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DEPARTMENT OF BUSINESS ADMININSTRATIONA AND INFORMATION SYSTEM (BAIS)

ASSESSING THE MAIN CONTRIBUTING FACTORES OF COST OVERRUN: IN THE CASE OF 20/80 HOUSING PROGRAM OF ADDIS ABABA CITY ADMINSTRATION

BY:

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Declaration

I, **Yohannes Adamu Getnet**, have carried out independently a research work on the main contributing factors of cost overrun on 20/80 housing programs in the case of Addis Ababa City Administration" for partial fulfillment of the requirement of the MAP program in project Management with the guidance and support of the research advisor.

This study is my original work and that has not been presented for any degree or diploma program in this or any other university/institutions, and that all source of materials used for the thesis have been duly acknowledged.

Declared by: **Yohannes Adamu**

Signature: _____

Date: _____

Endorsement

This is to certify thatYohannes Adamu Getnet has carried out his research work on the topic entitled **“the Main contributing factors of Cost Overrun on 20/80 Housing Programs in the case of Addis Ababa City Administration”**. The work is original in nature and is suitable for submission for the reward of the M.A Degree in Project Management.

Supervisor: Dr. Abudurazak Mohammed

Signture _____

Date _____

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List of Abbreviations

AAHPO – Addis Ababa Housing project office

AI – Average Index

ECT – And so on

EC – Ethiopian Calendar

FI – Frequency of Index

GTP – Growth and Transformation Plan

G+1, G+2, G+7 - Ground plus

MoFED – Ministry of Finance and Economic Development

MoWUD- Ministry of Works and Urban Development

SPSS – Statistical Products and Service Solution

PPPs– Public-private partnerships

US – United State of America

UK – United Kingdom

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ABSTRACT

Construction industry contributes significantly in improving socio-economic growth of a country. However, this industry usually faces chronic problems such as time overrun, cost overrun, poor quality and others. Of all these, cost overrun is a major problem that occurs globally including Ethiopia. Hence, this study focused on identifying the main contributing factors of cost overrun for 20/80 housing construction projects in the case of Addis Ababa City Administration. Data collection was done through structured questionnaire and office document review, which was designed based on 25 factors found from the literature. A total of 60 questionnaires were distributed to clients, consultants and contractors and 48 questionnaires were collected and which 44 responses were found valid. Descriptive statistics methods were employed through frequency Index/ mean score and average Index to understand the variables of cost overruns, the frequency of occurrence and significant impacts of each causative factor on the studied area. The findings from the study identified that, from 25 identified factors, only the most causative factors are 22 and the top five factors are Material shortage in the local market, delay preparation and approval of drawing, change order or rework, Labor cost increased due to environmental restriction, Change in foreign exchange rate/ for imported materials. Likewise, based on the possibility of occurrence the top five were identified, these are-payment delay for contractors, contractors financial difficulties, power interruption, incorrect quantity take-off, change in foreign exchange rate. Meanwhile, based on significant impacts of factors were identified. The most frequent way of using bidding methods in Addis Ababa housing program especially in 20/80 was open tendering. The overall effects that occurred in housing programs revealed through survey are – low productivity, project delay, low quality housing handover to beneficiaries or tenants, disputes among stakeholders E.T.C. Meanwhile, cost discrepancy of approved budget from actual cost for 20/80housing programs is 18.1%.

Key Words: housing programs, cost overrun, public housing

CHAPTER ONE
INTRODUCTION

1. Background

This study will analyzes the root causes, the impact and the overall effects of cost overrun on governmental 20/80 housing project undertaking by Addis Ababa city Administration. Construction industry is a very important industry that plays a vital role in the socioeconomic growth of a country. Economically, it contributes significantly in the improvement to the overall GDP of a country. It also improves the quality of life by providing necessary infrastructure such as houses, roads, hospitals, schools and other basic and enhanced facilities. Hence, it is fundamentally crucial to make the construction projects complete successfully within the time, budget and quality expected. However, being a complex, fragmented and schedule driven industry it is always facing chronic problems such as low quality, low productivity, cost overrun, time overrun, construction waste etc. Of these, cost overrun is the major problem as money is always of high importance.

Cost is the fundamental component for any construction project andis among the major considerations throughout the project management life cycle and can be regarded as one of the most important parameters of a project and the driving force of project success. Despite its proven importance, it is not uncommon to see a construction project failing to achieve its objectives within the specified cost. Cost overrun is a global phenomenon in the construction industry and very rarely projects are finished within the budgeted cost. Identifying the contributory factors that appear this variation is a crucial aspect to secure the project success. However, cost overrun is observed as one of the most frequently occurring issues in construction projects worldwide and need to be studied more to alleviate this issue in the future.

The issue of cost overrun in construction projects is very dominant in both developed and developing countries likes Ethiopia, but this trend is very severe in developing countries like Ethiopia, where these overruns sometimes exceed 100% of the anticipated cost (Azhar, Farooqui, & Ahmed, 2008).

If project costs exceed their planned targets, client satisfaction could be compromised. The funding profile may no longer match the budget limit and the resulting effects are detrimental,

especially in the case of developing countries, Cost overruns have a debilitating effect on clients, contractors and consultants in terms of growth in adversarial relationships, mistrust, litigation, arbitration, cash flow problems and a general feeling of trepidation towards each other (Ahmed et al., 2002).

1.1. Brief History of Housing Program in Ethiopia

Condominium housing program in Ethiopia cited by United Nations Human Settlement Program (2010) revealed that, during the first half of the twentieth century, at the time of Emperor HaileSelassie, land and housing in Ethiopia were controlled by a select few individuals and groups who owned and tightly controlled land and housing development. Low-income households had little option but to rent housing and this was done outside of any formal control or planning system. In 1962, for example, 58% of the land in Addis Ababa was owned by only 1,768 individuals, equating to ownership of over 10,000m^2 each, and leading to 55% of housing units being rental housing.

In 1974 evolution is the result of overthrow of Emperor HaileSelassie and means of established the 'Derg' regime. In July 1975, Proclamation No. 47: 'Government Ownership of Urban Lands and Extra Houses' nationalized all urban land in an effort to force a fairer distribution of wealth across the country. During this time, two new typologies in the housing sector were established: Government-owned rental units, administered by the Agency for the Administration of Rental Houses, and Kebele Housing managed by Kebele Administration units, the smallest government administration unit, operating at the neighborhood level. During this time approximately 60% of housing in Addis Ababa was rental accommodation and Kebeles accounted for 93% of this rental accommodation.

Since the overthrow of the 'Derg' by the Ethiopian People's Revolutionary Democratic Force (EPRDF) in 1991, Ethiopia has been undergoing market-orientated reforms, structural adjustment policies, decentralization of governing structures, and a programmed of agricultural development-led industrialization.In 1994, Following the new constitution and federal system of government, a rural development policy and named the Land Reform Program was introduced. Addis Ababa's first housing policy, incorporating the Government's practice of maintaining

public ownership, was also implemented at this time but it assumed that the housing market alone would meet the demand for affordable housing of the low-income population.

After the 1974 Ethiopian revolution, the rapid growth of population in Addis Ababa presents extraordinary pressure on the existing housing policy and on the entire infrastructure like- water, electrical power supply, drainage and roads. Planned development of the past was unable to meet the needs of the community and forced to develop public housing re-development plan in GTP I and II (Condominium Housing Program in Ethiopia cited by United Nations Human Settlement Program (2010)). The government estimates that the current housing deficit is between 900,000 and 1,000,000 units in urban areas and took considerable effort to improve the housing conditions in Addis Ababa city by maintaining different housing programs like- 10/90, 20/80 and 40/60 respectively. Housing construction started from G+2 buildings. Currently, G+4, G+7 and G+12 buildings are under construction. From those 20/80 takes the largest part.

According to housing project office now on the Addis Ababa city administration delivered 108,482 houses to tenants through the program of 20/80 in the year 2005 up to 2014 and makes 49,970 males and 58,512 females' benefited and 94,072 houses were under constructed.

Cited by Addis Ababa Saving Houses Development Enterprise (2016), the initial estimated selling price changed in to unspecified amount due to inflation of construction materials, labor costs and design changes. However, most of the projects are running behind schedule and have cost overrun which has brought serious backlash from people saving money.

1.2. Statement of the Problem

The inability to complete projects on time and within budget continues to be a chronic problem worldwide and is worsening. Cost overruns on construction projects are a universal phenomenon. Azhar (2008) states that the trend of cost overruns is common worldwide and that it is more severe in developing countries, like Ethiopia. In Ethiopia, the current government formulated different housing strategies to minimize the residential shortage; it can be constructed by saving of tenants and subsidiary of government. This shows there is scarce resource in terms of finance and land. Allocated budget which is initially estimated is not met due to different factors that rose from involved parties, from the initial start up to execution of the projects. The most causes of cost escalation on governmental housing projects that are identified by Addis Ababa housing

project (2016) is - price fluctuation of materials, power interruption, labor cost, design changes, mismanagement and supervision, poor capacity of some contractors and procurement procedures.

Despite its remarkable achievements, there remained several weaknesses that impose governmental housing projects to cost overrun and all need to be eliminated or mitigated to ensure accomplished the projects within allocated time and budget. A crucial aspect of governmental public housing projects that needs to be focused on identifying the root causes of cost overrun in current phenomena. Different literatures proven that, Housing projects across the world in different countries are entrapped by various types of causes, some are- inadequate or inefficient equipment, tools and plants , unreliable sources of materials on the local market, inadequate manpower, (e.g., in terms of numbers, poor training, lack of training, etc.), delayed payment to contractors, subcontractors and/or suppliers , rework required due to poor work or the wrong materials used by contractors , change of work scope and/or changes in material specifications, poor communication among stakeholders (e.g., slow responses to site queries, late receipt of drawings, etc.), disputes among the parties involved in the project (clients, contractors, consultants) , high inflation, insurance and interest rates , contractor's work load, bureaucracy, site accidents.

The broader area in which this study falls is the Addis Ababa housing construction project. Particularly, the study was analyzing **the main contributing factors of cost overrun in the case of 20/80 housing program of Addis Ababa city administration.** The condominium housing sector have been subjected to research for so long and remain the topic of research priority primarily due to the critical role they play in improving the livelihood of the poor and economic development. In Ethiopia this sector in were studied extensively from different perspective. However, studies relating to the factors contributing to cost overrun in the housing program are sparse. Thus, the current proposed study will address and try to fill the gap. The study covers**5 years from 2011 to 2015.**

After conducted the research, enables the stakeholders to aware criticality of those factors and additional causative factors that led to cost escalation besides city administration and stakeholders revealed, and also concurrently shows the impact and the overall effects of

costoverrun in the housing programs execution. In spit to this the study also intended to contribute knowledge in the area of housing construction industry in the case of Ethiopia.

1.3. Research questions

This study addresses and seeks answer to the following specific research questions:-

1. What are the main contributing factors of cost overrun in Addis Ababa housing program specially 20/80?
2. What is the level of cost overrun in 20/80 governmental housing programs?
3. What are the main effects of cost overrun in housing construction?
4. What are the main facilitators of cost overrun in 20/80 housing construction?

1.4. Objectives of the Study

By taking the background of above avowed problems in the public housing construction, the study formulates the following objectives:

1.4.1. General Objectives

The overall objective of the research is examining the main contributing factors and over all effects of cost overrun on governmental public housing construction specially 20/80 undertaking by Addis Ababa City Administration housing construction project office over the period of 2011 to 2015.

1.4.2. Specific Objectives

These specific objectives are:

1. Identifying the main causes of cost overrun will be occurred on 20/80 public housing construction.
2. Identifying the overall effects of cost overrun in 20/80 public housing industry.
3. Identifying the stakeholders that will be directly liable for the main causes of cost overrun.
4. Identifying the rate of cost overrun between main governmental public housing construction projects (20/80 housing projects).

5. Identifying the rate of discrepancy between costs overrun and contract amount on 20/80 housing project.
6. Forwarding recommendation for each stakeholder.

1.5. Definition of Terms

For the purpose of this research,

1. **Cost Overrun** is defined as the difference between the final actual cost of a housing construction projects at completion and the contract amount that was agreed or approved by the concerned parties (Wideman, 2002).
2. **Public Housing** – is housing owned and run by a local public housing authority and aim established to provide decent and safe household housing for eligible low income families, elderly and persons with disabilities (cited by U.S Department of housing and urban development(2016)).
3. **20/80 Housing Scheme**- it refers tenants are expected to pay 20% as a down payment, and the rest will be paid within 15- 20 years (Alebel, Berihu, and Simon2016).

1.6. Significance of the Study

Overall, this study can be relevant for: firstly, it will contribute to the literature on cause of cost overrun and its overall effect of government housing program and it analysis in general in the Addis Ababa context; Secondly, it will stimulate all involved parties or practitioners look for more effective solutions for the identified root causes of cost overrun in the case of Addis Ababa city Administration housing programs specially 20/80. Third, the findings and evidences of the study is used by the concerned body with insight information by which they can consider possible remedial actions to minimize the causes and negative impacts of cost overrun that exist in governmental public housing construction projects. Besides, the study try to identify and drawn attention to researchers, potential researchable areas that require further extensive investigation that can serve as an ideal laboratory for understanding issues related to government public housing program in Addis Ababa.

