ST. MARY'SUNIVERSITY
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ASSESSING CONSTRUCTION MATERIALS PRICE ESCALATION OF BUILDING PROJECTS: IN THE CASE OF SELECTED HIGH RISE BUILDING PROJECTS IN ADDIS ABABA.

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JULY, 2023
ADDIS ABEBA, ETHIOPIA

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DECLARATION

I, Bethelehem AdmasuAygota declare that this thesis is my original work, prepared under the guidance of my advisor Dejene Mamo (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or full to any other higher learning institution for the purpose of earning any degree.

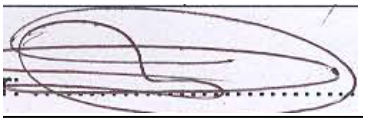
Bethelehem Admasu Aygota _____

Name signature

St. Mary University, Addis Ababa Ethiopia July, 2023

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduates for examination with my approval as university advisor.



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St. Mary's University Addis Ababa Ethiopia July, 2023

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APPROVED BY BOARD OF EXAMINERS

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LIST OF ABBREVIATIONS

GCC: General Conditions of Contract

GDP: Gross Domestic Product

MoWUD: Ministry of Works and Urban development

PPA: Public Procurement Authority

PPPAA: Public Property and Procurement Administration Agency

SCC: Special Conditions of Contract

UN: United Nations

ETB: Ethiopian Birr

FIDIC: Federation International des Ingenious-Conseils

CPI: contract price Improvement

ERA: Ethiopia Road Authority

SBD: Standard Bidding Document

CSA: Central Statistical Agency

ABSTRACT

The aim of this study is to identify the major factors of prices escalation of construction materials, its effect on building project and assessing the current price escalation management practice. This study employed a multiple case study and focused on four selected high rise building projects. Taking into account the nature of the objectives and research questions, the study used descriptive case study design and qualitative approach. This study investigated using primary and secondary data. Focus group discussion, interview and document study was performed to collect qualitative data. Qualitative analyses mainly content analyses were used to interpret, summarize the data and to find the implications of the result. The result indicated that the major determinants/factors to price escalation of construction materials are inflation, devaluation of local currency, Monopoly and unethical practices of suppliers, Political instability,high costs of fuels, and shortage of dollars, lack of proper planning, scarcity of building material and Over-dependence on imported building materials. The impacts of escalation on project involves higher project cost, project delay, profit loses, project abandonment,delay payments to contractors, investment return is delayed and high rental cost. The major challenges in price escalation and adjustment practice were: not applying price adjustment clauses for projects contract duration not exceeding 18 months, timely recorded data were not available, non-consistency in market price, Contractors failure to follow the proper contractual procedures for requesting Price Adjustment and the Clients` resistance in honoring the escalation clauses in special condition of Contract. It's recommended that CSA and PPPAA to set up a suitable data base for regularly record, updating, and disseminating monthly price indices for the main building materials.

KEY WORDS

Price escalation, price adjustment, construction materials, contract form, building project, ETHIOPIA

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Construction is defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams, etc. (UN, 1996).“The construction industry is vital for the development of any nation. In many ways, the pace of the economic growth of any nation can be measured by the development of physical infrastructures, such as buildings, roads and bridges. Construction project development involves numerous parties, various processes, different phases and stages of work and a great deal of input from both the public and private sectors, with the major aim being to bring the project to a successful conclusion”(Takim & Akintoye, 2002).

According to Mathews (2009), the building sector involves the construction of residential, commercial, industrial and institutional buildings. The building sector in construction industry is very crucial in any nation’s social and economic development. There are many factors responsible for this. Apart from the sector’s potential with respect to employment generation, the various activities undertaken in the sector are very important to fostering effective sectorial linkages and enhancing, as well as sustaining economic development.

Construction industries in Ethiopia are parts of the country’s development initiative. It shared considerable amount of the country’s scarce financial resources. In Ethiopia, the construction industry is the highest recipient of government budget in terms of government development program. Consequently, construction industries consume an average annual rate of nearly 60% (MoWUD, 2013).

Building construction sector has a significant influence in the development of Ethiopian economy. It has provided employment for different categories of employees, especially in major cities where construction activities have been immense. Building construction projects can be categorized as private and public based on ownership of the projects. Private building projects are owned and financed by private individuals or organizations. Public building construction projects are however owned and financed by public bodies (Dinkayehu, 2019).

High rise building is the major component of the sector. High rise building is a multi-story structure where the majority of occupants use elevators or escalators to reach their destinations Buildings of 20 to 50 stories have been constructed in Addis Abeba since recent time and they are transforming the skylines of our capital city. In Ethiopia, a building between 35 to 150 meters, generally 12 to 50 stories, is considered as high-rise (MoUDC, 2019). According to Emporis (2019), Addis Ababa has 101 Buildings which are considered to be high rise buildings that have total height of more than 45 Meter. In addition to these high-rise buildings being constructed, there are also more than 20 building under construction and new ones are being proposed and in progress.

The construction of high-rise buildings in Addis Ababa is increasing rapidly nowadays. It is constructing for residential, office, hotel, commercial and mixed used purpose. high rise building construction needs specialized professionals to design, to construct, and to manage; highly mechanized equipment's; and the large amount of budget to perform, most of high rise projects in Addis Ababa city are not completed within the specified time and limited budget (Mosie, 2022).

Therefore the construction industry is a crucial part of the economy and has a significant effect on the efficiency and productivity of other industry sectors. However, due to economic risks and uncertainty, the costs of materials, labor, and equipment frequently change, which makes it difficult for the contractors and the employers to estimate, bid on, and finance construction projects (Kassa, 2017). Tarekgn (2017) explain Cost overrun in general and price escalation in particular are more common to the construction Industry. The complex nature of the construction projects specially those mega projects makes the construction environment highly disposed for cost overrun and price escalation. On the other hand, there is a great opportunity for these effects to become causes for further complications in the process.

A construction project is commonly acknowledged as successful, when it is completed on schedule and within the agreed budget, with the highest quality and in the safest manner, in accordance with the specifications and to stakeholders' satisfaction. Among the major inputs, which affect the successful completion of the project, are construction materials which account about 65% of the project cost. There is a continuous rise in market price of construction materials, machinery and labor and also unsteady, inarticulate and accelerated escalation of

construction material price in Ethiopia (Dinsa, 2015). Escalation in the price of these materials affects not only the project cost but also the delivery time and delivery as per the technical specification. Hence, this study aims to identify the major contributing factors to price escalation construction materials, construction material price escalation effect on building project and the current practice of price escalation and adjustment practices of building projects.

1.2 Problem of statement

The prevailing unpredictable and erratic price fluctuations of materials, labor and equipment and less satisfactory practice of compensation are the major hindrances in the growth of the Nigerian construction industry; thus, the situation makes project owners sustain losses and suffering that could result therein (Iya & Aminu, 2014). Kaming et al. (1997) cited in Oghenekevwe et al. (2014)stated that inflationary increases in material cost are the major cause of construction cost overruns in Nigeria.

According to Asteway (2008), unpredictably occurring sharp price increases cause contractors to fail to complete their projects within the planned cost margin for them as well as within the client's acceptable margin of time and quality. Asteway (2008) describes that in recent years, the price fluctuation of construction inputs in Ethiopia has become severe and unforeseeable.

Mossa (2013) also studied the causes for price escalation and its effect on federal road projects focusing on project cost. Price escalation is observed as a major problem, which hinders project's progress, since it decreases the contractor’s profit leading to huge losses leaving the project in a big trouble.

Dinsa (2015) studied the causes and effects of price escalation of federal road contracts in Ethiopia focusing at tender stage. In addition, Zewde (2018) studied the effect of birr devaluation on public buildings construction in Addis Ababa. He considered the price escalation of different construction materials due to birr devaluation only and the consequential effect on project performance. Dinkayhu (2019) also studied the effects of escalation in price of steel on public building construction projects in SNNPRS. The focus was only on steel price escalation and overall effect on public construction projects. The researchers assess the effect of price escalation on the project and identify factors that cause the price escalation.

According to Hardlio (2020), the impact of price escalation on project Cost, Time and quality performance is very high. Price escalation causes poor cost, time and quality performance. Its impacts could also be cash flow problem of projects, project expenses will be larger than incomes as time elapses, shortage of allocated budget would occur at final stages of the projects, cancelation of project contract, dispute among parties, profit loss. The impact of price escalation on quality performance is indirect which is manifested through the impact on cost and time.

Prices of building materials have risen steeply in the last years. Materials are not available adequately in the market and since payment for any imported material has to be made in foreign currency, which will lead to increased cost of construction and makes inactive most of the construction projects. The deficiencies and market price fluctuation of construction inputs directly affect contractors and owners. The occurrence of frequent and unpredicted price increases in construction inputs may lead contractors into failure to complete projects within the planned cost for themselves, within the planed accomplishment date and quality for the client.

Due to inflation the building material prices, labor wages and machinery hire rates changes every year, resulting in the project's initial budget being deviated from the final budget. Most of the time projects are not completed within the planned time, budget and also sometimes within specified quality as that time and cost inflation is considered as a big problem. For that it is the key importance to exert the most effort to accomplish such study, to detect the previously mention factors and so giving specific priorities in order to avoid the problem of price escalation of construction materials at building construction.

1.3 Objective of the study

1.3.1 General Objective of the Study

To assess the price escalation of construction materials of building project; in the case of selected high rise building projects in Addis Abeba.

1.3.2 Specific Objectives of the Study

1. To assess the current Price Escalation and adjustment practices of the selected building projects.
2. To identify factors causing price escalation of construction material in the case of selected high-rise Buildings projects in Addis Ababa.

3. To identify the effects of construction material price escalation on the building projects the case of selected high-rise Buildings projects in Addis Ababa.

1.4 Research Questions

1. What are the current price escalations and adjustment practices in building projects?
2. What are the factors causing construction materials price escalation of building project?
3. What does the effects of price escalation of construction material on building projects?

1.5 Significance of the study

The study was conducted to assess construction material price escalation of building project. The finding of this research may have its own contribution on identifying factors causing material price escalation and the effects of price escalation of construction material on building projects. It supports clients, contractors and consultants to know in advance that there is a probability of price escalation problems occur in the sector and to consider applicable compensation measures in the contract document and also creates awareness to reduce its effects once the problems occur. The research helps to improve the capacity and competency of project implementation processes in the construction industry. It is also helpful to give the way forward and lessons to be learned.

