the direction of outliers. in a positive skew, the tail of a distribution curve is longer on the right side and the negative skew also shows the tail is longer on the left side. In this study, the tail is long to the left side which means the outliers of the distribution curve are further out towards the left. standard error of skewness can be used as a test of normality, the value should be between -2 and 2 if it is more than this on both the right and left side it is said to be the standard error of skewness. so that there is no standard error of skewness.

Table 26 Effects on Project Termination

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	27	10.0	10.0	10.0
	high effect	116	42.8	42.8	52.8
	very high effect	128	47.2	47.2	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

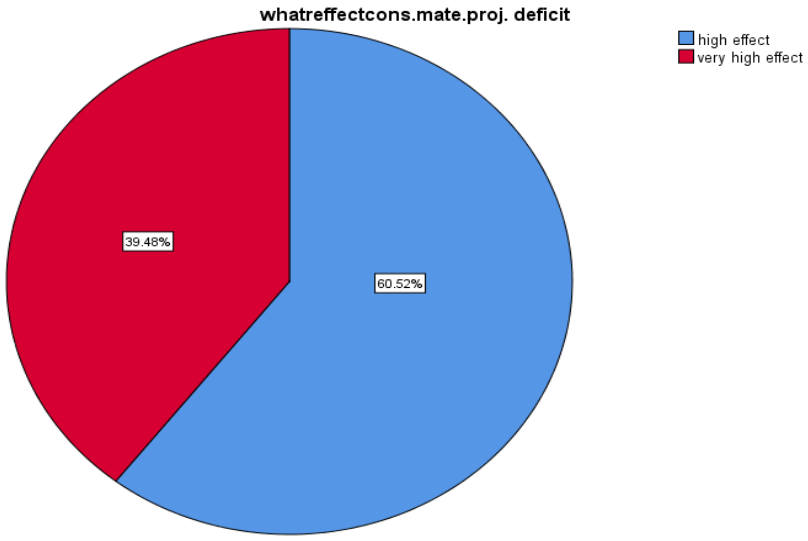


The effect of construction material price escalation led to the termination of the project, in this case, the respondents to the questionnaire gave a very high effect of 47.2%, a high effect of 42.8%and also a medium effect of 10% responded that construction material price escalation effect can cause the termination of the projects.

Table 27 Effects on Project Deficit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	164	60.5	60.5	60.5
	very high effect	107	39.5	39.5	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

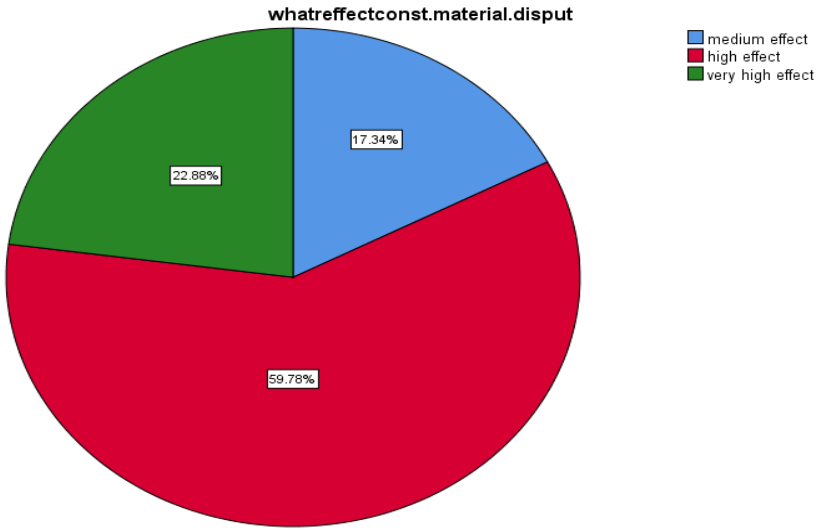


The effect of construction material price escalation led to the projected deficit, in this case, the respondent to the questionnaire gave a very high effect of 39.5%, a high effect of 60.5% so the respondent responded that construction material price escalation effect is the projected deficit of the construction industry of Addis Ababa sub-city public projects.

Table 28 Effects on Project Deficit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	47	17.3	17.3	17.3
	high effect	162	59.8	59.8	77.1
	very high effect	62	22.9	22.9	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

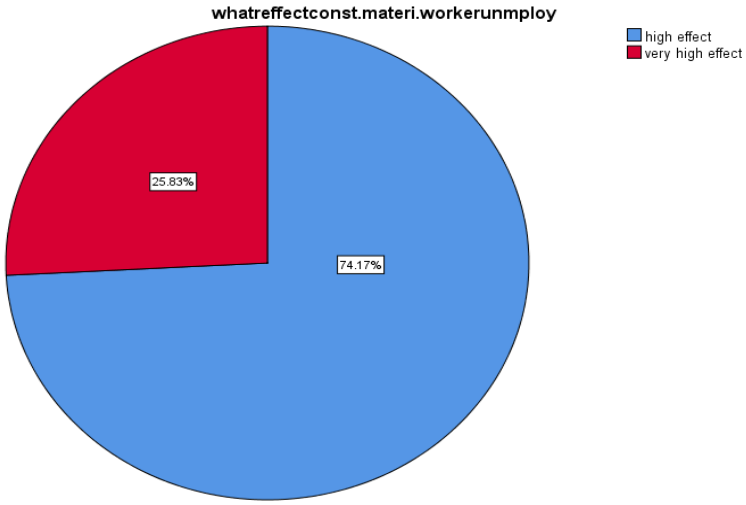


The effect of construction material price escalation led to a dispute between the client, contractor, and consultant, in this case, the respondent to the questionnaire said that the effect of construction material price escalation led to a dispute showed, a very high effect of 22.9%, a high effect of 59.8% and also the medium effect of 17.3%, so the respondent responded that construction material price escalation effect is the dispute of the construction industry of Addis Ababa sub-city public projects.

Table 29 Effects on Worker Unemployment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	201	74.2	74.2	74.2
	very high effect	70	25.8	25.8	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

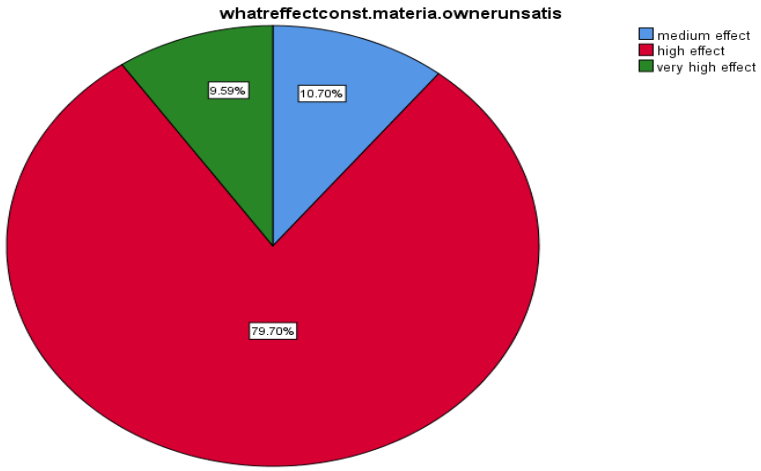


The effect of construction material price escalation led to worker unemployment, in this case, the respondents to the questionnaire gave that the effect of construction material price escalation led to worker unemployment respondent show, a very high effect of 25.8%, a high effect of 74.2%, so the respondent responded that construction material price escalation effect is the worker unemployment of the construction industry of Addis Ababa sub-city public projects.

Table 30 Effects on owner unsatisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	29	10.7	10.7	10.7
	high effect	216	79.7	79.7	90.4
	very high effect	26	9.6	9.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)



The effect of construction material price escalation led to worker unemployment, in this case, the respondents to the questionnaire gave that the effect of construction material price escalation led to worker unemployment respondent show, a very high effect of 25.8%, a high effect of 74.2%, so the respondent responded that construction material price escalation effect is the worker unemployment of the construction industry of Addis Ababa sub-city public projects.

4.5 The extent of the construction material price escalation affects the construction industry of Addis Ababa sub-city design and building work.

Table 31 On which material the price escalation shows more Impact

		cement	aggregate	sand	finishing material	rebar	Mechanical and sanitary	Elec material.	Skilled labor	unskilled	equipment	overhead
N	Valid	271	271	271	271	271	271	271	271	271	271	271
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		4.89	3.44	3.79	4.65	4.90	5.00	4.64	3.49	2.46	4.35	4.29
Median		5.00	4.00	4.00	5.00	5.00	5.00	5.00	3.00	2.00	4.00	4.00
Mode		5	4	4	5	5	5	5	3	2	4	4
Std. Deviation		.310	.617	.548	.479	.300	.000	.481	.620	.499	.478	.454
Variance		.096	.380	.300	.230	.090	.000	.232	.384	.249	.229	.206
Skewness		-2.557	-.612	-.076	-.613	-2.688		-.579	.867	.156	.630	.943
Std. Error of Skewness		.148	.148	.148	.148	.148	.148	.148	.148	.148	.148	.148
Range		1	2	2	1	1	1	1	2	1	1	1
Minimum		4	2	3	4	4	5	4	3	2	4	4
Maximum		5	4	5	5	5	5	5	5	3	5	5
Percentiles	25	5.00	3.00	3.00	4.00	5.00	5.00	4.00	3.00	2.00	4.00	4.00
	50	5.00	4.00	4.00	5.00	5.00	5.00	5.00	3.00	2.00	4.00	4.00
	75	5.00	4.00	4.00	5.00	5.00	5.00	5.00	4.00	3.00	5.00	5.00

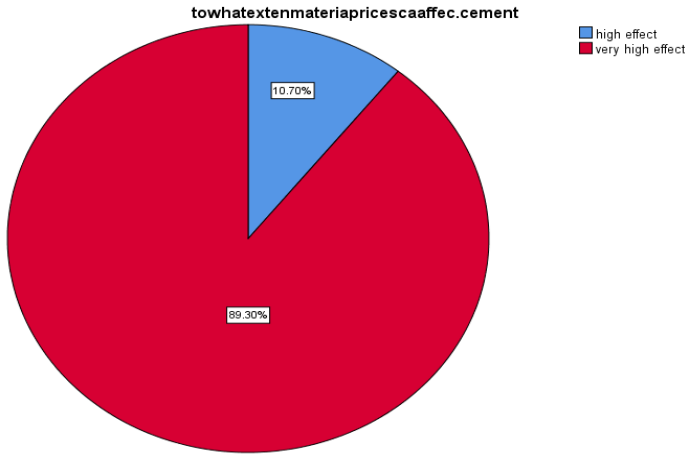
Source: Own computation based on data collected (SPSS 26 result)

From the result of the respondent's response the maximum value of the construction material that is affected by price escalation mean of 5 and the minimum value is 2.4 which shows that the respondent gave high, very high, and medium points. the values of median and mode maximum and minimum also show the maximum value of 5 and 5 and also the minimum value of 2 and 2 which means it shows a high-value impact of construction material price escalation. also, the standard deviation value shows good and then the skewness tells us the direction of outliers. in a positive skew, the tail of a distribution curve is longer on the right side and the negative skew also shows the tail is longer on the left side. In this study, the tail is long to the left side which means the outliers of the distribution curve are further out towards the left. standard error of skewness can be used as a test of normality, the value should be between -2 and 2 if it is more than this on both the right and left side it is said to be the standard error of skewness so that there is no standard error of skewness.

Table 32 Impact of Construction Material Price Escalation on Cement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	29	10.7	10.7	10.7
	very high effect	242	89.3	89.3	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

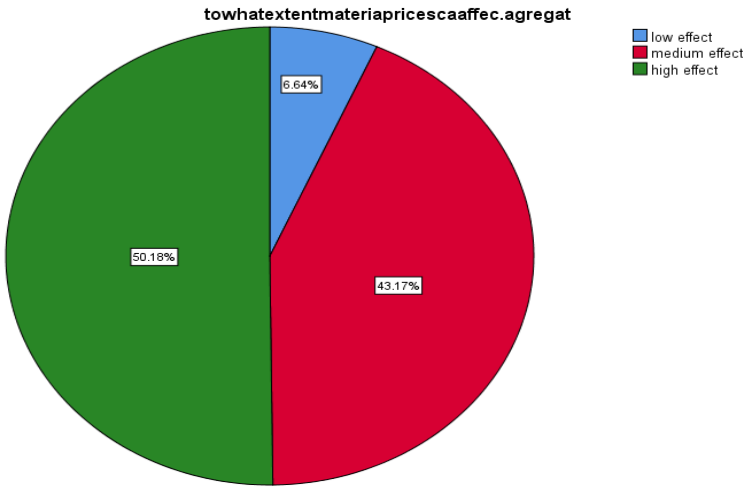


Data collected from the respondents of this questionnaire result shows from SPSS that cement price escalation has a very high effect of 89.3% and also a high effect of 10.7%, from the result shows that construction material price escalation is run out of control and the construction industry participants are affected and also the sector is the backbone of the country economy of many developing countries. In the case of Addis Ababa, sub-city public projects are greatly affected by the price escalation of construction materials price escalation.

Table 33 Impact of Construction Material Price Escalation on Aggregate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low effect	18	6.6	6.6	6.6
	medium effect	117	43.2	43.2	49.8
	high effect	136	50.2	50.2	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

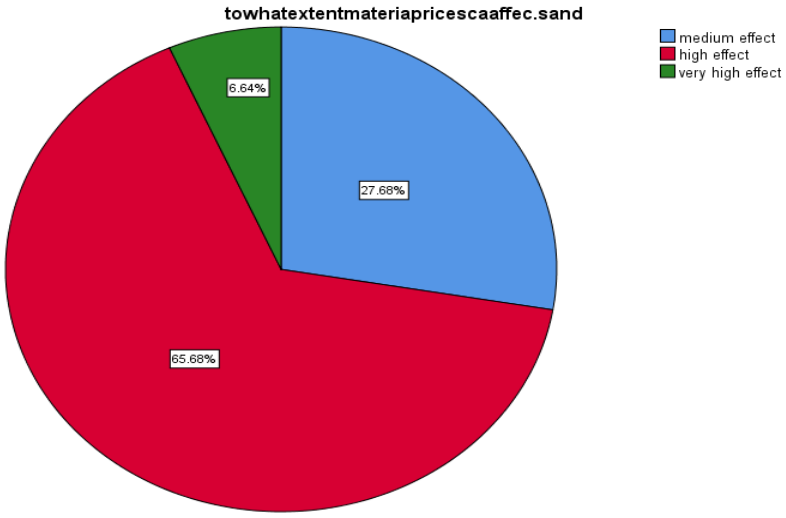


Data collected from the respondent of this questionnaire result shows from SPSS that aggregate price escalation has a high effect of 50.2%, a medium effect of 43.2%, and also a low effect of 6.6%, from the result shows that construction material price escalation is run out of control and the construction industry participants are affected and also the sector is the backbone of the country economy of many developing countries. In the case of Addis Ababa, sub-city public projects are greatly affected by the price escalation of construction materials price escalation.