1.7. Scope of the Study

Cost overruns, for governmental public housing construction projects, are caused by many factors. Each causes of cost overrun will have various likelihood occurrence and impact on the final cost of the housing construction project. Therefore, it is important to identify both key causes of cost overrun based on their occurrence and impact on governmental public housing construction projects that intended to execute or to be implemented in Addis Ababa city administration housing project office. The overall effects of cost overrun on the stakeholders, on the housing construction industry, and on the local economy are identified.

Thescopes of the proposed research were limited to governmental public housing construction projects that are implemented in Addis Ababa city administration. The respondents involved in data collection are consultants, clients, and contractors and limited to the construction practitioners who have more than five years of experience in the construction industry. Panel data for the period of five years (2011-2015) were used. The entire 20/80government housing programs operating in Addis Ababa that is finished in the prescribed year were included in the research.

1.8. Organizational of the proposed study

This research is presented in four parts. The first section is the introductory and consists of the background of the study, statement of the research problem and research questions, objectives of the study, significance and contribution of the study, scope of the study and organization of the study. The second part presents the theoretical and empirical studies reviewed. The third section deals with the method of the study. Finally the result and recommendation are included in the fourth section. The study were structured around the objectives and contributions outlined.

Chapter One: Introduction

Chapter Two: Review of relevant Literature

Chapter Three: Methodology

Chapter Four: Descriptive Analysis

Chapter Five: Empirical Results and Discussion

Chapter Six: Conclusion and Recommendations

CHAPTER TWO

2. LITERATURE REVIEW

Construction industry is necessary in every country to provide physical developments which help in improving social and economic needs of country (Abedi, Mohamad, &Fathi, 2011). Likewise other countries, in Ethiopia construction industry trend in the past 10 years shows a yearly growth rate of 12.43 and this shows a share of 5.3% of the country's GDP (ECIDP, 2014). Hence, construction industry has been growing rapidly worldwide. Flyvbjerg, Holm, & Buhl (2003) in their global study concluded that cost overrun is a major problem in the construction industry, where 9 of 10 projects are faced by these overruns which commonly range between 50 to 100%. In developed countries like UK also construction industry is affected by this problem (Olawale& Sun, 2010) and nearly one third of the client's complaint that their projects generally overrun the allocated budget (Jackson, 2002).

In Ethiopia, since the introduction of condominium housing construction about a decade ago, the dominant housing topology has changed from single to multi-story (up to G+12) to maintain the population density of the core areas of major cities, particularly Addis Ababa where the site of multi-story condominium buildings has become common. The design of each condominium block constitutes various typologies, Condominium housing in Ethiopia (2011). Due to the expanding of public housing construction projects in Addis Ababa time to time, the housing projects exposed to different factors that lead cost overruns, time delays and low quality works. According to Addis Ababa city Administration housing project office (2016), the major determinates of cost escalation are: inflation of construction materials, labor costs, design changes, power interruption, poor capacity of some contractors and mismanagement in supervision and procurement procedures.

This research review has three sections:-

1. Section 1 presents a review of the theory of main causes of cost overrun in housing construction projects in summary.
2. Section 2 presents a review of the relevant empirical evidences on cause of cost overrun and its effects in the housing construction industry.
3. Finally, conclusion and knowledge gap present in the third.

2.1. Theoretical Review: Cost Overrun

According to Azhar et al (2008), cost is one of the major considerations throughout the lifecycle of a project. Unfortunately, most of the projects failed to achieve project completion with the estimated cost. This is a major problem both in developed and developing countries, like Ethiopia. The trend is more severe in developing countries where these overruns sometimes exceeds 100% of the anticipated cost of the project (Azhar et al. 2008).

The history of the construction industry worldwide is full of projects that were completed with significant amount of cost overruns (Olawale& Sun, 2010). Despite the wide availability and use of different project management methods and software packages, many construction projects still suffer cost overruns (Olawale& Sun, 2010). Developed countries have lessons to learn as well since cost overrun in the construction industry is a worldwide phenomenon (Ameh, Soyingbe, &Odusami, 2010) and its ripples are normally a source of friction among clients, consultants and contractors on the issue of project cost variation. Project cost overruns create a significant financial risk to clients. However, in spite of the risks involved, the history of the construction industry is full of projects that were completed with significant cost overruns (Garry, 2005). Like other developing countries, Ethiopia construction industry is also facing a lot of challenges in completing the construction projects within the estimated cost (fetene, 2008) and from his desk study finding concluded that more than 97% of public building construction projects are suffered by cost overrun.

2.1.1. Definition of Cost Overrun

Cost overrun is also called "cost escalation," "cost increase," or "budget overrun" (Zhu & Lin, 2004 in Enshassi, Al-Najjar, &Kumaraswamy, 2009). Cost overrun defined by different researchers in different way, but the most comprehensive and expressive way of definitions compatible for this study is:

Cost Overrun: is the excess of actual cost over budgeted cost which occurs when the final cost of the project exceeds the original estimates (Azhar et al., 2008).

Or

Cost Overrun: is measured as a percentage of actual costs over the estimated costs of the project (Cantarelli, 2009; Choudhury&Phatak, 2004) as shown in expression below:

Cost Overrun = (Actual Cost−Estimated Cost)/Estimated cost

Or

Cost Overrun- The amount by which actual costs exceed the baseline or approved costs (Wideman, 2002).

For the purpose of this research, it is defined as the difference between the final actual cost of a housing construction projects at completion and the contract amount that was agreed or approved by the concerned parties (Azhar et al., 2008).

2.1.2. The Main Causative Factors of Cost Overrun in Construction Industry

Factors that could influence construction costs are numerous. Chan and Park, (2005), stated that the cost of a construction project is affected by a large number of factors because of the fact that construction is a multidisciplinary industry and its work involve many parties such as the project owner and various professionals, contractors and suppliers. Thus, a construction project cost not only depends on a single factor but a cluster of variables that are related to the characteristics of the project and to the construction team as well as the market conditions.

Therefore, it is very crucial to determine these root causes in improving cost performance. Since, in different countries many research works had been carried out in determining these root causes of cost overrun in construction industry, hence a comprehensive literature review was carried out to uncover these main factors affecting cost overrun in public housing construction projects in the case of Addis Ababa city Administration.

Aftab, Ismail, Ade (2011),structural modeling of cost overrun factors in construction industryidentifies common factors causing construction cost overrun are poor design & delays in Design, unrealistic contract duration & requirements imposed, lack of experience, late delivery of materials & equipment, relationship between management & labor, delay preparation & approval of drawings, inadequate planning & scheduling, poor site management & supervision and mistakes during construction were most common and significant factors causing cost overrun in Malaysian construction industry.

Kaming, Olomolaiye, Holt, & Harris (1997), they identified factors influencing construction cost overruns on high-rise building projects in Indonesia through a questionnaire survey administered on 31 project managers. The results showed that top factors that increase project cost were

materials cost increased by inflation, inaccurate quantity take-off, labor cost increased due to environment restriction, lack of experience of project location, lack of experience of project type, unpredictable weather conditions and lack of experience of local regulation.

Jackson & Steven (2001), examined the causes of cost overrun in building projects of Ilorin through questionnaire survey and found that main factors were fluctuation in the prices of materials/Labor, variation orders, delay in honoring certificates, lack of proper analysis of tenders, selection of incompetent contractors, lack of proper appraisal of projects and unrealistic representation of client's needs.

Nabil, Zaydoun, Hesham (2017), examined the causes of cost overrun in Infrastructure Projects in Jordan on a sample of 40 public infrastructure projects and found that terrain conditions, weather conditions, new variation orders, cost of variation orders, mistakes in design, emergency working , poor scheduling of time , and poor planning of cost for the infrastructure projects.

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.

A study conducted by Fetene, (2008) on predominant factors for cost overrun in public building construction projects in Ethiopia are identified the following major cost overrun factors. These are inflation or increase in the cost of construction materials, poor planning and coordination, change orders due to enhancement required by clients, and excess quantity during construction.

Long, Lee, and Jun Yong Lee (2008)delay and Cost Overruns in Vietnam Large Construction Projects**,** they conducted questionnaires and interviewing survey on 78 Vietnams experts, they investigated 21 main causes of cost overrun, top five causes of cost overrun in large construction projects are poor sit management and supervision, poor project management assistance, financial difficulties of owners, financial difficulties of contractor and design changes.

Azhar et al. (2008) investigated cost overrun causes in construction industry of Pakistan showed that the top ten cost overrun factors found were fluctuation in prices of raw materials, unstable cost of manufactured materials, high cost of machineries, lowest bidding procurement procedures, poor project (site) management/ poor cost control, delays between design and procurement phases, incorrect/ inappropriate methods of cost estimation, additional work, improper planning, and unsupportive government policies.

Preliminary Study on Causative Factors Leading to Construction Cost Overrun conducted byAftab, Ismail &Ade Asmi(2011) that occurred in Malaysia construction. The top ten causes identified are poor design and delays in design, Unrealistic contract duration and requirements imposed, lack of experience, late delivery of materials and equipment's, relationship between management and labor, delay preparation and approval of drawing, inadequate planning and scheduling, Poor site management and supervision, mistakes during construction and change in material specification and type.

Henry, Ruth and Dan (2013) revealed the main causative factors in the case of Uganda public constructions are: changes in the work scope, high inflation and interest rates, poor monitoring and control, delayed payments to contractors and fuel shortages. Meanwhile the top five factors that were ranked the highest in terms of their impact on cost overruns were changes in the work scope, high inflation and interest rates, fuel shortages, poor monitoring and control and delayed payments to contractors.

Ismaaini, Ismail Abdul and Aftab(2013), Study of Factors Causing Time and Cost Overrun throughout Life Cycle of Construction Project in the Case of Malaysia. The top six factors causing cost overrun in each phases are - Inadequate monitoring and control (construction phases), Mistakes and Errors in design(design & construction phase), Incomplete design at the time of tender (design phase), Poor design and delays in Design(design phase), Contractual claims, such as, extension of time with cost claims(construction phase), high cost labor, labor absenteeism, fluctuation of prices of materials and inaccurate quantity take-off (construction phase).

Delays and cost increases in the construction of private residential projects in Kuwait conducted by P.A. Koushki, K. Al- Rashid and N.Kartamy(2015), comprises of 170 private residential project owners and 27 developers in the study, they revealed the top five causes of cost overrun

occurred in private residential projects in Kuwait are related with contractor problem, material related problem, owners financial constraints, change orders and bad weather condition.

Causes of Contractor Cost Overrun in Construction Projects in the Case of Ethiopian Construction Sector conducted by Zinabu and Getachew (2015), through involving 140 contractors, consultants and clients on their questionnaires survey, they revealed the top five factors that causes cost overrun in construction projects on the side of contractors are poor planning, fluctuation of prices of materials, poor productivity, inflationary pressure and project financing.

2.1.3. The Overall Effects of Cost Overrun in Construction Industry

Kodwo sites on Mbachu and Nkado(2004), 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/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/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 (Mbachu and Nkado, 2004). All these consequences undermine the viability and sustainability of the construction industry.

In Ethiopia, according to the finding of FeteneNega (2008), the common effects of cost overrun in general in the country are : project delay, 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, Poor quality workmanship, dissatisfaction by project owners and consequently by end users, Negative attitude towards the construction industry by the higher public authority and by the society as a whole,

The contribution of the construction industry to the growth of national economy of the country will be less, Cost overruns in construction projects prevent the planned increase in property and service production from taking place (this phenomenon in turn affects, in a negative way), Weakens the growth of the construction industry by eroding mutual trust and Respect, Pours money unnecessarily to the project at hand at the expense of other new projects, Distorts fair and equitable resource distribution, Discourage investment (the investment on building construction by public clients will be less, hence the number of projects will decrease in the future), Creates skeptical outlook on appraisal of other new construction projects, Some project owners (clients) become reluctant to effect additional payments to contractors and they view the cost overrun as a fabricated thing.

2.1.4. Mitigation Measures for Controlling Cost Overrun

Construction project delay and over budget have been a major setback in the last decades and is an even more serious issue in developing nations. Awareness regarding this phenomenon seems high while tremendous effort has been placed in identifying its contributors and mitigation plans but time and cost overrun still remains an important topic within the industry, Nadzirah sites on (Riazi, & Fiona, 2013). Keeping construction projects within estimated costs and schedules requires sound strategies, good practices, and careful judgment. There are, however, steps that can be taken to minimize their causes and effects of cost overrun, the major one is using efficient project management tools and practices.

In response, measures are required that together address the varied causes of escalating project costs. According to Matti(2015), below are some promising approaches, drawn from international best practices, to reduce construction cost overruns.

2.1.4.1. Enhance Performance Monitoring, Reporting, and Information Sharing

The world is in the midst of a big data and analytics revolution. Sophisticated new methods are being developed to improve performance by collecting and statistically analyzing massive amounts of data. Yet infrastructure megaproject delivery remains a sector that has been largely untouched by this trend. International research on infrastructure project cost overruns has identified a lack of systematic tracking across government departments of how project cost estimates at the time of project approval compare with the outcome. As a result, limited institutional learning from past experience is taking place and information is not being harnessed in real time to improve decision-making. Cities should therefore

require that data on procurement performance be collected for all infrastructure projects over a minimum cost threshold. Data collection should be coordinated through a central department and conducted through a single software application.