1.6 Scope of the study

The study assesses the price escalation of construction materials of building project, in selected high rise building projects, in Addis Ababa. Only Addis Abeba included geographically in this study. The study focused on four building projects, all of the projects were ongoing and among the four two have completed the structural work that selected to represent the different building construction projects as they were huge projects. This study does not cover all of the construction-related industries; it focuses on the building construction industry, particularly high rise building projects, in the Addis Abeba city. The research in this area is restricted to assess price escalation effects, factors cause the escalation and the current price escalation and adjustment practice. The scope of information was obtained from focus group discussion, In-depth interview and document review of exiting building construction project.

1.7Limitation of the study

This study is limited to few projects and focused in identifying factors causing price escalation, its effects on building projects and assessing the current price escalation and adjustment practices. Due to the accessibility of construction documents and reluctance of stakeholders to provide data related the project; the case study was limited to four case project for which the project documents were accessible. The methodology considers only the project team members (clients, consultants and contractors) working on the four projects.

1.8 organization of the study

The research is divided into five chapters, the first of which highlights the overall purpose of the study, including the background of the study, the statement of problem, the objectives of the study, research questions, the significance of the study, the scope and limitations of the study, and the organization of the study. The following Chapter deals with the Literature review, which discusses the empirical and theoretical study in detail that conducted previously by different researchers. The third chapter presents the methodology section, which includes the methods and techniques that will be used in data collection, analysis, and interpretation. The fourth chapter presents the data analysis and discussion, which briefly elaborates the data collected in the chapter three. Conclusions and Recommendations are presented in the final chapter. According to the analysis, we will summarize the effects of price escalation of construction materials on building project in this section. In this regard, we will make recommendations to minimize or avoid the problems.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical reviews

2.1.1 Construction industry

Construction is defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams, etc. (UN, 1996).The construction industry makes its direct contributions to economic growth by providing the basis upon which other sectors can grow by constructing the physical facilities required for production and distribution of other goods and services i.e., the sector indirectly stimulates other sectors through economic multiplier effects and makes a significant contribution in terms of conserving and generating foreign exchange. This latter contribution has implication for the economic development trends of most developing counties (Kasiem, 2008).According to Abadir (2011), the construction industry make available all infrastructure facilities needed for development such as road, telecom, electricity, power projects, and socioeconomic facilities such as school, hospitals, factories etc. Hence, the role of the construction industry in the growth of nations' economies across the world is very crucial.

The industry also employs a large proportion of the civilian work force in countries at all levels of economic and social development and in that way, it affords income earning opportunities and helps in the improvement or acquisition of skills as part of the direct benefits of the sector. The industry is likely to provide from 6 to 10 percent of total employment in most of the developed countries and from 2 to 6 percent in developing countries (Kasiem, 2008).

According to Abraham (2004), the construction industry is one of the major development constraints in developing countries. This is mainly because; developing countries are considerably dependent on the growth and development of their physical infrastructures.

Construction industries in Ethiopia are parts of the country's development initiative. It shared considerable amount of the country's scarce financial resources. In Ethiopia, the construction industry is the highest recipient of government budget in terms of government development

program. Consequently, construction industries consume an average annual rate of nearly 60% (MoWUD, 2013).

Hardilo (2020) also discussed that the importance of the construction sector in terms of its contribution to national economies is easily noticed and measured with its contribution to national GDP and employment prospects. Like any developing country the construction industry in Ethiopia plays a major role and contributes highly to the development of the economy of the country. Next to agriculture, the industry provides one of the largest employment opportunities. The economic impacts of construction industry on national economies can be well felt with increased number of successful projects. Besides the growth and contribution to economy, the Ethiopian construction industry, like most construction industries in developing countries and worldwide, faces several problems and challenges that directly affect the performance of its construction projects. There are many factors that affect the overall performance of a construction projects. Project success measured in terms of completing the project within the cost, time, scope, quality, resources, and risk constraints agreed upon by the project managers and senior project management however it's not noticed in Ethiopia construction industry in most case.

2.1.2 Construction Project Performance

Project success can be defined as meeting goals and objectives as prescribed in the project plan. A successful project means that the project has accomplished its technical performance and maintained (Yaw et al., 2003).Performance can be considered as an evaluation of how well individuals, groups of individuals or organizations have done in pursuit of a specific objectives (Ankrah & Proverbs, 2005 cited in Hardilo, 2020). These objectives differ significantly, but from the viewpoint of an industry or an organization, they typically center on meeting the expectation of the main stakeholders, including the public sector, the government, the general public, and the various suppliers.

Numerous performance indicators could be related to different dimensions, including time, cost, quality, client satisfaction, client changes, business performance, health and safety, which can be used to measure and evaluate project performance (Cheung et al., 2004).

Cost, time, and quality are the three fundamental and crucial performance indicators in construction projects, according to Chan (2001), although other performance indicators like safety, functionality, and satisfaction were said to be attracting more attention.

Success of construction projects depends mainly on success of its performance. Several nations at various stages of socioeconomic development have become concerned about the issue of performance measurement or assessment as they have come to understand the need to enhance the performance of their construction industries (Kingsley, 2010).

The level of success in carrying out construction project development activities will depend heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risk management, the business environment, and economic and political stability (Takim & Akintoye, 2002).

2.1.3 Construction material

Building material is any material which is used for construction purposes. Many naturally occurring substances, such as clay, rocks, sand, and wood, even twigs and leaves, have been used to construct buildings. Apart from naturally occurring materials, many manmade products are in use, some more and some less synthetic (Oxford, 2009).

Building materials are the major inputs to the construction process of these building projects. Building materials play an important role in constructing structures. No construction activity is possible without the use of building materials. Building materials contribute enormously to the quality and cost of public building, from substructure (foundation) to the superstructure as well as materials for roofing and finishes. Hence, the cost of building materials poses a significant threat to the building sector (Anosike, 2009).

Akanni et al. (2014) stated the vital role that building materials play in the construction industry as they are those materials put together in erecting buildings and construction project is not feasible without the utilization of building materials. Akanni et al. (2014) also emphasized on the fact that building materials play an incontrovertibly noteworthy role in the delivery of construction projects and hence remain the most extensive input in project development. Materials, while being an essential resource in the building construction sector, constitute about 60 percent of the total cost of building (Omange & Udegbe, 2000). Windapo and Cattell (2012)

indicated that the huge percentage of building materials that make up to the total cost of construction project costs make it a critical constituent with a substantial effect on the cost of construction and fundamentally the affordability of construction projects.

2.1.4 Definition of price escalation

Price escalation/fluctuation can generally be defined as the rise or fall of the price of goods, materials, and services on the markets. Price fluctuation can occur at any market, i.e. at international markets, local market and/or at the labor market (Stukhart, 1982). Price Escalation is an increase in the cost of any construction elements of the original contract and base cost of a project due to passage of time (Williams et. al., 1999).

Lock (2003) defined Price Escalation is the increase in any element of project costs when the cost of that element is compared between two different periods. Escalation is defined as the increase in the cost of construction elements (labor, equipment, and materials especially fuel, cement, reinforcement bar and bitumen) required for original contract works occurring during construction. According to Hardilo (2020), price escalation is defined as an increase in the price of materials due to continuing price changes over time. Gashaw (2015) stated that price escalation is defined as an increase in the cost of equipment, material, labor, etc., due to continuing price changes over time. Dinkayehu (2019) defined price escalation is an increase in the price of materials and particularly steel due to continuing price changes over time.

Escalation is an increase in cost due to upward changes in prices due to changes in market conditions. Because costs typically increase over time, escalation rates must be developed for future forecasting purposes. Though less common, escalation rates can be negative as well, reflecting decreases in one or more prices. In another way escalation can also be defined as the change in price, over given period of time, of goods and services operating in an economy. Construction price escalation is therefore understood as the situation when the money required to construct a project exceeds the original budgeted value (Bhosale & Khatri, 2017).

Most researchers used interchanged terms like price escalation, price overrun, cost escalation and cost overrun. The preferred term for this research is price escalation, which can be defined as difference in the price of materials at contract signing and completion stage of the project as a result of an increase in the cost of labor, materials, equipment, and other production factors and ongoing price changes.

2.1.5 Construction contracts and price adjustment

According to the GCC of the PPPAA SBD for procurement of works (2011), a contract means the binding contract agreement entered into between the Public Body and the Contractor, comprising Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein. According to Article 1675 of the Civil Code a contract is an agreement whereby two or more persons as between themselves create vary or extinguish obligation of a proprietary nature. This definition is applicable to construction contract since it fulfills all the elements given in the definition. Construction project cost estimation is directly impacted by the type of contract used, and compensation for price escalation is likewise directly impacted by the type of contract used.

Price adjustment is a method of transferring the risk associated with increasing material prices from the contractor to the contracting agency (Brown, 2011).The idea behind contract price adjustment is to compensate the contractor or the employer in case of rise and fall of labor and/or materials or any change in legislations. This enables the contractor or the owner to be protected against price fluctuation that may occur between the contract signing and execution. There are a number of methods of calculating such contract price adjustment (CPA). To adjust price fluctuations there are two alternative methods commonly employed in the local context to determine such variations practiced in the construction industry? These methods are “Basic Prices” or proven cost method and “Price Indices” or Improvement formula Method (ERA, 2006).

2.1.5.1 Basic Price/Proven cost Method

In using base date prices, the difference between the current date prices and base date prices will be established for each items allowed for adjustment.

In applying this method the Contractor is required, in his bidding document, to list those elements of his costs which he requires to be subject to contract price adjustment. In support of this he includes a list of the actual costs and suppliers of the various elements which he based his tender. When the Contractor purchases these materials he presents proof of the actual price paid and receives compensation for the difference between the "Basic Cost" and the "Actual" invoiced cost of those same items. It is therefore important to ensure that all purchases are from the

suppliers identified at the time of the tender. Any change in suppliers is likely to result in an invalid comparison of prices and accordingly over compensation (ERA, 2006).

When using this method, that the Client verify the authenticity and reliability of the suppliers and prices quoted as the base prices. Any change in supplier is likely to result in different base prices, which will complicate the calculation of contract price improvement (CPI). It is not the preferred method by the Employer as it has the potential for abuse by: under quoting base prices, over invoicing current prices and changing suppliers.

According to Mohammed (2013), it is crucial that the Employer confirms the authenticity and reliability of the suppliers and prices listed as the base prices when employing basis prices method. Any supplier change is likely to lead to new base prices, which will make calculating the contract price adjustment more challenging.