Table 34 Impact of Construction Material Price Escalation on Sand

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	75	27.7	27.7	27.7
	high effect	178	65.7	65.7	93.4
	very high effect	18	6.6	6.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

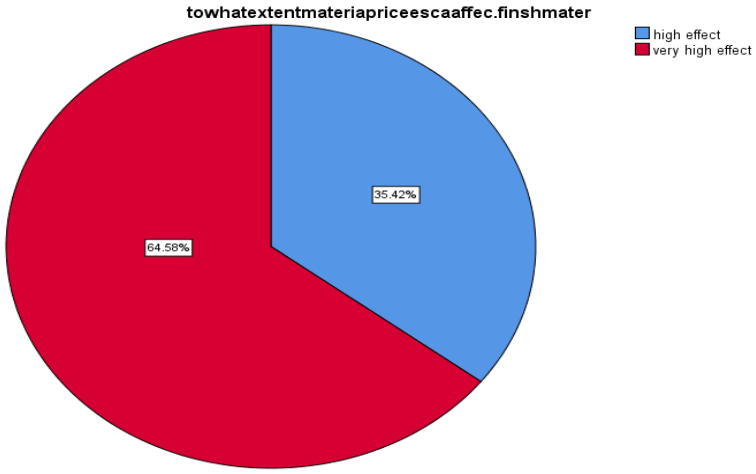


Data collected from the respondents of this questionnaire result shows from SPSS that sand price escalation has a very high effect of 6.6%, a high effect of 65.7%, and also a medium effect of 27.7%, from the result shows that construction material price escalation is run out of control and the construction industry participants are affected. In the case of Addis Ababa, sub-city public projects are greatly affected by the price escalation of construction materials price escalation.

Table 35 Impact of Construction Material Price Escalation on Finishing Material

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	96	35.4	35.4	35.4
	very high effect	175	64.6	64.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

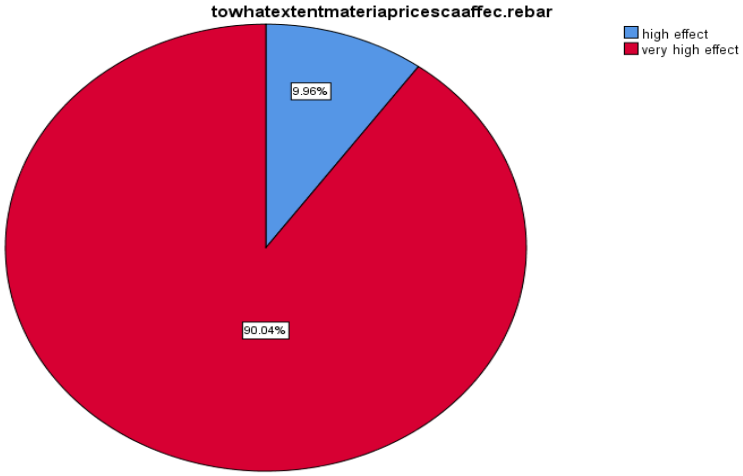


Data collected from the respondents of this questionnaire result shows from SPSS that finishing material price escalation has a very high effect of 64.6%, and also a high effect of 35.4%, from the result, shows that construction material price escalation on finishing material is very high and the customer of the material is exposed to the extra cost.

Table 36 Impact of Construction Material Price Escalation on Re-bar

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	27	10.0	10.0	10.0
	very high effect	244	90.0	90.0	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

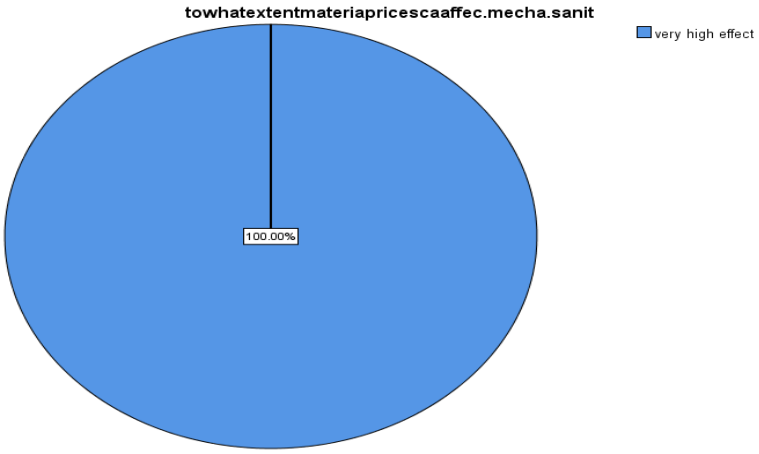


Data collected from the respondents of this questionnaire result shows from SPSS that rebar price escalation has a very high effect of 90.0%, and also a high effect of 10.0%%, from the result, shows that construction material price escalation on rebar is very high and the customer of the material is exposed to the extra cost.

Table 37 Impact of Construction Material Price Escalation on Mechanical and Sanitary Materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very high effect	271	100.0	100.0	100.0

Source: Own computation based on data collected (SPSS 26 result)

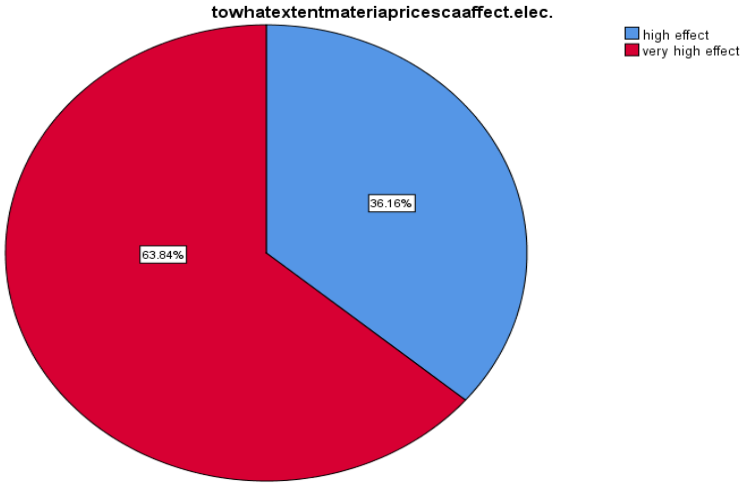


Data collected from the respondents of this questionnaire result shows from SPSS that mechanical and sanitary material price escalation has a very high effect of 100%, from the result, shows that construction material price escalation on mechanical and sanitary material is very high and the customer of the material is exposed to the extra cost.

Table 38 Impact of Construction Material Price Escalation on Electrical Materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	98	36.2	36.2	36.2
	very high effect	173	63.8	63.8	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

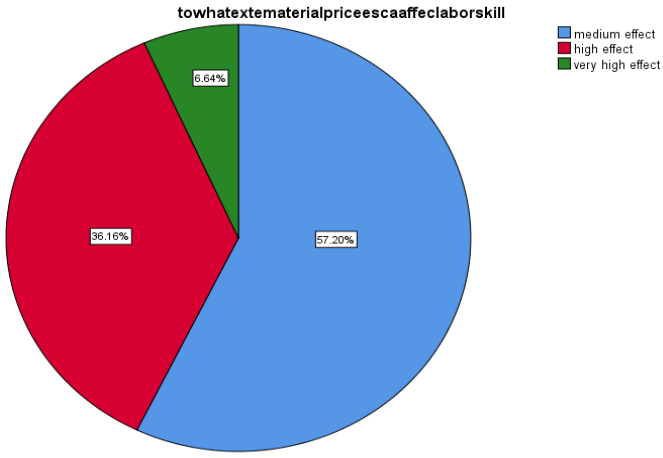


Data collected from the respondents of this questionnaire result shows from SPSS that electrical material price escalation has a very high effect of 63.8%, and also a high effect of 36.2%, from the result, shows that construction material price escalation on electrical material is very high and the customer of the material is exposed to the extra cost.

Table 39 Impact of Construction Material Price Escalation on Skilled Labor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium effect	155	57.2	57.2	57.2
	high effect	98	36.2	36.2	93.4
	very high effect	18	6.6	6.6	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

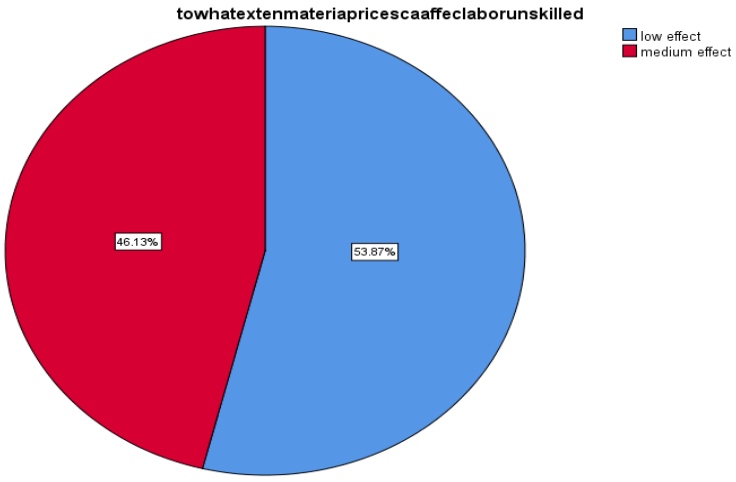


Data collected from the respondents of this questionnaire result shows from SPSS that skilled labor requirement price has a very high effect of 6.6%, a high effect of 36.2%, and also a medium effect of 57.2% from the result, shows that skilled labor price does not have a high effect like the construction materials.

Table 40 Impact of Construction Material Price Escalation on Unskilled labor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low effect	146	53.9	53.9	53.9
	medium effect	125	46.1	46.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

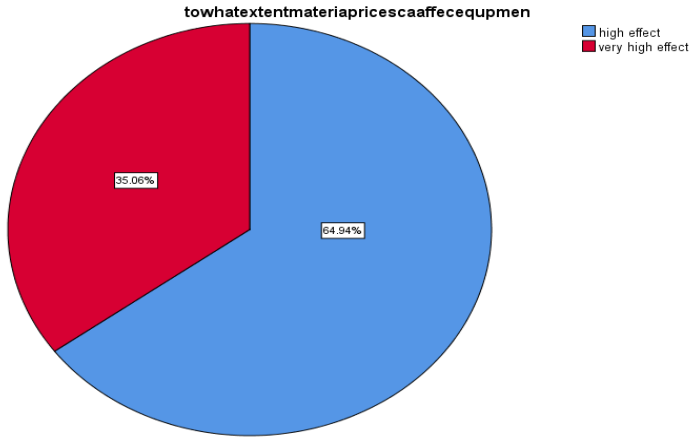


Data collected from the respondents of this questionnaire result shows from SPSS that unskilled labor requirement price has a medium effect of 46.1%, and also a low effect of 53.9%, from the result, shows that unskilled labor price does not have an effect like the construction materials price escalation.

Table 41 Impact of Construction Material Price Escalation on Construction Equipment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	176	64.9	64.9	64.9
	very high effect	95	35.1	35.1	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)

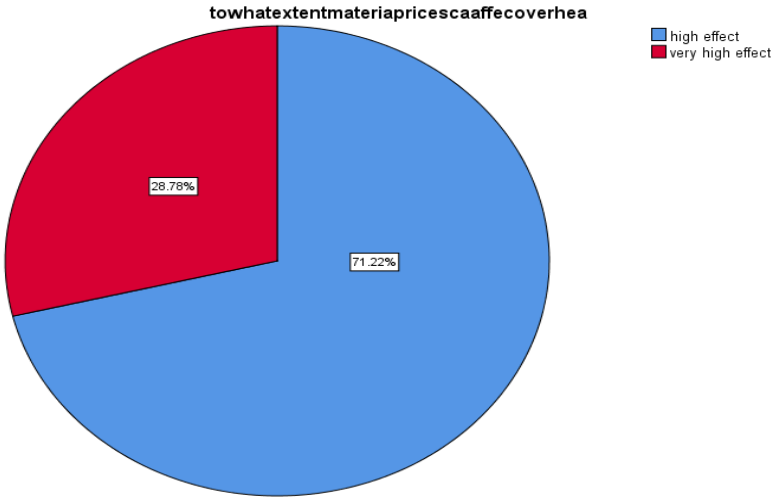


The data collected from the respondents to the questionnaire shows that equipment prices have a very high effect of 35.1% and also a high effect of 64.9% so from the result of the respondent the equipment cost has an effect on the construction industry because the cost of owning and rental cost of equipment goes very high.

Table 42 Impact of Construction Material Price Escalation on Overhead Cost

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high effect	193	71.2	71.2	71.2
	very high effect	78	28.8	28.8	100.0
	Total	271	100.0	100.0	

Source: Own computation based on data collected (SPSS 26 result)



The data collected from the respondents to this questionnaire shows that the overhead cost of the project shows a very high effect of 28.8 % and also a high effect of 71.2 % so the overhead cost has effects on the price escalation of construction material on the construction industry of Addis Ababa sub city design and building work projects.

4.6 The analytical review of the impact and effect of unexpected construction material price escalation.

In this section, correlation analysis, normality, and regression analysis were conducted in line with one of the research questions. The impact and effect of unexpected construction material price escalation ‟ by using two-tailed Pearson correlation analysis and linear regressions.

4.6.1 Correlation Analysis

Correlation is a measure of association between two variables. According to Kothari (2004), positive values of r indicate a positive correlation between the two variables (i.e., changes in both variables take place in the stated direction), whereas negative values of 'r' indicate a negative correlation i.e., changes in the two variables taking place in the opposite directions.

Correlation coefficient	Interpretation	
(-1.00 to -0.8]	Strong	
(-0.8 to -0.6]	Substantial	
(-0.6 to -0.4]	Medium	Negative
(-0.4 to -0.2]	Low	
(-0.2 to 0.2)	Very Low	
[0.2 to 0.4)	Low	
[0.4 to 0.6)	Medium	Positive
[0.6 to 0.8)	Substantial	
[0.8 to 1.00)	Strong	

A zero value of 'r' indicates that there is no association between the two variables. When r = (+)1 (one), it indicates a perfect positive correlation and when it is (–) 1, it indicates a perfect negative correlation. In the same way, Cohen (1998) cited by (Warokka et al. 2012), also interpreted the coefficient of correlation between 0 and 1 in the following manner.

The correlation coefficient (r) ranging from 0.10 to 0.29 indicates as indicating a low degree of correlation, r ranging from 0.30 to 0.49 is considered a moderate degree of correlation, and r ranging from 0.50 to 1.00 indicates a high degree of correlation. This study determines the strengths of the relationship between (verbal or written appreciation with feedback about performance.)

It is expected that there is a positive correlation between these two questions, as verbal or written appreciation for a good job is possible with the existence of feedback about performance.