2.1.4.2. Reward Good Performance

Long-term, sustained improvements in performance are greatest when incentives reward individuals or firms that rank at the top of their league table, while penalizing those that fail to meet performance expectations.

2.1.4.3. Enhance the management capabilities of staff

Weak project management by city staff has been identified as a common source of cost overruns. There is a growing need for city government staff with specialized skills to manage the complex relationship between the public and private sectors.

2.1.4.4. Make Selective Use of Public-Private Partnerships

Public-private partnerships (PPPs) have become increasingly popular as a procurement model. To date, provincial governments have been the primary users of PPPs. PPPs have two main features designed to incentivize on-time and on-budget project delivery. First, they bundle multiple aspects of project delivery, such as facility design, construction, operations, and maintenance into a single contract. This creates a level of integration within the consortium of designers, builders, and operators of the facility right from the planning stages of the project. Second, PPPs function as pay-for-performance contracts in which the private-sector concessionaire finances all or a portion of the initial construction costs of the project. The private-sector partner is repaid its initial investment in the project by government or through user fees over the entire life of a long-term operating concession that can last between 25 and 50 years, provided that service quality standards in the contract are met. Having a significant amount of private capital at stake during the construction of a project provides an incentive for the contractor to meet performance objectives and gives greater leverage to the government client to enforce the terms of the contract.

According to Parviz F. Rad (2002),Mitigationmeasures were classified into three categories in accordance with implementation strategy as pro-active, re-active and organizational measures. These measures will be helpful in cost performance at different stages from planning as proactive

measure to construction as reactive measure. Some of the measure may be fluid and applicable in applied at both planning and execution stage.

According to Siemiatycki(2015),Mitigation measure to improve cost performance are effective strategic planning, Proper project planning and scheduling, Effective Site management and supervision, frequent progress meeting, Proper emphasis on past experience, Use of experienced subcontractors and suppliers, Use of appropriate construction methods, Use up to date technology utilization, Clear information and communication channels, Frequent coordination between the parties, Perform a preconstruction planning of project tasks and resources needs, Developing human resources in the construction industry, Comprehensive contract administration, Systematic control mechanism, Improving contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors.

2.1.5. Project Lifecycle (Phases) for Construction Projects

The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project's objectives. Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful), Watt (2016).

According to watt (2016), A standard project typically has the following four major phases, that is- initiation, planning, implementation, and closure. Taken together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project "life cycle."

2.1.5.1. Project Initiation Phase

According to Watt, 2016 cited in his web-site, during initiation phase, the project objective or need is identified; this can be a business problem or opportunity. An appropriate response to the need is documented in a business case with recommended solution options. Once the recommended solution is approved, a project is initiated to deliver the approved solution and a project manager is appointed. The major deliverables and the participating work groups are identified, and the project team begins to take shape. Approval is then sought by the project manager to move onto the detailed planning phase.

2.1.5.2. Project Planning Phase

The next phase, the planning phase, is where the project solution is further developed in as much detail as possible and the steps necessary to meet the project's objective are planned. In this step, the team identifies all of the work to be done. The project's tasks and resource requirements are identified, along with the strategy for producing them. This is also referred to as "scope management." A project plan is created outlining the activities, tasks, dependencies, and timeframes. The project manager coordinates the preparation of a project budget by providing cost estimates for the labor, equipment, and materials costs. The budget is used to monitor and control cost expenditures during project implementation (Watt 2016).

Fetene cited on (parker 1998), most owner and designer cost control problems are created at the planning stage of a project. At this time, clients need sometimes are understated in order to justify a project more often than not, client needs are not fully known and thus are oversimplified.

Lack of communication between parties, Delays in decisions making, Inadequate planning and scheduling, Lack of experience, Inaccurate Time and Cost estimates, Change in the scope of the project are factors contributing to cost overrun, Ismaaini, Ismail Abdul and Aftab(2013).

2.1.5.3. Project Implementation Phase

During the third phase, the implementation phase, the project plan is put into motion and the work of the project is performed (Watt 2016). It is important to maintain control and communicate as needed during implementation.

According to Ismaaini, Ismail Abdul and Aftab(2013), Factors related to project cost overrun in this stage are:- Incompetent subcontractors, Schedule Delay, Mistakes during construction, poor financial control on site, Delay in progress payment by owner, Delay payment to supplier /subcontractor, labor productivity, Shortage of technical personnel (skilled labor), Inadequate monitoring and control, Mistakes and Errors in design, contractual claims, such as, Inaccurate quantity take-off, Time & Cost overruns Poor site management and supervision, Inadequate planning and scheduling, Lack of experience, Frequent design changes, Cash flow and financial difficulties faced by contractors, Financial difficulties of owner, Shortages of materials, Poor project management and Change in the scope of the project.

2.1.5.4. Project Closing Phase

During the final closure, or completion phase, the emphasis is on releasing the final deliverables to the customer, handing over project documentation to the business, terminating supplier contracts, releasing project resources, and communicating the closure of the project to all stakeholders. The last remaining step is to conduct lessons-learned studies to examine what went well and what didn't. Through this type of analysis, the wisdom of experience is transferred back to the project organization, which will help future project teams (Watt, 2016).

According to Ismaaini, Ismail Abdul and Aftab(2013), Factors related to project close out Phase, Poor financial control on site, Delay payment to supplier /subcontractor, Lack of communication between parties, Labor productivity, Cash flow and financial difficulties faced by contractors, Shortage of site workers, Late delivery of materials and equipment, Change in the scope of the project are factors.

2.2. Cost Estimation in Housing Construction Projects

Washington State of Transportation institution (2015),define Cost estimating is the predictive process used to quantify, cost, and price the resources required by the scope of the project, to better manage budgets and deliver projects that do not exceed the identified scope, and that are on time throughout the development process. And also avowed simultaneously, estimation process can be seen in four areas, lasso szonyi (20011):

- **To state financial plan-** it is affected as cost estimates are used to obtain and allocate funding for the overruns of the estimated project costs.
- **To Public satisfaction-** is increased if housing construction projects show and prove to the general public that they are timely and within budget.
- **To Project control-** relies on cost estimates to help keep projects within the appropriate fiscal boundaries. Although not necessarily a "check and balance" format, the existence of the original estimate will keep the project from growing and expanding beyond its spending limit.
- **To projects encounter problems,** and their estimates come "under fire," great scrutiny is given to the project and its associated estimates. The ability to confront and solve problems and obstacles relies in large part on the quality of the estimate and the documentation, which, if done properly, will provide critical support to project success.

2.2.1. Cost Estimation Methodology

According to Washington State of Transportation institution (2015), cost estimating methodology can be applied in housing construction at various stages of project development stages. This includes:-

1. **Parametric methods-** are to be applied to housing projects in the planning, scoping, or early design stage. These methods involve techniques that use historical data to define the cost of the typical housing construction using measurements that are easily determined, such as cost per one building, cost per interchange, and cost per intersection. Two techniques are commonly used in parametric estimating: (1) analogous (similar) projects and (2) historical percentages.

2. **Historical bid-based methods-** are commonly to be used to develop housing construction cost estimates, and are appropriate when design definition has advanced to the point where detailed quantification of bid items is possible. The unit cost prices used are collected and stored from prior projects. They should be modified or adjusted to reflect current prices and project-specific conditions such as geographic location, quantity of items needed, and the scheduled timing of project advertisement.
3. **Cost-based estimate methods- are** based on estimating the contractor's cost for materials, equipment, and labor for an item or a set of items. Estimated contractor overhead and profit are added. This may be appropriate in situations where historical unit prices are not available, or where historical bid-based information is not suitable for the project under consideration. Contractors also generally utilize a cost-based estimating approach to prepare their bids. This method can be used to support the decision for contract award/rejection and to support any future price negotiations with the contractor after contract award.
4. **Risk-based estimate methods-** are to be used the probabilistic relationships between base cost, base durations, and risks related to the housing construction projects. This approach may incorporate a variety of techniques, including historical data, cost-based estimating, and the best judgment of subject matter experts for given types of work.

2.3. Project Procurement Management

It includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team. The organization can be either the buyer or seller of the products, services, or results of a project. It includes the contract management and change control processes required to develop and administer contracts or purchase orders issued by authorized project team members, Project management Institution (2013).

2.3.1. The Main Process of Project Procurement Management

2.3.1.1. Plan Procurement Management

It is the process of documenting project procurement decisions, specifying the approach, and identifying potential sellers. The key benefit of this process is that it determines whether to acquire outside support, and if so, what to acquire, how to acquire it, how much is needed, and when to acquire it. Meanwhile, the basic inputs that needed to perform this process are – project management plan, requirements documentation, risk register, activity resource requirements, project schedule, activity cost estimate, stakeholder registration, enterprise environmental factor and organizational process asset (project management institution,2000).

2.3.1.2. Conduct Procurements

Conduct Procurements is the process of obtaining seller responses, selecting a seller, and awarding a contract. The key benefit of this process is that it provides alignment of internal and external stakeholder expectations through established agreements (project management institution, 2013).

2.3.1.3. Control Procurements

It is the process of managing procurement relationships, monitoring contract performance, and making changes and corrections to contracts as appropriate. The key benefit of this process is that it ensures that both the seller's and buyer's performance meets procurement requirements according to the terms of the legal agreement, project management institution (2000).

2.3.1.4. Close Procurements

It is the process of finalizing all procurements involved in the project. The key benefit of this process is that it documents agreements and related documentation for future reference, project management institution (2000).

2.3.2. Procurement Procedures and Practices in Ethiopia (from Bidding to Contract Award)

Cited by World Bank (2003), Federal Governments of Ethiopia is using various procurement methods. The most are six – open tendering, two stage tendering, request for proposal, restricted tendering, requests for quotation and single source procurement.

TecleHagos and Mahelet(2009), states that open tendering is the preferred procedure of procurement. Under open tendering, the procuring entity must prepare an invitation to tender as well as tender documents. The invitation to tender must be brought to the attention of those who may wish to submit tenders by advertisement in newspapers that have wide circulation within the country.

The restricted Tendering, which is available if the costs of open tendering would be disproportionate to the value of the contract, is below the prescribed maximum. Restricted Tendering is also available if there are only a limited number of suppliers. Restricted Tendering is similar to "open tendering" except that the invitation to tender is given only to selected persons. Similarly the Direct procurement or single source procurement, which is available if there is only one supplier or if there is an urgent need, or if the procurement is for goods or services in addition to those already supplied under another contract. In this procedure, a Government department negotiates directly with the supplier (construction law of Ethiopia, 2009).

Request for Proposals, which is available to procure services that are advisory or are of a predominantly intellectual in nature. In this procedure, the procuring entity invites expressions of interest by publication of an advertisement in the press. The Procuring entity determines which persons who express interest are qualified to be invited to submit proposals. Similarly "Request for Quotations" (pro forma), which is available to procure goods that are readily available and for which there is an established market. In this procedure the procuring entity prepares a request

for quotations and gives it to selected persons. The successful quotation is the one with the lowest price that meets the requirements in the request for quotations, TecleHagos and Mahelet (2009).

"Negotiated procurement" occurs under a two envelop system, using sequential opening of the technical and financial proposals. Only those bids that meet the technical criteria are opened and the contract is negotiated with the lowest bid, in order to lower the price (construction law of Ethiopia, 2009).

Since March 2001, the Institution of financial regulation provide for the application of domestic preferences for local contractors, when it concerns local competition. Eligibility for the domestic preference for products of metal and engineering industries is deemed to be locally produced if the domestically added value is at least 15%. A preference formula is also being devised for local contractors.

According to institute of financial regulation in Ethiopia (2001), Contracts above certain money thresholds require MOFED (ministry of finance and economic development) approval (> Birr 500,000 for local bidding, and > 2 million for international bidding).

According TecleHagos and Mahelet(2009), Consultants are normally chosen from a short list of qualified firms, information on which is obtained from expressions of interest or through advertisement or from locally kept data bases. Except for small to medium size contracts (< Birr 200,000 and < 700,000, respectively), terms of reference are well prepared in most cases. For large contracts, which are more likely financed by external aid agencies, the Request for Proposals contains adequate information on the selection process and evaluation criteria, but this is not the case for locally funded contracts (institute of financial regulation in Ethiopia (2001).

2.4. Licensing and Registration of Contractors and Civil Engineering Consultants

2.4.1. Contractors

Cited by TecleHagos and Mahelet(2009), All contractors registering under the guidelines are required to register firstwith the Ministry of Trade in accordance with the Commercial Code of Ethiopia andrelated directives of the MoWUD(ministry of works and urban development).It is

after securing a registration certificate from the Ministry of Trade that an application for registration with the MoWUD can be entertained.

Every contractor has the option of submitting an application for registration as a contractor in any one of the following categories: -General Contractors, Building Contractors, Road Contractors and Specialized Contractors (construction law of Ethiopia, 2009):-

The criteria for registration of a contractor in any of the categories listed above differ based on the grade to which the contractor is applying. There are 10 grades which are categorized accordingly based on required skilled manpower and the construction cost of the project that the contractor is seeking to undertake (construction law of Ethiopia, 2009). General Contractors, Building Contractors and Road Contractors can register in the ten grades based on the following criteria, TecleHagos and Mahelet(2009) are:-

Grade 1 -CCB >20,000,000 and expected to have seven professional engineers.