2.1.5.2 Indices/Formula Method

For rise or fall in the cost of labor, good, and other inputs into the Works, the amount due to the contractor shall be adjusted by the addition or deduction of the amounts specified by the adjustment formula**.**

This method uses a mathematical model of the construction contract to calculate the contract price Improvement (CPI). The Client develops the model by identifying the items of greatest expenditure and combining these with statistically derived indices, which indicate the changes in the cost of these items (Tarkegn, 2022).With this method the works, to be undertaken, are mathematically described in a formula. The formulae are based on price indices for material, fuel and the consumer price index published by the central statistics office in its monthly statistical release. The similar formula is used to determine permitted labor increases using the difference between the registered employment agreement hourly rate at the Base Date and the current registered employment agreement rate. The formula contains a number of factors representing the various elements of the project at the time of tender and a number of similar factors for the various elements of work at the time that the works are undertaken. By using these factors in the formula, a percentage increase in the tendered value of work done is obtained and the amount resulting from this represents the CPI due to the Contractor (ERA, 2006).To address these problems, the MoWUD 1994, PPA 2006 and PPPAA 2011 form of contracts provide an

adjustment formula for price escalation (Mohammed, 2013).The circumstances under which the adjustments are allowed and the extent of their application differ from one contract condition to another. In the case of Ethiopia, the contract condition used in the past and the current conditions of contract provide such escalation clauses with varying preconditions and application.

Table 2.1 presents the provisions in the price adjustment clauses of the MoWUD (1994), PPA (2006), FIDIC (2006) MDB and PPPAA (2011) conditions of contracts.

NO.	Condition of contracts	Clause	Description of Price Adjustment Clauses
1	MoWUD (1994)	70	**Changes in Cost and Legislation** The contract price shall be deemed to have been calculated as described below and shall be subject to adjustment in the following circumstances: ➢ The rate contained in the priced Bill of Quantities are based upon the rates of wages and other emoluments and expenses applicable at the site date of bid pricing. ➢ If the said rates of wages and other emoluments and expenses are increased or decreased by any Act, Statute, Decree, Regulation and the like after the said date of bid pricing, then the net amount of the increased or decreased of the emoluments and expenses shall, after due consultation. ➢ Net difference of costs shall be payable in addition to or deduction from the contract price, ➢ The contractor shall give written notice, ➢ The adjustments are calculated with reference to date of bid pricing.
2	PPA 2006	47	**Price Adjustments**

			➢ Prices shall be adjusted only for fluctuations in of costs the input only if provided in the SCC. ➢ These inputs have to be proposed and submitted by the Contractor along his bid and is subjected to the approval of the engineer. ➢ It would be applied only if it is provided in the special conditions of contract. ➢ Provisional of each cost element (labor, materials, equipment usage, etc) are net of provisional sum. ➢ Price adjustment of cost elements are made in comparison of their current cost at the time of the adjustment with their Prices at the date 28 days prior to the deadline for bid submission. ➢ The sources of indices shall be those listed in the contractor's and approval by the engineer. ➢ Price adjustment is recommended for contracts having completion time exceeding 18 months
3	FIDIC (2006) MDB	13.8	**Adjustment for Changes in cost** The formula is the same as that of the PPA, and the application is also similar to it except some additional clarifications as described below. If the contractors fails to complete the works within the time of completion, adjustment of price thereafter shall be made using either: ➢ Each index or price applicable on the date 49 days prior to the expiry of the Time for Completion of the Works, or ➢ The current index or price: whichever is more favorable to the employer the weightings

			(coefficients for each of the factors of cost stated in the table(s),so adjustment data shall only be adjusted if they have been rendered unreasonable, Unbalanced or inapplicable, as a result of Variations.
4	PPPAA (2011)	62	**Price Adjustments** ➢ Request for price adjustment in relation to a particular work items under this Contract may be filed by the Contractor after twelve (12) months from the effective date of the Contract where it is verified that the performance of the contract requires more than 18 months, which adjusted price takes effect as the new Contract Price in relation to that work item on the expiration of 30 days from the date on which the Public Body receives notification of that adjusted price from the Contractor, unless another date is agreed in writing between the Parties. ➢ Price Adjustment shall be applicable as payable in full for the original scheduled completion period. ➢ Unless specifically stated otherwise in the Contract, the basis for compensation will be only those categories of inputs, which are specifically listed as specified items in the SCC. ➢ Contractor shall submit to the Public Body for review and approval all calculations and supporting information necessary to determine the price adjustment. ➢ The fraction for each specified element and exact combination of elements that will be applied in the

			formula for price adjustment shall be determined in the SCC.

2.1.6Factors Causing Price Escalation of construction material

According to Morris (1991), the causes of price escalation in construction projects are varied, some of which are both challenging to predict and handle. Accordingly, many scholars studied and discussed several factors leading to escalation in price of building materials in their perspective.

Devaluation of local currency is one of factors identified by many researchers. The study of Ughamadu (1993) cited in Dinkayehu (2019), asserts that one of the factors that escalated the cost of construction in Nigeria was devaluation of the local currency. He indicated that the devaluation of Nigeria currency would increase cost of production where there was no substitute for imported materials. This is supported by the assessment of Makoju (1995) stating the substantial devaluation of Naira had contributed to the cost of procurement of construction resource with manufacturers hiking the prices of their products.

The proportion to which building material costs are influenced by exchange rates relies on the type and quantity of material being imported by a country at a particular time, the necessity to import the raw materials used in the production of building materials locally, and on whether or not local materials (such as copper, timber and steel) are internationally merchandized commodities (Windapo & Cattell, 2012). A study conducted in Nigeria shown that, about 50 percent of the building materials and components incorporated into construction or parts of the materials ingredients required for the manufacture of the materials are sourced from overseas and this brings to closer attention the issue of foreign exchange and its inherent problems in construction industry and the need for local sourcing of building materials (Tarekgn, 2017).

Fetene (2008) discussed that during periods of high development where the level of construction activity is unusually high in a particular region; there may be shortages of some construction materials. Sometimes the local market may not be able to supply the full demand of these construction materials; hence, a need may arise to import these construction materials from abroad. If this was not anticipated in the original cost estimate, delays may occur and/or the

prices of these elements may increase which consequentially lead to delay and cost overrun for the project.

Dinkayehu (2019) also discussed that over dependence in imported materials and shortage of locally manufactured materials are among the factors that are indicated in studies dealing with material price escalation. The prices of materials react to market circumstances by the economic law of supply and demand.

Inflation is one the most reputable factors leading to price escalation of building materials as depicted by several studies. However, Windapo and Cattell (2012) explained that there is a time interval between increases in inflation in advance of bringing about in definite increase in the cost of building materials. Nega (2008) pointed out that due to the nature of the process and the rate of return for work carried out on construction projects, the effects of inflation can mean loss of profit to contractors and higher cost overrun to project owners.

The longer the expected construction period, the more account will need to be taken of expected inflationary price increases over time. Initial cost estimates will need to allow for the value that will need to be paid at the time the project actually goes ahead. Inflation can act to increase the original estimates of construction costs. Inflation may have been taken into account in the original estimates, but if the rate of inflation increases above the predicted level during the construction period, then the original cost estimate will be exceeded. Obviously any other factor that delays a project will expose the project to the risk of further inflationary cost increases (Gashaw, 2015).

Researchers in Gashaw (2015) discussed that Poor estimating can lead to project cost underestimation. Estimate documentation must be in a form that can be understood, checked, verified, and corrected. The foundation of a good estimate is the formats, procedures, and processes used to arrive at the cost (Arditi et al., 1985). Poor estimation includes general errors and omissions from plans and quantities as well as general inadequacies and poor performance in planning and estimating procedures and techniques (Merrow, 1988). Errors can be made not only in the volume of material and services needed for project completion but also in the costs of acquiring such resources (Harbuck, 2004; Carr, 1989).

Flyvbjerg et al. (2002) and Molenaar (2005) cited in Turkey (2011) discussed in developing countries lack of proper planning can contribute to the discrepancy of supply and demand. This leads to shortage of construction materials as the demand will exceed the supply, which in turn leads to a climb in the cost of construction materials; this inevitably gives rise to project cost escalation, with consequential effects on inflation and a decline on efficient activity in the construction industry.

Another study done among capital projects in Ghana has identified five top factors responsible for cost overrun. These factors were price fluctuations, late material delivery, changes in the scope of work, fluctuations in the market demand, and changes in design Tamhankar et al. (2018).

The current high volume of construction is creating a high demand for skilled construction workers. Labor shortages can have severe consequences especially sectors like construction, given the inter-relatedness of the production process and the backward and forward linkages that are involved (Henson &Newton, 1995). The shortages of skilled labor increase the contractor's risk, by increasing the likelihood of delay. The most obvious and direct consequence is that the construction job does not get started or completed in a timely fashion (Gashaw, 2015).

Bimpe (2017) pointed out many factors such as the change in government policies and legislations, scarcity of raw building materials, fluctuation in the cost of fuel and power supplies, inadequate infrastructural facilities, unfortunate corruption, fluctuation in the cost of plant and labor, and seasonal changes as being factors responsible for the escalating cost of building materials.

Other factors responsible for the escalation in price of building materials identified by researchers are these: fluctuation in the cost of transportation and distribution, political interference, local taxes and charges, fluctuation of cost of raw materials, cost of finance, inflation, and fluctuation in the exchange rate. Moreover, Oladipo and Oni (2012) analyzed some macro-economic indicators impacting the cost of building materials, which include the following: exchange rate of local currency to other currencies globally, inflation rate and interest rate charge on loans.

2.1.7 Effects of Price Escalation of construction material on building projects

Effects are the outcomes that will be experienced when price escalation occur on a construction project. 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, future price escalation, and the absence of price escalation clauses in most construction contracts, often leads to higher contract prices and larger project costs (Pearl, 1994).

According to Van der Schans (2005), the impact of price escalation is being felt in the public construction sector. For public projects, substantial price increases present exceptional problems. In several projects, between the time budget was approved by the financers and the time bids were received for construction projects, material prices increased significantly and bids came in at prices much further than the approved contract amounts. Public bodies are then confronted with the alternatives of keeping projects on hold while additional funding is pursued, withdrawing the project if additional fund is not available, or make an attempt to reduce the project scope.

According to the study by Asteway (2008), indicated that the price fluctuations that occur unpredictably have impact both on the capacity of the contractors to undertake their projects and on the overall performance of the project itself. It indicated that such price fluctuations result in delay of the projects. In addition to the delay, it was also found out that cash flow problem of contractors, profit loss and poor quality output may result as a result of unpredicted price fluctuation. Therefore, it can be understood that price fluctuations can result in poor project performance by delaying project time, by increasing the project cost and by making contractors deliver poor quality projects (Asteway, 2008).