The Pearson correlation coefficient is used to quantify the strength and direction of the relationship between continuous variables. The primary objective of correlation analysis is to measure the strength or degree of linear association between two variables. The correlation coefficient examines the strength and direction of the linear relationship between two variables. The correlation analysis shows the degree of association between variables and that indicates the direction in which the variables associate - positively or negatively. The strength of association can be categorized from very low with a correlation coefficient (r) less than 0.2 to very high with a coefficient greater than 0.9. The sign of the relationship indicates the direction of the relationship. A correlation of 0 indicates there is no straight-line relationship at all (SPSS v.26 manual). Correspondingly, the effect size for a correlation measures the strength of the relationship. For correlation, r serves as the numeric measure of the effect size whose strength can be interpreted as follows; -

Table 43 Descriptive Statistics

	Mean	Std. Deviation	N
Impacts of conflict rise	3.96	.411	271
Impacts of contractual problem	4.00	.513	271
Impacts of schedule delay	4.38	.666	271
Impacts of inflation	4.08	.534	271
Impacts of claim	4.26	.634	271
Impacts of costs run	4.38	.666	271
Impacts of a firm quote	4.04	.543	271

Impacts of market instability	4.05	.503	271
Impacts of Budget Defects	4.01	.915	271
Impacts of unfair risk share	4.15	.578	271
Effects of Project Termination	4.37	.659	271
Effects of Project Deficit	4.39	.490	271
Effects of dispute	4.06	.633	271
Effects of worker unemployment	4.26	.439	271
Effects of owner unsatisfaction	3.99	.451	271

Source: Own computation based on data collected (SPSS 2026 result)

This descriptive statistic shows the impacts and effects of correlation between each dependent and independent variable. it shows the mean and standard deviation of the dependent and independent variables. The mean value of the above variables of the maximum value is 4.39 and the minimum is 3.96 which means it is a very high result. and the standard deviation result is also to show good.

		conflict rise	contractual pro	Schedule delay	inflation	claim	costovrun	Firm quote	Market instability	budget defect	unfarrisksha	termination	Project deficit	dispute	worker employ	Owner unsatisfaction
Impacts of conflict rise	Pearson Correlation	1	.493**	.430**	.487**	.435**	.430**	.471**	.510**	.553**	.460**	.297**	.073	.008	.053	-.002
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.233	.897	.384	.971
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
contractual problem	Pearson Correlation	.493**	1	.614**	.634**	.510**	.690**	.625**	.645**	.726**	.561**	.314**	.525**	.193**	.276**	.000
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.998
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of schedule delay	Pearson Correlation	.430**	.614**	1	.670**	.398**	.783**	.443**	.709**	.861**	.780**	.549**	.383**	-.094	.465**	.014
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.124	.000	.819
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of inflation	Pearson Correlation	.487**	.634**	.670**	1	.525**	.670**	.589**	.619**	.763**	.607**	.299**	.395**	.118	.317**	.004
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.053	.000	.949

	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of claim	Pearson Correlation	.435**	.510**	.398**	.525**	1	.626**	.553**	.704**	.632**	.623**	.085	.405**	.536**	.342**	-.029
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.165	.000	.000	.000	.638
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of cost overrun	Pearson Correlation	.430**	.690**	.783**	.670**	.626**	1	.709**	.709**	.745**	.597**	.489**	.463**	.135*	.224**	.335**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.026	.000	.000
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of lack of firm quote	Pearson Correlation	.471**	.625**	.443**	.589**	.553**	.709**	1	.373**	.558**	.313**	.086	.474**	.274**	-.149*	.395**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000	.160	.000	.000	.014	.000
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of market instability	Pearson Correlation	.510**	.645**	.709**	.619**	.704**	.709**	.373**	1	.779**	.855**	.404**	.464**	.352**	.548**	.002
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.969
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271

impacts of budget deficit	Pearson Correlation	.553**	.726**	.861**	.763**	.632**	.745**	.558**	.779**	1	.865**	.525**	.599**	.197**	.572**	.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.001	.000	.995
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Impacts of unfair risk share.	Pearson Correlation	.460**	.561**	.780**	.607**	.623**	.597**	.313**	.855**	.865**	1	.254**	.513**	.292**	.770**	.006
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.918
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Effects of Project Termination	Pearson Correlation	.297**	.314**	.549**	.299**	.085	.489**	.086	.404**	.525**	.254**	1	.254**	-.094	.217**	.014
	Sig. (2-tailed)	.000	.000	.000	.000	.165	.000	.160	.000	.000	.000		.000	.123	.000	.820
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Effect of Project Deficit	Pearson Correlation	.073	.525**	.383**	.395**	.405**	.463**	.474**	.464**	.599**	.513**	.254**	1	.670**	.593**	.456**
	Sig. (2-tailed)	.233	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Effect of dispute	Pearson Correlation	.008	.193**	-.094	.118	.536**	.135*	.274**	.352**	.197**	.292**	-.094	.670**	1	.429**	.339**

	Sig. (2-tailed)	.897	.001	.124	.053	.000	.026	.000	.000	.001	.000	.123	.000		.000	.000
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Effect of worker unemployment	Pearson Correlation	.053	.276**	.465**	.317**	.342**	.224**	-.149*	.548**	.572**	.770**	.217**	.593**	.429**	1	.015
	Sig. (2-tailed)	.384	.000	.000	.000	.000	.000	.014	.000	.000	.000	.000	.000	.000		.812
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
Effects of owner unsatisfaction	Pearson Correlation	-.002	.000	.014	.004	-.029	.335**	.395**	.002	.000	.006	.014	.456**	.339**	.015	1
	Sig. (2-tailed)	.971	.998	.819	.949	.638	.000	.000	.969	.995	.918	.820	.000	.000	.812	
	N	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271

Source: Own computation based on data collected (SPSS 2026 result)

From the above table, I got the Pearson correlation with the value P=0.1-0.29 low degree of correlation,0.3-0.49 medium degree of correlation, and 0.5-1 is a high degree of correlation .and also the Pearson correlation have –ve value correlation said be a negative correlation and the value is said to be, if P=-0.5 to -1 it is said to be high negative correlation value and also it is -0.1 to -0.4 it said to be low value of negative correlation between the variables. In this table the other value shown is the sig(significant) value is interpreted as follows. the sig value is 0.01 it is said the model is 99% significant, if the value is 0.05 it is said to be 95% significant. and also the value is 0.1 it is said to be 90% significant at this point.

There for Pearson correlation from the above table shows that the correlation value of the independent and dependent variables to each other value is put in the table that greater than 0.5 to 1 shows a strong positive correlation and also in the table the value from -0.5 to -1 is said to be a strong negative correlation between the independent and dependet value. on the other hand, the correlation is near 0 showing a low correlation value between the variables. if the correlation value is 0 there is no correlation between the variables.

4.6.2 Regression Analysis

Regression analysis is about predicting the future (the unknown) based on data collected from the past (the known). The regression analysis determines the mathematical equation to be used to figure out what will happen, within a certain range of probability. It analyzes one variable, the dependent variable, taking into consideration the effect on it by one or more factors, the independent variables. The analysis determines that some independent variables have more effect than others, so their weights must be considered when they are the basis of a prediction.

Regression analysis, therefore, is the process of looking for predictors and determining how well they predict. When only one independent variable is considered, it's called a simple regression. However, this study uses more than one independent variable; it uses multiple regression analysis that shows the influence of two or more variables on a designated dependent variable.

Multiple regression is an extension of simple linear regression. It is used when we want to predict the value of a variable based on the value of two or more other variables. The variable we want to predict is called the dependent variable (or sometimes, the outcome, target, or criterion variable). The variables we are using to predict the value of the dependent variable are called the independent variables (or sometimes, the predictor, explanatory, or regressor variables).

The result of this sequence is to produce a regression analysis that identifies as a predictor are impacts and effects of unexpected construction material price escalation in Addis Ababa sub-city public projects.

Multiple regressions also allow you to determine the overall fit (variance explained) of the model and the relative contribution of each of the predictors to the total variance explained.

Multiple regressions have been used to test the relationship between dependent and independent variables and hypothesis testing.

The results of multiple regression analysis where the entry method used a dependent variable and any numbers of predictor (independent) variables are designated are presented in the tables below

Table 44 Independent Variables entered or removed regression with project termination.

Model	Independent Variables Entered	Variables Removed	Method
1	What impacts unfair risk share, What impacts profit loss, what impacts the claim, what impacts inflation, what contractual problem, what impacts schedule delay, what impacts market instability, what are the impacts of budget defects, what impacts costovrun[b]		Enter

a. Dependent Variable: what are effect project.termination

b. All requested variables entered.

The above table shows all independent variables are entered, which means there is no removed variable for regression analysis with the dependent variable of project termination.

Table 45 Model summary table

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.910[a]	.827	.821	.279

a. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts claim, what are impacts inflation, what are impacts contractual pro, what are impacts scheduled, what are impacts market instability, what are impacts budget defect, what are impacts costovrun

b. Dependent Variable: what is the effect of project termination

The above illustrates the correlation coefficient, denoted by R, which becomes 0.910 at a 5% significance level. To be precise, R (the multiple correlation coefficients) shows the relationship between the study variables. Thus, the finding indicates that there was a strong relationship between the variables under consideration.

The R squared is the coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable and the findings in the above table revealed that the value of R squared was 0.827. It shows 82.7% of impacts of project termination emanate from the factors (unfair risk share, profit loss, claim, inflation, schedule delay, market instability, budget deficit, cost overrun contractual problem,). It is a strong explanatory power of regression and the remaining unexplored variables may explain the variation in motivation. The regression model summary presents how much of the variance in project termination is explained by the predictor variables.

Table 47 Coefficients table

Table 46 Anova Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.085	9	10.787	138.877	.000[b]
	Residual	20.273	261	.078		
	Total	117.358	270			

a. Dependent Variable: what are effect project.termination

b. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are impacts inflation, what are impacts contractual pro, what are impacts of schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts cost overrun.

Source: Own computation based on data collected (SPSS 2026 result)

The ANOVA tells us whether the overall model is statistically significant and is good at predicting the outcome variable. (F) Value is (138.877) at 0.000 p-value which indicates that the regression model is fit and significant. This implies if we take the nine predictor variables together as a group, they predict they affect project termination significantly.

The table shows the goodness of fit of the model. The lower this number, the better the fit. Typically, if “Sig.” is greater than 0.05, we conclude that our model could not fit the data (See annex E) If Sig. < .01, then the model is significant at 99% if Sig. < .05, then the model is significant at 95%, and if Sig. <.1, the model is significant at 90%. Significance implies that we can accept the model. If Sig>., 1 then the model was not significant (a relationship could not be found) or "R-square is not significantly different from zero

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7.065	.268		26.325	.000		
	what are the impacts profit lose	-.319	.094	-.322	-3.404	.001	.074	13.482
	What is a contractual problem	-.611	.055	-.475	-11.169	.000	.366	2.732
	what are the impacts of schedule delay	-.033	.077	-.033	-.421	.674	.109	9.192
	what are the impacts of inflation	-.551	.054	-.446	-10.186	.000	.345	2.899
	what are the impacts claim	-.645	.054	-.620	-12.059	.000	.250	3.998
	what are the impacts of cost overrun	.471	.102	.475	4.631	.000	.063	15.895
	what are the impacts of market instability	1.593	.097	1.216	16.371	.000	.120	8.334
	what are the impacts of budget defect	1.467	.067	2.036	22.046	.000	.078	12.885
	what are the impacts of unfair risk share	-1.955	.100	-1.713	-19.623	.000	.087	11.513

a. Dependent Variable: what are effect project.termination

Source: Own computation based on data collected (SPSS 2026 result)

The coefficient table indicates the level of effect each variable has on the dependent variable. The highest beta value of Time β = 1.593 indicates that the variable "impacts of market instability" has relatively a strong degree of effect on dependent variables followed

by achievements of the value of β = 1.467 than any other variables in the study. Recognition and its degree of importance beta values are β=0.471, β=-0.033, β=-0.319, β=0.551, β=-0.611, β=-0.645, β=-1.955. Therefore, all variables are statistically significant and have a positive impact on the dependent variable since their p-value is < 0.05. The standardized coefficient (Beta value) indicates the degree of importance each variable has towards project termination as a result, the affecting variables can be ranked in the following order based on their contribution.

Table 48 Collinearity Diagnostics table

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	Profit lose	contractual problem	Schedule delay	inflation	claim	costovrun	market instability	budget defect	unfarrisksha
1	1	9.923	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.027	19.161	.06	.00	.00	.00	.00	.01	.00	.00	.07	.00
	3	.016	25.261	.00	.04	.01	.00	.00	.04	.02	.00	.01	.02
	4	.013	27.820	.04	.01	.00	.04	.02	.23	.00	.00	.00	.00
	5	.008	34.704	.00	.01	.16	.03	.26	.00	.00	.02	.02	.02
	6	.006	40.415	.00	.00	.53	.01	.31	.02	.01	.01	.00	.00
	7	.003	54.078	.19	.01	.00	.05	.23	.13	.00	.24	.07	.01
	8	.002	71.658	.34	.19	.25	.22	.00	.09	.08	.00	.38	.01
	9	.001	91.706	.01	.00	.00	.53	.00	.26	.25	.17	.00	.51
	10	.001	133.129	.37	.75	.05	.12	.17	.22	.63	.55	.44	.42

a. Dependent Variable: what is the effect of project termination

Source: Own computation based on data collected (SPSS 2026 result)

The Collinearity Diagnostics table provides information about multicollinearity problems in your data. It contains several columns, including Dimension, Eigenvalue, and Condition Index. The first column of the table, Dimension, attempts to determine dimensions with independent information. The second column, Eigenvalue, indicates whether there are several eigenvalues close to 0 which is an indication for multicollinearity. The third column, Condition Index, is derived from the square root of the ratio of the largest eigenvalue (dimension 1) to the eigenvalue of the dimension. Values above 15 can indicate multicollinearity problems, and values above 30 are a very strong sign of problems with

multicollinearity. In this study, the interpretation of variance proportion is near zero showing that no segregation or no relationship between parcel and group.