Grade 2 -CCB up to 20,000,000 and expected to have seven professional engineers.

Grade 3 -CCB up to 15,000,000 and expected to have five professional engineers.

Grade 4- CCB up to 10,000,000 and expected to have five professional engineers.

Grade 5- CCB up to 5,000,000 and expected to have five professional engineers.

Grade 6- CCB up to 2,500,000 and expected to have two professional engineers.

Grade 7 - CCB up to 1,000,000 and expected to have two professional engineers E.T.C.

Once a contractor is registered as such, the registration shall be valid for a period of one calendar year beginning form the year of such registration.

2.4.2. Consulting Office

Consulting service vary discipline to discipline. Due to this variation, registration on consulting office can be consulting architects and engineers, consulting architects, general consulting engineers, or specialized consulting engineer. Consultants registering in office for consulting architects and engineers may participate in the preparation of total design documents for building and civil projects befitting their categories. Those consultants registered in the Office for General Consulting Engineers may participate in the preparation of all engineering design works befitting their category. On the other hand, applications for registration in the Office of Specialized Consulting Engineers may be submitted in the specific fields of engineering- like structural,

road, sanitary and mechanical, foundational, electrical, quantity surveying, and surveying (construction law of Ethiopia, 2009).

2.5. Empirical literature

The success of any project can be measured by various norms like time performance, cost performance, quality standards, achieving safety and health, etc. Atkinson (1999)stated that cost, time and quality serve as Iron Triangle for success of any project. Of these, cost performance is the most important indicator of project success (Frimpong et al., 2003; Olawale& Sun, 2010). It presents not only the firm's profitability but also the productivity of organizations at any point during the construction processes. It can be seen easily in the project account and is always used to measure project performance against the estimated target.

Unfortunately, construction industry in general has been experiencing poor cost performance which described its inability to complete projects within budget. This chronic issue is experienced worldwide and becoming more critical has been revealed in World Bank report in 1990. The report pointed out that 63% of the 1778 financed construction projects faced poor performance with overrun in budget at an average of 40% as cited by (Ameh et al., 2010; Zujo et al., 2010). For worldwide scenario, Flyvbjerg et al. (2003) had studied 258 projects in 20 nations which approximately US$90 billion worth of project with size ranging from US$1.5 million to $8.5 billion. They found that cost escalation happened to almost 9 out of 10 projects with an average of 28% higher than forecasted costs. The study concluded that cost performance has not improved over the time and its magnitude has not changed for the past 70 years. The problem of cost overrun is common issue in both developing and developed countries (Angelo & Reina, 2002) However, it is more severe in developing countries where actual cost exceeded 100% of the anticipated cost of the projects (Azhar et al., 2008).

2.5.1. Empirical finding on cost overrun in developing countries

Different research shows that most of the developing countries including Ethiopia still suffered by cost overrun in their public construction in general. Revealed by olawale& son (2010) and cited by Aftab (2013), the most are:-

- **India:** A study of 290 projects showed a total of Rs 20,024 cost over the contract cost of projects as Rs 27,568 with an average of 73% of cost overrun as cited by (Gupta, 2009).

- **Bosnia and Herzegovina:** In a study of 177 structures, it was found that the contracted price was not met in 41.23% of structures. Another study of 53 building projects including 29 new construction and 24 reconstruction projects showed that average cost overrun in reconstruction projects was 9.23% white it was 6.84% for new construction projects (Zujo et al., 2010; Zujo& Car, 2008).
- **Korea:** Lee (2008) investigated 161 projects which included 138 road projects, 16 rail projects, 2 airport and 5 port projects. Findings of study showed that 95% of road projects had cost overrun at rate of 50% of the project cost, all the rail projects faced cost overrun at the rate of 50% of projects cost while airports projects had overrun of more than 100% of project cost and port projects had approximately 40% of cost overrun.
- **Malaysia:** Malaysians Auditor General 2008 (in Khamidi, Khan, &Idrus 2011) showed that completion of electrified double track project between Rawang and Ipoh resulted in a cost overrun of RM 1.43 billion. Endut et al. (2009) analyzed cost overrun problems by investigating 308 public and 51 private projects (a total of 359 projects). They found that only 46.8% and 37.2% of public sector and private sector projects completed within the budget respectively with average cost deviation of the project was 2.08%. The maximum deviation was found as 80.76% of project cost.
- **Thailand:** Meeampol&Ogunlana (2006) studied cost performance on 99 highway construction projects and found that only 46 projects only were satisfied with cost performance while the others faced poor cost performance
- **Ghana:** Frimpong et al. (2003) studied cost performance of water drilling projects and found that 38 of total of 47 investigated projects (at a rate of 75%) were facing cost overrun whereas only 25% were completed within the budget.
- **Nigeria:** Jackson & Steven (2001) studied the problem of cost overrun by investigating 15 projects in all in and found that 73.7% project faced cost overrun at an average of 34.7% of the initial project cost. They also conducted a questionnaire survey and mentioned that only 10% respondents have not experience cost overruns at all while 75% of the respondents mentioned that cost overruns have sometimes occurred in building projects, 15% said it always occurred. Through 61 cases studies Aibinu&Jagboro (2002) found that the projects had a mean percentage cost overrun of 17.34%. Later on an investigation of 137 construction projects showed that 55% of projects were facing cost

overrun problem. These overrun ranged from 5% to a maximum amount of 808% of project cost (Olatunji, 2008). A research of cost escalation on infrastructure projects conducted by Omoregie& Radford (2006) showed that a minimum percentage of cost escalation was found as 14% of the budgeted cost.

- **Pakistan:** Azhar et al. (2008) stated that cost overrun was a common problem in construction projects. The minimum range of cost overrun experienced was found as near around the 10% of the total cost of the project. In large construction firms these overrun ranged up to about 40% while in medium size firms this percentage increased up to nearly about 60% of the project cost.
- **Zambia:** Kaliba, Muya, &Mumba (2009) studying the project performance in road construction projects of worth U$542.7 found that more than 50% of projects could not meet the contract budget and were facing cost overrun.
- **Uganda:** Northern by-pass project in Kampala was overrun by more than 100% and a study of a total of 30 projects showed that 53% of the projects had cost overruns (Apolot, Alinaitwe, &Tindiwensi, 2011).
- **Vietnam:** Government has acknowledged the construction cost overruns problem as the big headache, especially with government-related funded projects (Le-Hoai et al., 2008).
- **Ethiopia:** studied by Fetene (2008), from his field study of 70 public constructions projects, revealed that 67 out of 70, (95.7%) of public building projects suffered by cost overrun in their projects execution. For this building construction projects, the actual cost at completion exceeded by 0 up to 126% from contract amount.

2.6. Conclusion and knowledge gap in the literature review

The review of literature discloses the existence of gaps knowledge in respect of causative factors of cost overrun in housing construction projects and also it enhance to test the causative factors founded by different researchers are concurrently applicable in the case of public housing construction at the context of Ethiopian working habit. As per the researchers, there are investigations in developing countries like-Jordan,Uganda, Ghana, Ethiopia, Vietnam, and Malaysia E.T.C.

Let compare their identified causative factors according to ranked across each investigation of the country on the samples of the above Examples.

In the case of Jordan, Nabil , Zaydoun , Hesham (2017), The most important reason that leads to cost overrun was:-Terrain conditions occurred in 22.20% of the studied projects, Weatherconditionsoccurred in 15.3% of the projects of the study sample, New variation orders (10.2% of the sample), Cost of variationorders (1.9%), Mistakes in design (6.1%),Emergency working (3.2%), Poor scheduling of time (5.9%), and Poorplanning of cost (4.3%) for the infrastructure projects.

In the case of Ghana, Frimpong, et. Al (2003), revealed that the top causative factors of cost overrun in ground water drilling projects are:-Monthly payment difficulties, Poor contract management, Procurement, Inflation, Contractors financial difficulties

In the case of Ethiopia, Nega (2008), investigated that the main causative factors in public construction projects in general are;- Inflation or increase the cost of construction materials, Poor planning and coordination, Change order due to the enhancement required by clients, Excess quantity during construction

In the case of Vietnam's, le- hoai, dai lee, &youg lee (2008), they revealed the main causative factors of cost escalation in construction projects in general are: -Poor sit management and supervision, Poor project management assistance, Financial difficulties of owners, Financial difficulties of contractors and Design change.

In the case of Uganda's, Alinaitwe, Ruth Apolot, & Dan Tindiwens (2013), they revealed the main causative factors of cost escalation in public sector construction projects in general are:- Change in the work scope, High inflation and interest rate, Poor monitoring and control, Delayed payments to contractors and Fuel shortages.

In the case of Aftab, Ismail, Ade (2011), they revealed the main causative factors of cost escalation in public sector construction projects in general are:- Poor design & delays in Design, Unrealistic contract duration & requirements imposed, Lack of experience, Late delivery of materials & equipment, Relationship between management & labor, Delay preparation & approval of drawings, inadequate planning & scheduling and poor site management & supervision.

As attested from the above, we can concluded the rank of causative factors of cost escalation are varies from one country to country. For instance, inflation in Ethiopia first priority factor, in

Ghana the fourth factors, and Vietnam and Uganda inflation is not the top five factors in their construction execution. Beside to this, the causative factors of cost escalation across developing countries is varies due to the types of projects were executed. For instance, in the case of Ghana ground water drilling projects, the causative factors of the first fifth are – monthly payment difficulties, poor contract management, related with procurement, inflation and contractors financial difficulties but in the case of Jordan the causative factors of the first fifth are:-Terrain conditions occurred, Weather conditions, New variation orders, Cost of variation and Mistakes in design. From these two countries, no one factor included in the first five. Therefore these gaps lead the researcher to the research idea and question of this study. "What are the main causes of cost overrun in public housing construction projects in the case of 20/80 housing programs in Addis Ababa Administration"? In identifying the causes of cost escalation in the selected area, the involved parties makes their selves ready to response or eliminate the root causes of each causative factors in their project execution and able to delegate the causative factors for each stakeholder.

CHAPTER THREE

3. Research methodology

3.1 Research Design

The research were developed from observation of practical problems on 20/80 of governmental housing projects budget allocation and uses led to cost overrun that constructed and on the way of construction stage undertaking by Addis Ababa city administration from 2011 up to 2015. For this research, the research design is descriptive. It is descriptive, because the research question basically focuses on practical projects to realize the reasons and impacts of cost overrun through identifying rate of cost overrun, the main variables of cost overrun and their overall effects cost overrun and also showed the rate of discrepancy between the contract amount and the actual cost at completion.Mixed approaches wereimplemented sequentially, in which the research starts with gathering qualitative data and then gather quantitative data.

3.2. Sampling Techniques

Census is a study of every unit, everyone or everything, in a population and has its advantage, the most are- provides a true measure of the population rather than sampling techniques, benchmark data may be obtained for future studies, detailed information about small sub-groups within the population is more likely to be available, Calleam Consulting Ltd(2012). Due to this and other consideration like – a total population of the study is less than 100; the study was adopted census techniques rather than sampling techniques.

3.3. The Research Population and sample size

Defined target population of the study particularly were include city Administration housing project office project administrator employees, Addis Ababa saving housing development Enterprise project administrator employees and housing scheme contractors and consultants who construct and consult 20/80 in the year 2011-2015 more than 5 years working experience respectively, since they are qualified to explain and response the required inquire as per research questions interest.

Currently they are around 20 consultants, 23 contractors and the sum of 17 project administrators hired by city housing administration office and Addis Ababa city saving housing development

enterprises for 20/80 projects on the basis of duration(for consultants and contractors) and permanently (for executor). Out of which 100 % executors, contractors and consultants had more than 5 years' experience in this specific projects, which leads as to the approximate target population of this research were taking this figure as a starting point that limits the total population of this study, which is a total of 60. Therefore respondent distribution was undertaken through census techniques, which are 17 respondents from clients (project owners), 23 respondents from contractors and 20 respondents from consultants.

3.4. The study limitation

Cost overrun in building construction projects are caused by many factors. Each causes of cost overrun have different rates of occurrences and their impact on the final cost of the construction project also varies. Therefore, it is important to identify both key causes of cost overrun based on their occurrence and their impact on 20/80 housing construction projects.

3.4. Source and Tools of Data Collection

The data types for this work are primarily and review selected office documentation, interview with key informants to refer the contract agreement. The selected public housing project types only included in this particular study are public housing projects that executing within five years period. Primarily data were collected by distributing open ended and close ended structured questionnaires to selected clients, contractors and consultants. The respondents are asked to provide information on previous and existing housing projects in relation to starting and completion date, contractual and actual duration, pre-contract budget, contract sum and final cost on the project 20/80 housing program, procurement methods, nature of works and tendering methods will also requested.