Fetene (2008) states that cost overruns have obvious effects for 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 inability to deliver value for money and could well tarnish their reputations and result in 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, bad reputation, and inability to secure project finance or securing it at higher costs due to added risks.

The study of Fetene (2008) further identified the following as the major effects of cost overruns: delays during construction, supplementary agreement, additional cost, budget short fall, 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 budget short fall of the client and poor quality workmanship.

Escalation in the price of building material is destroying the construction industry as numerous contractors are incapable of precisely predicting anticipated profit on the project, a circumstance that has contributed to laying-off of workers and closure of companies in some extreme cases (Ayodele & Alabi, 2011).

According to study by Akanni et al. (2014), possible effects that escalation in the price of building materials have on delivery of construction projects were identified as: fluctuation in cost of construction; project abandonment; completion at the expense of other projects; delay in progress of project works; other valuable projects not being commissioned; rate of unemployment of construction workers; poor workmanship due to inadequate materials to use; low quality local materials; and hindered implementation of innovation in construction.

Akanni et al. (2014), in their study of the implications of the rising cost of building materials in Nigeria, identified fluctuation in construction costs as the most important effect of increase in the price building materials. The study illustrates that the cost of constructing the same building is swiftly rising due to increase in the price of building materials. Abandonment of a construction project refers to ceasing every work or suspending the project for a long duration. Their study also explains that an upward review of contract amount leads to conflicts between contractors and clients, probably resulting in cases of abandonment where investments are tied down, since such project will not be ready for use at the expected time.

Vamsidhar et al. (2014) indicated that price escalation results delay in construction projects, reduced scope of projects or projects being cancelled. Escalation clauses could also affect public

projects negatively due to the fact that prices being submitted are not being guaranteed during long period of time.

Due to escalation fears, clients are finding fewer numbers of bidders for their projects. Hence, some projects need finding alternatives financial sources or canceling the project if additional money is not at hand. Contractor and supplier fears concerning probable price escalation and the lack of price escalation clauses in most construction contracts, usually leads to higher contract prices and larger project costs (Vamsidhar et al., 2014).

2.1.8Managing price escalation

Understanding the factors that drive escalation is crucial in order to measure or manage escalation on construction projects. This is especially crucial in the current situation, where price fluctuations have been so volatile that it has been difficult to foresee or estimate what bid prices would actually be (Peter & William, 2006).

Reichard (2014) discuss that mitigating the effects of price escalations should start in the bidding process. During the bidding phase of a project, contractors, subcontractors, and suppliers should identify which materials are most susceptible to price volatility and discuss them with the upstream contracting party. Downstream contractors and suppliers also should be wary of bidding requirements which require them to bear the sole risk of any price escalations and should modify their standard bidding forms and proposals to include general price escalation clauses.

The best way to mitigate risks associated with material cost volatility is to include price escalation provisions in your contracts. There are many different types of price escalation provisions that can be included in a construction contract, but the three most common types are: (1) any-increase escalation clauses, (2) threshold escalation clauses, and (3) delay escalation clauses (Reichard, 2014).

Gashaw (2013) explain that a variety of different factors work together to increase costs in the construction market. Many of the strategies will necessitate novel approaches to construction design and procurement as well as redistribution of the risk allocation in projects.

Price escalation happens during a project's planning, design, and execution phases. Every stage of a project should use price escalation management. The first step is to recognize that escalation is an actual threat to construction programs and projects and to recognize it existence. There is

still a high degree of ambitious thinking in project budgeting, expecting that escalation is not going to remain high. Project owners must first:

- Recognize the reality of the bid market
- Recognize the reality of the bid volatility: Material prices will continue to fluctuate, although perhaps not to the extent seen in recent years (Gashaw, 2013).

The most crucial action project owners can do to minimize the effects of the unstable construction market is to share the risk. This takes the burden of handling market volatility off the back of the contractors and vendors and in turns reduces the pressure for bidders to charge premium (William &Peter, 2006).

Gashaw (2013) discuss that the first step is for project owners to assume more responsibility for the risk related to changes in material price. The owner is better able to manage the risk because they are much more diversified. At every stage of the design and construction process, this can be accomplished in a variety of ways.

Gashaw (2013) identified and summarized the following methods to manage price escalation as variables Consider fluctuation/escalation clauses, Bulk material purchases and suppliers' partnerships, Use Cost-Plus contracts, Develop program-wide contingencies and risk management protocols, Regular cost monitoring throughout the project, Consider locally available material in design.

2.1.9 Challenge of price escalation and adjustment practice

According to Dinkayehu (2019), Price escalation can have negative impact on building construction projects if there is no means to handle the escalation in the contracts. If the risk of escalation in price of materials is fairly distributed among contract parties, there is a good chance that projects would be completed. However, contracts could be prepared in a way that the risk of material price escalation is laid up on only one party usually favoring the client. In other cases the price adjustment administration practices are very poor to the level that one can conclude they are not applicable.

According to Getaneh (2017) cited in Hardilo (2020), the most common challenges affecting price adjustment on construction contracts are: Constant weighting coefficients throughout project lifetime, Use of foreign country indices which might not reflect the actual conditions, Different estimators give rise to different weighing coefficients, It does not consider actual labor

work time, Change in project cost, Constant input material amounts, Computation time, Considering only extreme prices.

Dinkayehu (2019) identified and summarized problems in price escalation and adjustment as follows after review contract documents, claims submitted by contractors and correspondence letters in SNNPRS Construction Authority Archives.

- Clients resist honoring the escalation clauses.
- Escalation clauses do not adequately compensate increase in prices.
- Construction Price Indices may overestimate or under estimate the market conditions as at how prices have risen.
- Steel Price Escalation occurring in projects with contract duration less than 18 months.
- Special Conditions of Contract limit application of Price Adjustment clauses.
- Contractors do not follow the proper contractual procedures for requesting Price Adjustment.
- There is no public database for recording and updating the price of steel for contractual or any other purpose.
- Contractors do not provide the necessary basis cost index in their bidding document for approval by the Engineer.

The rapidly rising costs lead to the complications of "price escalation.” In the absence of fair and balanced contracts, coupled with the lack of suitable dispute resolution mechanisms, rising costs cause serious disputes on price escalation. This paralyzes on-going projects and seriously affects the prospects of maintaining and developing future business relationships. Problems relating to construction price escalation include clients resist honoring the escalation clauses; escalation clauses do not adequately compensate increase in prices and uncompensated increase in cost of construction materials (Flyvbjerg et. al., 2004). The contract price adjustment formula is a method of compensation or reimbursing for price fluctuation in labor costs, material prices, plant and equipment and fuel (De Vynck, 2002). The purpose of the formula was to provide for the needs of contractors who required a clear-cut, agreed recovery formula method to avoid dissension and disputes with employers and subcontractors and provide a reasonable reimbursement of unusual price fluctuations.

Hardilo (2020) identified and summarized the challenges in price escalation and adjustment as follow: Constant weighting coefficients throughout project lifetime, Use of foreign country

indices which might not reflect the actual conditions, Constant input material amounts, Clients resist honoring the escalation clauses, Escalation clauses do not adequately compensate increase in prices, Construction Price Indices may overestimate or under estimate the market conditions as at how prices have risen, Material price Escalation occurring in projects with contract duration less than 18 months, Special Conditions of Contract limit application of Price Adjustment clauses, Contractors do not provide the necessary base price index, There is no public database for recording and updating the price of steel for contractual or any other purpose.

2.2 Empirical literature

It has been discussed that price escalation is a predictable event due to the complex nature of the construction industry and the unstable external environment. As a result of this fact, a large number of researchers have been conducting various studies to determine the potential causes and effects of price growth in various sectors of the construction industry. This section of the study aims to present various research findings regarding the reasons behind and consequences of price increases in the construction sector.

Frimpong et al. (2003) conducted a questionnaire survey consisting of 26 factors to study major contributors of cost overrun in groundwater drilling projects in Ghana. Out of 26 factors considered, top 10 factors are monthly payment difficulties, poor contract management, material procurement, inflation, contractor's financial difficulties, escalation of material prices, cash flow during construction, planning and scheduling deficiencies, bad weather and deficiencies in cost estimates prepared.

When it comes to the Ethiopian situation, a study by Fetene (2008) that looked at finished public building construction projects in Ethiopia revealed that 67 out of 70 of these projects experienced cost overruns. The rate of cost overrun varies from 0% at the lowest to 126% at the highest of the contract amount for individual projects. According to the study, from identified 39 causes of cost overrun for Ethiopian case the most significant ones were found to be inflation or a rise in the price of construction materials, poor planning and coordination, change orders due to client-requested enhancements, and an excess of quantity while construction was under way. Fetene further explained that the most typical effects of cost overrun that found on his research were delay, supplementary agreement, adversarial relations among stakeholders, and budget shortfall of project owners. Fetene also comes to the conclusion that cost overruns 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.

The study by Mohammed, (2013) on the Price Escalation and Adjustment Problems on Federal Road Construction Projects of Ethiopia claimed that poor estimation, improper planning and/or improper implementation of proper planning and project schedule changes are the identified major internal causes of price escalation and also increase in material cost/material price fluctuation, increase in global demand for construction materials, fluctuation in money exchange rates and limited capacity of material producers are the identified major external causes of price escalation in Ethiopian federal road construction projects. Mohammed (2013) also has revealed that the major effects of price escalation are higher project costs, cash flow (project financing) problem of the projects, delay and dispute among parties. Mohammed also has identified that uncompensated increase in cost of construction materials, and construction price indices may over estimate or under estimate the market conditions as at how prices have risen and selection of the most suitable index in using inflation indices are identified as major problems of price escalation & adjustment in Ethiopian federal road construction projects.

Dinsa (2015) has assessed the causes of price escalation in the Federal Road Construction Projects of Ethiopia at some projects, and concluded that the major five price escalation causing factors in the specified projects are cost inflation of construction materials, change in foreign exchange rate of imported materials, lack of proper budgetary planning and less emphasis given to planning by clients and financiers, cost of labor, equipment and material and the tendency of the client to stick to list bidder criteria rather than analyzing the bid offer against the engineers estimate. Additionally Dinsa (2015) described that the effect of price escalation of federal road contracts is necessitating the requirement of more funds to get injected into the road development program against the planned budget allocation program of clients' and financiers'. The effect has also transcended as far as clients' losing their contractual power to terminate and replace long overdue and liquidated road contracts with new ones as a result of the danger of facing an escalated project contract cost for the remaining portion of the work

Dinkayehu (2019) summarized the findings from the case studies of the three projects as follows; devaluation of the local currency is the number one recent factor causing the escalation closely followed by inflation which has been escalating prices for the last decade. The major problems in

price adjustment application and administration practices are; Escalation occurring in projects with contract period not exceeding 18 months, the SCCC limits/restricts application of price adjustment, Lack of public database for recording and updating the monthly market price of steel, Contractors don't follow proper contractual procedures to request price adjustment, Poor price adjustment administration practice. The major effects of the steel price escalation on the projects are; Delay, Dispute among parties and Cash flow problem (Dinkayehu, 2019).