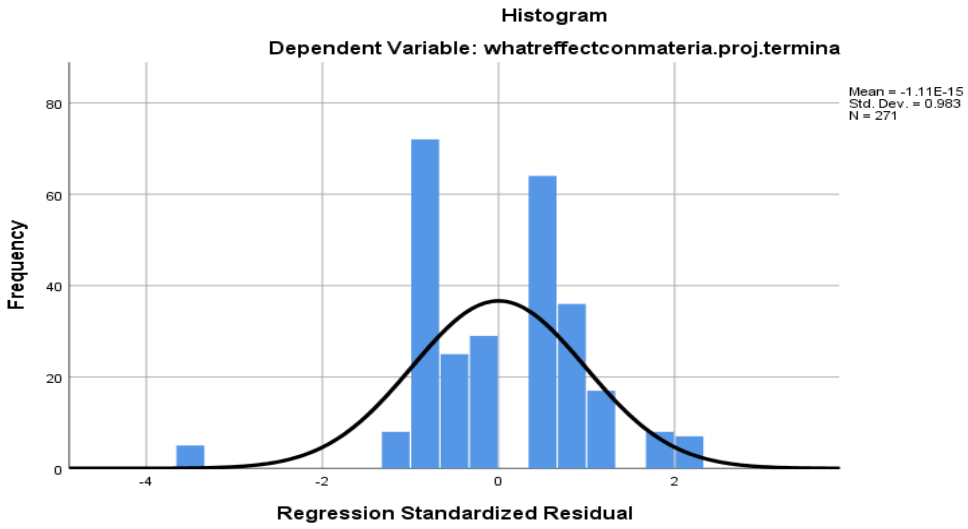
Table 49 Residuals statistics table

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.27	5.96	4.37	.600	271
Residual	-.960	.584	.000	.274	271
Std. Predicted Value	-1.842	2.646	.000	1.000	271
Std. Residual	-3.443	2.094	.000	.983	271

a. Dependent Variable: what are the effects of project termination

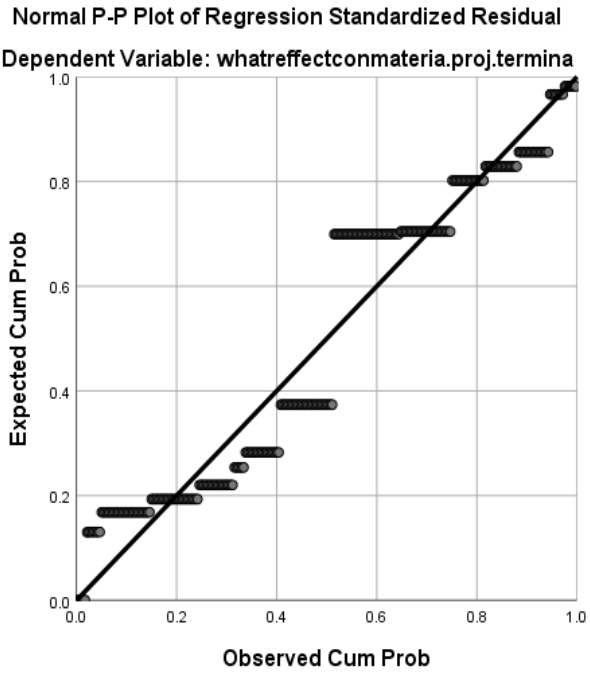
Source: Own computation based on data collected (SPSS 2026 result)

The standardized residual is a measure of the strength of the difference between observed and expected values. It's a measure of how significant your cells are to the chi-square value. If your sample is large enough, the standardized residual can be roughly compared to a z-score. we can see that the standard residual, minimum, and maximum values are -3.443 and 2.094 respectively meaning there is no out layer seen.



Source: Own computation based on data collected (SPSS 2026 result)

Figure 4 Regression Standardized Residual



Source: Own computation based on data collected (SPSS 2026 result)

Figure 5 Normal p-p plot of regression standardized residual

Table 50 Independent Variables entered regression with worker unemployment table

Model	Variables Entered	Variables Removed	Method
1	What are the impacts of unfair risk share, What are the impacts of profit loss, What are the impacts claim, What are the impacts of inflation, What are the impacts of contractual problems, What are the impacts scheduled, What are the impacts of market instability, what are the impacts of budget defects, What are the impacts costovrun	.	Enter

a. Dependent Variable: what are the effects of worker unemployment

b. All requested variables entered.

Source: Own computation based on data collected (SPSS 2026 result)

The above table shows all independent variables are entered, which means there is no removed variable for regression analysis with the dependent variable of worker unemployment.

Table 51 Model summary table

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.857[a]	.734	.724	.230

a. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are impacts inflation, what are impacts contractual pro, what are impacts schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts costovrun

b. Dependent Variable: whatreffectconst.materi.worker unemployment

The above illustrates the correlation coefficient, denoted by R, becoming 0.857 at a 5% significance level. To be precise, R (the multiple correlation coefficients) shows the relationship between the study variables. Thus, the finding indicates that there was a strong relationship between the variables under consideration.

The R squared is the coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable and the findings in the above table revealed that the value of R squared was 0.734. It shows 73.4% of the impacts of worker unemployment emanate from the factors (unfair risk share, profit loss, claim, inflation, schedule delay, market instability, budget deficit, cost overrun contractual problem,). In fact, it is a strong explanatory power of regression and the remaining unexplored variables may explain the variation in motivation. The regression model summary presents how much of the variance in effect is explained by the predictor variables.

Table 52 ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.091	9	4.232	79.883	.000[b]
	Residual	13.828	261	.053		
	Total	51.919	270			

A Dependent Variable: whatreffectconst.materi.worker unemployment

B. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are impacts of inflation, what are impacts contractual pro, what are impacts of schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts cost overrun.

Source: Own computation based on data collected (SPSS 2026 result)

The ANOVA tells us whether the overall model is statistically significant and is good at predicting the outcome variable. (F) Value is (79.883) at 0.000 p- value which indicates that the regression model is fit and significant. This implies if we take the nine predictor variables together as a group, they predict they affect worker unemployment significantly.

The table shows the goodness of fit of the model. The lower this number, the better the fit. Typically, if “Sig.” is greater than 0.05, we conclude that our model could not fit the data (See annex E) If Sig. < .01, then the model is significant at 99% if Sig. < .05, then the model is significant at 95%, and if Sig. <.1, the model is significant at 90%. Significance implies that we can accept the model. If Sig>., 1 then the model was not significant (a relationship could not be found) or "R-square is not significantly different from zero."

Table 53 Coefficients table

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.193	.222		9.893	.000		
	what are the impacts profit lose	.437	.077	.663	5.651	.000	.074	13.482
	what are the impacts of contractual problems	-.045	.045	-.053	-1.006	.315	.366	2.732
	what are the impacts of schedule delay	-.168	.064	-.255	-2.629	.009	.109	9.192
	what are the impacts of inflation	.028	.045	.034	.631	.528	.345	2.899
	what are the impacts claim	-.066	.044	-.095	-1.483	.139	.250	3.998
	what are the impacts of cost overrun	-.436	.084	-.661	-5.191	.000	.063	15.895
	what are the impacts of market instability	-.379	.080	-.435	-4.716	.000	.120	8.334
	what are the impacts of budget defect	-.052	.055	-.109	-.952	.342	.078	12.885
	what are the impacts of unfair risk share	1.178	.082	1.551	14.313	.000	.087	11.513

a. Dependent Variable: what are the effects of worker unemployment

Source: Own computation based on data collected (SPSS 2026 result)

The coefficient table indicates the level of effect each variable has on the dependent variable. The highest beta value of Time β = 1.178 indicates that the variable "impacts of unfair risk share" has relatively a strong degree of effect on dependent variables followed by achievements of the value of β = 0.437 than any other variables in the study. Recognition and its degree of importance beta values are β=0.028, β=-0.052, β=-0.066, β=-0.379, β=-0.436, β=-0.045, β=-0.168. Therefore, all variables are statistically significant and have a positive impact on the dependent variable since their p-value is < 0.05. The standardized coefficient (Beta value) indicates the degree of importance each variable has towards worker unemployment as a result, the affecting variables can be ranked in the following order based on their contribution.

Table 66 Collinearity Diagnostics table

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	profit lose	contractual pro	schedule delay	inflation	claim	cost ovrun	market instability	budget defect	Unfair Risk share
1	1	9.923	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.027	19.161	.06	.00	.00	.00	.00	.01	.00	.00	.07	.00
	3	.016	25.261	.00	.04	.01	.00	.00	.04	.02	.00	.01	.02
	4	.013	27.820	.04	.01	.00	.04	.02	.23	.00	.00	.00	.00
	5	.008	34.704	.00	.01	.16	.03	.26	.00	.00	.02	.02	.02
	6	.006	40.415	.00	.00	.53	.01	.31	.02	.01	.01	.00	.00
	7	.003	54.078	.19	.01	.00	.05	.23	.13	.00	.24	.07	.01
	8	.002	71.658	.34	.19	.25	.22	.00	.09	.08	.00	.38	.01
	9	.001	91.706	.01	.00	.00	.53	.00	.26	.25	.17	.00	.51
	10	.001	133.129	.37	.75	.05	.12	.17	.22	.63	.55	.44	.42

a. Dependent Variable: what are the effects of worker unemployment

Source: Own computation based on data collected (SPSS 2026 result)

The Collinearity Diagnostics table provides information about multicollinearity problems in your data. It contains several columns, including Dimension, Eigenvalue, and Condition Index. The first column of the table, Dimension, attempts to determine dimensions with independent information. The second column, Eigenvalue, indicates whether there are several eigenvalues close to 0 which is an indication for multicollinearity. The third column, Condition Index, is derived from the square root of the ratio of the largest eigenvalue (dimension 1) to the eigenvalue of the dimension. Values above 15 can indicate

multicollinearity problems, values above 30 are a very strong sign for problems with multicollinearity. In this study, the interpretation of variance proportion is near zero showing that no segregation or no relationship between parcel and group.

Table 54 Residuals statistics table

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.74	5.14	4.26	.376	271
Residual	-.763	.380	.000	.226	271
Std. Predicted Value	-1.387	2.348	.000	1.000	271
Std. Residual	-3.314	1.652	.000	.983	271

a. Dependent Variable: what is the effect of worker unemployment

Source: Own computation based on data collected (SPSS 2026 result)

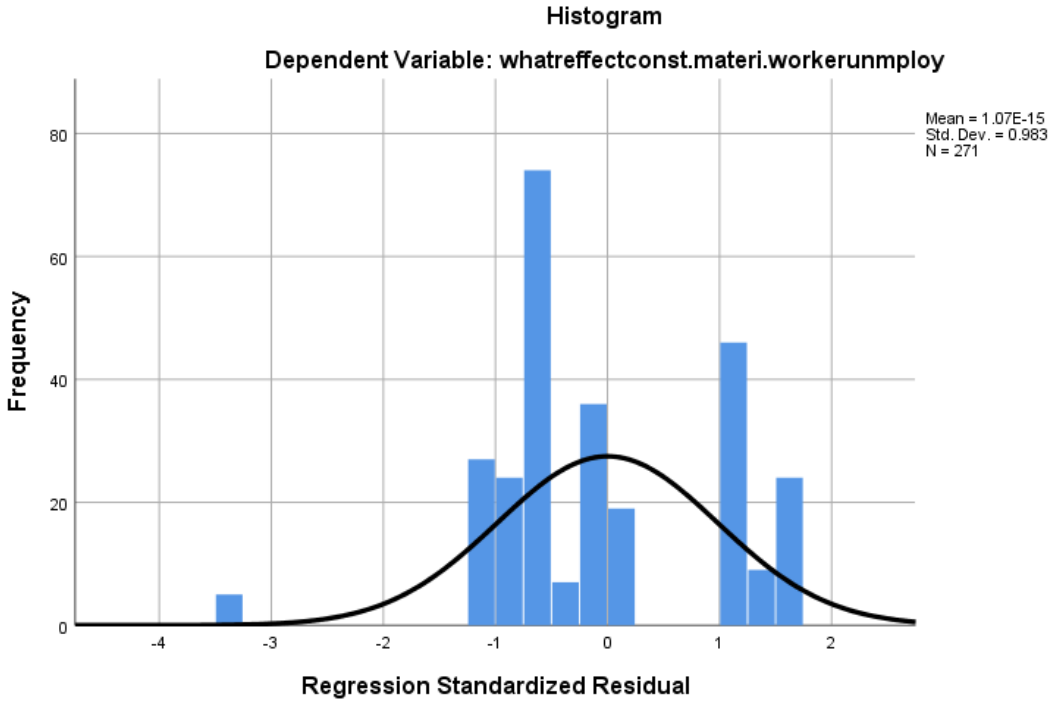
The standardized residual is a measure of the strength of the difference between observed and expected values. It's a measure of how significant your cells are to the chi-square value. If your sample is large enough, the standardized residual can be roughly compared to a z-score. we can see that the standard residual, minimum, and maximum values are -3.314 and 1.652 respectively. because of that, there is no outlier.

4.6.3 Multivariate Normality Test

The fundamental assumption in regression analysis is the Normality of the residuals in the independent variable to take a wider view of the results of research beyond the sample collected. This assumption tests the normality of independent variables by showing the residuals normally distributed. It can be tested through a histogram of the standardized residual (Stevens, 2009). The graph shows the normality of the independent variable of residual with the place over normal curve distribution (Hair, Jr. et. al,2010).

In statistics, it is conventional to assume that the observations are normal. The entire statistical framework is grounded on this assumption and if this assumption is violated the

inference is interrupted for this reason, it is essential to check or test this assumption before any statistical analysis of data is done (ibid, 2010).



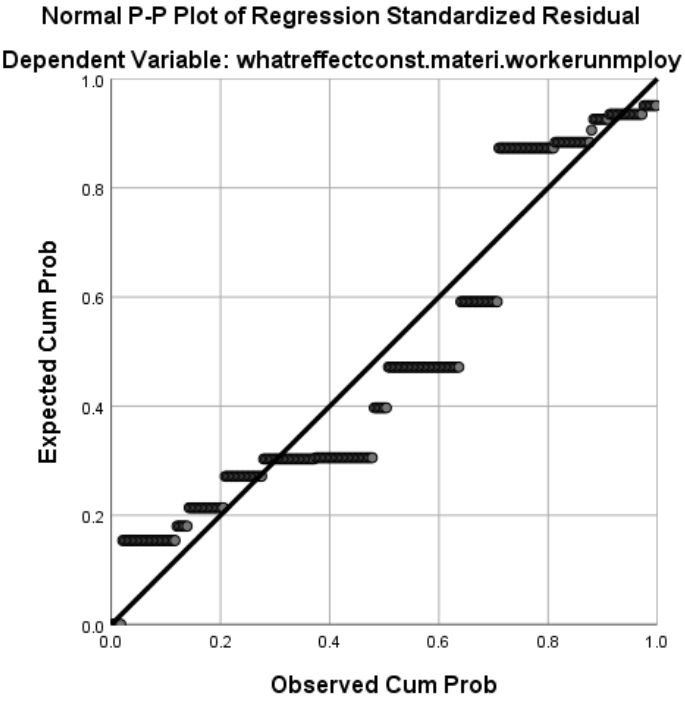
Source: Own computation based on data collected (SPSS 2026 result)

Figure 6 Regression standardized residual

The Normality of the distribution of the independent variables is shown in Figure 6 The test of multivariate normality as shown in the histogram clearly shows the residuals are normally distributed. Hence, the data met the assumption of multivariate normality of the independent variables.

4.6.4 Homoscedasticity Test

This assumption refers to an equal variance of errors across all levels of the independent variables. A plot of standardized residuals versus predicted (independent) values can show points equally distributed across all values of the independent variables. This means that researchers assume that errors spread out consistently between the variables (Hair, Jr.et.al, 2010).



Source: Own computation based on data collected (SPSS 2026 result)

Figure 7 Regression standardized residual

As shown in the above figure 7 The spread of the residuals was relatively constant at each point of the predictor variables (or across the linear model), all the plots are equally distributed hence there is no homoscedasticity problem.