After hypothesized variables of cost overrun in general construction projects are taken from literature review, the respondents are asked about their agreement on these variables of causing cost overrun in the case of housing construction projects. To done this, five point likert-scale of 1 to 5 was adopted to assess the consensus level of the respondents on causative factors of cost escalation in housing construction and ranked through their mean value. Where,

1= Strongly Agree

2= Agreed

3= Neutral

4= Disagree

5= Strongly Disagree

After the main causative factors of cost overrun are identified and ranked accordingly, the respondents are asked to determine the frequency of occurrence within one project life cycle. Likewise, a five point of likert-scale of 1 to 5 were employed. Where,

1= no frequency

2= slightly

3= moderate

4= high

5= extremely

The data were computed by using the formula of frequency index, that is

$$F.I = \frac{\sum_{n=1}^{5} \text{ai.ni}}{4\text{N}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, a=constant expressing weight assigned to each response range from

1 for extremely happen to 5 not happen

n = frequency of each response and

N= total number of response

After factors of cost overrun in housing constructions are identified, the respondents will be asked to rank the significance level of factor affecting public housing construction cost.Likewise, a five point likert-scale of 1 to 5 will be adopted to assess the degree of significance of each cause. Where,

1=extremely significant (ES),

2= very significant (VS),

3= moderately significant (MS),

4= slightly significant (SS) and

5= not significant (NS)

Data will be analyzed by using average index method as follows:

$$AI = \frac{\sum (1\text{X1}+2\text{X2}+3\text{X3}+4\text{X4}+5\text{X5})}{\sum(\text{X1}+\text{X2}+\text{X3}+\text{X4}+\text{X5})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where;

- AI= Average index
- X1 = Number of respondents for “Extremely Significant”
- X2 = Number of respondents for “Very Significant”
- X3 = Number of respondents for “Moderately Significant”
- X4 = Number of respondents for “Slightly Significant”
- X5 = Number of respondents for “Not Significant”

The calculated value of AI is between 1 and 1.5($1.00 < AI < 1.50$), were said, Extremely Significant, the calculated value of AI is between 1.5 and 2.5($1.50 < AI < 2.50$), were said, Very Significant, the calculated value of AI is between 2.5 and 3.5($2.50< AI < 3.50$), were said, Moderately Significant, the calculated value of AI is between 3.5 and 4.5($3.50< AI < 4.50$), were said, Slightly Significant and the calculated value of AI is above 4.5 ($AI > 4.5$), were said, Not Significant.

3.5. Procedures of Data Collection

The researches were adopted field survey methodology and selective office document review to uncover factors influencing on cost overruns arising during construction stage. To identify the cost overrun factors in public housing construction projects specially 20/80, literature reviews and informal discussion with prototype practitioners of all parties involved in housing construction industry will be carried out. After that, a pilot questionnaire was prepared. The designed questionnaires were randomly distributed to three principal construction parties (executor, consultant and contractor). For each factor, the respondents requested to answer frequency of occurrence, severity and also requested to identify the causative factors cost overrun in the case of Addis Ababa city housing construction projects.

3.6. Methods of Data Analysis

For this study, only descriptive method was employed in the data analysis. As introduced earlier, “frequency index”, “average index” method, mean score and percentage were adopted to know the responsibility parties, ranking the causative factors of cost overrun, to measure the frequency and the significant level of each causes of cost overrun. As discussed earlier Likert’s scale of five ordinal measures of agreement towards each statement (1, 2, 3, 4 and 5) is used to calculate the frequency index and average index for each factor that is used to determine the relative ranking.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This part of the research deals with the analysis and discussion of the data gathered from document review in each office and questionnaire survey. As clearly specified on the methodology part, the procedures used in analyzing questionnaires survey result was aimed to identify main causes, establish the significance level and impact of each factors on the cost overrun in the studied area.

From each office document review, all the documents of each 20/80 housing scheme such the approved contract amount, contract time during signing of the contract, actual cost at completion, actual completion time at completion of the project, project site, each housing block, rising floor and housing type were thoroughly investigated. These help to understand the reasons behind each project for cost overrun, and to investigate how the actual cost at completion deviates from the contract amount. Meanwhile collecting these data helped to analyze and draw the discrepancy rate of cost overrun and contract amount on the basis of housing type.

4.1. Review of Questionnaires Survey

A total of 60 questionnaires sets were distributed to practitioners involved in public housing construction industry, that is 20/80 housing scheme in the selected area. By conceptualizing this phenomena, the review of collected 44 fully filed questionnaires are endeavored as follows:

4.1.1. Demographics of the Respondents

The demographics of the respondents participated in the survey are summarized as follows:

Table 4.1.1, Demographic Characteristics of the Respondents

No.		Frequency	%age	Cumulative %age
1.	Gender type			
	• Male	41	93	93
	• Female	3	7	100
2.	Types of Respondents			
	• Clients	12	27	27
	• Consultants	18	41	68
	• Contractors	14	32	100

	Total	44	100	
4.	Academic qualification • BSC degree holder • MBA/MSc master holder • PhD holder Total	 26 18 ---	 59 41 ---	 59 100 100
5.	Work experience - 4years - 5 years - 6 years - 7 years - 8 years Total	 2 11 19 7 5 44	 4.5 25 43.2 15.9 11.4 100	 4.5 29.5 72.7 88.6 100

Source; survey result

Table 4.1.2 attested that the majority of the respondents 93% (41) participated in the survey were males and 7% (3) were female respectively.

Likewise, on table 4.1.2 declared that respondents of 27% (12), 41% (18) and 32% (14) participated in the survey were clients, consultants and contractors respectively, meanwhile, all respondents involved in the survey were selected from 20/80 housing schemes.

In general on the above table 4.1.2 conformed that, 59% (26) respondents participated in the survey were degree holder and the rest had obtained MBA/MSc degree in construction engineering, and similarly, the majority of respondents 25% (11) & 43.2%(19) involved in the survey had 5 and 6 work experience in housing construction which shows that the respondents were competent enough and capable to participate in the survey.

4.1.2. Types of Bidding or Tendering Employed on 20/80 housing program

As declared on the literature review, the most common using of tendering or bidding methods of the federal democratic of Ethiopia, especially Addis Ababa city Administration public housing projects are - open tendering, two stage tendering, request for proposal, restricted tendering, requests for quotation and single source procurement. From this common methods, the most

frequent employed types of tendering are open tendering, restricted or fixed tendering and selective or request for proposal.

From survey result, the degrees of conscious among each party are presented as follow:

Table 4.1.2, Summary of the Respondents of Tendering Methods Employed on 20/80 housing scheme.

Methods	Frequency	%age	Cumulative %age
Open bid	37	84.1	84.1
Selective bid	7	15.9	100
Fixed bid	-	-	-
Total	44	100	100

Source: survey filled

From the above avowed data, 84% (37) of the respondents agreed thatopen tendering and 16% (7) agreed on selective tenderingis the most common methods.

As per the clients, contractors and consultants' response concluded that common methods of the tendering practices in the case of Addis Ababa city Administration public housing projects are open tendering.

4.1.3. Main Factors of Cost overrun on 20/80 Housing Programs

After identifying factors that result in cost overrun of housing construction projects, questioner was prepared, incorporating 25 factors and the responses are ranked in Table 4.1.4 below according to their mean scored. As per the clients, consultants and contractors response top ten factors that cause cost overrun of public housing construction projectsand similarly, three variables not the means of cost overrun on public housing construction projects in the studied area are identified.

The general information on the identified factors on the basis of each selected client, consultant and contractors response are presented below.

Table 4.1.3, Summary of Clients, Contractors and Consultants Response on Factors for Cost Overrun,

No.	Cause s of Cost Overrun	Frequency of the Respondents					
		Strongly Disagree(5)	Don't Agree(4)	Neutral (3)	Agreed (2)	Strongly Agree(1)	Mean
1.	Material shortage in the local market	1	20	2	20	1	3.00
2.	Delay preparation & approval of drawing	1	13	5	24	1	2.75
3.	Change order /rework/	0	0	4	39	1	2.07
4.	Labor cost increased	0	1	0	43	0	2.04
5.	Change in foreign exchange rate/ for imported materials	0	0	1	43	0	2.02
6.	Materials procurement	0	0	0	44	0	2.00
7.	Owner's / executor financial difficulties	0	0	0	43	1	1.98
8.	Power interruption	0	0	0	39	5	1.89
9.	Contractors financial difficulties	0	0	0	38	6	1.86
10.	Material cost increased by inflation	0	0	0	38	6	1.86
11.	Inadequate / deficiency in planning , scheduling & coordination	0	0	0	37	7	1.84
12.	Lack of experience of project location	0	0	0	37	7	1.84
13.	Excess quantity during construction	0	0	0	32	12	1.73
14.	Governmental bureaucratic procedures	0	0	0	31	13	1.7
15.	Design change /change of work scope/	0	0	0	29	15	1.67
16.	Incomplete design at the time of tender	0	0	0	29	15	1.67
17.	Payment delay for contractors	0	0	0	29	15	1.67
18.	Inaccurate quantity take-off	0	0	0	28	16	1.64
19.	Incorrect / inappropriate methods of cost	0	0	0	26	18	1.59
20.	Supplementary / additional work	0	0	0	23	21	1.53
21.	Poor site management & supervision	0	0	0	20	24	1.45
22.	Selection of incompetent contractor's and consultants	0	0	0	13	31	1.30
Factors identified by clients, contractors and consultants factors not causes of cost overrun in Addis Ababa city housing schemes							
23.	Unavailability of competent staff	0	37	7	0	0	3.84
24.	Project materials monopoly by some suppliers	1	35	8	0	0	3.84
25.	Unpredictable weather condition	1	31	6	6	0	3.61

Source: survey filled and SPSS V.20 result

As per the clients, contractors and consultants response, from 25 hypothesized variables that causes cost overrun taken from literature review, the majority of the respondents agreed that 22 of causative factors, that is- Material cost increased by inflation, Labor cost increased due to environmental restriction, Lack of experience of project location, Change in foreign exchange rate/ for imported materials, Contractors financial difficulties, Owner's / executor financial difficulties, Change order , power interruption E.T.C, are occurred during the execution stage of housing scheme in the case of Addis Ababa city Administration housing project and Addis Ababa City Administration saving housing development enterprise.

Likewise, on the basis of clients, contractors and consultants' response, and the threecausative factors that are not happened in selected housing projectsare: unpredictable weather condition, project materials monopoly by some supplierand unavailability of competent staff. This finding shows that there is agreement in the literature review. Howevertherearesome differences between the results of the literature reviewand the questionnairesurvey investigation. For instance, in Addis Ababa city housing schemes project materials monopolized by some suppliers are tolerated factors or not considered as variables of cost overrun for domestic clients, contractors and consultants but for foreign are not tolerable factors. This is due to the basic construction materials suppliers of these projects for contractors are the government itself in the case of Addis Ababa city Administration housing schemes projects.

Similarly, in Addis Ababa City public housing projects, unpredictable weather condition is not considered as a causative factor for cost overrun but for foreign projects it is one factors of cost overrun. This finding variation is due to environmental location of the country as a whole, that is, Addis Ababa city convince rate of environmental location for building every housing construction projects are more suitable than the projects executed foreign developed and developing countries, this can be proved by evaluating the performance of every constructed project reports undertaken in the city.

Meanwhile, regarding on unavailability of competent staff, the finding discrepancy from foreign and Addis Ababa city housing projects involved parties occurred due to the availability of competent skilled man power and selection procedures performed by the countries. In the case of Addis Ababa city, there is excessive skilled man power in the area because of this the rate of hiring not compatible employees is less.

In general, the causative factors identified by the respondents involved in the survey were ranked by using statistical mean by employed SPSS V.20, from these, the top ten causative factors that exists on housing schemes are material shortage in the local market, delay preparation and approval of drawing, change order, labor cost increased due to environmental restriction, change in foreign exchange rate, material procurement, owner's/ executor financial difficulties, power interruptions, contractors financial difficulties and material cost increased by inflation.

4.1.4. Responsible Parties for the Causative Factors of the Cost Overrun

On table 4.1.4 above, declared the main causative factors that occurred during execution of 20/80 housing projects. This helps to know the stakeholders that involved in the execution of these housing projects and direct liability for the causative factors when they are occurred or happened. The survey result on the identification of responsibility parties is summarized below:

4.1.4, Summary of Responsibility Parties for Causative Factors of Cost Overrun

No.	Causes of Cost Overrun	Frequency of the Respondents						
		Client	Contractors	Consultants	Others	Rate Scored in % age		
						Client	Contractor	Consultants
1.	Inadequate / deficiency in planning , scheduling & coordination	25	0	19	0	57	--	43
2.	Design change /change of work scope/	1	0	43	0	2	--	98
3.	Lack of experience of project location	9	29	6	0	20	66	14
4.	Incorrect / inappropriate methods of cost estimation	14	0	30	0	32	--	68
5.	Change order /rework/	25	0	19	0	57	--	43
6.	Selection of incompetent contractor's and consultants	34	0	10	0	77	--	28
7.	Incomplete design at the time of tender	0	8	36	0	--	18	82
8.	Unavailability of competent staff	12	32	0	0	27	73	--
9.	Material cost increased by inflation	41	0	3	0	93	--	7
10.	Supplementary / additional work	1	0	43	0	2	--	98
11.	Payment delay for contractors	36	0	8	0	82	--	18
12.	Unpredictable weather condition	13	31	0	0	30	--	70
13.	Contractors financial difficulties	0	44	0	0	--	100	--
14.	Labor cost increased	0	34	10	0	--	77	23
15.	Owner's / executor financial difficulties	44	0	0	0	100	--	--
16.	Materials procurement	25	0	19	0	57	--	43
17.	Excess quantity during construction	0	0	44	0	--	--	100
18.	Poor site management & supervision	8	19	17	0	18	43	39
19.	Change in foreign exchange rate/ for imported materials	29	1	13	0	66	2	13
20.	Delay preparation & approval of drawing	30	0	14	0	68	--	32
21.	Project materials monopoly by some suppliers	25	9	10	0	57	20	23
22.	Inaccurate quantity take-off	0	0	44	0	--	--	100
23.	Governmental bureaucratic procedures	37	0	7	0	84	--	16
24.	Material shortage in the local market	39	5	0	0	89	11	--
25.	Power interruption	44	0	0	0	100	--	--

Source; survey filed and SPSS V20 result

As per clients, contractors and consultants response involved in the survey, from identified factors, factors that directly related with clients or owner of the projects are Owner's / executor financial difficulties, material cost increased by inflation, power interruption, material shortage in the local market, governmental bureaucratic procedures, payment delay for contractors, selection of incompetent contractors and consultants, change in foreign exchange for imported materials, materials procurement, inadequate/ deficiency in planning, scheduling and coordination, change order, project materials monopoly by some suppliers, delay preparation & approval of drawing, , and power interruption.