According to Hardilo (2020) findings from the case studies indicate that; The project cost has escalated by 144% due to price escalation, The contract time has elapsed by 162.7% while the physical progress is at 18%, The major factors led to escalation in price of materials are devaluation of national currency and the associated inflation, lack of public database for recording and updating the monthly market price. This took long time until the regional procurement agency executes market study allows for price adjustment, Contractors don't follow proper contractual procedures to request price adjustment, Poor price adjustment administration practice, Claim and associated dispute among the parties, Project abandonment.

Mekonen (2020) concluded that delays in decision making, change, addition or omission of work, financial difficulties and late delivery of materials, money exchange fluctuations, project schedule problems like schedule change and unrealistic schedules as well as slowness in giving instructions. Other very important factor was escalation in the cost of construction inputs or inflation. There were also some causes that can be considered as force majeure like weather condition problems

2.3 Research Gap

The overall literature review indicates many researchers have been conducting different researches to identify the possible causes and effects of price escalation in different sectors of the construction industry.

Among those researchers studied in Ethiopia, Dinkaywehu (2019) studied the effects of escalation in price of steel on public building construction projects in SNNPRS. The focus was only on steel price escalation and overall effect on public construction projects. Dinsa (2015) studied the causes and effects of price escalation of federal road contracts in Ethiopia focusing at tender stage. Mossa (2013) also studied the causes for price escalation and its effect on federal

road projects focusing on project cost. Tarekegn (2017) studied price escalation and its management in turnkey projects: the case of Ethiopian Railways Corporation. The study Emphasized Turnkey type of contracting. Gashaw (2013) studied assessment of Price Escalation and Adjustment Problems on Federal Road Construction Projects. Getnet (2022) also studied on the Causes and Impacts of Price Escalation and Its Improvement Mechanisms in Road Construction Projects in SNNPR. Yigezu (2008) studied on the Effects of Unpredictable Price Fluctuation on the Capacity of Construction Contractors. The above most researchers conducted in a sector other than building on the road and railway sector in different region and having different objectives.

However, the pervious researches assessed the effects of price escalation of construction material conducted in different sector applied different methodology like questionnaire survey, interview, document study and statics descriptive for data collection and analysis. However this research studied the effects of price escalation of construction material on building project through qualitative approach using focus group discussion, interview and document study. Qualitative data analysis tool were used on four selected project for in-depth understanding of the subject area. More over the current research assessed the current price escalation and adjustment practice in depth but the pervious study highlights roughly.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

According to Cooper (2014), any researcher can use various strategies or more than one design at a time. This research employed descriptive case study designs. According to Creswell (2013) “The case study method explores a real life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple resources of information… and reports a case description and case themes”. Data and information sources were determined based on the formulated research design. On the basis of the data and information sources the research instruments were decided; and available documentary sources relevant to the research were reviewed.

3.2 Research Approach

In this study, qualitative approach methods mainly content analysis used to assess the construction material price escalation of the building projects in Addis Ababa. As explained in the literature, different studies indicated that price escalation has various effects on the projects. Qualitative data were collected to assess the effects of the construction material price escalation.

3.3 Types and Sources of Data

This study investigated using primary and secondary data. Primary data collected through focus group discussion and interviews using structured interview questions. Secondary data collected from different sources existing in the office documents. Through focus group discussion and interviews, the main data were gathered. This information aids in determining the degree to which construction material price escalation affect the projects. Primary data help to make an accurate assessment of the study. The primary sources of the study's data were the team member of client, contractor and consultant of each project. Secondary data include reports; gathered from contractual agreements and minutes related to the project. Secondary data also used to investigate and identify the effects of price escalation of construction materials on project by seeing major problems in the execution of the project on the actual time. For qualitative analysis; in-depth interviews and focus group discussion were carried out to purposefully selected

respondents (engineering head, team leader, project managers, contractor administrator, site Engineers, office Engineers and resident Engineers).

3.4Case study selection and Population

According to Yin (2003) a case study can contain either a single study or multiple studies. This study employed a multiple case study and focused on four selected high rise building projects. The sample projects were chosen purposively for the study. They are a huge project regarding to the cost and scope of work so that they are representative sample of other projects which is affected by price escalation severely. Moreover comprehensiveness and accessibility of project records and documentation are taken into consideration. The study populations of this study were the team members and professionals of the selected high rise buildings projects which consist of the contractors, consultants and clients currently working at each selected projects. Contract administrator, engineering head, team leader, project manager, resident engineer and site engineer were involved.

3.5 Data Collection Methods

According to Yin (2003), evidence/data for a case study research may come from six sources namely Documents, Archival Records, Direct Observations, participant- observations and physical artifacts. More to the point, Yin (2003) also underscored to the point that there are some important overriding principles that a research should give attention in addition to the six sources. These include the use of (a) multiple sources of evidence (evidence from two or more sources, but converging on the same set of facts or findings) (b) a case study database (a formal assembly of evidence distinct from the final case study report), and (c) a chain of evidence (explicit links between the questions asked, the data collected and the conclusion drawn).

Having said so, for this research the required data were collected by using focus group discussion, interview and document review. The group discussion conducted to assess the effects of price escalation of construction materials on building project. The participant of the discussion consist project team member from the client, contractor and consultant. Structured question prepared in English. The questions designed to be open ended questions. The secondary data for this research comes from reports; gathered from contractual agreements and minutes. In addition to these written documents like approved payment certificates, diaries, letters and site books

were assessed. The information, which is relevant, used as a benchmark against primary data collected to support the research.

3.6Method of Data Analysis and Presentation

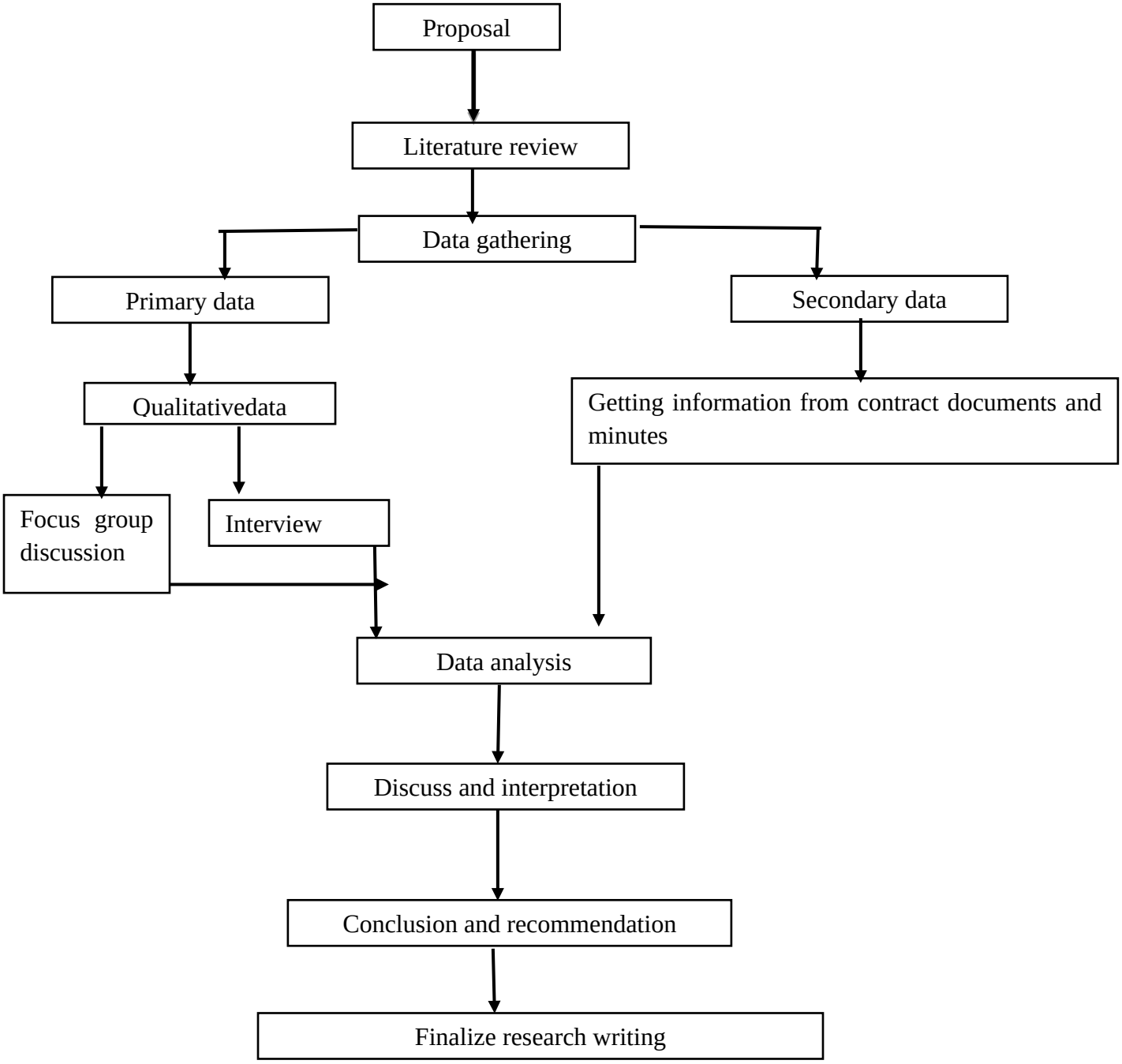
In analyzing data, especially a multiple case study research, Yin (2003) recommends a two-stage analysis: within-case analysis and cross-case analysis.

Within-case analysis entails analyzing the collected qualitative and quantitative data of each case study independently after which the researcher concludes the findings of the research issues for each individual case. Cross-case analysis includes three major cross-case analytic strategies. The first is to categories cases based on certain dimensions and then search for similarities and differences among the group of cases. The second is to choose two cases and list the similarities and differences between them. The final strategy is to break up the data by the data source such as one researcher works on interview data, while other reviews questionnaire data. In conclusion, within-case and cross-case analyses were carried out in analyzing the data of the current research.