Table 55 Independent Variables Entered regression with owner unsatisfaction table

Model	Independent Variables Entered	Variables Removed	Method
1	What are the impacts of unfair risk share What are the impacts of profit loss, What are the impacts claim, What are the impacts of inflation, What are the impacts of contractual problems, What are the impacts of schedule delays, What are the impacts of market instability, what are the impacts of the budget deficit, What are the impacts of cost overrun	.	Enter

a. Dependent Variable: what are effect-const owner unsatisfaction

b. All requested variables entered.

Source: Own computation based on data collected (SPSS 2026 result)

The above table shows all independent variable is entered, which means there is no removed variable for regression analysis with the dependent variable of owner unsatisfaction.

Table 56 Model summary table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.682	.671	.259

a. Predictors: (Constant), what are impacts unfair risk share, Whatrimpactsprofitlose, what are impacts claim, what are impacts inflation, what are impacts contractual pro, what are impacts schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts costovrun

b. Dependent Variable: what impacts affect owner unsatisfaction

Source: Own computation based on data collected (SPSS 2026 result)

The R squared is the coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable and the findings in the above table revealed that the value of R squared was 0.682. It shows 68.2% of the impacts of owner dissatisfaction emanate from the factors (unfair risk share, profit loss, claim, inflation, schedule delay, market instability, budget deficit, cost overrun contractual problem,). In fact, it is a strong explanatory power of regression and the remaining unexplored variables may explain the variation in motivation. The regression model summary presents how much of the variance in effect is explained by the predictor variables.

Table 57 Model summary of ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.468	9	4.163	62.095	.000[b]
	Residual	17.499	261	.067		
	Total	54.967	270			

a. Dependent Variable: what are the effects of owner unsatisfaction

b. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are impacts inflation, what are impacts contractual pro, what are impacts schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts cost overrun

The ANOVA tells us whether the overall model is statistically significant and is good at predicting the outcome variable. (F) Value is (62.095) at 0.000 p- value which indicates that the regression model is fit and significant. This implies if we take the nine predictor variables together as a group, they predict they affect owner dissatisfaction significantly.

The table shows the goodness of fit of the model. The lower this number, the better the fit. Typically, if "Sig." is greater than 0.05, we conclude that our model could not fit the data (See annex E) If Sig. < .01, then the model is significant at 99% if Sig. < .05, then the model is significant at 95%, and if Sig. <.1, the model is significant at 90%. Significance implies that we can accept the model. If Sig>., 1 then the model was not significant (a relationship could not be found) or "R-square is not significantly different from zero."

Table 58 Coefficients table

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	4.394	.249		17.623	.000		
what are the impacts profit lose	.399	.087	.588	4.586	.000	.074	13.482
what are the impacts of contractual problems	-.282	.051	-.321	-5.561	.000	.366	2.732
what are the impacts of schedule delay	-1.050	.072	-1.549	-14.633	.000	.109	9.192
what are the impacts of inflation	-.013	.050	-.015	-.258	.797	.345	2.899

what are the impacts claim	-.579	.050	-.813	-11.646	.000	.250	3.998
what are the impacts of costovrune	.965	.094	1.424	10.223	.000	.063	15.895
what are the impacts of market instability	-.601	.090	-.671	-6.654	.000	.120	8.334
what are the impacts of budget deficit	-.006	.062	-.013	-.102	.919	.078	12.885
what are the impacts of unfarriskshare	1.045	.093	1.338	11.293	.000	.087	11.513

a. Dependent Variable: whatreffectconst.materia.ownerunsatis

Source: Own computation based on data collected (SPSS 2026 result)

The coefficient table indicates the level of effect each variable has on the dependent variable. The highest beta value of Time β = 1.045 indicates that the variable "impacts of unfair risk share" has relatively a strong degree of effect on dependent variables followed by achievements of the value of β = 0.965 than any other variables in the study. Recognition and its degree of importance beta values are β=0.399, β=-0.006, β=-0.013, β=-, β=-0.579, β=-0.601, β=-1.050. Therefore, all variables are statistically significant and have a positive impact on the dependent variable since their p-value is < 0.05. The standardized coefficient (Beta value) indicates the degree of importance each variable has towards worker unemployment as a result, the affecting variables can be ranked in the following order based on their contribution.

Table 59 Collinearity Diagnostics table

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	Profit lose	contractual pro	Schedule delay	inflation	claim	cost ovrun	Maket instab	budget defect	unfarrisksha
1	1	9.923	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.027	19.161	.06	.00	.00	.00	.00	.01	.00	.00	.07	.00
	3	.016	25.261	.00	.04	.01	.00	.00	.04	.02	.00	.01	.02
	4	.013	27.820	.04	.01	.00	.04	.02	.23	.00	.00	.00	.00
	5	.008	34.704	.00	.01	.16	.03	.26	.00	.00	.02	.02	.02
	6	.006	40.415	.00	.00	.53	.01	.31	.02	.01	.01	.00	.00
	7	.003	54.078	.19	.01	.00	.05	.23	.13	.00	.24	.07	.01
	8	.002	71.658	.34	.19	.25	.22	.00	.09	.08	.00	.38	.01
	9	.001	91.706	.01	.00	.00	.53	.00	.26	.25	.17	.00	.51
	10	.001	133.129	.37	.75	.05	.12	.17	.22	.63	.55	.44	.42

a. Dependent Variable: what are the effects of owner unsatisfaction

Source: Own computation based on data collected (SPSS 2026 result)

The Collinearity Diagnostics table provides information about multicollinearity problems in your data. It contains several columns, including Dimension, Eigenvalue, and Condition Index. The first column of the table, Dimension, attempts to determine dimensions with independent information. The second column, Eigenvalue, indicates whether there are several eigenvalues close to 0 which is an indication for multicollinearity. The third column, Condition Index, is derived from the square root of the ratio of the largest eigenvalue

(dimension 1) to the eigenvalue of the dimension. Values above 15 can indicate multicollinearity problems, and values above 30 are a very strong sign for problems with multicollinearity. In this study, the interpretation of variance proportion is near zero showing that no segregation or no relationship between parcel and group.

Table 60 Residuals statistics table

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.13	4.69	3.99	.373	271
Residual	-.652	.867	.000	.255	271
Std. Predicted Value	-2.298	1.871	.000	1.000	271
Std. Residual	-2.518	3.349	.000	.983	271

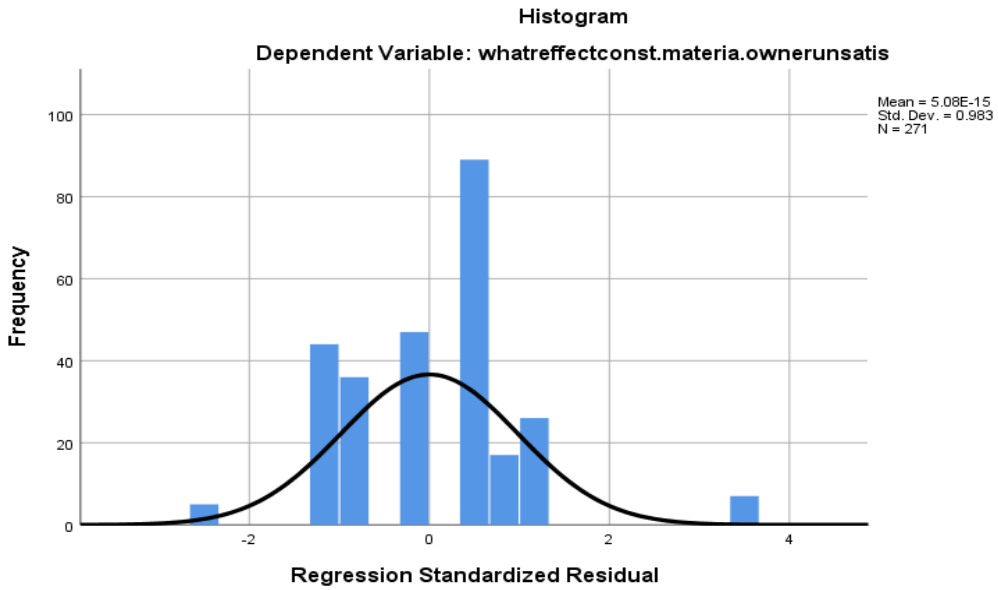
a. Dependent Variable: what are the effects of owner unsatisfaction

A residual plot is a display of the residuals on the y-axis and the independent variables on the x-axis. This shows the relationship between the independent variable and the response variable. A residual can be defined as the observed value minus the predicted value (e= y– ŷ). The purpose of a residual plot is to determine whether or not a linear regression model is appropriate for the data. From the above table, I understand that the residual distribution is normal. the standardized residual is a measure of the strength of the difference between observed and expected values. and also it show how significant your cells are to the chi-square value. If your sample is large enough, the standardized residual can be roughly compared to a z-score. we can see that the standard residual, minimum, and maximum values are -2.518 and 3.349 respectively. because of that, there is no outlier.

4.6.5 Multivariate Normality Test

The fundamental assumption in regression analysis is the Normality of the residuals in the independent variable to take a wider view of the results of research beyond the sample collected. This assumption tests the normality of independent variables by showing the residuals normally distributed. It can be tested through a histogram of the standardized residual (Stevens, 2009). The graph shows the normality of the independent variable of residual with the place over normal curve distribution (Hair, Jr. et. al,2010).

In statistics, it is conventional to assume that the observations are normal. The entire statistical framework is grounded on this assumption and if this assumption is violated the inference is interrupted for this reason, it is essential to check or test this assumption before any statistical analysis of data is done (ibid, 2010).



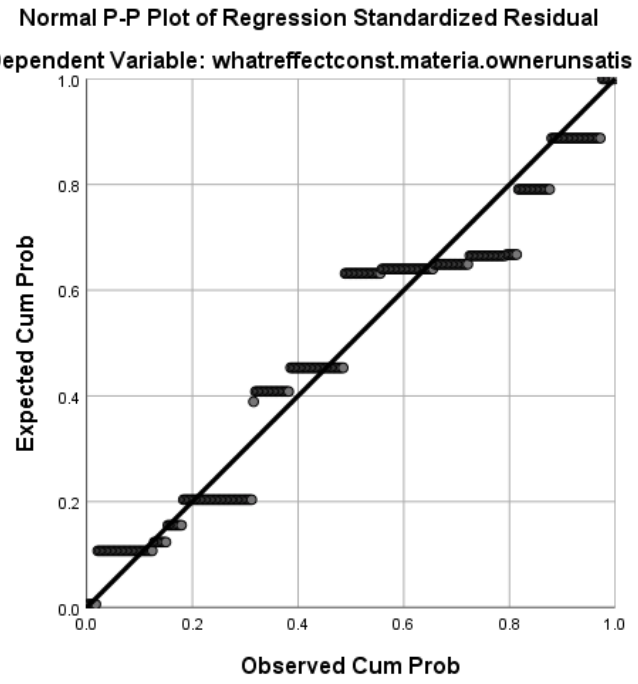
Source: Own computation based on data collected (SPSS 2026 result)

Figure 8 Regression standardized residual

The Normality of the distribution of the independent variables is shown in above Figure 4.9.2.5 The test of multivariate normality as shown in the histogram clearly shows the residuals are normally distributed. Hence, the data met the assumption of multivariate normality of the independent variables.

4.6.6 Homoscedasticity Test

This assumption refers to an equal variance of errors across all levels of the independent variables. A plot of standardized residuals versus predicted (independent) values can show points equally distributed across all values of the independent variables. This means that researchers assume that errors spread out consistently between the variables (Hair, Jr.et.al, 2010).



Source: Own computation based on data collected (SPSS 2026 result)

Figure 9 p-p plot of regression standardized residual

As shown in above figure 4.9.2.6 The spread of the residuals was relatively constant at each point of the predictor variables (or across the linear model), all the plots are equally distributed hence there is no homoscedasticity problem.

Table 61 Independent Variables which regression with Entered table

Model	Independent Variables Entered	Variables Removed	Method
1	what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of the claim, what are the impacts of inflation, what are the impacts of contractual problems, what are the impacts of schedule delays, what are the impacts of market instability, what are the impacts of the budget deficit, what are the impacts of cost overrun	.	Enter

a. Dependent Variable: what are impacts what are impacts of project deficit

b. All requested variables entered.

The above table shows all independent variables are entered, which means there is no removed variable for regression analysis with the dependent variable of project deficit

Table 62 Model summary table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.804[a]	.646	.634	.296

a. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are the impacts of inflation, what are the impacts of contractual pro, what are impacts schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts cost overrun

b. Dependent Variable: what are the impacts of Project deficit

The R squared is the coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable and the findings in the above table revealed that the value of R squared was 0.646. It shows 64.6% of the impacts of owner dissatisfaction emanate from the factors (unfair risk share, profit loss, claim, inflation, schedule delay, market instability, budget deficit, cost overrun contractual problem,). It is a strong explanatory power of regression and the remaining unexplored variables may explain the variation of project deficit. The regression model summary presents how much of the variance in effect is explained by the predictor variables.

Table 63 Anova Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.857	9	4.651	53.016	.000[b]
	Residual	22.896	261	.088		
	Total	64.753	270			

a. Dependent Variable: what are the impacts of project deficit

b. Predictors: (Constant), what are the impacts of unfair risk share, what are the impacts of profit loss, what are the impacts of claim, what are impacts inflation, what are impacts contractual pro, what are impacts of schedule delay, what are impacts market instability, what are impacts budget defect, what are impacts cost overrun

Source: Own computation based on data collected (SPSS 2026 result)

Table 64 Coefficients table

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	3.057	.285		10.718	.000		
	what are the impacts profit lose	.957	.100	1.299	9.610	.000	.074	13.482
	what are the impacts of contractual pro	.102	.058	.107	1.755	.080	.366	2.732
	what are the impacts of schedule delay	-.711	.082	-.966	-8.655	.000	.109	9.192
	what are the impacts of inflation	.005	.057	.005	.085	.932	.345	2.899
	what are the impacts claim	-.163	.057	-.211	-2.863	.005	.250	3.998
	what are the impacts of costs run	-.400	.108	-.543	-3.703	.000	.063	15.895
	what are the impacts of market instability	-.635	.103	-.653	-6.143	.000	.120	8.334

what are the impacts of budget defect	.336	.071	.628	4.751	.000	.078	12.885
what are the impacts of unfair risks	.845	.106	.996	7.978	.000	.087	11.513

a. Dependent Variable: what are the effects of project deficit

Source: Own computation based on data collected (SPSS 2026 result)

The coefficient table indicates the level of effect each variable has on the dependent variable. The highest beta value of Time β = 0.957 indicates that the variable "impacts of unfair risk share" has relatively a strong degree of effect on dependent variables followed by achievements of the value of β = 0.845 than any other variables in the study. Recognition and its degree of importance beta values are β=0.336, β=0.102, β=0.005, β=-0.163, β=-0.400, β=-0.635, β=-0.711. Therefore, all variables are statistically significant and have a positive impact on the dependent variable since their p-value is < 0.05. The standardized coefficient (Beta value) indicates the degree of importance each variable has towards project deficit as a result, the affecting variables can be ranked in the following order based on their contribution.