As per clients, contractors and consultants response participated in the questionnaire survey, from identified factors, factors that directly related with contractors are contractor's financial difficulties, labor cost increased due to environmental restriction, unavailability of competent staff, lack of experience of project location, poor site management and supervision and incomplete design at the time of tender. This finding is some extent similar with the finding of zinabu and getachew (2015), investigate on factors of cost overrun related with contractors in the case of Ethiopia construction sectors. Howevertherearesome differences between the results of zinabu and getachew and the questionnaire survey investigation. For instance zinabu and getachew revealed the top causative factors related with contractors are price fluctuation, inflation, monopoly supplier E.T.C., but as per clients, contractors and consultants response involved in the survey revealed that these all factors are problem related with client/ owner of the project. This variation is appeared due to the type of the construction project and project contract agreement. In the case of Addis Ababa city public housing projects, all necessary construction materials are supplied by the client itself and deducted from the contract cost or total budget of the project. On the other hand labor cost increased due to environmental restriction, lack of experience of project location, contractor's financial difficulties, unpredictable weather condition and unavailability of competent staff are similar with this investigation tremendously.

As per clients, contractors and consultants response participated factors that directly related with consultants are design change, supplementary/ additional work, incorrect/ inappropriate methods of cost estimation, incomplete design at the time of tender, delay preparation and approval of drawing, poor site management, excess quantity during construction and inaccurate quantity

take-off. This investigation is more else similar with the finding were obtained by Nega, 2008 and other reviewed literature included in this study.

4.1.5. Measuring the Frequency of Main Causative Factors of Cost Overrun in 20/80 housing program

The frequency of occurrence each causative factors of cost overrun on selected housing schemes were computed by using frequency index methods. Frequency index used to expresses occurrence frequency of factors responsible for cost overrun in the case of Addis Ababa city Administration housing schemes. It is computed as per the following formula:

$$F.I = \frac{\sum_{n=1}^{5} \text{ai.ni}}{4\text{N}} \quad \text{..... (1)}$$

Where, a= constant expressing the weight assigned to each response (range from 1 for extremely happen to 5 not happen), n= frequency of each response and N= total number of response.
Likewise, a five point of likert-scale of 1 to 5 were employed. Where,

1= no frequency

2= slightly

3= moderate

4= high

5= extremely

Table 4.1.5, Summary of Clients, Consultants and Contractors Response, Frequency Index and Ranking

Causes	Summary of Responses of Clients, Consultants and Contractors					Frequency index	Ranking
	5= Extremely	4= High	3= Moderately	2= Slightly	1= No Frequency		
Payment delay for contractors	10	34	0	0	0	1.056	1
Contractors financial difficulties	7	36	1	0	0	1.034	2
Power interruption	6	34	3	1	0	1.006	3
Incorrect quantity take-off	5	35	3	1	0	1.00	4
Change in foreign exchange rate	0	37	6	1	0	0.955	5
Inadequate planning, scheduling and coordination	3	33	5	3	0	0.955	6
Material cost increased by inflation	0	37	5	2	0	0.949	7
Poor sit management & supervision	1	34	5	4	0	0.932	8
Excess quantity during construction	0	29	7	8	0	0.869	9
Supplementary / additional work	0	28	3	13	0	0.835	10
Change order /scope	0	4	34	6	0	0.738	11
Labor cost increased due to environmental restriction	0	9	22	12	1	0.727	12
Lack of experience of project location	0	1	35	8	0	0.710	13
Incorrect / inappropriate methods of cost estimation	1	16	1	26	0	0.705	14
Design change	0	2	30	12	0	0.693	15
Incomplete design at the time of tender	0	8	15	21	0	0.676	16
Materials procurement	0	0	30	14	0	0.670	17
Owner/ executor financial difficulties	0	2	23	19	0	0.653	18
Government bureaucratic procedures	0	1	15	24	4	0.574	19
Unavailability of competent staff	0	10	1	21	12	0.551	20
Selection of incompetent contractors and consultants	1	0	5	23	15	0.460	21
Delay preparation & approval of drawing	0	0	3	27	14	0.438	22
Material shortage in the local market	0	0	7	17	20	0.426	23
Unpredictable weather condition	0	0	10	3	31	0.381	24
Project materials monopoly by some suppliers	0	0	0	6	38	0.284	25

Source: survey filed and SPSS V20 result

As per clients, contractors and consultants response the top ten factors of cost overrun that occurred frequently on the public housing projects in the case of Addis Ababa city administration that attested on table 4.5.1 above using frequency index are payment delay for contractors- frequency index(1.056), contractors financial difficulties- frequency index(1.034), power interruption- frequency index(1.006), incorrect quantity take-off- frequency index(1.00), change in foreign exchange rate – frequency index(0.955), inadequate planning, scheduling & coordination- frequency index(0.955),material cost increased by inflation – frequency index(0.949), poor sit management and supervision- frequency index(0.932),), excess quantity during construction- frequency index(0.869) and supplementary/ additional work – frequency index(0.835).

4.1.5.1. Comparison of Survey Result with Previous Studies Based on Frequency

As already stated on the literature review section, there are different factors that potential to increase the final cost of every construction projects specially housing one. These factors are differing from projects to projects besides its ranking. Below table, describes the ranking of top factors based on frequency of nega, hennery; ruth&dan, and survey results.

Table 4.1.5.1., Summary of comparison factors of cost overrun based on frequency investigated by nega, hennery; ruth&dan, dinesh; and survey result.

	Nega	**Henry, ruth&dan**	**Survey result**
1.	Inflation	Change of work scope	payment delay for contractors
2.	Fluctuation	Inflation	contractors financial difficulties
3.	Change in foreign exchange rate	Poor monitoring & control	power interruption
4.	Change order	Delay payment to contractor	incorrect quantity take-off
5.	Lack of planning and coordination	Fuel shortage	change in foreign exchange rate
6.	Additional cost due to variation cost	Project complexity	inadequate planning, scheduling & coordination

7.	Failure to identify problems and institute	Shortage of material in the local market	material cost increased by inflation
8.	Changes in planning and drawing	Incomplete document	poor sit management and supervision
9.	Insufficient geotechnical investigation	Poor communication	excess quantity during construction
10.	Contractors financial difficulties	Incompetent staff	supplementary/ additional work

As clearly attested on the above table 4.1.5.1, from top ten factors identified by the researchers, there is variation regarding on factors and ranking between each researchers finding results. For instance, priority factors for Nega, result are inflation, fluctuation, and change in foreign exchange rate and change order. For hennery; ruth&dan, result is change of work scope, inflation, lack of planning and monitoring, payment delay for contractors respectively and fuel shortage. As proved on the survey results on table 4.5.1, inflation is ranked on 7^{th}, change of work scope is ranked 11^{th} and material shortage in the local market is ranked 23^{th}.

Similarly, due to project type execution, some factors are not acute for escalation of cost in the Case of housing program. For instance, for public housing construction projects fuel shortage, incomplete documents and shortage of labor are a tolerable factors, which means, were not a reason to increase the final cost of the projects. This is due to-

- Availability of fuel deposit tanker that enhances to overcome fuel shortage exists on the market.
- The housing program is running by well qualified consultants and technical advisors, this led less appearance of incomplete document to increase the cost of the total project.
- Existence of trained manpower on the area high in number in the labor market.

4.1.6. The Main Causes of Cost Overrun Based on Negative Impacts

Identification of the level of impact of each 25 factors that took from literature review was computed through Average index methods.

Average index were computed by using:-

$$AI = \frac{\sum (1X1+2X2+3X3+4X4+5X5)}{\sum (X1+X2+X3+X4+X5)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where;

- AI= Average index
- X1 = Number of respondents for "Extremely Significant"
- X2 = Number of respondents for "Very Significant"
- X3 = Number of respondents for "Moderately Significant"
- X4 = Number of respondents for "Slightly Significant"
- X5 = Number of respondents for "Not Significant"

Evaluation range to assess significant level of each factor was applied by referring previously adopted by Ghani, A (2006) and Abdullah MR (2010). This means;

The calculated value of AI is between 1 and 1.5 (1.00 < AI < 1.50), were said, Extremely Significant,

The calculated value of AI is between 1.5 and 2.5 (1.50 < AI < 2.50), were said, Very Significant,

The calculated value of AI is between 2.5 and 3.5 (2.50< AI < 3.50), were said, Moderately Significant,

The calculated value of AI is between 3.5 and 4.5 (3.50< AI < 4.50), were said, Slightly Significant and

The calculated value of AI is above 4.5 (AI > 4.5), were said, Not Significant.

Based on this understanding, the results are shown below table, and from the result, the factors with average index from 1.00 to 2.50 were selected as common factors affecting the selected public housing program.

Table 4.1.6, Summary of Clients, Consultants and Contractors response, Average index and Ranking,

Causes	Summary of responses of clients, consultants and contractors					Average index	Ranking
	very significant	significant	Moderately Significant	Slightly Significant	Not significant		
	1	2	3	4	5		
Owner/ executor financial difficulties	38	6	0	0	0	1.14	1
Contractors financial difficulties	34	10	0	0	0	1.23	2
Incorrect / inappropriate methods of cost estimation	24	18	0	0	0	1.36	3
Power interruption	26	12	4	2	0	1.59	4
Design change	18	25	1	0	0	1.61	5
Material cost increased by inflation	16	28	0	0	0	1.64	6
Payment delay for contractors	14	25	5	0	0	1.8	7
Unpredictable weather condition	18	14	12	0	0	1.86	8
Selection of incompetent contractors and consultants	6	34	3	1	0	1.98	9
Poor sit management & supervision	3	37	4	0	0	2.02	10
Unavailability of competent staff	5	35	2	2	0	2.02	11
Supplementary / additional work	9	28	3	4	0	2.04	12
Materials procurement	5	31	8	0	0	2.07	13
Inadequate planning, scheduling and coordination	7	24	13	0	0	2.14	14
Incomplete design at the time of tender	5	27	12	0	0	2.16	15
Change order /scope	8	20	14	2	0	2.23	16
Incorrect quantity take-off	1	29	14	0	0	2.3	17
Material shortage in the local market	0	28	14	2	0	2.4	18
Delay preparation & approval of drawing	2	20	21	1`	0	2.48	19
Lack of experience of project location	1	11	32	0	0	2.70	20
Government bureaucratic procedures	0	22	12	10	0	2.73	21
Excess quantity during construction	0	13	25	6	0	2.84	22
Change in foreign exchange rate	0	0	31	13	0	3.3	23
Labor cost increased due to environmental restriction	0	0	24	14	6	3.59	24
Project materials monopoly by some suppliers	0	1	22	16	5	3.57	25

Source: survey filed and SPSS V.20 result

The factors that have extreme significant (the average index result ranges from 1.00 up to 1.5) and very significant (the average index result ranges from 1.5 up to 2.5) are the common factors of the studied housing program. Based on this conformance, from 25 factors that took from literature review, only 19 factors are the common factors with a significant impact on the final cost of the housing program. And the rest 6 factors have tolerable impacts on the execution of housing program.

As per the finding declared on above table 4.1.6, factors that have extreme significant impacts on the final cost of the housing program, when they are happened, are owner's financial difficulties1st, contractor's financial difficulties 2nd, and incorrect/inappropriate method of cost estimation 3rd. From this finding, we can understand that factors that identified there is very less probability to occur under executing housing projects but has very high impact on the housing projects when they are happen. For instance, owners/executers financial difficulties is ranked based on frequency at table 4.1.5 above is 19th but this factors ranked based on severity is 1stunder and incorrect/inappropriate method of cost estimation ranked 14th but based on severity ranked3rdcategorized extremely significant.

As per the finding declared on the above table 4.1.6, top factors that have high significant impacts on the final costs of the housing program, when they are happened, are Owner/ executor financial difficulties, Contractors financial difficulties, Incorrect / inappropriate methods of cost estimation, power interruption, Design change, Material cost increased by inflation, Payment delay for contractors, Unpredictable weather condition, Selection of incompetent contractors and consultants, poor site management and supervision and unavailability of competent staff.