This study discuss factors causing price escalation of construction materials, effects of construction material price escalation on performance of building construction project, the current price escalation practice of building projects. Qualitative data was interpreted using content analysis.

The process of the study methodology was summarized by chart below. This chart shows the process of the study methodology starting from proposal until conclusion and recommendation.

Figure 3.1 methodology diagram



3.7 Reliability and validity

To ensure validity and reliability of the research, questions are comprehensively defined. This helps to reduce misunderstandings thus increase the reliability of the measuring instruments. Moreover, triangulation of results employed to ensure reliability of the data collected. Thus, all the data acquired from different sources compared and cross checked. Besides, to ensure reliability of the data, the interview questionnaires tested to the respondent's priority. With focus group, another focus group of similar but different group conducted. The questions then amended based on the comment which collected from those who participated in the test. The validity of the data also acquired through careful selection and use of appropriate size of the sample.

3.8Ethical Considerations

Ethical considerations were part of this study and documents which reviewed from the organization remains confidential. During this study respondents were free to respond their own opinion from their experience and their personal information such as name and religion were not mentioned and the information used in this research was only for academic purposes.

CHAPTER FOUR

ANALYSIS AND DISCUSSION

4.1 Introduction

This section of the study deals with the analysis and discussion of results of the data gathered through using different data collection instruments like document review, interview and focus group discussion. As discussed in the previous chapters, there are four cases selected for in-depth assessment. The following sections present the analysis and discussions part on; factors causing price escalation of construction materials, contract forms used, the effects of price escalation on building project and the current price escalation management practice.

4.2General Description of the Cases

The study included four building construction projects named as Project 1, project 2, Project 3 and Project 4.All of the projects were ongoing; among the four selected projects two of them accomplished the structural work 100%.

Table 4.1 Contract amount and duration of selected high rise building Construction Projects (contract document and payment certificate).

Projects	Project name	Contract amount (ETB)	Contract duration	Contract signing date
PROJECT 1	3B+G+21 mixed used building	1,863,141,858.51	900 calendar days	Jan. 01, 2021
PROJECT 2	3B+G+23 Luxury apartment	528,660,225.86	16 months	May,18,2020
PROJECT 3	3B+G+20 + pent house multipurpose building	124,185,498.2	24 months	Aug. 24,2018

PROJECT 4	2B+G+10 mixed used building	218,447,123.67	540 calendar days	Apr. 30 ,2020

As shown on the table below all project have experienced price escalation, those projects either accomplished or non-accomplished the work have faced price escalation having different price escalation amount. Project 1 experienced 72.29% price escalation an amount of 1,346,884,486.09 ETB, Project 2 94.53 % price escalation amount of 499,762,232.96 ETB, the least experienced by project 3 with 2.93% price escalation an amount of birr 3,634,782.6 and project 4 experienced 30.77% price escalation an amount of 36,763,520.95 ETB. The mean of price escalation of all projects is 50.13% and total escalation amount is 471,761,255.65 ETB. The price escalation amount and contract amount after escalation for each project were collected from project documents like contractual agreement and payment certificate.

Table 4.2 price escalation amount and work progress of the selected building construction projects

	Work progress (%)	Contract amount after escalation	Escalation amount	Escalation (%)	Elapsed time	Delay(%)
Project 1	22	3,264,026,344.6	1,346,884,486.09	72.29	18 days	
Project 2	24.73	1,028,422,458.82	499,762,232.96	94.53	22 months	137.5%
Project 3	100	127,820,280.80	3,634,782.6	2.93	45 days	
Project 4	100	156,229,776.68	36,763,520.95	30.77	1029 days	

4.3 Results of document study

Group focus discussion was conducted consists members from client, contractor and consultant. Interviews were also conducted with counterpart, project manager, contract administrator

engineering head and resident engineers. All participants in the group discussion and interview believed that there is price escalation in their project.

Case of project 1

The project is mixed used building construction work which was started on January 2021 with contract amount of 1,863,141,858.51 ETB and having 900 days contract duration. The contract amount includes both structural and finishing work. The current work progress of the project is 22% and experienced 72.29% price escalation of the contract amount. As per the contract agreement the project shall accomplish the work on June, 2023 which expected nearly 100 % accomplishment of the work on this month however currently it's on the early stage of the work having 22% of work progress and experienced a huge delay.

The contract form used in this project is PPPAA 2011.The contract allows the application of price adjustment clause as the project contract duration were more than 12 months and inflation governs the frequency of the price adjustment. When the work starts there were a difference between the geotechnical report result and the existing soil condition of the site. In connection to this unexpected weathering rock appeared during shoring and excavation work that required a further excavation for a depth of 60cm until they got hard rock that make the practical execution difficult and time consuming. Additionally, there were design change and heavy truck transport time limitation. Due to these reasons the contractor requested time of extension and an additional 80 days were added to the original contract duration through time claim analysis. The contractor accomplished substructure work and ground floor work until Aug, 2022.However the contractor suspended the project work for 8 months from Sep, 2022 up to April, 2023 requesting for price adjustment and until it get approval. Different correspondence letters from the contractor indicated request for financial claim and time of extension. By the time the contractor request the price escalation the project were at the early stage of the work and were not run according to the schedule; as a result it required justification for the delay to accept the price escalation so the client resisted honoring the escalation. This causes a slight discrepancy between the client and contractor results in wastage of time. After a discussion that took a lot of time and energy, the contract document has been amended and new unit rate has been adjusted for the rest of work items and the contract duration also extended to Aug. 2024. The price index were done by

consultant and checked by contract administration from client side then again checked by deputy CEO and final amended by CEO.

There were challenges while adjusting new unit rate like timely recorded data were not available at central statistical agency to collect market price at different time. For price adjustment under PPPAA contract conditions, it requires material price indexes at different points of time, i.e. Benchmark Price Index and the Monthly Price Index. These price indexes, Bench mark price index and Monthly Price Index, shall primarily be obtained from Ethiopian Central Statistical Agency or Public Procurement and Property Administration Agency. However, price indices especially for construction materials are not available in the agencies. The other challenge was Contractors failure to follow the proper contractual procedures for requesting Price Adjustment. As per the provisions of Clause 62 of the GCC of PPPAA, contractors are expected to; request for price adjustment, give notice in writing to the Engineer, shall submit for review and approval all calculations and supporting information necessary to determine the price adjustment. However the contractors suddenly suspended the work and started to process the price adjustment request which is in contradictory to the above listed Contractual procedures. The participant in the discussion indicated that the other challenges were there was no separate team that conducts the price adjustment process which caused delay in checking and setting the price. In relation to this, there was also poor management decision making system to amend and approve the price index. This decision weren't made by individual it's made by board member that takes a lot of time. The good thing is here its cross checked by both consultant and project follow up and contract administration team which is effective in providing the solution.

The participant indicated mechanisms to manage the effects of escalation in price of on building construction projects through government's control the unethical practices of suppliers and create market consistency. Using locally produced material instead of imported materials whenever possible. In addition to utilizing locally available construction materials and labor, an environment which is suitable for the manufacturing of these materials should be created by all responsible parties. Dinsa (2015) explained that government should create a stable economy by attracting and motivating local companies to specialize in the production of enough construction materials from local market to avoid price fluctuations associated with imported construction materials. Moreover there is difficulty in getting dollar to import material which causes late

delivery of material and delay of the projects. The other method discussed was improving the management system of the project through precise, concise and realistic planning.

Case of project 2

This project is a luxury apartment building construction work started at May, 2020 with contract amount of birr 528,660,225.86 and 16 months of contract duration. The contract amount includes only structural work. Recently the work progress of the project is around 24.77% however the contract amount escalated by 94.53% and the contract accomplishment time were Sep. 2021 but the construction is still ongoing. The project experienced delay by 22 months.

The contract form used under this project is PPPAA 2011.The disadvantage in this contract with respect to price adjustment is that, the clause 62: sub-clause 62.1 of the GCC of the PPPAA 2011not allowed the application of the price adjustment for the contract less than 18 months on top of that the SCC also mentioned that the contract is not subjected to unit price adjustment. This means the contract assumes the market to be a stable before 12 months or else the contractors are expected to consider the anticipated effect of price escalation in their bid price which might make the bid price unreasonably expensive or the contractor alone expected to take the risk associated with price escalation. Since compensation is not permitted, the escalation is a reality which makes it challenging for the contractor to complete the work. Because the contract document not allowed the price adjustment, the price escalation affected the project severely. At the beginning of the work the contractor spend over one year on shoring and excavation work which were hard to execute as there were storm water that cross the project area which requires a diversion work that isn't considered during the preparation of contract document and planning. The diversion work had to start prior to the main works to avoid problems related to the storm water however it was not done. Delays caused by these issues exposed the project to the price escalation that has impacts on the cost and time of the project. Due to this the contractor suspends the work over one year while requesting for price adjustment and to amend the contract document. The Client need the projects delivered on time and the contractor need compensation to proceed the works. The contractor doesn't have adequate capacity to absorb the escalation and complete the projects on his expense. The contractor has requested for price adjustment many times through letter by attaching material cost breakdown using suppliers' price. The client has investigated and cross checked the unit price submitted by contractor. It's possible to say the

price escalation and adjustment management practice were poor and not effective. After a lot of time taking discussion, the clients amend the contract document and provide new contract unit price. The SCC in the new contract stated that contract is subjected to price adjustment every three months based on the attached cost break down. Price adjustment shall be applicable to only reinforcement bar, ready mix concrete and ply wood materials. It also stated that the intended completion date for the whole of the works shall be 270 calendar days from the signing of the contract document. However the contractor suffered from delay of the payment and the project again is experiencing delay.

The challenges occurred during price escalation and adjustment practices were that the GCC of PPPAA limits the application of price adjustment for projects with contract period not exceeding 18 months were the major problems identified, contractors do not follow the proper contractual procedures for requesting price adjustment as per Clause 62 of the GCC of PPPAA. Contractual procedures like giving notification to the client; providing claim for price adjustment to the consultants describing the reasons, contractual basis and proofs for the claim; and submitting the calculation and necessary supporting information necessary to determine the price adjustment are usually missed by contractor as evident in the project's contract documents reviewed. The contractor suspended the work for significant period of time and presented the price escalation as a reason for justification of delay and demand for price escalation. The other challenge was Special Conditions of Contracts limit application of price adjustment clauses. This project weren't complied with the requirements of the GCC for price adjustment and it's also limited by the SCC. The respondents mentioned that clients resist honoring escalation clause. Clause 62: sub-clause 62.4 give the power to increase or decrease the contract price amount to the public body i.e. client laying the fate of approving the price adjustment on the hands of the client which makes it difficult for application. Approval and compensation events might take long period of time while projects remain idle. Hence, problems of honoring escalation clauses a practical challenge to application of price adjustment. The other one is fluctuation in the market price time to time becomes a challenge to set the exact unit rate. As the market price varied from day to day, it's difficult to collect prices from the suppliers and hard to be sure on the market conditions and even to submit the same unit price.