Table 65 Collinearity diagnostics table

			Variance Proportions									
Dimension	Eigenvalue	Condition Index	(Constant)	profit lose	contractual pro	Schedule delay	inflation	claim	costovrun	Market instability	budget defect	unfarrisksha
1	9.923	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.027	19.161	.06	.00	.00	.00	.00	.01	.00	.00	.07	.00
3	.016	25.261	.00	.04	.01	.00	.00	.04	.02	.00	.01	.02
4	.013	27.820	.04	.01	.00	.04	.02	.23	.00	.00	.00	.00
5	.008	34.704	.00	.01	.16	.03	.26	.00	.00	.02	.02	.02

6	.006	40.415	.00	.00	.53	.01	.31	.02	.01	.01	.00	.00
7	.003	54.078	.19	.01	.00	.05	.23	.13	.00	.24	.07	.01
8	.002	71.658	.34	.19	.25	.22	.00	.09	.08	.00	.38	.01
9	.001	91.706	.01	.00	.00	.53	.00	.26	.25	.17	.00	.51
10	.001	133.129	.37	.75	.05	.12	.17	.22	.63	.55	.44	.42

a. Dependent Variable: what is the effect of project deficit

Source: Own computation based on data collected (SPSS 2026 result)

The Collinearity Diagnostics table provides information about multicollinearity problems in your data. It contains several columns, including Dimension, Eigenvalue, and Condition Index. The first column of the table, Dimension, attempts to determine dimensions with independent information. The second column, Eigenvalue, indicates whether there are several eigenvalues close to 0 which is an indication for multicollinearity. The third column, Condition Index, is derived from the square root of the ratio of the largest eigenvalue (dimension 1) to the eigenvalue of the dimension. Values above 15 can indicate multicollinearity problems, values above 30 are a very strong sign for problems with multicollinearity. In this study, the interpretation of variance proportion is near zero showing that no segregation or no relationship between parcel and group.

Table 66 Residuals statistics table

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.59	5.36	4.39	.394	271
Residual	-.791	.414	.000	.291	271
Std. Predicted Value	-2.053	2.440	.000	1.000	271
Std. Residual	-2.669	1.396	.000	.983	271

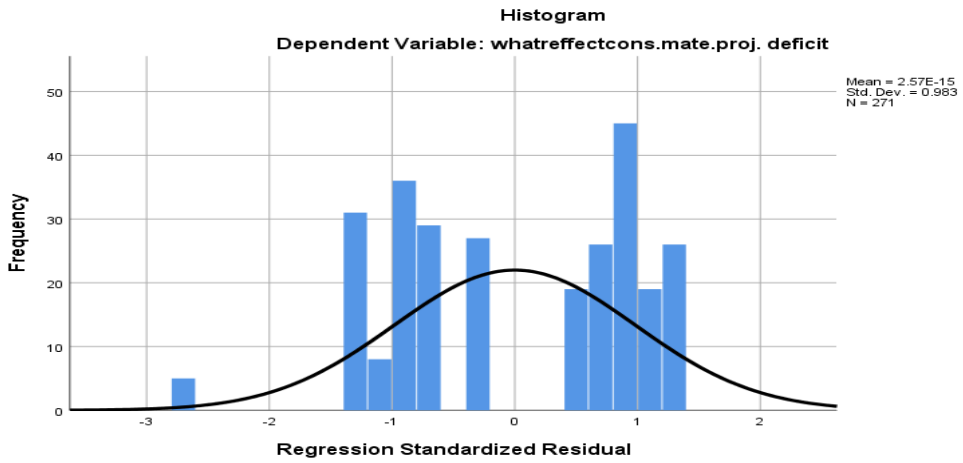
Source: Own computation based on data collected (SPSS 2026 result)

A residual plot is a display of the residuals on the y-axis and the independent variables on the x-axis. This shows the relationship between the independent variable and the response variable. A residual can be defined as the observed value minus the predicted value ($e= y– \hat{y}$). The purpose of a residual plot is to determine whether or not a linear regression model is appropriate for the data. From the above table, I understand that the residual distribution is normal. The maximum value standard residual is 1.396 and also the minimum value of the standard residual is -2.669.

4.6.7 Multivariate Normality Test

The fundamental assumption in regression analysis is the Normality of the residuals in the independent variable to take a wider view of the results of research beyond the sample collected. This assumption tests the normality of independent variables by showing the residuals normally distributed. It can be tested through a histogram of the standardized residual (Stevens, 2009). The graph shows the normality of the independent variable of residual with the place over normal curve distribution (Hair, Jr. et. al,2010).

In statistics, it is conventional to assume that the observations are normal. The entire statistical framework is grounded on this assumption and if this assumption is violated the inference is interrupted for this reason, it is essential to check or test this assumption before any statistical analysis of data is done (ibid, 2010).



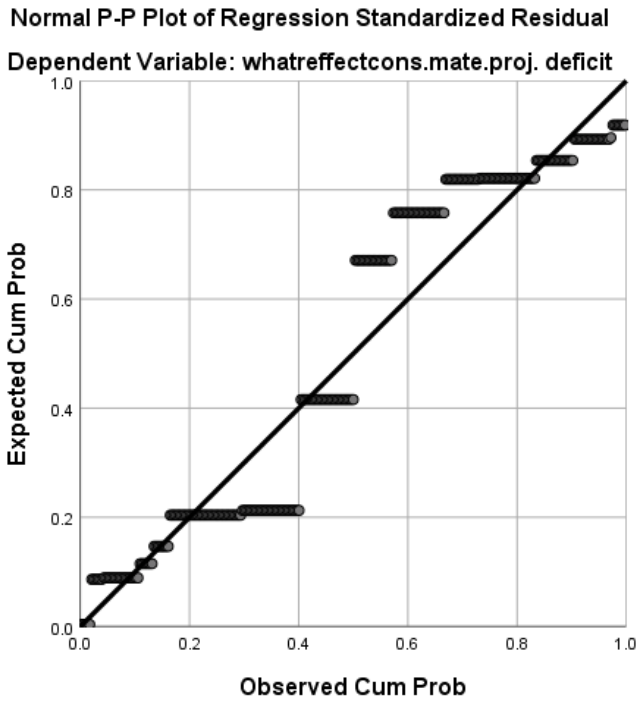
Source: Own computation based on data collected (SPSS 2026 result)

Figure 10 Regression standardized residual

The Normality of the distribution of the independent variables is shown in Figure 10 The test of multivariate normality as shown in the histogram clearly shows the residuals are normally distributed. Hence, the data met the assumption of multivariate normality of the independent variables.

4.6.8 Homoscedasticity Test

This assumption refers to an equal variance of errors across all levels of the independent variables. A plot of standardized residuals versus predicted (independent) values can show points equally distributed across all values of the independent variables. This means that researchers assume that errors spread out consistently between the variables (Hair, Jr.et.al, 2010).



Source: Own computation based on data collected (SPSS 2026 result)

Figure 11 p-p plot of regression standardized residual

As shown in above figure 11 The spread of the residuals was relatively constant at each point of the predictor variables (or across the linear model), all the plots are equally distributed hence there is no homoscedasticity problem.

4.7. CASE STUDY

4.7.1 Introduction

4.7.1.1 Price escalation

Cost is a vital element in every development. Both the government and other owners of construction projects, contractors and construction workers are all interested in construction costs because it affects them in one way or another. Cost consideration guides the developer on the type and magnitude of development and resources to use out of available ones and that together with the prospect of benefit-cost consideration helps to dictate the purpose for which land may be developed, the location, and the timing of development.

Construction cost escalation is many and complex. They include labor, equipment and material inflation, construction demand, and major events. The ability of contractors to forecast reasonable estimates for construction are often considered the life-blood of a successful project execution. The estimate is generally compiled by assembling fairly, comprehensive quantity surveys and quotes for vendor and multiplier items. Overhead and profit is added based on the firm's requirements. Contingency is finally added to cover the cost of unknowns. A contractor attempts to mitigate these cost increases by the use of a cost multiplier. This cost adjustment is often based on little deterministic factors often developed through experience. Estimating formulas and mathematical models have attempted to modify this practice. Traditional business forecasting models for predicting cost increases are being considered and applied to construction estimation. This business models involve extrapolation of past data into the future by using linear and non-linear curves or mathematical relationships.

The ability to successfully predict the cost of escalation of labor and materials most widely used in construction is also required by several other industries. These industries often utilize economic indicators to develop business strategies and goals. Economic indicators are also used in determining the prices of products. Economic indicators

are statistical data, and charts, which show production, output, employment, and many other economic variables in the phases of the economy and Gross National Product (GDP)

A price increase is an increase in any component of the project cost when the cost of that component is high. A comparison of two different periods (Lock, 2003) Escalation at home centers in the past few years has been very volatile and this trend is expected to continue shortly. It depends on many different factors. This situation creates a lot of uncertainty, and tension during construction. The economic success of a construction project depends on Dangers and vulnerability due to changes in escalation rates during construction (Bates, 1996), of the success of a building construction project is primarily affected by the level of costs involved Identify and assign escalations to construction projects as an important part of Factors driving price increases are out of control Cost escalation budgeting a major problem during the project planning stage (Dawood and Bates, 1998).

A successful construction project meets the required quality standards. Safely, on time, and within the approved budget (Cunningham, 2013). Cost issue Overrun is very influential; the other affects two factors: quality and time. Lack of It can lead to the use of under-budgeted materials and personnel. Additionally, the shortfall Employers are forced to seek additional funding sources, most of which lead to project delays.

One of the main causes of cost overruns is raising prices. This is an increase in cost for everyone

the basic cost of the project due to the design elements of the original contract and the passage of time (Williams. et.al. 1999). It is known that material prices fluctuate greatly, It is unstable and a factor in project costs.

The definition of price increase that is most appropriate for this study is that of Jaeger (1996), who states that a price increase is a decision in estimating rising costs of equipment, materials, labor, etc. due to sustained price fluctuations. As time passes the purpose of this study is primarily to address cost overruns caused by changes in prices of building materials and labor.

This paper is tested by three projects of Addis Ababa sub-city design and building works office projects that are affected by the price escalation. The impacts and effects of construction material price escalation are very high in the construction sector. Because of that public projects of Addis Ababa city design and building works office were majorly

affected by the construction material price escalation.in the case of these three projects the impacts and effects of construction material price escalation.

- ✓ **Impacts of price escalation**

Profit loss Inflation, Cost overrun, Budget deficit, Market instability, claim, contractual problem, unfair risk share, schedule variance, and project delay.

- ✓ **Effects of price escalation**

Project deficit, dispute, worker unemployment, owner unsatisfaction, project termination

Evaluate the three projects from the above point of view to test the impacts of price escalation and its effects on the projects of Addis Ababa no-2 G+4 school, Gutomeda sports field work, and also pastor police Camp G+2 building works. The above three projects have faced the problems of construction material price escalation. so that the impacts of price escalation and also the effects of construction material price escalation badly influence the projects.

- **In the case of Addis Ababa no-2 G+4 school impacts of price escalation.**

- **Profit lost**

The contractor of the project takes the work by the last bidder and starts the project. On the sub-stricture work of the project takes more time because of hard rock and the schedule is delayed on the other hand construction material on the market is extremely escalated. The contractor lost his expected profit and got into negative and left the project for more than 28 days and went to termination.

- **Inflation**

Inflation of the market at the time of that increase continually and the power of the money to buy more material is decreased extremely and the construction material cost is overrun. The contractor of this project H.T.G general contractor is exposed to inflation problems.

- **Cost overrun**

The cost of construction materials increases from time to time at that time and the contractor cannot control the problem, mainly reinforcement bars, cement, finishing material, and

many other costs that the project needs increase extremely when the contractor decides to terminate the project.

- **Budget deficit**

A budget deficit means a shortage of capital to execute projects and it is limited to work on the project that is needed by the public. In the case of this Addis Ababa no-2 G+4 project the contractor won the project by the list bidder also at that time the construction material price escalation happened and the contractor could not handle this problem and was exposed to a shortage of budget.

- **Claim**

On this project, a claim is raised by the client side because the progress of the project is very low and schedule delays are happening. The client of the project is right two warnings later and the contractor does not react to the latter. After that, the owner takes the next step to terminate the project.

- **In the case of Addis Ababa no-2 G+4 school effects of price escalation.**

- **Project deficit**

Price escalation because many different effects on the construction industry and this problem causes project deficits in the Addis Ababa sub-city public projects executed by the design and building work office. Because of unexpected price escalation, the project is terminated and the project is not completed on time, so the project deficit is happening. The effect of the Project deficit on public projects shortage of schools, health centers, the shortage of road work, and many projects that are essential to the public is limited.

- **Dispute**

On this project, the client claims the contractor to complete the project within a specified period on the agreement but the contractor cannot work because of the above and many other cases the project is terminated and the client sends the case to the court. Because of this dispute, the client asks the contractor to have a debit of 1.2 million Ethiopian birrs, which is an advance payment the contractor does not return to the client.