As per the finding declared on the above table 4.1.6, factors that have tolerable or very less impact on the final costs of the housing program, when they are happened, are lack of experience of project location, government bureaucratic procedures, excess quantity during construction, change in foreign exchange rate, labor cost increased due to environmental restriction and project materials monopoly by some suppliers.

4.1.6.1 Comparison of Survey Result with Previous Studies Based on Impacts

Aftab, Ismail and Ade Asmil Study revealed that, only 49 factors have significant impacts on construction in general from 79 factors of cost overrun worldwide investigated by different researchers by using Average index methods. But, according to clients, contractors and consultants' response result, in the case of Addis Ababa city Administration public housing program from 25 identified factors of cost overrun only 19 factors have significant impacts. The are listed below table.

Table 4.1.6.1 summery of nega, Aftab; Ismail & Ade asmil and survey result.

Survey result	**Ranks**	**Previous result in the case of Ethiopia**	**Ranks**	**Previous result in the case of Malaysian**	**Rank**
Owner/ executor financial difficulties	1	Inflation	1	Unpredictable weather	1
Contractors financial difficulties	2	Price fluctuation	2	Inadequate planning and scheduling	2
Incorrect / inappropriate methods of cost estimation	3	Unforeseeable risks	3	Shortage of material in the local market	3
Power interruption	4	Change in foreign exchange rate	4	Shortage of site worker	4
Design change	5	Supplementary work	5	Delay in decision making	4
Material cost increased by inflation	6	Change order	6	Late delivery of site, material and equipment	5
Payment delay for contractors	7	Lack of experience of project location	7	Price fluctuation	6
Unpredictable weather condition	8	Material shortage in the local market	8	Design change	7
Selection of incompetent contractor and consultant	9	Incomplete document	9	Government bureaucracy	7
Poor sit management & supervision	10	Unpredictable weather condition	10	Unrealistic contract duration and equipment imposed	7

Source: document review

The comparison shows there is some difference the survey result and previous studies. Results show that Owner/ executor financial difficultiesis ranked as the firs most significant cause of cost overrun as perceived by involved practitioners in public housing program whereas the previous study of nega and Aftab; Ismail & Ade asmil found that this factor ranks at 25^{th} and 18^{th} respectively.

Similarly, results show that contractors financial difficulties is ranked 2^{nd} most significant causes of cost overrun in the case of public housing program but this factor ranked 12^{th} and 11^{th} in the case of construction in general according to Nega and Aftab; Ismail & Ade asmil study respectively.

Likewise, results shows that incorrect method of cost estimation is ranked 3^{rd} most significant causes of cost overrun in the case of public housing program but this factor ranked 16^{th} by the study of Ismail& Ade asmil and not consider this as a factor of cost overrun under the study of nega.

Likewise, results shows that power interruption is ranked 4^{th} factors of cost overrun for public housing program and meanwhile for construction industries this factor is not considered for factor of cost overrun according to investigation of nega and Ismail & Ade asmil respectively. This result in both case occurred at the top ten significant causes of cost overrun category.

Similarly, results shows that design change is ranked 5^{th} most significant factor of cost overrun for public housing programs but this factor is ranked under nega and Ismail & Ade asmil study is 6^{th} and 57^{th}respectively.

Similarly , results show that material cost increased by inflation 6^{th} , payment delay for contractors at the time of tender is ranked 7^{th} , unpredictable weather condition is ranked 8^{th} , selection of incompetent contractors and consultant and poor site management and supervision is ranked $9^{th}$and 10^{th}factors of cost overrun for public housing programs but according to nega investigation, these factors are ranked 1^{st},20^{th}, 10^{th}, 1th and 19^{th} and Ismail & Ade asmil investigation are also ranked these factors 6^{th} , 24^{th}, 1^{st}, 33th and 2^{nd} respectively.

In general, the overall comparison result revealed that the significant level of each causative factors of cost overrun is differing from construction to construction and the meanwhile from country to country.

4.1.7. The Overall Effects of Cost Overrun in Public Housing Program

The basic goal of any practitioners involved in any industry is to achieve the compilation of the project with in time and stipulated budget. In fact the complexity and acute of problem raised by involved practitioners in the public housing construction due to many reasons, like personal interest conflict, lack of mainstreaming sense of ownership E.T.C., there are some effects that occurred on public housing construction projects as the basis of cost overrun.

One of the common effects of cost overrun is delay; this in turn affects clients, consultants and contractors. Furthermore, lengthy delays increase cost overruns tremendously. Excessive cost overrun requires additional budget, this in turn eat up the scarce financial resources of the country, which lead to further budget short fall for construction projects. This prevents the planned increase in property and service production from taking place, and this phenomenon in turn affects, in a negative way, the rate of national growth. Cost overrun will also be a source of dispute among stakeholders and it will lead to adversarial relationship among project participants.

And also, excessive delay from cost overrun, which subsequently lead to additional cost overrun as the duration of a project is extended the price of materials will rise which subsequently lead to additional costs not only to the project owner but also to the contractor and to the consultant which participate on that project until completion. And the contractor will incur an additional cost due to idle man power and idle equipment.According to the data obtained from project sites the housing project will not pay more than 5% of cost from the contracted amount and this will in turn led to low quality of housing construction.

Generally, As per the responses of clients, contractors and consultants participated on questionnaires survey, the most common effects of cost overrun in housing programs are :- Project delay, Low quality housing handover to beneficiaries, Low productivity, Total abandonments of the housing projects, arbitration, Inappropriate use of public budget, Delay payment to contractors, Difficult to achieve the contribution that expected from the housing industry to the growth of the national economies of the country in general, Skilled manpower’s are suffered due to involvement of unsecured business environment, Due to excessive uses of tax payer budget and saver money tenants to housing construction, it led backlash of their activities and blame the government policy and practices as a whole, Supplementary agreement, High cost

of supervision and contract administration for consultants, Loss of reputation to the consultant, the consultant will be viewed as incompetent by project owners, Contractor will suffer from budget short fall of the client, Dissatisfaction by project owners and consequently by end users, Negative attitude towards the government housing industry by the society as a whole, Creates skeptical outlook on appraisal of other new construction projects, Some project owners (clients) become reluctant to effect additional payments to contractors.

4.2. Document Review

4.2.1. Cost Performances of 20/80 Housing Scheme

The degree or rate of cost overrun variesfrom housing schemes to housing schemes in general. In document review, cost overrun it was notably found that each prototype housing type that started their construction within five years are not accomplished within the budgeted or contracted cost and also contracted project duration, in other orders, 100% of public housing schemes in the studied area are faced on cost overrun and project delay as compared with contracted cost and contracted project duration. The results of cost performances of selected site to 20/80 housing scheme are presented in below;

Table 4.2.1, Summaries of data on 20/80 types of housing program,

Types of housing	Number of block	Typology	Estimated cost to accomplish the project	Contracted Date in E.C	Contracted duration to accomplish the project	Actual cost incurred to accomplish the project	Actual date accomplished the project	Total months spent to finalize the project	Cost variation in %	Time variation in %
20/80	34	R(G+4)	136,534,725.61	Jan. 2005	10	173,401,101.5	Mar. 2009	50	27	400
20/80	3	S(G+4)	13,355,425	Jan. 2005	10	14,370,437	Mar. 2009	50	7.6	400
20/80	27	R(G+4)	100,747,689	Jan. 2005	10	119,937,725	Mar. 2009	50	19	400
20/80	12	S(G+4)	44,620,989.14	Jan. 2005	10	51,288,493.26	Mar. 2009	50	14.5	400
20/80	26	R(G+4)	110,901,292.8	Jan. 2005	10	129,709,114.4	Mar. 2009	50	17	400
20/80	6	S(G+4)	23,332,554.8	Jan. 2005	10	25,361,472.6	Mar. 2009	50	8.7	400
20/80	24	R(G+4)	76,660,404	Jan. 2005	10	87,392,860.6	Mar. 2009	50	14	400
20/80	6	R(G+4)	17,931,935.3	Jan. 2005	10	19,448,953.7	Mar. 2009	50	8.5	400
20/80	17	R(G+4)	78,907,454	Jan. 2005	10	91,752,853	Mar. 2009	50	16	400
20/80	3	R(G+4)	12,780,363.8	Jan. 2005	10	14,523,140.7	Mar. 2009	50	13.6	400
20/80	21	R(G+4)	85,155,233.6	Jan. 2005	10	105,067,358	Mar. 2009	50	23.4	400
20/80	6	E_2(G+4)	3,653,418.36	Dec. 2003	18	4,045,654.5	Oct.2007	48	10	400
20/80	3	E_1(G+4)	3,142,603.45	Nov.2003	18	3,515,771.57	Oct.2007	47	11	400
20/80	2	L_1(G+4)	1,765,728.84	Nov.2003	18	2,108,905.15	May.2007	41	21	400
20/80	9	S(G+4)	37,502,387.1	Jan. 2005	10	42,377,697.4	Mar. 2009	50	13	400
20/80	2	S(G+7)	31,764,851.1	Jan. 2005	18	35,690,843.9	Mar. 2009	42	12.4	133.3
TOTA	**198**		**778,757,055.9**			**919,992,382.28**			**18.1**	

Source; office document review (2017/18)

Note: the site of each listed above 20/80 housing schemes are bole Arabsa, ayat-2, yikaabado, and koyefeche site. And also Each 20/80 housing schemes comprises one bed room, two bed room and three bed room.

As attested in the above table 4.1.1, the discrepancy of budgeted or contracted cost and acute cost incurred to executed 20/80 housing scheme at the site of bole Arabsa, ayat-2, yikaabado and koyefech are ranged from a minimum of 7.6 % (1,015,012.3 birr) to a maximum of 27% (36,866,375.9 birr). The contributory factors of cost over run in construction industry, that is, vast project delay, in the case of 20/80 housing project executed under Addis Ababa city Administration project office, there is another contributory factor, Which is the complexity of housing skeleton increased, rising floor and the size of housing block increased. That means,

In 20/80 housing scenario, the house type is comprises one bed , two bed and three bed, and in addition to this the building includes facilities like- better dinner and living room, toilet, storage, bath and kitchen and also the building rising floor are 4 and 7.

Likewise, complexity of housing skeleton increased, due to the size of housing block increased, in table one avowed that, the housing block is 34 were the cost increasing rate is 27 % (36,866,375.9 birr) from the contracted project cost and the housing block is 21 were the cost increasing rate is 23.4% (19,912,124.45 birr) from the budgeted cost but the housing block is 3 were the cost increasing rate is only 7.8%(1,742,776.9 birr) from the contracted cost of the project and the meanwhile, the housing block is 6 were the cost increasing rate is 8.5 % (1,517,018.4 birr). From this observation, as per the finding, we can concluded that the number of housing block were increased the cost of construction is concurrently increased because of the construction required excessive trained man power, eligible contractors and consultants, and also quality staff and management procedures. The overall rate of cost overrun, by declared different factors appeared on 20/80 housing scheme, is 18.1%. In general this finding is similar with the investigated by Mr. Dinesh and Prof. Emeritus M. R. (2016) in the case of Nigeria residential high rising building.

4.1.2. Rate of cost discrepancy between each housing scheme

From the above avowed table revealed that 100% of 20/80 housing schemes are currently faced on the cost overrun in their project execution stage, as compared with the approved or budgeted contractual project cost, by means of the availability of excessive project delay.

As per finding, we can concluded that the cost overrun rate varies by 18.1% appeared on 20/80 housing scheme.

The investigation of Questionnaires survey comprises bidding procedures, the identification of the existence and extent of cost overrun, main causes of cost overrun, rate of occurrences of variables of cost overrun and the impact of the variables of cost overrun on the final/total cost of the project. Finally, the effects of cost overrun on the various stakeholders on the construction industry are also revealed.

As clearly specified on the methodology part, the procedures used in analyzing questionnaires survey result was aimed to established the significance level of each factors on the cost overrun in the studied area.

Note: -As indicated above according to the data obtained from the project sites the cost overrun on the selected housing shame was 18.1%, but different literature in different countries proven that the cost overrun were higher than this and also Fetene in the Ethiopian case proven that the cost overrun riches up to 126%, and also according to office data obtained from the housing project the cost/m^2 used to transfer houses to tenants increased from year to year so this need further investigation and research on the problem.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

This section concludes by suggesting recommendation for each involved parties to mitigate the root causes of cost overrun in public housing programs under the studied area.

5.1. Conclusion

Financial resources are so scarce in developing countries like Ethiopia, hence, cost related issues in Addis Ababa city Administration housing projects are sensitive issues because they are implemented by using tax payer and tenant saver money resources. Therefore, carrying out a research in this area will have a paramount importance.

The main objective of this research is, therefore, to identify and investigate the critical causes and the overall effects of cost overrun on public housing programs executed under Addis Ababa city Administration. Document review was undertaken to identify the existence and extent of cost overrun on the selected housing programs. Questionnaire survey was also used to identify the main causes, the impact and overall effects of cost overrun in public housing programs at Addis Ababa City Administration. Clients, consultants and contractors were asked to identify the variables of cost overrun, frequency of occurrence of the variables and the significant effects of the variables in Addis Ababa City Administration housing program. The analysis of the results from the open-ended and close ended part of the questionnaire was carried out using descriptive analysis.