The methods to manage the effects of escalation in price on building construction projects and to prevent the effects of similar conditions in the future price adjustment should be allowed for projects with contract periods less than 18 month. The contractors don't have sufficient capacity to absorb the escalation and complete the projects. Thus, works are ceased and projects are being abandoned. The other method is that the government should control and monitor the market to create stable market conditions and eliminate unethical suppliers. In addition to this the government should also create safe and steady political environment to ensure the availability of raw building materials on the market and movability of materials from one place to others. The other way to manage the effects of price escalation is through establishing proper planning and management system. This is vital to projects since it helps to differentiate potential risk in advance and considering their impacts during planning and having proper cash flow management will make the best use of the available incoming cash keeping the effects of the escalation on the projects to the possible minimum.

Case of project 3

The project is a multipurpose building construction work started on Nov. 2018 having contract amount of birr 124,185,498.2 and 24 months contract duration. The contract amount is only for structural work. The structural work is 100% accomplished on Jan. 01, 2021 after 45 lagging days.

The contract form is PPA, 2006 and applies admeasurements contract type. Under Clause 47 of PPA, 2006 standard condition of contract stated that, Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Special Conditions of Contract.SCC allows the contract is subjected to price adjustment using proven cost method up on agreement between the client and the contractor. Proven cost method is used for the cost deflation or inflation of input materials in which the work executed within a specific period is subjected to any deduction or addition of cost by acquiring material's cost in the same period of time. The price adjustment shall be applicable on direct cost of rebar at 3 months interval. In case of unexpected high cost fluctuation, cement shall also be part of the price adjustment in which it shall only be administered beyond one year of construction period and half execution of project's physical work. The contract sets base price only for rebar and cement, as a result price adjustment is inapplicable for other materials. The adjustment also not applicable for labor and equipment cost.

If the market price is more or less than the base price, the difference price either added or deducted from the payment. The project experiences 2.93% price escalation which is the least as compared to the other projects this is because the project completed nearly within the contract duration. The price adjustments were done when the contractor reported to the consultant while the market price changed and fluctuated. The contractor identified the quantity and the timely price of the work done during market price escalation. The contractor collects the market price from the suppliers or submitted the receipts of the material already bought then prepare the entire necessary document and submitted to the consultant. The consultant made an assessment accordingly through crosschecking the market price of the material and set reasonable unit rate. This result sent to the client for further investigation and the client chooses the least market price as base price.

Table 4.1 shows basic prices (contract document)

No.	Materials	unit	source	Basic price(ETB)
1.	G-60/S500 reinforcement bars for ⌀8-⌀20	Kg	imported	35.70
2.	G-60/S500 reinforcement bars for ⌀24-⌀28	Kg	imported	37.40
3.	Cement-OPC	Kg	Derba cement	262.0

The current price escalation management practices were poor and not conducted properly it doesn't solve the escalation issue appropriately as the basic material items to be adjusted were very limited. As a result the contractor is not satisfied and raised claim frequently. However the client has made price adjustment two times total amount of ETB 3,634,782.6.

There were challenges at price escalation and adjustment period, since the contract were not allowed price adjustment for other materials except rebar and cement and labors, it causes dispute between the client and the contractor when other materials and labor cost has increased

significantly. There were also poor documentation practice like site book, test result and site diary were not adequately fulfilled to crosscheck the work done during escalation. In addition to this there were a delay in a decision making process, it took long time to check the market price and to approve it.

The methods to manage the effects of escalation in price on building construction projects, the contract should open for price adjustment of all items. The price adjustment should apply for all materials, labors and equipment in order to share risks equally caused by price escalation. Establish good management practice that helps to give response in time and essential to monitor and control the cost and material on site. It also helpful to avoid the means or causes of the delay and to run according to the schedule which in turn minimizes the effect of price escalation caused by project delay.

Case of project 4

The project is a mixed used building construction work commencement date Mar. 2020 and 540 days contract duration. The contract amount includes both the structural and the finishing works. The structural work is 100% accomplished on Aug. 18, 2021. It's accomplished before the intended contract duration. The total escalation amount paid to the contractor is birr 36,763,520.95.

PPPAA, 2011the contract form were used allows price adjustment. The special condition of the contract also allowed the application of the price adjustment. Even the contract duration was 18 months; there were an extension of time about 309 days on the original contract duration for the justified delay mainly caused by client and external factor. From the discussion the delay was caused by design not available in time and also there is design change, shortage of material on the market and weather condition. As a result price adjustment was applied since the beginning of the contract. The adjustment practices were good and provide solution for the issues. Data were collected from 3-5 suppliers, from central Statistical agency and Addis Abeba city construction at different point of time. Materials were crosschecked and distinguish according to representative group done by Ethiopian construction authority. Then price index were done by consultant and again checked and approved by client. The price adjustment was done separately from the interim payment which is calculated at different time of escalation. The analysis was

done accordingly only for the structural work and paid once to the contractor escalated amount of ETB 36,763,520.95. Price adjustment for finishing work is in progress and couldn't know the exact amount yet. The required data were available and easy to access as well the decision making process weren't time taking.

There were challenges during price escalation and adjustment like grouping issues for example there was different escalation percentage for concrete ingredients such as cement, sand and aggregate that makes the analysis too difficult. Through discussion it's raised how to manage the effects of price escalation and the extent of utilizing the local construction materials instead of imported materials is not satisfactory, so that it's better to manufactured local construction materials which in turn reduce the rate of unemployment. The other strategy is for the government to monitor and control the market in order to establish stable market conditions and get rid of unethical suppliers. Establish appropriate public database for periodical recording and updating price of construction materials. This is supported by the fact that if price indexes or price indicators are available from public bodies (CSA and PPPAA), it will significantly reduce the time required for conducting market survey and consequently the time it takes to process the price escalation.

4.4 Results of Focus Group Discussion and Interview

The case of project 1

Various factors that contribute to price escalation of construction materials revealed through by extensive group discussion and interview. The results from the discussion and interview shown that factors causing price escalation of construction material and its effect on building projects. According to the discussion "delay on the project, inflation, devaluation of the currency, political instability, high costs of fuels, shortage of dollars, non-consistency in the current market conditions associated with poor gov't role in monitoring material price, poor feasibility study and Scarcity of building materials" were mentioned as major factors for the observed price escalation. The results affirms the findings by hardilo (2020) stated that inflation, rapid depreciation/devaluation of national currency, Political instability, Government's poor role in monitoring materials prices are major factors causing construction material price escalation. Dinsa (2015) also has identified fluctuation in money exchange rates as the second major price escalation causing factor in the road projects. The country has been experiencing high rates of

inflation for the last decade and is still is experiencing its effect. This inflationary practice has been causing price escalations in the past and the public building construction sector was struggling with escalation in material, equipment and labor prices (Dinkayehu, 2019).

Therefore, based on both theoretical and empirical evidences we can infer that the contributing factors for the observed price escalation in the studied project are those listed above.

From the group discussion, higher project cost were identified as the major effects of construction material price escalation on building projects followed by delay in progress of project works, profit loss and project abandonment. Fetene (2008) explains that excessive cost overrun requires additional budget, this in turn consumes the scarce financial resources of the country, which lead to further budget short fall for construction projects. Findings by Dinkayehu, (2019) mentioned Delays in projects, cash flow problem of projects, dispute among parties, project abandonment, and poor quality of project outputs and profit loss of contractors are identified as the major effects of steel price escalation on public building projects. This finding again highly coincides with the findings of many previous studies on the topic.

The case of project 2

The result from the group discussion shows that shortage of foreign currency, devaluation of local currency, inflation, high cost of fuel, political instability, lack of proper planning, Scarcity of raw building material, gov't poor role in monitoring materials prices, delay of the project, contractor's and client's financial instability are the majors factors causing price escalation of construction materials. these results supported by Mekonen (2020) stated that delays in decision making, change, addition or omission of work, financial difficulties and late delivery of materials, money exchange fluctuations, project schedule problems like schedule change and unrealistic schedules as well as slowness in giving instructions, inflation actors were responsible for the observed price escalation.

Political instability, high cost of fuels, devaluation of birr and shortage of foreign currency and inflation are interrelated factors. One factor is a means for another. Lack of proper planning discussed as some works are not prioritized during initial phase of planning and lately becomes challenges for the project to proceed as per schedule. This results in lagging of contract duration and exposed the project to price escalation. The other factors is contractor's financial capacity, it

was getting weaker time to time and waited interim payment to purchase materials. The client as well can't provide payment for the contractor on time as a result the contractor can't purchase materials in time and can't prepare for the next work in advance. This causes delay of the project and reveal the project to experienced price escalation of materials. There were shortage of material supply like cement, rebar and formwork on the market results in wastage of time to purchase and deliver materials on site which again exposed the project for further material price escalation.

The other issue raised during the discussion was the effects of price escalation on the projects were quoted that includes higher project cost, delay of the projects, higher overhead cost, project abandonment, delay payments to contractors, investment return are delayed, profit loss, high rental costs or prices and laying off workers. The results are in line with the findings by Igboekulie, Monye , Joseph (2022) that revealed major effects of Building Materials cost on Building Developments to be Shortage in the delivery of housing to the populace, fluctuation in cost of construction, increase in project abandonment, low income earners are priced out for house ownership due to high cost of building, unemployment of construction workers, Building collapse due to use of poor quality materials, conflicts between client and contractor due to upward review of contract sum, Delay on the progress of project works, poor quality of construction product, increase in the final cost of building products; final cost higher than budgeted cost, affect Gross Domestic Product (GDP) contribution to the economy, increased contractors fraudulent practices, investment return on construction projects are delayed, completion at the expense of other products, transportation cost e.g. returning substandard products to the supplier, hindered adequate implementation of innovation in construction.