- **Worker unemployment**

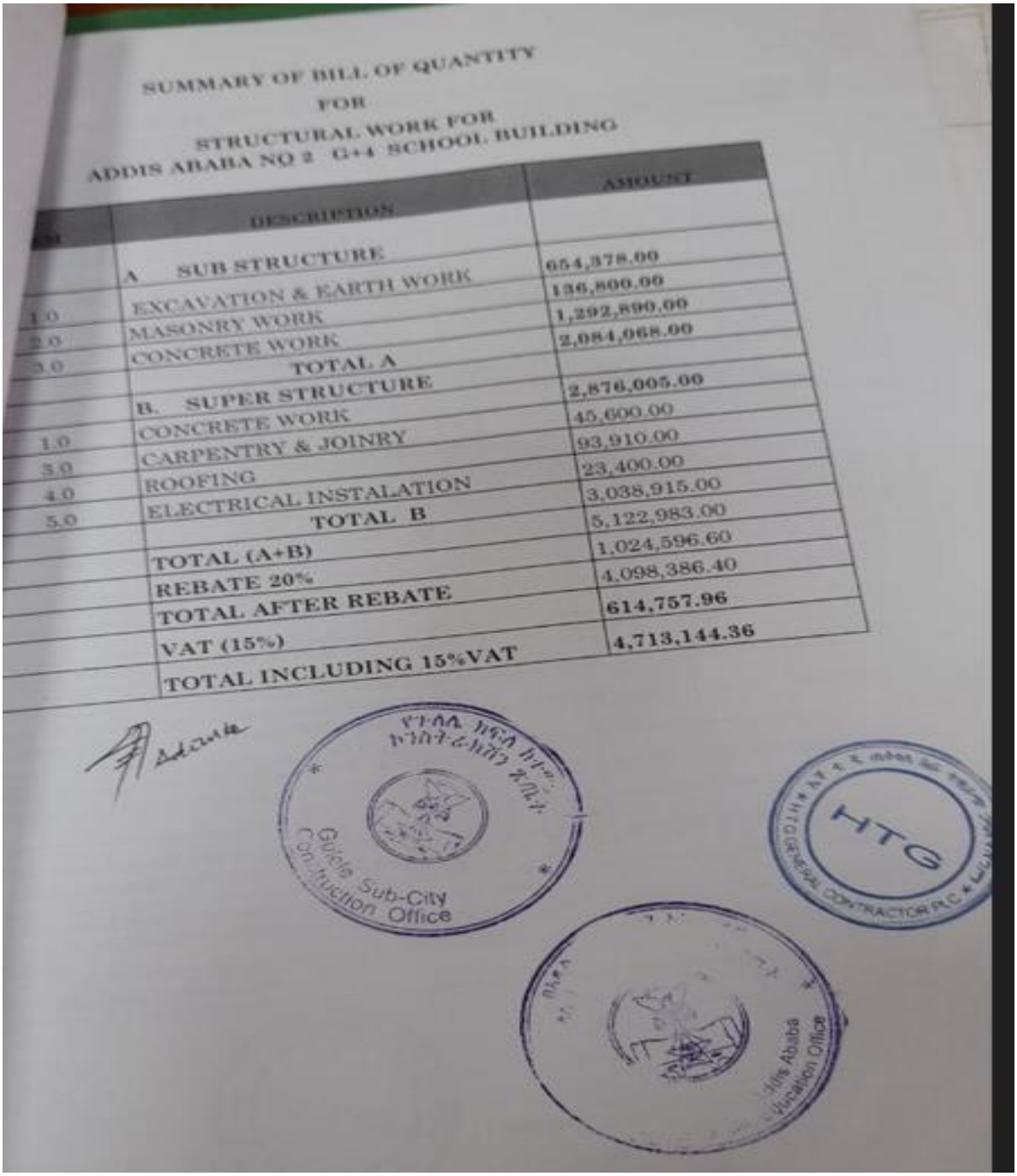
On this project of Addis Ababa no- G+ 4 schools the contractor is terminated and the project workers are exposed to unemployment. The project workers prom project manager to daily almost 20 workers lost their work and were exposed to want to another work opportunity.

- **Owner unsatisfaction**

The project owner is not satisfied because the project is not completed on time and used for its purposes. Many projects in Addis Ababa city are exposed to termination and the owner of the project is not satisfied.

- **Project termination**

The project is terminated and sent to the court, the price escalation of the construction material, and many other cases the project is terminated.



SUMMARY OF BILL OF QUANTITY
FOR
STRUCTURAL WORK FOR
ADDIS ABABA NO 2 G+4 SCHOOL BUILDING

	DESCRIPTION	AMOUNT
	A SUB STRUCTURE	
1.0	EXCAVATION & EARTH WORK	654,378.00
2.0	MASONRY WORK	136,800.00
3.0	CONCRETE WORK	1,292,890.00
	TOTAL A	2,084,068.00
	B. SUPER STRUCTURE	
1.0	CONCRETE WORK	2,876,005.00
3.0	CARPENTRY & JOINRY	45,600.00
4.0	ROOFING	93,910.00
5.0	ELECTRICAL INSTALATION	23,400.00
	TOTAL B	3,038,915.00
	TOTAL (A+B)	5,122,983.00
	REBATE 20%	1,024,596.60
	TOTAL AFTER REBATE	4,098,386.40
	VAT (15%)	614,757.96
	TOTAL INCLUDING 15%VAT	4,713,144.36

Gulele Sub-City Construction Office

HTG

Figure 12 Contract Agreement For the Project Addis Abeba No 2 G+4 School Building

H.T.G GENERAL CONTRACTOR FINANCIAL STATUS FOR ADDIS ABABA NO-2 G+4

date 1/10/2010

	contract amount	supplimentery amount	advance amount	total excuted amount	penality 10%	previos paimer	net amount
main contract	5,122,983.08		819,677.28	1,139,376.63			
rebate 20%	1,024,596.62			227,875.33			
after rebate	4,098,386.46		122,951.59	911,501.30	409,838.65	601,858.41	(965,448.10)
vat 15%	614,757.97		942,628.87	136,725.20	61,475.80	90,278.76	(144,817.22)
grand total	4,713,144.43			1,048,226.50	471,314.44	692,137.17	(1,110,265.32)

AFTER TERMINATION

TEWODROS WOLDE GENERAL CONTRACTOR FINANCIAL STATUS FOR ADDIS ABABA NO-2 G+4

date 20/05/2012

	contract amount		advance amount	total excuted amount	penality 10%	previos paimer	net amount final
main contract	10,670,636.00		3,201,190.80	12,171,886.80			
supplimentery	1,768,439.30						
supplimentery	846,603.17						
supplimentery	49,382.83			-			
total summ	13,335,061.30		3,201,190.80	12,171,886.80		8,014,375.72	652,023.11
vat 15 %	2,000,259.20		480,178.62	1,825,783.02		1,202,156.36	97,803.47
grand total	15,335,320.50		3,681,369.42	13,997,669.82		9,216,532.08	749,826.58

	contractor 1		contractor 2	difference
main contract	10,670,636.00	main contract	5,122,983.08	
supplimentery	1,768,439.30	rebate 20%	1,024,596.62	325% increase
supplimentery	846,603.17	after rebate	4,098,386.46	
supplimentery	49,382.83			-
total summ	13,335,061.30		4,098,386.46	
vat 15 %	2,000,259.20		614,757.97	
grand total	15,335,320.50		4,713,144.43	

Figure 13 Current Picture of Addis Abeba No 2 School Building Work

- **In the case of pastor police camp G+2 work impacts of price escalation**

Pastor police camp G+2 work started in 2012 EC and the project faced many different problems the contractor of the project is the Wochecha general contractor. The project contractor wines the contract by the list bidder and the contractor entered into the agreement 20% less than the contract amount and faced different problems of construction material price escalation the project was delayed more than one year and the owner claimed delayed the project, the contractor also claimed construction material on market shortage and also a variation of work in the agreement, after that the variation of work adjusted and schedule is crushed the contractor continue his work. However, the project cannot be completed because of construction material price escalation and variation increased by more than 30% of the contract agreement the contractor is terminated and transferred to another contractor.

- **Impacts of price escalation on pastor police camp G+2 work**

Impacts of price escalation that are taken in this paper are Profit loss, Inflation, Cost overrun, Budget deficit, Market instability, claim, contractual problem, unfair risk share, schedule variance, and project delay. According to this project of the pastor police camp, all the above impacts are shown on the project.

- **Effects of price escalation on pastor police camp G+2 work**

Construction material Price escalation because many different effects on the construction industry and this problem causes project deficits in the Addis Ababa sub-city public projects executed by the design and building work office. Because of unexpected price escalation, the project is terminated and the project is not completed on time, so the project deficit is happening. The effect of the Project deficit on public projects shortage of schools, and health centers, a shortage of road work, and many projects that are essential to the public are not effectively worked.

Table 67 Contract Agreement For the Project pastor police camp G+2 work

	WOCHECHA GENERA CONTRACTOR FINANCIAL STATUS FOR PASTER POLICE CUMP G+2						
						date 05/06/2012	
	contract amount		advance amount	total excuted amount	penality 10%	previos paimen	net amount final
main contract	3,501,061.22		1,050,318.36	5,346,203.39			
supplimentery 1	1,845,686.61						
supplimentery 2							
supplimentery 3				-			
total summ	5,346,747.83		1,050,318.36	5,346,203.39		3,600,301.85	561,928.09
vat 15 %	802,012.17		157,547.75	801,930.51		540,045.28	84,289.21
grand total	6,148,760.00		1,207,866.11	6,148,133.90		4,140,347.13	646,217.30
		AFTER TERMINATION					
GEDAM AND MOGESE CONSTRUCTION CONTRACTOR FINANCIAL STATUS FOR PASTER POLICE CUMP G+2 FINISHING WORK							
						date 11/10/2013	
	contract amount		advance amount	total excuted amount	penality 10%	previos paimen	net amount final
main contract	3,912,813.92		782,562.78	5,017,125.50			
supplimentery 1	1,117,853.79						
supplimentery 2							
supplimentery 3				-			
total summ	5,030,667.71		782,562.78	5,017,125.50		3,477,306.25	631,827.85
vat 15 %	754,600.16		117,384.42	752,568.83		521,595.94	94,774.18
grand total	5,785,267.87		899,947.20	5,769,694.33		3,998,902.19	726,602.03
	contractor 1		contractor 2	difference			
main contract	3,501,061.22	main contract	3,912,813.92				
supplimentery 1	1,845,686.61	supplimentery 1	1,117,853.79				
supplimentery 2		supplimentery 2					
supplimentery 3		supplimentery 3		-			
total summ	5,346,747.83	total summ	5,030,667.71	100% increase			
vat 15 %	802,012.17	vat 15 %	754,600.16				
grand total	6,148,760.00	grand total	5,785,267.87				

Figure 14 Current Picture of Project pastor police camp G+2 work

- **In the case of the Gutomeda sports field, tribune, and fence work impacts of price escalation**

Gutomeda sports field, tribune, and fence work was started in 2010 EC, and the project is gone by the contractor arhaya lulu general contractor. The contractor takes the project by list bidder selection criteria and the contractor wines the project by low amount from other competitors. Because of that and the price escalation of construction material, the contractor cannot work on the project within budget, time, and schedule. The price escalation of construction material is gone continually and the project is terminated by Clint.

The construction material price escalation on this project caused project termination, worker unemployment, disputes, owner dissatisfaction, and project deficit. On this project, all of the above happened and the project was transferred to the other contractor.

- **Impacts of price escalation on Gutomeda sports field, tribune, and fence work**

Impacts of price escalation that are taken in this paper are Profit loss Inflation, Cost overrun, Budget deficit, Market instability, claim, contractual problem, unfair risk share, schedule variance, and project delay. According to this project of the Gutomeda sports field, tribune and fence work all the above impacts are shown on the project.

- **Effects of price escalation on Gutomeda sports Field, tribune, and fence Work**

- **Project termination**

Termination means the birch of a contract agreement between the parties of the projects. In this case, the contractor is terminated and transferred to another contractor this happened because of the project delay and the construction material price escalation. The project is terminated and sent to the court, the price escalation of the construction material, and many other cases the project is terminated.

- **Project deficit**

Price escalation because many different effects on the construction industry and this problem causes project deficits in the Addis Ababa sub-city public projects executed by the design and building work office. Because of unexpected price escalation, the project is terminated and the project is not completed on time, so the project deficit is happening. The

effect of the Project deficit on public projects shortage of schools, health centers, shortage of road work, and many projects that are essential to the public is limited.

- **Dispute**

A dispute means a disagreement happens between the parties and because of that the case is sent to the dispute resolution party. On this project, the client claims the contractor to complete the project within a specified period on the agreement but the contractor cannot work because of the above and many other cases the project is terminated and the client sends the case to the court.

- **Worker unemployment**

On this project of Gutomeda sports field, tribune, and fence work the contractor is terminated and the project workers are exposed to unemployment. The project workers from the project manager to more than 35 workers lost their work and were exposed to another work opportunity.

- **Owner unsatisfaction**

The project owner is not satisfied because the project is not completed on time and used for its purposes. Many projects in Addis Ababa city are exposed to termination and the owner of the project is not satisfied. In this project, the sports field is used for sports training work every day and because of this problem, the owner of the project claimed the contractor of the project and was exposed to the termination.

Table 68 Contract Agreement For the Project Gutomeda sports field, tribune, and fence work

ARAYA LULU GENERAL CONTRACTOR GUTOMEDA SPORT FIELD AND FENCE WORK FINANCIAL STATUSE

date 1/10/2010

	contract amount		advance amount	total excuted amount	penality 10%	previos paimen	net amount final
main contract	4,971,918.17		994,383.64	2,815,377.06			
supplimentery 1	-						
supplimentery 2							
supplimentery 3				-			
total summ	4,971,918.17		994,383.64	2,815,377.06			
vat 15 %	745,787.73		149,157.55	422,306.56		-	-
grand total	5,717,705.90		1,143,541.19	3,237,683.62		-	-

AFTER TERMINATION

GIRUM DERBE AND ADDIS CONSTRUCTION GUTOMEDA SPORT FIELD AND FENCE WORK FINANCIAL STATUSE FOR FINISHING WORK

date 03/09/2012

	contract amount		advance amount	total excuted amount	penality 10%	previos paimen	net amount final
main contract	6,096,879.82		1,829,063.94	7,586,255.10			
supplimentery 1	1,493,473.65						
supplimentery 2							
supplimentery 3				-			
total summ	7,590,353.47		1,829,063.94	7,586,255.10		5,285,271.74	282,263.04
vat 15 %	1,138,553.02		274,359.59	1,137,938.27		792,790.76	42,339.46
grand total	8,728,906.49		2,103,423.53	8,724,193.37		6,078,062.50	324,602.50

	contractor 1		contractor 2	difference
main contract	4,971,918.17	main contract	6,096,879.82	
supplimentery 1	-	supplimentery 1	1,493,473.65	
supplimentery 2		supplimentery 2		
supplimentery 3		supplimentery 3		-
total summ	4,971,918.17	total summ	7,590,353.47	162% increase
vat 15 %	745,787.73	vat 15 %	1,138,553.02	
grand total	5,717,705.90	grand total	8,728,906.49	

Figure 15 Current Picture of Project Gutomeda sports field, tribune, and fence work

- **Construction material cost**

The construction material price is studied by the Addis Ababa City Design and Construction Works Bureau every quarter of the year and distributed to all sub-city administrations and executed public projects under the bureau. In this study, I select the year of study from 2011-2014 EC and understand the construction material price escalation. Because of that construction material price escalation is a critical problem in the construction sector and many projects are exposed to project delay, project termination, and also many other problems.

The price escalation of construction materials affects the client of the project in many different ways. For example, if the price of construction materials increases the project budget also increases and causes a budget deficit at the initial time of the project start.

4.8 Result and Discussion

From the above three projects of Addis Ababa sub-city design and building work office the impacts of construction material price escalation and also its effects. The impacts of construction material price escalation are project delay, schedule delay, market instability, claim, cost overrun, budget deficit, and many other impacts affecting the project performance. Also, construction material price escalation causes many different effects on the construction industry of Addis Ababa sub-city design and building work office projects.

These three projects are affected by price escalation of construction materials and the impacts of escalation are that the three projects show schedule delay, cost overrun, market instability, budget deficit, contractual problem, inflation, claim, and profit loss are some of the impacts that take in this study. In this case, all three projects selected for this case study are delayed from their schedule by more than 2 years and the project cost is increased by more than 100% of its initial contract amount.

The effect of this construction material price escalation on Addis Ababa sub-city design and building office public projects The three projects that are selected for this case study are terminated, dispute rise, workers of the project lose their work, the owner of the project is not satisfied and also project deficit happens on the end user of the projects.