From the results of the analysis of document review and respondents' responses the following Conclusions are drawn:

1. Justification of the existence and extent of cost overrun on housing program is important before identifying the causes of cost overrun. 100% of 20/80 housing program investigated in the research suffered by cost overrun in their execution. For these public building construction projects, the actual cost overrun ranges by 18.1% of the contract amount.
2. Rate of cost overrun is found to be influenced by the contract amount, complexity of housing skeleton and the size of housing program. From document review, the data gathered from 20/80 housing program shows that the rate of cost overrun is found to

decrease the number of block and the rising flower of the housing is decrease and increase the rate of cost overrun in the reverse.

3. From the results of this thesis, The top ten causes of cost overrun based on frequency are payment delay for contractors, contractors financial difficulties, power interruption, incorrect quantity take-off, change in foreign exchange rate, inadequate planning; scheduling & coordination, material cost increased by inflation, poor sit management and supervision, excess quantity during construction and supplementary/ additional work.
4. From the results of this thesis, the most common significant causes of cost overrun in the final budget of the housing program were declared through average index and ranked accordingly the result. The most are owner/executer financial difficulties, contractors financial difficulties, incorrect/inappropriate methods of cost estimation, power interruption, design change, material cost increased by inflation, payment delay for contractors, and unpredictable weather condition E.T.C
5. From the results of this thesis, the responsibility parties are investigated. Based on this,
    - Factors related with client's are 18, from these, the most factors are – material cost increase by inflation, selection of incompetent contractors and consultants, change in foreign exchange rate, payment delay for contractors, material procurement, E.T.C.
    - Factors related with contractors are 9, from these, the most are – labor cost increased due to environmental restriction, lack of experience of project location, unpredictable weather condition, contractor's financial difficulties, E.T.C.
    - Factors related with consultants are 18. These are design change, supplementary/ additional work, incorrect/inappropriate method of cost estimation, incomplete design at the time of tender and inaccurate quantity take-off.
6. Based on the survey results of this thesis, the most frequently implemented bidding type are open, since they are influenced due to the availability of compatible applicants in the local market, and government rule and regulation.
7. From this research, the consequences of cost overrun in housing programs are low productivity, project delay, low quality handover to beneficiaries, disputes among stockholder, project abandonment, E.T.C.

8. From the results of this thesis, there is variation on the ranking of factors of cost overrun based on frequency and significance from previous study results, since variation occurred due to project location, project agreement and types of project execution.
9. From this research clients are those who are severely affected by cost overrun, since they are forced to look for additional money to complete the housing construction projects. However, it should be noted that client affects that adverse effects on the national economy of the country as a whole.

5.2. Limitation of the study

It is not denial that any research papers from its initiation to completion perhaps encounter a limitation. Besides, there are some of the limitations that face in the preparation of this research thesis are the time allotted is really too short, difficult to get organized data on each office and reluctance of the respondent are major problems encountered to finalized this research.

5.3. Recommendation

According to the finding obtained through this study, there are some recommendation for involved parties, like- clients/ owner, contractors and consultants:

5.3.1. For Client/ Owner

Clients are one of the most important parties who invest their money for realization of public housing projects, and they are the key role players starting from conception through construction up to handover the project to the beneficiaries. So the following recommendations are expected from clients:

1. The executer or owner of the housing program should give sufficient time to approval of drawing, design and site preparation work.
2. Fulfill contractual obligations, especially as regards to payment of contractor's works duly executed, procurement should undertake before commencement of the housing projects and supply all necessary construction materials and equipment’s timely based on required quantity and quality. Clients should ensure that adequate funds are available before projects are started, so that the client can pay to contractors, consultant and purchase material in accordance with the contract agreement and specification.

3. Client disseminate all necessary information from the beginning of the project up to closure of the projects with contractors, consultants and tenants to secure deception among them and also build good communication channel.
4. Minimize red-tape; that is, minimize unnecessary and excessive bureaucratic procedures in the clients' organization.
5. Client triggers their regular monitoring and evaluation procedures to eliminate power interruption rise by involved practitioner.
6. The client or funding agency should ensure that adequate funds and other sources of funds are availablebefore construction work starts. This will ensure that, contractors are paid according to the contractagreement.
7. Secured foreign exchange rate to import construction materials that not available in domestic markets: hence avoid shortage of construction materials at the time of constructing that lead cost overruns due to delay.

5.3.2. For Consultants

Also consultants are one of the vital players in public housing program projects. Hence, Consultants should surveillance the progress of each building public housing program in accordance with the specification and design that approved by involved parties. Hence, consultant enables to take correction action on time; Consultant should evaluate the cost performance of each contractor on phases with respect to the performed work. Hence, minimize request of supplementary/ additional work, design change and change order on executing of the projects, facilitate and enforce the executor timely contractors requests are responses as needed, like – payment, request construction materials in terms of quantity and quality and should develop sense of ownership.

5.3.3. For Contractors

Contractors must hire well qualified skill manpower and eligible sub-contractors to minimize the cost overrun due to quality problem, Ensure efficient time to management and supervision through proper work break down planning, activity duration estimation, and schedule development and control to avoid delay and Resolve timely disputes and conflicts occurred during project progress among involved parties and workers.

Generally:-

From the findings of this research, the following recommendations are provided to ensure that cost overruns on future projects are avoided or minimized.

1) The executer or owner of the housing program should give sufficient time to approval of drawing, design and site preparation work.
2) Comprehensive site investigation should be carried out at the design phase of the project in order to avoid variations (additions and omissions) that are likely to occur during construction.
3) As much as possible, all design discrepancies and errors as well as omission in design work must be completed with clearly defined scope of work before construction starts.
4) The client or funding agency should ensure that adequate funds and other sources of funds are available before construction work starts.
5) Government must help stabilize the cedi against the major trading currencies. This will eventually help keep prices of materials and labor stable.
6) Proper and realistic approximate estimates should be obtained for all provisional items during the construction phase.
7) All parties to the contract should ensure that they abide by the rules of the contract to avoid undue delays to the project. The contractor should be carefully monitored to avoid possible lapses that he can hijack to his advantage to delay the current and probable future projects.
8) There should be continuous co-ordination and direct communication between the parties to the contract.
9) Measures must be put in place to reduce construction costs, since this is one way of reducing potential cost overrun.
10) The selection of a contractor should be based on expertise, financial standing, capacity and experience and not merely on the basis of price and time offerings as well as fraternal acquaintances.
11) Efficient management of time through proper resource planning, duration estimating, cost control and constructing programming must be ensured to avoid delay and hence, to avoid cost overrun due to delay

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A research questions prepared

To

ASSESS THE MAIN CONTRIBUTING FACTORES OF COST OVERRUN IN THE CASE OF 20/80 HOUSING PROGRAM OF ADDIS ABABA CITY ADMINSTRATION

Addis Ababa University (A/A.U)

College of business and economics

School of Graduates Studies

Masters of Project Management (MBA)

YOHANNES ADAMU GSE/0120/08

April, 2010 E.C

ADDIS ABABA, ETHIOPIA

Addis Ababa University (A/A.U)

College of business and economics

School of Graduates Studies

Masters of Project Management (MBA)

Questionnaire filled by clients (executor), consultants and contractors

Dear respondents

The purpose of preparing these questionnaires is to carry out a research on the topic of **"The main contributing factors of cost overrun in the case of 20/80 housing program of Addis Ababa city Administration",** for partial fulfillment of the requirement for Masters of degree in Project Management (MBA). The research focus on Addis Ababa City Administration public housing programs, especially 20/80 housing projects constructed from 2011-2015, with The main causes of cost overrun, frequency and impacts in the housing construction projects. Hence, to gather the information, I kindly request your assistance in responding to the questions listed below. Any information you present will be kept absolutely confidential and will only be used to academic purpose. Your cooperation and prompt will be highly appreciated.

"Thank you very much in advance"

Yohannes Adamu

(Graduating student)

N.B:

- Writing your name is not necessary.
- Please tick your choose appropriate to the box.
- If you have any suggestion, question or confusion on the listed question, you can list out at last page of the questionnaire.

1. Gender of the respondent

a. Male

b. Female

2. Your Educational background?

a. Diploma holder

b. Degree holder

c. MSC/ MA holder

d. PhD holder

3. Your professional job?

a. Clients (executor of the project)

b. Consultants

c. Contractors

4. How many years do you have work experience on governmental housing construction projects? ----------.

5. How many 20/80 housing sites you are undertaking up to now? ----------

6. Have you taken 20/80 housing scheme from Addis Ababa City Administration housing Projects? **(Fill by only consultants and contractors)**----------

7. Do you have an experience on other housing projects? ------ If yes, which one?**(Fill by only consultants and contractors)**

a. 10/90 housing scheme

b. 40/60 housing scheme

8. What your opinion about the types of bidding procedures is frequently implemented in your office? **(Fill by only clients or executor)**

a. Fixed

b. Open bid

c. Selective bid or other ----------

9. What your opinion about main causes of cost overrun in governmental public housing construction projects are listed below? And also who is blamed?

No.	Hypothesized Variables of Cost Overrun	Choose for respondents					Responsible parties			
		strongly Disagreed (5)	Don't Agree (4)	Neutral (3)	Agreed (2)	Strongly agreed (1)	Client/ government	Contractors	Consultants	Others
1.	Material cost increased by inflation									
2.	Labor cost increased									
3.	Lack of experience of project location									
4.	Unpredictable weather condition									
5.	Selection of incompetent contractor's and consultants									
6.	Change in foreign exchange rate/ for imported materials									
7.	Design change /change of work scope/									
8.	Supplementary / additional work									
9.	Payment delay for contractors									
10.	Materials procurement									
11.	Contractors financial difficulties									
12.	Inadequate / deficiency in planning , scheduling & coordination									
13.	Owner's / executor financial difficulties									
14.	Change order /rework/									
15.	Excess quantity during construction									
16.	Poor site management & supervision									
17.	Incorrect / inappropriate methods of cost estimation									
18.	Project materials monopoly by some suppliers									
19.	Delay preparation & approval of drawing									
20.	Incomplete design at the time of tender									
21.	Inaccurate quantity take-off									
22.	Governmental bureaucratic procedures									
23.	Unavailability of competent staff									
24.	Material shortage in the local market									
25.	Power interruption									

10. What your opinion about possibility of occurrence/ frequency of main causes of cost overrun in governmental 20/80 public housing construction projects in one project execution processes ?

No.	Hypothesized Cause s of Cost Overrun	Likelihood Occurrence in One Project Execution				
		No/ frequency (1)	Slight (2)	Moderate (3)	High (4)	Extremely (5)
1.	Material cost increased by inflation					
2.	Labor cost increased					
3.	Lack of experience of project location					
4.	Unpredictable weather condition					
5.	Selection of incompetent contractor's and consultants					
6.	Change in foreign exchange rate/ for imported materials					
7.	Design change /change of work scope/					
8.	Supplementary / additional work					
9.	Payment delay for contractors					
10.	Materials procurement					
11.	Contractors financial difficulties					
12.	Inadequate / deficiency in planning , scheduling & coordination					
13.	Owner's / executor financial difficulties					
14.	Change order /rework/					
15.	Excess quantity during construction					
16.	Poor site management & supervision					
17.	Incorrect / inappropriate methods of cost estimation					
18.	Project materials monopoly by some suppliers					
19.	Delay preparation & approval of drawing					
20.	Incomplete design at the time of tender					
21.	Inaccurate quantity take-off					
22.	Governmental bureaucratic procedures					
23.	Unavailability of competent staff					
24.	Material shortage in the local market					
25.	Power interruption					

11. What your opinion about the impacts of the main causes of cost overrun in governmental 20/80 public housing construction projects?

No.	Hypothesized Causes of Cost Overrun	**Negative Impacts in One Project Execution**				
		Not Significant (5)	**Slightly Significant (4)**	**Moderately Significant (3)**	**Significant (2)**	**Very Significant (1)**
1.	Material cost increased by inflation					
2.	Labor cost increased					
3.	Lack of experience of project location					
4.	Unpredictable weather condition					
5.	Selection of incompetent contractor's and consultants					
6.	Change in foreign exchange rate/ for imported materials					
7.	Design change /change of work scope/					
8.	Supplementary / additional work					
9.	Payment delay for contractors					
10.	Materials procurement					
11.	Contractors financial difficulties					
12.	Inadequate / deficiency in planning , scheduling & coordination					
13.	Owner's / executor financial difficulties					
14.	Change order /rework/					
15.	Excess quantity during construction					
16.	Poor site management & supervision					
17.	Incorrect / inappropriate methods of cost estimation					
18.	Project materials monopoly by some suppliers					
19.	Delay preparation & approval of drawing					
20.	Incomplete design at the time of tender					
21.	Inaccurate quantity take-off					
22.	Governmental bureaucratic procedures					
23.	Unavailability of competent staff					
24	Material shortage in the local market					
25.	Power interruption					

12. Please list some effects that occurred in 20/80 housing construction projects due to cost overrun?

    ……
    ……
    ……

13. If you have further comments, please indicate in the space provided below.

……

……