The case of project 3

The outcome from the group discussion shows that inflation, devaluation of birr, fluctuation in the cost of fuel, political instability, and poor management system were the major factors causing price escalation of construction material. Findings by (Getnet, 2022) revealed that weather condition, Delay of contractor's interim payment. Removal of utilities from the road corridor, Personal protective Equipment's are not provided for the project workers, Quality of supervision, Availability of material, Number of change or extra work, weather condition, shortage of Dump trucks, rainy weather condition, COVID-19, sequence of work, Availability of skilled Labor,

material quality, insufficient or incomplete drawing were some of the factors that causes price escalation in SNNPR federal road construction projects. This findings support the result gathered from group discussion. Poor management systems discussed as there was poor management of materials handling on the site causing wastage of material and didn't deliver the pre-order material on time.

The other topic discussed were the effects of price escalation of construction material on building projects and profit loss, higher project cost, higher rental costs or prices and adversarial relationship between the stakeholders were identified as the effects of price escalation. Belay and Jain (2023) explain the major consequences of price inflation were delayed project progress, problems with the projects' cash flow (funding), higher construction project costs and increasing dispute between contracting parties in line with the result obtained from group discussion.

The case of project 4

Discussions consists of four participant were held to identify the possible factors causing price escalation. Accordingly inflation, political instability (inside and outside the country), poor gov't market control mechanism, monopoly and unethical practices of suppliers, shortage of dollars, Scarcity of raw building material, and devaluation of birr are identified as major factor causing material price escalation. The finding by Hardilo (2020) explain that the major factors led to escalation in price of materials are devaluation of national currency and the associated inflation, Lack of public database for recording and updating the monthly market price, Contractors don't follow proper contractual procedures to request price adjustment, Poor price adjustment administration practice, Claim and associated dispute among the parties, Project abandonment. Belay and Jain (2023) shown fluctuation in foreign currency exchange rates, increase in material price and unstable market condition, unbalanced demand and supply of construction materials, limitation of construction material producers capacity, and project schedule changes play an important part in the escalation of project prices.

The effects of material price escalation on building project were discussed and summarized as follow higher project cost, completion at expense other projects, delayed return investment. This finding is supported by Akanni et al. (2014), possible effects that escalation in the price of building materials have on delivery of construction projects were identified as: fluctuation in cost

of construction; project abandonment; completion at the expense of other projects; delay in progress of project works; other valuable projects not being commissioned; rate of unemployment of construction workers; poor workmanship due to inadequate materials to use; low quality local materials; and hindered implementation of innovation in construction.

4.5 Cross case analysis

Cross-case analysis is a research method that facilitates the comparison of commonalities and difference in the events, activities, and processes that are the units of analyses in case studies. Cross-case analysis is a method that involves the in-depth exploration of similarities and differences across cases with a view to supporting empirical generalizability and theoretical predictions (yin, 2003).

All projects had experienced price escalation. They are differing in contract amount; contract duration and the commencement date of the projects were also different. Project 3 and 4 were completed nearly within contract duration whereas project 1 & 2 has experienced delay. The contract form used in project 1, project 2 and project 4 were PPPAA 2011 whereas project 4 employed PPA 2006. The contract weren't allowed Price adjustment for project 2 before the modification of SCC, the contract of project 1 and 4 allowed the applicability of price adjustment while project 3 used proven cost method for price adjustment of certain materials. The price escalation and adjustment practice of all projects weren't similar as they are employed different processes. Project 1 and project 2 set new unit rate and amend the former contract. While project 3 and 4 has already paid the escalated amount for structural works as they are accomplished it 100%.All projects had almost common factors affecting the price escalation of construction materials such as inflation, devaluation of local currency, high cost of fuels, political instability, and government's poor role of monitoring the market, unethical practices of suppliers, shortage of dollars, poor management system, lack of proper planning and Scarcity of raw building material. The effects of price escalation of construction materials on four building projects were also varied based on the extent of escalation amount the common one were increased project cost and completion at the expense of other projects. The challenge of price escalation and adjustment for projects were unavailability of timely recorded data, clients resist honoring price escalation clauses and Special Conditions of Contract limit application of Price Adjustment clauses.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the conclusions and recommendations of the research that are drawn based on the results of data analysis and discussion. The objectives of the research were to identify the factors affecting escalation in price of construction materials, to identify the effects of material price escalation on building projects.

The study used document review and focus group discussion as research instruments to achieve these objectives. Then, the data gathered were analyzed with appropriate methods and the results were thoroughly discussed in the previous chapter. This chapter presents the conclusions drawn and recommendations forwarded from the results of the analysis.

5.2 Summary of the findings

Four projects were selected as potential subjects to the construction material price escalation issues as the most susceptible projects for the effects of escalation in the price of material. Price adjustment was not allowed for one project because of having contract periods not exceeding 18 months and also price adjustment was restricted by the SCC and the remaining three projects were allowed the application of price adjustment.

Objective one: To assess the current Price Escalation and adjustment practices of the selected building projects.

When assessing the current practice of price escalation and adjustment on project 4 were good and the risk was shared equally as a result the contractor compensated well. However the other projects' price escalation and adjustment practice were poor and time taking. There were delay in decision making to amending and approving the rates. In project 3 the contract allowed the adjustment only for two materials i.e. rebar and cement. The items to be adjusted were limited and caused dispute between the client and contractor. This creates gap and challenges in price escalation practices.

Objective two: To identify factors causing price escalation of construction material in the case of selected high-rise Buildings projects in Addis Ababa.

To achieve this objective focus group discussion and interview were conducted containing questions on factors causing price escalation. The main factors include inflation, devaluation of the currency, political instability (inside and outside of the country), high costs of fuels, shortage of dollars, lack of proper planning, Scarcity of raw building material, gov't poor role in monitoring materials prices, contractor's and client's financial instability, project delay and poor management system, Poor initial planning, political safety issue, monopoly and unethical practices of suppliers.

Objective three: To identify the effects of construction material price escalation on the building projects the case of selected high-rise Buildings projects in Addis Ababa.

The effects of price escalation of construction materials on four building projects were also varied based on the extent of escalation amount. The result shows the effects of price escalation on project from the four projects including higher project cost, delay in progress of project works, profit loss and project abandonment, higher overhead cost, delay payments to contractors, investment return are delayed, high rental costs or prices and laying off workers and adversarial relationship between the stakeholders, completion at expense other projects.

5.3 conclusions

The objectives of the research were to study the causes of price escalation, to assess the existing price escalation and adjustment practice and to investigate the impacts of price escalation on building construction projects. To achieve these objectives, the study used document study, interview and focus group discussion as a research instrument. The information gathered from the survey was analyzed using the qualitative analysis. In light of the findings, it is more likely that the project price increase and the majority of the contributing causes can be manageable. Some of the data also revealed that there were planning issues and poor preliminary planning, which can be viewed as contributing factors to price escalation materials. Clients are among the stakeholders who are severely affected by price escalation of construction materials. This is because, if the problem persists, ultimately the client will be compelled to look for an additional fund to cater for the budget deficit induced as a result contractor's high bid offer at tender stage.

The effect has also transcended as far as clients' losing their contractual power to terminate and replace long overdue and liquidated contracts with new ones as a result of the danger of facing an escalated project contract cost for the remaining portion of the work.

5.4 Recommendations

Recommendation focused in addressing the major findings identified through the research processes.

- The Contractors better to follow proper contractual procedures to request for price adjustment. Implementing price adjustment provisions requires an extensive verification process and skill set in contract management.
- Contractors and clients need to develop good planning and scheduling practices and proactive decision making will reduce delay and consequently price escalation. Therefore the clients, consultants and contractors should work very closely to address the major causes of price escalation.
- Clients open to honor price adjustment clauses and fairly share the risks of price escalation with contractors through the provisions of price adjustment clauses in the SCC.
- Clients better to have a well planned schedule to allow consultants enjoy sufficient time for feasibility studies, design and tender document preparation of projects. This helps to bring about clarity of tender documents with which contractors offer bids without any bias of quantity estimates.
- The government improves its role of monitoring, control of monopoly and unethical practices of suppliers'. The government should improve its poor role in monitoring materials prices by having strict policies and effective implementation.
- The government organizations in particular, CSA and PPPAA good to set up a suitable data base for regularly recording, updating, and disseminating monthly price indices for the main building materials.

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APPENDIX 1

St. Mary's University

School of Graduate Studies

Assessing construction materials price escalation of building projects: in the case of selected high rise building projects in Addis Ababa.

Dear respondents,

The purpose of this survey is to obtain data for the specified study being conducted as a partial fulfillment of MA Degree in Project Management at St. Mary's University. The research aims to assess the effects of price escalation of construction materials on building project: The case of selected high rise building projects in Addis Abeba. Through this study, I would like to investigate the effect of price escalation of construction materials that currently exist in the construction of building projects to give the way forward and lesson to be learned.

All the information you provide will be kept in strict confidentiality and it will be only used for academic research. I value your participation and thank you for the commitment of time, energy and effort. If you have any further questions, we can be reached at the address below.

Sincerely,

Bethelehem Admasu

Phone no.- 09-28-83-08-51

Email:- betiadmasu21@gmail.com

INTERVIEW

1. How do you explain your experience in the construction industry?

   Year of service_____

   How many and what type of projects you work on? _____

   How many of them you execute with in time and budget? _____

2. How strong is your projects' financial management system?

   _____

   _____

   _____

3. In your current building construction project did you experience price escalation?
   a) Yes b) No
4. How do you level the occurrence of price escalation in your project throughout the contract duration?

   a) Most Frequent b) Frequent c) Least Frequent
5. If yes to question no 3, how much was the percentage of escalation?

   _____

   _____

6. If yes to question no 3, what were the major factors/ causes for price escalation in your project?

   _____

   _____

   _____

7. How do you describe the current price escalation and adjustment practice on your building projects?

   _____

   _____

   _____

8. What are the major problems or challenge of price escalation and adjustment practice occurred in your project?

   _____

   _____

   _____

9. What are the major effects of price escalation of construction material on building project?_____

   _____

_____

_____

10. How did you mitigate the price escalation? Or what do you recommend to improve the problem in price escalation at your project?

_____

_____

_____

FOCUS GROUP DISCUSSION

1. Which contract form does use in your current project?

PPPAA 2011 □ PPA 2006 □ MoWUD 1994 □

FIDIC 1999 □ MDB FIDIC 2006 □

2. What do you think of the current price adjustment administration practice in buildings construction projects?

Excellent □ Very good □ Good □ Satisfactory□ Poor □

3. What are the factors causing construction materials price escalation on building project?

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_____
_____

4. What are the effects of price escalation of construction material on building projects?

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5. What are the existing price escalations and adjustment practices in building projects?

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6. What are the major problems or challenge of price escalation and adjustment practice occurred in your project?

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