The price escalation of construction material is shown on the cost that is studied by design and construction Biro in every quarter year. In this case, I can see the cost from 2011-2014 EC of every quarter of the year cost of construction material price escalation increase incredibly.

The price of construction material price increased continuously from the year of 2011-2014 EC mainly focused on concrete work, re-bare, masonry, and metal work.

On concrete work, the price increased immediately from the year 2011-2014 the difference or the concrete cost increased by 100% and more.it is only one item of c-25 concrete on sub-

structure work which means on other items the price increases more than 100% and also may be less than 100% but the price escalation on major construction materials is very high.

The price of the masonry work also increased by more than 100% when compared to the cost of the masonry work. it shows the price escalation of construction material price of masonry is very high.it is one item of masonry work that shows the escalation of material cost on another masonry item the cost is more than 100% and also on some items less than 100% but the price escalation is exists on every construction material is very high.

On the other hand, the price escalation of reinforced stile work also shows the increment of price escalation is 200% and more, In the construction sector stile work on construction covers a major part of the project cost and it causes project cost overrun and the client out of budget. The project cost increment affects the public projects because project cost escalates the number of projects decreased by the shortage of budget.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1. Summary

The construction industry is the leading industry in developing countries like Ethiopia. The sector covers a high economic part of the GDP and this sector also contains many different types of workers. for example the workers of skilled and unskilled workers.in Ethiopia, the construction industry the construction sector holds a very high number of workers from daily laborers to skilled workers because of that many numbers of people's lives depend on the construction industry.

The price escalation of the construction industry greatly affects the sector workers of the construction industry, for example, the contractors, consultants, owners of the project, and other stakeholders of the construction industry. In Addis Ababa sub-city public projects executed by design and construction works many workers get the work opportunity in the city but currently, the construction sector is exposed to unexpected construction material price escalation effect. the cause of construction material price escalation is expressed by many different points of view, for example by the shortage of construction material, shortage of foreign currency, the production of construction material is mostly from outside the country and imported expenses increase, and also the consumption of construction material in the market is very high.

The impact of this construction material price escalation and its effects on the construction industry is very high and exposes the sector participants to an unemployment problem.

Major findings concerning the dominant factors

- ✓ From the analysis, the researcher has tried to present the major findings. From the descriptive analysis, the findings show that cost overrun, inflation, market instability, project delay, contractual problems, profit loss, unfair risk share, and budget deficit are the impacts that cause the effects of project deficit, termination, worker unemployment, owner dissatisfaction, and dispute.

- ✓ The study reveals that in Addis Ababa city public projects are executed by the design and construction works office.

- ✓ The mean score for the independent variables of unexpected construction material price escalation(conflict rise, contractual problem, schedule delay, inflation, claim, cost overrun, market instability, budget deficit, and unfair risk share) **3.96, 4.00, 4.38,4.08,4.26,4.38,4.04,4.05,4.01 and 4.15** respectively. This implies that unexpected construction material price escalation affects the construction industry of public projects of sub-city design and building work projects.

- ✓ The study also found that this unexpected construction material price escalation greatly affects the construction industry participants of contractors, consultants, owners, and other stakeholders of the projects, the final output of this effect is project termination, dispute, worker unemployment, owner unsatisfaction, and project deficit are the major output.

- ✓ The impacts of unexpected construction material price escalation on this study's financial problems of profit loss, inflation, cost overrun, budget deficit, and market instability are the major financial impacts. and also claim, that contractual problems and schedule delays a complex problems, on the other hand, schedule variance and project delay are also time problems in this study. from the SPSS result of the respondent (profit loss, conflict rise, contractual problem, schedule delay, inflation, claim, cost overrun, market instability, budget deficit, unfair risk share) cumulative percent of impacts of each variable are profit loss 52.4%, conflict rises 93.4%, contractual problems =86.7%, schedule delay 52% inflation 81.2% claim 63.5% cost overrun 52% market instability 84.9% budget deficit 67.9% and unfair risk share 74.9% so that the result shows all the above variables have a great effect to the dependent variables.

- ✓ The effects of unexpected construction material price escalation in the construction industry of Addis Ababa sub-city public projects executed by the design and building work office and the SPSS result of the respondent show that the effects of unexpected construction material price escalation are termination,

worker unemployment, owner unsatisfaction, project deficit, dispute are the final effect that greatly affects the construction sector of Adis Ababa sub city public projects. So from the result of the SPSS cumulative percent termination 52.8%, project deficit 60.5%, dispute 77.1% worker unemployment 74.2%, owner unsatisfaction 90.4%, and from the result the effect of unexpected construction material price escalation is determined.

5.2 Concluding remarks

The following are the major conclusions drawn from the study.

- ✓ According to the results of the study, it can be argued that the impacts of construction material price escalation on public projects are inflation, claim, cost overrun, contractual problems, budget deficit, schedule delay, project delay, unfair risk share, profit loss, and market instability are the major impacts of unexpected construction material price escalation. because of that, all the above impacts have a great effect on the construction industry slowing down the sector's growth. this sector contains many different skilled and unskilled workers so the sector is exposed to unexpected construction material price escalation the owner of the project, the worker of the project, and other stakeholders of the project are exposed to many different problems.

- ✓ According to the research, it is evident that the effects of unexpected construction material price escalation outputs are termination, project deficit, dispute, owner dissatisfaction, and worker unemployment. because of the above problems projects are terminated, the need of the project owner is not fulfilled, the workers of the sectors are exposed to the unemployment problem, and disputes arise between the stakeholders of the project, like a contractor, consultant, owner, and sublayer of the projects. all the above problems are the effects of unexpected construction material price escalation. because of all the above problems the construction sector of Addis Ababa sub-city public projects is exposed to many different problems that are expressed in the above and other problems.

- ✓ According to the analysis of responses un expected construction material price escalation impacts explained above happened and the effects of this unexpected construction material price escalation in Addis Ababa sub-city public projects executed by the design and building works office exposed several different challenges. for example, in the city, there are many different types of public project shortage problems example schools, health centers, and recreational centers, and because of that unexpected construction material price escalation problem many projects face termination of the project, worker unemployment because of shortage of budget the project quantity is minimized to complete the project with the specified budget.

- ✓ The study shows that in the last four years construction material price escalation has continuously increased without any limit and the sector was exposed to a shortage of construction materials in the market also stakeholders in the construction industry faced problems executing the project. the construction industry is the backbone of many developing countries' GDP and this sector is exposed to problems in the country's economy and is affected negatively. the construction sector in Ethiopia is a very critical sector for the country's economy and also contains many different skilled and unskilled workers in the sector. because of this, the sector is exposed to problems all of the participants face economic instability.

5.3 Recommendations

As already explained in the literature overview, price increases can occur in various cases. Due to the different uncertainties, it is difficult to rule them out. However, it is possible to minimize the effect and their consequences. Based on the analysis and findings of the study, the following recommendations are made to mitigate the impact and effect of price increases.

Based on the problems identified by the sample respondents' unexpected construction material price escalation in Addis Ababa sub-city public projects, the following recommendation is suggested for controlling this problem. Depending on the findings of the research, the following recommendations are forwarded.

- ✓ Proper communication is required between all stakeholders working on the project to improve understanding of the price increase issue and reduce disagreements. All parties involved must ensure collaboration. This allows you to actively interact with each other so that you can spend your time-solving problems instead of figuring out how to blame the other person. Therefore, a more coordinated effort of training and capacity-building seminars for relevant professionals on the key concepts of price increases.
- ✓ Mechanisms should be put in place to manage price increases based on consultations with consultants and data obtained from contractors, to appropriately anticipate future price volatility, and to share the risk of escalation.
- ✓ The customer must complete project tracking and regular meetings with all involved entities Under the construction of the project.
- ✓ Experienced professionals seriously consider the effect of price increases Determine how the price increase effect is fairly distributed throughout the deployment Corresponding price adjustment clauses in special terms and conditions.
- ✓ The contractor should consider price escalation effects critically before tender submission and should agree on the way that price escalation effects are fairly shared through provisions in the conditions of the contract.
- ✓ During the execution of the project, the contractor should focus on planning (dividing the workflow). Project Manager's Efforts and Leadership Ability Improve effective site management in the utilization and coordination of human resources, Equipment, and materials for a successful project.
- ✓ Governments should encourage domestic and foreign investors to invest capital. Building materials production and the government should start a private enterprise Make it possible to import building materials and equipment that are sufficient in both quality and quantity.
- ✓ The government should provide updated control information continually with current prices, indices, and trends.
- ✓ Contractors should have a thorough detailed market price assessment of construction materials locally and globally to reflect the real cost inputs on their bill of quantities when tendering a project.

- ✓ Government should play an important role in research and development programs The right project cost management tools to help and educate Experts to reduce internal causes of price hikes in the construction industry.
- ✓ Government should attract and motivate local people and create a stable economy The company specializes in producing sufficient quantities of building materials from the region A market to avoid price fluctuations associated with imported building materials.

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ANNEXES

QUESTIONNAIRE SURVEY –

PREPARED FOR CONSTRUCTION CONTRACTORS, CONSULTANTS, CLIENT

"INVESTIGATE THE IMPACT OF UNEXPECTED MARKET PRICE ESCALATION AND ITS EFFECT ON ADDIS ABABA CITY CONSTRUCTION INDUSTRY OF PUBLIC PROJECTS"

PART-1

GENERAL INFORMATION

This research survey is designed to fulfill an academic requirement for an MSC Program in Construction Technology and Management at Addis college. I can assure you that the research data will only be used for academic purposes. The particular mentioning of names will not be required anywhere. Your open and prompt response is highly appreciated.

For any clarification on this questionnaire, please contact the researcher on

+251912-40-64-94 (Beyene Hailu),

The objective of the research

1. To investigate the main causes of price escalation in the construction industry in Addis Ababa city in the case of public projects.

2. To investigate the extent of construction material price escalation in the construction industry in the case of Addis Ababa city public projects.

3. Investigate the frequency occurrence of construction material price escalation in the construction industry in the case of Addis Ababa city public projects.

4. Identify best practices for the handling of construction material price escalation.

Purpose of the research

The unprecedented escalation of prices escalations in the construction industry has caused significant financial hardships for unprepared suppliers, subcontractors, contractors, and owners. Contract losses suffered, projects delayed, or serious disputes resulting from the efforts of construction industry players to mitigate, shift or recoup the financial consequences of these sudden and dramatic price escalations. Yet, it is certain that profits have been lost, relations have been damaged, projects have been impacted, and construction lawyers have been called upon to look for ways to soften or shift the impact of price escalations on their unprepared constructions client. the research used in handling its evaluation, especially on those aspects relating to price escalations is very inadequate. Any information you provide will not be disclosed and will only be used for the analysis of the research. We welcomed your willingness.

1. RESPONDENT'S ORGANISATION PROFILE

Name of organization

(Optional) : _____

Address: _____

Telephone: _____

E-mail address: _____

2. GENERAL DETAILS OF THE RESPONDENT'S FIRM

(Please tick the appropriate answer, you also provide your answers in the spaces provided)

1. Occupation:

□Site engineer □ project manager □ consultant □quantity surveyor □ Other

2. Type of your organization

□ Consulting firm, please specify your grade_____

□ Contractor, please specify your grade_____

□ Client (the project owner) _____

3. When was your firm established?

□ More than 20 years

□ 11-20 years

□ 6-10 years

□ 1-5 years

□ Less than one year.

PART-2

2. **What are the impacts of construction material price escalation problems in the Addis Ababa sub-city design and building work office construction of public projects?**

   1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

no	impacts	**1**	**2**	**3**	**4**	**5**
1	Profit lose					
2	Conflict rise b/n the stakeholders					
3	Contractual problems					
4	Schedule delay of the project					

5	inflation					
6	Claim					
7	Cost overrun					
8	Lack of firm price quotes					
9	Market instability					
10	Budget deficit					
11	Unfair risk share					

2.1 Which party is majorly impacted by price escalation in the construction industry of Addis Ababa sub-city design and building work public projects?

1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

parties	Degree of impacts				
	1	**2**	**3**	**4**	**5**
Contractor					
consultants					
End users					
Regulatory bodies					
supplier					

PART-3

3. **What are the effects of construction material price escalation in the Addis Ababa sub-city design and building works of public projects?**

   1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

effects	Degree of effects				
	1	**2**	**3**	**4**	**5**
Project termination					
Project deficit					
dispute					
worker unemployment					
owner unsatisfaction					

3.1 On which party is the effect of price escalation majorly shown in the construction industry of Addis Ababa sub-city design and building work public projects?

1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

parties	Degree of impacts				
	1	**2**	**3**	**4**	**5**
Contractor					
consultants					
End users					
Regulatory bodies					
supplier					

3.2 Based on the current condition of our country especially in Addis Ababa sub-city public projects what is the level of price escalation led to great effect (choose and thick (√) tour answer,)

1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

no	effects	**1**	**2**	**3**	**4**	**5**
1	Project deficient					
2	Dispute					
3	Unemployment					
4	Owner unsatisfaction					
5	Project termination					
6	Lose of end users b/c of					

	delay					
7	Interest loss of the client and contractor					
8						
9						
10						

PART-4

4.1 To what extent does the construction material price escalation affect the construction industry of Addis Ababa sub-city design and building work since 2010-2014 EC? rate according to the table.

Very high effect (5), High effect (4), medium (3), high effect (2), very high effect (1)

S/N		**1**	**2**	**3**	**4**	**5**
1	**materia**l					
1	Cement					
2	aggregate					
3	sand					
4	Finishing material					
5	Reinforcement bar					
6	mechanical and					

	sanitary					
7	electrical materials					
2	**Labor**					
	Skilled					
	Unskilled					
3	Equipment					
4	**Overheads**					

PART-5

5. **What are the best practices for handling the adverse effects of materials price escalation on the construction industry?**

1. very low effect 2. low effect 3 medium effect 4. High effect 5. Very high effect

s/n	**Tools used to mitigate price escalation**	**1**	**2**	**3**	**4**	**5**
1	Adoption of value engineering concept					
2	Comprehensive and error-free designs and specifications					
3	Effective human resource management					
4	Improved financial utilization of contractors					

5	Maintenance of control and effective administrative system					
6	Accelerate design time					
7	On-time payments of funds					
8	Use contracting procedures that shorten the overall design– award–award-construction time					
9	Applying early corrective action					
10	Timely documentation					
11	Understanding project requirements and needs					
12	Minimizing variation					
13	Good leadership skills					

6. Is there any available link or strategy to minimize the effects of materials price escalation on Addis Ababa sub-city design and building works of public projects? Pleasecommentfreely_____

_____

_____

_____

6.1. If yes, which of the methods do you use to accommodate the price escalation effect?

a) Introducing risk factor _____

b) Conducting risk analysis for planning _____

c) Adopting high-profit margin _____

d) Other methods (please specify) _____

_____

_____

6.2. If No, why?

_____

_____

7. which impact is more pressure on Addis Ababa city public projects? please put your view.

_____